

The Premier Website for K-12 Science Teachers

>> sciencenetlinks.com <<



Science NetLinks is a **FREE** science education resource produced by the American Association for the Advancement of Science. At Science NetLinks, you'll find teaching tools, interactives, podcasts, hands-on activities, and more!

Who is it for?

Science NetLinks provides K-12 teachers, students, and families with quality resources for teaching and learning science.

How do I use it?

All of the resources are available on the web and free to everyone. Lessons and activities can be printed or used online. Many of the interactives, esheets, videos and tools work great on a white board, mobile tablet, or in a computer lab. All of the resources are designed to be delivered in a variety of formats and classroom settings.

Thinkfinity

Science NetLinks is part of Thinkfinity, a partnership between the Verizon Foundation and 10 premier educational organizations, including AAAS.

For the latest in engaging activities and outstanding science resources visit sciencenetlinks.com today!

NSF Robert Noyce Teacher Scholarship Program Conference

*Building Connections for Revitalizing
STEM Education in High Need Schools*

June 18-20, 2014

Renaissance Washington DC Hotel

Co-hosted by

American Association for the Advancement of Science (AAAS)
Education and Human Resources Program (EHR)

and

National Science Foundation (NSF) Division of Undergraduate Education (DUE)



ADVANCING SCIENCE, SERVING SOCIETY

NSF Grants DUE-1138038 and DUE-1415932

©AAAS 2014

ISBN 978-0-87168-759-3

Conference Program Editors:

Yolanda S. George, AAAS, Education and Human Resources Programs

Donna Behar, AAAS, Education and Human Resources Programs

Nicole Davies, AAAS, Education and Human Resources

Conference Program Cover Design: Ann Williams, AAAS, Education and Human Resources Programs

Conference Program Design: Donna Behar, AAAS, Education and Human Resources Programs

Abstracts published in this program reflect the individual views of the authors and not necessarily that of AAAS, its Council, Board of Directors, Officers, or the views of the institutions with which the authors are affiliated. Presentation of ideas, products, or publications at AAAS' meetings or the reporting of them in news accounts does not constitute endorsement by AAAS.

CONTENTS

About the NSF Robert Noyce Teacher Scholarship Program	6
About the American Association for the Advancement of Science (AAAS)	6
Conference Agenda.....	7-8
Biographies	9-12
Workshop Abstracts (<i>By Session</i>).....	13-34
Hotel Floor Plans	35
Washington DC Subway System Map	36
PI Poster Abstracts (<i>Alphabetized by Institution</i>).....	A1-A65
Noyce Scholar/Fellow Poster Abstracts (<i>Alphabetized by Institution</i>)	A66-A78
Poster Abstract Index	A79-A83

The National Science Foundation (NSF) Robert Noyce Teacher Scholarship Program

The Robert Noyce Teacher Scholarship Program, first authorized under the National Science Foundation Authorization Act of 2002 (P.L. 107-368) and reauthorized in 2007 under the America COMPETES Act (P.L. 110-69) and the America COMPETES Reauthorization Act of 2010 (P.L. 111-358) responds to the critical need for K-12 teachers of science, technology, engineering, and mathematics (STEM) by encouraging talented STEM students and professionals to pursue teaching careers in elementary and secondary schools.

The program provides funding to institutions of higher education to provide scholarships, stipends, and programmatic support to recruit and prepare STEM majors and professionals to become K-12 teachers. The program seeks to increase the number of K-12 teachers with strong STEM content knowledge who teach in high-need school districts. For that reason scholarship and stipend recipients are required to complete two years of teaching in a high-need school district for each year of support.

In addition, the program supports the recruitment and development of NSF Teaching Fellows, STEM professionals who complete Master's degrees leading to teacher certification and then receive salary supplements while fulfilling a 4-year teaching requirement in a high-need school district. It also supports the development of NSF Master Teaching Fellows by providing professional development and salary supplements for current STEM

teachers with leadership potential while they are teaching for five years in a high-need school district.

A goal of the Noyce program is to recruit individuals with strong STEM backgrounds who might otherwise not have considered a career in K-12 teaching. The program seeks to inspire institutions of higher education to develop and sustain a culture where successful STEM students, including those of the highest achievement and ability, are encouraged and supported when they express a desire to pursue K-12 teaching careers in mathematics and science.

The Noyce program addresses the goal established by the President's Council of Advisors on Science and Technology, "of ensuring over the next decade the recruitment, preparation, and induction support of at least 100,000 new STEM middle and high school teachers who have strong majors in STEM fields and strong content-specific pedagogical preparation, by providing vigorous support for programs designed to produce such teachers." (PCAST, 2010).

By supporting the recruitment and preparation of strong STEM teachers who will teach in high-need school districts, serving diverse student populations, the program supports the *NSF Strategic Plan for 2011-2016* performance goal to "Prepare and engage a diverse STEM workforce motivated to participate at the frontiers." The Noyce program supports the role of NSF as central to discovering, studying, and promoting pathways for STEM teacher education through research and development.

The American Association for the Advancement of Science (AAAS)

The American Association for the Advancement of Science is an international non-profit organization dedicated to advancing science around the world by serving as an educator, leader, spokesperson and professional association. In addition to organizing membership activities, AAAS publishes the journal *Science*, <http://www.sciencemag.org/>, as well as many scientific newsletters, books and reports, and spearheads programs that raise the bar of understanding for science worldwide.

AAAS was founded in 1848, and includes some 261 affiliated societies and academies of science, serving 10 million individuals. *Science* has the largest paid circulation of any peer-reviewed general science journal in the world, with an estimated total readership of one million. The non-profit AAAS is open to all and fulfills its mission to "advance science and serve society" through initiatives in science policy; international programs; science education; and more. For the latest research news, log onto EurekAlert!, <http://www.eurekalert.org/>, the premier science-news website, a service of AAAS.

Membership and Programs

Open to all, AAAS membership includes a subscription to *Science*. Four primary program areas fulfill the AAAS mission:

- Science and Policy
- International Activities
- Education and Human Resources
- Project 2061

AAAS Mission

AAAS seeks to "advance science, engineering, and innovation throughout the world for the benefit of all people." To fulfill this mission, the AAAS Board has set these broad goals: enhance communication among scientists, engineers, and the public; promote and defend the integrity of science and its use; strengthen support for the science and technology enterprise; provide a voice for science on societal issues; promote the responsible use of science in public policy; strengthen and diversify the science and technology workforce; foster education in science and technology for everyone; increase public engagement with science and technology; and advance international cooperation in science. Visit the AAAS website at <http://www.aaas.org/>.

WEDNESDAY, JUNE 18, 2014

- 3:30 pm - 5:00 pm **Museum Tours for Scholars and Fellows (optional)**
(Grand Ballroom Registration)
- 4:30 pm - 5:30 pm **New Awardees Session with the National Science Foundation (NSF)**
(Renaissance Ballroom East)
- Joan Prival, Noyce Lead Program Director, Division of Undergraduate Education (DUE), NSF**
- Noyce Monitoring System**
Maggie Carlin, ICF International
Patrick Higgins, ICF International
Michael Hooks, ICF International
- 7:00 pm - 10:00 pm **Registration**
(Grand Ballroom Registration)

Poster Setup
(Renaissance Ballroom)

THURSDAY, JUNE 19, 2014

- 7:00 am - 8:00 am **Registration**
(Grand Ballroom Registration)
- Poster Setup**
(Renaissance Ballroom)
- Continental Breakfast**
(Grand Ballroom)
- 8:00 am - 9:00 am **Opening and Welcome:**
(Grand Ballroom)
- Joan Prival, Noyce Lead Program Director, DUE, NSF**
- Joan Ferrini-Mundy, Assistant Director, Directorate for Education and Human Resources, NSF**
- Alan I. Leshner, Chief Executive Officer, AAAS, and Executive Publisher, Science**
- The Honorable Chaka Fattah, U.S. House of Representatives, Pennsylvania's 2nd Congressional District**

9:15 am - 10:30 am **Concurrent Workshops: Session I**
(Meeting Rooms— Meeting Room Level. See *handout for workshop room assignments.*)

10:45 am - 11:45 am **Panel: Voices from the Field**
(Grand Ballroom)

Moderator:
Rebecca Sansom, Albert Einstein Distinguished Educator Fellow, NSF

Panelists: (Scholars and Fellows)
Karen Cheng, L&N STEM Academy, Knoxville, TN
Albana Kume-Robertson, Bay View Middle and High School, Milwaukee Public Schools, Milwaukee, WI
Tami May, Semmes Middle School, Mobile County Public Schools, Mobile, AL
Shannon Muramoto, El Modena High School, Orange Unified School District, Orange, CA
Stephanie Sanders, East Central High School, East Central ISD, San Antonio, TX
Caroline Stone, Skyline High School, Dallas ISD, Dallas, TX
Rachel Taylor, Williamsburg High School for Architecture and Design, New York City Public Schools, New York, NY

12:00 pm - 1:30 pm **Lunch and Keynote**
(Grand Ballroom)

Keynote:
"Strategies for Creating an Inclusive STEM Classroom"

Introduction:
Yolanda S. George, Deputy Director, Education and Human Resources (EHR), AAAS

Keynote Speaker:
Robert W. Simmons, III, Associate Professor, Teacher Education Department, Director, Center for Innovation in Urban Education

1:30 pm - 2:45 pm **Poster Session 1**
(Renaissance Ballroom)

AGENDA

3:00 pm - 4:15 pm **Concurrent Workshops: Session II**
(Meeting Rooms– Meeting Room Level.
See handout for workshop room
assignments.)

4:30 pm - 5:45 pm **“Effective Use of Multimedia in
Science and Mathematics Classes”
(Grand Ballroom)**

Moderator:
Keith A. Sverdrup, Program Director,
DUE, NSF

Speaker:
Derek Muller, Science Educator,
Communicator, and Filmmaker

6:00 pm - 7:30 pm **Poster Session 2**
(Renaissance Ballroom)

Reception and Networking
(Grand Ballroom North/Central)

8:30 pm **Remove Posters**
(Renaissance Ballroom)

FRIDAY, JUNE 20, 2014

7:00 am - 8:00 am **Continental Breakfast**
(Grand Ballroom)

8:00 am - 9:00 am **Plenary Session**
(Grand Ballroom)

**“Preliminary Findings from the Noyce
Program Evaluation and Possible
Future Directions for a National
Evaluation of the Noyce Program”**

Moderator:
Connie K. Della-Piana, Program
Director, DUE, NSF

Noyce Program Evaluation
Ellen Bobronnikov, Abt Associates, Inc.
Cristofer Price, Abt Associates, Inc.
Beth Gamse, Abt Associates, Inc.
Amanda Parsad, Abt Associates, Inc.
Radha Roy, Abt Associates, Inc.
Melissa Velez, Abt Associates, Inc.

9:10 am - 10:25 am **Concurrent Workshops - Session III**
(Meeting Rooms– Meeting Room Level.
See handout for workshop room
assignments.)

10:35 am - 11: 50 am **Concurrent Workshops - Session IV**
(Meeting Rooms– Meeting Room Level.
See handout for workshop room
assignments.)

12:00 pm - 12:45 pm **Closing Remarks**
(Grand Ballroom)

Shirley M. Malcom, Director, EHR,
AAAS

France A. Cordova, Director, NSF

Joan Prival, Noyce Lead Program
Director, DUE, NSF

12:45 pm **Conference Adjourns**

1:00 pm - 2:30 pm **Museum Tours for Scholars and
Fellows (optional)**
(Grand Ballroom Registration)



France A. Córdoba, *Director, NSF*

France A. Córdoba was sworn in as director of the National Science Foundation (NSF) on March 31, 2014. Nominated by President Barack Obama to head the \$7.2-billion independent federal agency, she was confirmed by the U.S. Senate on March 12, 2014. Córdoba leads the only government science agency charged with advancing all fields of scientific discovery, technological innovation, and science, technology, engineering and mathematics (STEM) education. NSF's programs and initiatives keep the United States at the forefront of science and engineering, empower future generations of scientists and engineers, and foster U.S. prosperity and global leadership.

Córdoba is president emerita of Purdue University, where she served as president from 2007 to 2012. From 2002 to 2007, she led the University of California, Riverside, as chancellor and was a distinguished professor of physics and astronomy. Córdoba was the vice chancellor for research and professor of physics at the University of California, Santa Barbara, from 1996 to 2002.

From 1993 to 1996, Córdoba served as NASA's chief scientist. Prior to joining NASA, she was on the faculty of the Pennsylvania State University where she headed the department of astronomy and astrophysics from 1989 to 1993. Córdoba was deputy group leader in the Earth and Space Sciences division at Los Alamos National Laboratory from 1988 to 1989 and staff scientist from 1979 to 1989. She received her Bachelor of Arts degree from Stanford University and her doctorate in physics from the California Institute of Technology in 1979.

More recently, Córdoba served as chair of the Board of Regents of the Smithsonian Institution and on the board of trustees of Mayo Clinic. She also served as a member of the National Science Board (NSB), where she chaired the Committee on Strategy and Budget. As NSF director, she is an ex officio member of the NSB.

Córdoba's scientific contributions have been in the areas of observational and experimental astrophysics, multi-spectral research on x-ray and gamma ray sources and space-borne instrumentation. She has published more than 150 scientific papers. In 1997, she was awarded an honorary doctorate by Loyola Marymount University, Los Angeles. She is a recipient of NASA's highest honor, the Distinguished Service Medal, and was recognized as a Kilby Laureate in 2000. The Kilby International Awards recognize extraordinary individuals who have made "significant contributions to society through science, technology, innovation, invention and education." Córdoba was elected to the American Academy of Arts and Sciences and is a National Associate of the National Academies. She is also a fellow of the American Asso-

ciation for the Advancement of Science (AAAS) and the Association for Women In Science (AWIS).

She is NSF's 14th director, succeeding Subra Suresh who stepped down in March 2013.

Córdoba is married to Christian J. Foster, a science educator, and they have two adult children.



The Honorable Chaka Fattah, *U.S. House of Representatives, Pennsylvania's 2nd Congressional District*

Congressman Chaka Fattah is a senior member of the House Appropriations Committee. This committee is responsible for setting spending priorities for over \$1 trillion in annual discretionary funds. Congressman Fattah is Ranking Member on the Subcommittee on Commerce, Justice, Science and related agencies (CJS). The Subcommittee on CJS oversees close to \$51 billion in discretionary spending including the Commerce and Justice Departments, NASA, NOAA and the National Science Foundation. Fattah is also Chair of the Congressional Urban Caucus, a bipartisan group of Members representing America's metropolitan centers. These Members work collaboratively with other stakeholders to address the unique challenges facing America's urban communities. Some of his major achievements include:

- Fattah Neuroscience Initiative - In December 2011 the Office of Science and Technology Policy (OSTP) was directed by Congress to establish an Interagency Working Group on Neuroscience (IWGN). The IWGN, housed at the White House, was chartered on June 20, 2012 and is currently convening representatives across the Federal government to make recommendations about the future of neuroscience research.
- Congressman Fattah is also partnering with the American Association for the Advancement of Science (AAAS) to host a series of congressional briefings educating Members of Congress and their staff about current neuroscience research. Topics presented thus far have included infant brain development and mental illness in young adults.
- Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) – Congressman Fattah is the architect of the nation's largest and most successful college readiness and access program. Over the past 12 years, GEAR UP has received more than \$4 billion in federal funds and currently serves some 12 million students from sixth to 12th grades in 49 states, Puerto Rico, the District of Columbia, and U.S. territories. GEAR UP serves as an international model to aid underserved students in their preparation and pursuit of a college education.

- Student Aid and Fiscal Responsibility Act – an early proponent and strong advocate for the greatest expansion in college access since the creation of the federal student loan and Pell Grant programs. This law invests \$36 billion over 10 years to increase the maximum annual Pell Grant to \$5,975 by 2017, provide \$2.5 billion for Historically Black Colleges and Universities and Minority-Serving Institutions and \$2 billion for community colleges. The bill also provides for loan forgiveness after 10 consecutive years in government or nonprofit work or after 20 years of payments, and it strengthens Income Based Repayment to reduce graduate debt loads and expand career options. Additionally, the bill invests \$750 million to promote support for students with college application, college retention and financial literacy programs in the College Access and Completion Grant Program, an initiative similar to GEAR UP.

Chaka Fattah is serving in his 10th term in the U. S. House of Representatives. Before his election to United States Congress in 1994, Fattah served six years as a Representative in the State House followed by six years as a State Senator.

In May of 1986, Congressman Fattah earned a Master's degree in Governmental Administration from the University of Pennsylvania, Fels Institute of Government.

Fattah is the recipient of numerous honors and awards including 10 honorary doctorates and the University of Pennsylvania's Fels Institute of Government Distinguished Alumni Achievement Award. Time Magazine named Fattah one of the 50 most promising leaders in the country.



Joan Ferrini-Mundy, *Assistant Director, Directorate for Education and Human Resources, NSF*

Joan Ferrini-Mundy began her career as a high school mathematics teacher, and received her BS in mathematics education and an MS in mathematics from the University of New Hampshire, where she completed her PhD in mathematics education in 1980. She taught mathematics and co-founded the Summer-Math for Teachers program at Mount Holyoke College, and served on the mathematics faculty at the University of New Hampshire from 1983 through 1999. From 1999 through 2010 she was at Michigan State University, serving as Associate Dean for Science and Mathematics Education in the College of Natural Science. Joan was a faculty member in the MSU departments of mathematics and teacher education, and was named a University Distinguished Professor of Mathematics Education. Ferrini-Mundy has had a number of public policy-related positions, including as Director of the Mathematical Sciences Education Board at the National Research Council (1995-1999),

and in various positions at the National Science Foundation (program officer in Teacher Preparation and Enhancement, 1989-91; and inaugural director, Division of Research on Learning in Formal and Informal Settings, 2007 – 2010). Currently Ferrini-Mundy is the NSF Assistant Director for Education and Human Resources, a position she has held since 2011, serving as a member of the U.S. Government Senior Executive Service.

Ferrini-Mundy was an ex officio member of the President's National Mathematics Advisory Panel, and co-chaired its Instructional Practices Task Group (2007-08). She was co-chair of the Federal Coordination in STEM Education Task Force which produced the 2013 *Federal Science, Technology, Engineering, and Mathematics (STEM) Education 5-Year Strategic Plan*. She has been a member of the Board of Directors of the National Council of Teachers of Mathematics, the Board of Governors of the Mathematical Association of America, and the American Mathematical Society's Committee for Research in Undergraduate Mathematics Education. She was president of the organization *Women and Mathematics Education*. Her research interests include calculus teaching and learning, mathematics teacher learning, and STEM education policy.



Yolanda S. George, *Deputy Director, Education and Human Resources, AAAS*

Yolanda Scott George is Deputy Director and Program Director, Education and Human Resources Programs, American Association for the Advancement of Science (AAAS). She has served as Director of Development, Association of Science-Technology Centers (ASTC), Washington, DC; Director, Professional Development Program, University of California, Berkeley, CA; and as a research biologist at Lawrence Livermore Laboratory, Livermore, California involved in cancer research and cell cycle studies using flow cytometer and cell sorters.

George conducts evaluations, workshops and reviews for the National Institutes of Health and National Science Foundation, as well as for private foundation and public agencies, including the European Commission. She develops and coordinates conferences and workshops related to STEM undergraduate reform and recruitment and retention of minorities, women, and persons with disabilities in STEM. She works with UNIFEM, UNESCO, L'Oreal USA and Paris, and non-governmental organizations on gender, science, and technology initiatives related to college and university recruitment and retention and women leadership in STEM.

She currently serves as principal investigator (PI) or co-PI on several National Science Foundation (NSF) grants, including Vision and Change in Undergraduate Biology Education; National

Science Education Digital Library (NSDL) Biological Sciences Pathways; Historically Black Colleges and Universities-Undergraduate Programs (HBCU-UP); Robert Noyce Teacher Scholarship Program; Transforming Undergraduate Education in STEM (TUES) and Virtual Faculty Workshop; and Women's International Research Collaborations at Minority Serving Institutions. In addition, George is the lead AAAS staff person for the L'Oréal USA Fellowships for Women in Science Program (postdoctoral fellowships) and the David and Lucile Packard Foundation HBCU Graduate Scholars Program (graduate school fellowships).

George serves on a number of boards or committees, including: Maria Mitchell Women in Science Awards Committee; McNeil/Lehrer Productions Online Science Reports Advisory Committee; Burroughs Wellcome Fund, Science Enrichment Program Grants, Advisory Board; The HistoryMakers, ScienceMakers, Advisory Board; and the National Advisory Board of The American Physical Society Physics Bridge Program. She has authored or co-authored over 50 papers, pamphlets, and hands-on science manuals. She received her B.S. and M.S. from Xavier University of Louisiana and Atlanta University in Georgia, respectively.



Alan I. Leshner, *Chief Executive Officer, AAAS, and Executive Publisher, Science*

Alan I. Leshner has been Chief Executive Officer of the American Association for the Advancement of Science and Executive Publisher of the journal *Science* since December 2001. AAAS (triple A-S) was

founded in 1848 and is the world's largest, multi-disciplinary scientific and engineering society.

Before coming to AAAS, Leshner was Director of the National Institute on Drug Abuse (NIDA) from 1994-2001. One of the scientific institutes of the U.S. National Institutes of Health, NIDA supports over 85% of the world's research on the health aspects of drug abuse and addiction.

Before becoming Director of NIDA, Leshner had been the Deputy Director and Acting Director of the National Institute of Mental Health. He went to NIMH from the National Science Foundation (NSF), where he held a variety of senior positions, focusing on basic research in the biological, behavioral and social sciences, science policy and science education.

Leshner went to NSF after 10 years at Bucknell University, where he was Professor of Psychology. He has also held long-term appointments at the Postgraduate Medical School in Budapest, Hungary; at the Wisconsin Regional Primate Research Center; and as a Fulbright Scholar at the Weizmann Institute of Science in Israel. Leshner is the author of a textbook on the relationship

between hormones and behavior, and has published over 150 papers for both the scientific and lay communities on the biology of behavior, science and technology policy, science education, and public engagement with science.

Leshner received an undergraduate degree in psychology from Franklin and Marshall College, and MS and PhD degrees in physiological psychology from Rutgers University. He also has been awarded six honorary Doctor of Science degrees. Leshner is an elected fellow of AAAS, the National Academy of Public Administration, the American Academy of Arts and Sciences, and many other professional societies. He is a member of the Institute of Medicine of the National Academies of Science and Vice-Chair of its governing Council. He was appointed to the National Science Board by President Bush in 2004 and reappointed by President Obama in 2011.



Shirley M. Malcom, *Director, Education and Human Resources, AAAS*

Shirley M. Malcom, Director for Education and Human Resources (EHR) Programs at AAAS, has served as a program officer in the NSF Science Education Directorate; an assistant professor of biology, University of North Carolina, Wilmington; and a high

school science teacher. Malcom received her PhD in Ecology from the Pennsylvania State University; Master's in Zoology from the University of California, Los Angeles; and Bachelor's with distinction in Zoology from the University of Washington. In addition, she holds 16 honorary degrees.

Malcom serves on several boards, including the Heinz Endowments, Public Agenda, Digital Promise, and the National Mathematics and Science Initiative. She serves as a trustee of Caltech and as a Regent of Morgan State University. In 2003, Malcom received the Public Welfare Medal of the National Academy of Science, the highest award granted by the Academy. She was a member of the National Science Board, the policymaking body of NSF, from 1994 to 1998, and of the President's Committee of Advisors on Science and Technology from 1994 to 2001.



Derek Muller, *Science Educator, Communicator, and Filmmaker*

Derek Muller is a passionate science educator, communicator, and filmmaker. He completed his bachelor's in Engineering Physics at Queen's University in Kingston, Canada and a PhD in Physics Education Research at the University of Sydney.

BIOGRAPHIES

Muller was always destined to return to Australia. Born in Traralgon, Victoria, he was transplanted to Vancouver, Canada at the tender age of two. But his first stuffed animal was a koala and his doona cover was the Australian flag. There was never any hope of him remaining in the great white north. After completing his undergraduate degree, he set out on his own to rediscover the land of his birth, burdened only by his North American accent.

Muller is a passionate science educator, communicator, and filmmaker. He completed his bachelor's in Engineering Physics at Queen's University in Kingston, Canada and a PhD in Physics Education Research at the University of Sydney. Muller studied how to design multimedia to teach physics effectively. One of his major findings is that addressing misconceptions first is often essential to engage the audience and promote conceptual change.

He puts this research into practice as a presenter for Catalyst and as director of the science video blog, *Veritasium*. Muller has published in several international science education journals and presented at numerous education conferences worldwide. He also teaches physics at the high school and university levels.



Robert W. Simmons, III, Associate Professor, Teacher Education Department, Director, Center for Innovation in Urban Education

A native of Detroit, Michigan, Robert W. Simmons III is the director of the Center for Innovation in Urban Education at Loyola University Maryland as well as an associate professor in the teacher education department in the School of Education and an affiliated faculty member in the African and African American studies program. Additionally, he is a member of the nationally recognized social justice collaborative *Ed-change*, and a contributor for *The Village Celebration*. A former middle school science teacher in the Detroit public schools, his teaching and administrative career in Detroit, Minnesota, and the Dominican Republic, included being nominated twice as the Walt Disney National Teacher of the Year and once for the Whitney and Elizabeth MacMillan Foundation Outstanding Educator Award. Additionally, Simmons has been part of a team of educators who started a STEM focused middle school for boys, a board member at one of the few public Montessori schools in an urban community, and the founder of a mentoring program for African American boys in Minnesota.

Simmons has been a fellow with the Woodrow Wilson Fellowship Foundation and participated in the Japan Fulbright Memorial Fund. He is a contributing author to the highly acclaimed books, *White Teachers/Diverse Classrooms: A Guide to Building*

Inclusive Schools, Promoting High Expectations, and Eliminating Racism (2006), and *White Teachers/Diverse Classrooms: Creating Inclusive Schools, Building on Students' Diversity, and Providing True Educational Equity* (2011). Much of his work explores the experiences of African American boys in public and Catholic schools, the teaching practices of African American male teachers utilizing hip hop in classrooms, urban education, and the role of race in understanding the social context of schooling. Simmons recently co-edited *Talking about Race: Alleviating the Fear* with Steve Grineski and Julie Landsman.

Session 1: Thursday, June 19, 2014
9:15am - 10:30am

1.1 The Amazing Race: An Adaptation for Student Learning and Assessment

Length of Session: 75 minutes

Shelton Ford, Fayetteville State University, sford2@uncfsu.edu
Jada Nealy, Fayetteville State University, Noyce Scholar, jnealy01@broncos.uncfsu.edu
Rayshawn Lockear, Fayetteville State University, Noyce Scholar, rlockle4@broncos.uncfsu.edu
Gabrielle Alexander-Lee, g.alexanderlee@yahoo.com, Fayetteville State University, Noyce Scholar

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers
Topic: Resources for Teachers

Come learn about an exciting adaptation of the hit TV show, "The Amazing Race," for student learning engagement. The Amazing Race activity provides a fun and energized student experience to assess mathematical learning. The intent is for two teams of students to complete a series of clues and be successful in finishing the race. The Amazing Race activity is a unique learning strategy to address 21st Century education. This activity allows teachers to make the mathematical content engaging, relevant, and meaningful to the student's lives. The Amazing Race is an energetic alternative to standardized assessment and serves as an evaluation tool. The Amazing Race is adaptable to fit all subjects and related projects to ensure collaborative learning and individual skill refinement. During the race, challenges are devised such as "Roadblocks" that participants execute along the way. These can be logical or physical challenges. This activity utilizes several teaching strategies such as differentiated learning, collaborative inquires, experimental learning. A school's campus can be used to facilitate the Amazing Race. Come participate and experience the fun you can expect from your students.

1.2 Incorporating the Common Core Standards in Mathematics: Two New Teacher's Journeys

Length of Session: 30 minutes

Shannon Muramoto, Cal State Fullerton, shannon.muramoto@gmail.com
Susanna Meza, Cal State Fullerton, MS Mathematics Teacher, szmuez@gmail.com

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, School and District Administrators
Topic: Resources for Teachers

This interactive session presents a discussion of the experience of two second-year teachers in incorporating the Common Core standards meaningfully into their everyday classroom activities.

1.3 This session includes two 30-minute presentations.

1.3a The Mysterious Death of Mr. Pheoc

Length of Session: 30 minutes

Adam Kresl, University of Wisconsin - Oshkosh, kresla@centurylink.net

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows
Topic: Resources for Teachers

This session highlights the personal stories, motivations, and support systems for career switchers who completed the Alternative Careers in Teaching program (act!). The act! program offers a flexible path for practicing scientists or mathematicians to become licensed secondary (grades 6-12) teachers in Wisconsin. act! is an alternative licensure program - individuals must have at least 5 years of work experience as practicing scientists or mathematicians to enter the program, and they can receive credit for prior learning in some cases. More than 600 individuals wishing to switch careers have contacted act! since 2006: 160 individuals have enrolled in this licensure only program, and 61 of those have received math or science teaching licenses. Participants in this session will hear from three former Noyce Scholars about why they choose to leave their careers as scientists and mathematicians to become professional educators, and from other act! students who have completed the program via Internet conferencing or through written testimonials. The range of personal, academic and financial supports needed in order to make this career change possible for act! students will be highlighted.

1.3b Classroom Strategies that Minimize Test Anxiety and Increase Students' Engagement

Length of Session: 30 minutes

Albana Kume-Robertson, act!Oshkosh, albana.kume@yahoo.it

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, School and District Adminis-

trators, Evaluators/Education Researchers
Topic: Resources for Teachers

When it comes to assessing and testing, students often become anxious, stressful, concerned about their performance, and sometimes less collaborative than in an usual lecture/lesson day. A friendly and “relaxing” environment where students are assessed is a key factor that positively influences their performance and increases their engagement and motivation.

The presentation focuses on some strategies that minimize the stress from assessments like games, creating posters, take home summaries or research for a certain topic, and student portfolios. Real examples supported by student’s work evidence, and pros/cons for each strategy will be discussed.

1.4 Understanding and Using Next Generation Science Standards

Length of Session: 75 minutes

Jo Ellen Roseman, Director of AAAS Project 2061

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers
Topic: Resources for Teachers

This workshop will highlight methods for evaluating curriculum materials in light of the Next Generation Science Standards (NGSS), including the Educators Evaluating the Quality of Instructional Products (EqUIP) rubric and Project 2061’s research-based curriculum materials analysis criteria. Participants will examine how a model unit integrates disciplinary core ideas, science practices, and crosscutting concepts and supports student learning.

1.5 Teacher Research Teams: New Model for Teacher Preparation, Induction, and Development

Length of Session: 60 minutes

Laurie Langdon, University of Colorado-Boulder, Laurie.Langdon@colorado.edu
Valerie Otero, University of Colorado-Boulder, Professor, Valerie.Otero@colorado.edu,
Carissa Marsh, University of Colorado-Boulder, Noyce Scholar, Carissa.Marsh@colorado.edu
Emma Carr, University of Colorado-Boulder, Noyce Scholar, Emma.Carr@colorado.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

This workshop highlights how sustained NSF Noyce funding has allowed University of Colorado-Boulder to build towards a new model that couples teacher preparation, induction, and professional development. In this model, teams of prospective, new, and veteran teachers engage in lesson study and classroom research as a way to address teaching and learning difficulties, study characteristics of instructional successes, and extract principles of teaching and learning from the experience. Teams are led by Master Teaching Fellows from our Streamline to Mastery program; Noyce scholars and new teachers (including former Noyce scholars) are supported through our Phase II scholarship grant. Collaboration occurs within teams, across communities of 2-3 teams, and with university researchers so that all participants contribute knowledge and develop from the experience. In our first full year of implementing Teacher Research Teams, we are learning the benefits and challenges of merging communities of prospective teachers and practicing teachers and are beginning to characterize what happens during TRT research meetings and what roles each participant plays within the team.

As we launch our Phase II Streamline to Mastery grant, we are working towards structures that provide master teachers, new teachers, and prospective teachers opportunities to learn and grow within their own communities while also engaging in team activities. This workshop will document our progression and where we are headed. Noyce scholars and teachers who have participated in the model will share their experiences, what they have learned, and their suggestions for improving the model.

1.6 This session includes two 30-minute presentations.

1.6a STEM Honors Summer Camp: Recruiting Scholars, Stoking High Schoolers' Enthusiasm

Length of Session: 30 minutes

Tim Howard, Columbus State University, thoward@ColumbusState.edu
Kerri Edgar, Columbus State University, Noyce Scholar, edgar_kerri@columbusstate.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators
Topic: Recruitment and Marketing Strategies

Now in its third year, the STEM Honors Summer Camp at Columbus State University forms a key component of CRAFT-STEM, the Robert Noyce Teacher Scholarship program at Columbus State University (NSF #1136356). The camp serves as a vehicle for recruiting university freshmen and sophomores (Noyce interns) to become secondary teachers, motivate high school students to pursue STEM majors and careers, and inform high school students about STEM related careers. In this workshop we will overview the structure of the camp, share details about forms and logistics of the camp, discuss how additional funds were raised to make camp participation free for the high school students, and review what we have learned from our assessments. About a third of our interns have taken coursework in the UTeach Columbus program, and about 9% have gone on to become Noyce scholars.

1.6b Community Engagement in Schools: Innovative Recruitment and Formative Experiences

Length of Session: 30 minutes

Austin Pryor, College of William and Mary, alpryo@wm.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel
Topic: Partnerships

This workshop will present an early experiences program that engages students in STEM teaching beginning as freshmen. The College of William and Mary's Phase II Noyce project features a partnership with the College's Office of Community Engagement (OCE) in the Division of Student Affairs. OCE's Education Programs engage over 300 university students weekly as volunteers in K-12 education settings. Through partnerships with local schools and neighborhoods, students from the College serve as tutors and mentors to improve the academic achievement of local low-achieving students. As our students engage with the community, they gain a deeper knowledge of educational issues and challenges expanding their understanding of the root causes of educational issues and increasing their overall impact and commitment to community.

In this workshop, we will review the use of these experiences as a recruitment tool to identify potential Noyce Scholars, and as an educational experience to provide our scholars with the knowledge, skills, and mindsets to be effective educators in high-need communities. We will show how the partnership further develops a pipeline of future educators with the drive and passion to work in high-need communities.

1.7 This session includes two 30-minute presentations.

1.7a Conceptions of Mentoring Among Science Teacher Mentors and Pre-service Teachers

Length of Session: 30 minutes

Sara Salloum, Long Island University-Brooklyn,
Sara.Salloum@liu.edu

Target Audience: Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff
Topic: Supporting New Teachers

The purpose of the study was to investigate both pre-service and mentor teachers, "conception of mentoring," which are meanings they associate with mentoring and what constitutes acts of mentoring in a science classroom. Conceptions of mentoring influence and determine mentoring practices and therefore can affect kinds of experiences both mentors and mentees encounter in the classroom.

A mentored classroom residency can be instrumental in preparing teachers for the demands of urban science teaching, thus the study also aimed to explore: (a) relationships between mentoring practices and conceptions of mentoring, and (b) mentoring practices identified as most useful in preparing preservice teachers as teachers of record. Semi-structured interviews and observation data were used to investigate conceptions of mentoring and mentoring practices. Semi-structured interviews were conducted with mentors and scholars at the end of the school year. School observations were used to observe mentoring practices and ways scholars and mentors interact in the classroom. Classroom observation data was used to create a profile with a smaller focus group (3 scholars and mentors).

The data was analyzed in the following ways: Analytic induction to discern emergent and common themes in conceptions of mentoring. Classroom observations analysis focused on discerning recurring mentoring practices and roles assumed by mentors and mentees. Roles that will be presented and discussed are modeling, co-teaching, observing, stepping in, and combinations of such roles. Progression of roles throughout the year will also be presented, specifically how shifting the roles allowed the scholars to take more ownership of their science teaching.

1.7b First Year Experience as a Noyce Teacher Scholar at Delaware State University

Length of Session: 30 minutes

Chanel Paul, Delaware State University,
chanelpaul09@gmail.com

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows

Topic: Supporting New Teachers

This presentation will describe what type of experience Noyce Teacher Scholars had at Delaware State University. As a first year teacher scholar, each scholarship recipient was required to attend three hour learning sessions one Saturday out of each month. This session will go into detail about each topic students were presented with in the seven workshops they attended. The ultimate goal in the end was for students to be able to construct and present a unit plan as if they were actually teaching their own class.

1.8 This is Not Your Grandfather's Geometry

Length of Session: 60 minutes

Jacqueline Sack, University of Houston Downtown,
sackj@uhd.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, Evaluators/Education Researchers
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The presentation will engage the audience in hands-on activities that require only intuitive understanding of important geometric concepts. The entire framework for the learning trajectory is founded on the Van Hiele Model of Geometric Thought (Van Hiele, 1976) in two respects: firstly, as a framework for concept development rapidly moving from Visual to Descriptive to Relational levels; and, secondly, as a learner-centered instructional tool. Beginning with isometric transformations learners use the underlying geometric structures as tools to construct and then develop extensive property knowledge of triangles and special quadrilaterals. These properties are then called upon to engage learners in deductive proof activities and in making sense of geometric measurement formulas, in particular, the Pythagorean Theorem, which seems to be a gatekeeper for so many learners as they progress through the high school mathematics curriculum.

This trajectory has been used successfully in a geometry course for pre-service secondary teachers that, through the Noyce pro-

ject, has allowed the presenter, a faculty member of the university's educator certification program, to co-teach with a mathematics professor. The course materials are available for all students to download and retain for future use when they become teachers.

1.9 Implementing a Successful Noyce Program - Our Story

Length of Session: 60 minutes

Viji K. Sundar, California State University Stanislaus,
Vsundar@csustan.edu

Tara Ribeiro, California State University Stanislaus, Program Manager, tribeoro@csustan.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

Topic: Project Management

In this workshop, the leadership team of the California State University, Stanislaus Robert Noyce Scholarship Program will cover all areas of program development and execution. It will be an A to Z guide for Noyce Program Directors and Administrative Personnel encompassing all facets of the program. The presenters will navigate you through some of the roadblocks that most awardees encounter in the successful implementation of the program. The workshop will focus on the following:

- Assembling Program Coordinating Team
- Scholarship Eligibility Criteria and Application Development
- Advertising Noyce Scholarship to prospective candidates
- Application Review Process and Recipient Selection
- Recipient Contracts - Scholar Expectations
- Billing for Non-Completers
- Scholar Orientation/ Annual Noyce Academy
- Required Activities and Professional Development
- Project Poster
- Program Reporting

1.10 Collegiality and Transformation: Spiraling the Quantitative Literacy Curriculum

Length of Session: 60 minutes

Ruth Cossey, Mills College, rcossey@mills.edu

Christine Aguzar, Mills College, Noyce Fellow, christine.aguzar@gmail.com

Ryan Cox, Mills College, Noyce Fellow, racox@mail.sfsu.edu

Zubin Hu, Mills College, Noyce Fellow, zhu@mills.edu

Lily Jefferies, Mills College, Noyce Fellow, lilyjefferies@gmail.com

Steve Luntz, Mills College, Faculty Supervisor of Noyce Student Teaching, sluntz@earthlink.net
 Kimberly Padua, Mills College, Noyce Fellow, kimberlypadua@gmail.com
 Lauren Stoll, Mills College, Noyce Fellow, laurenkstoll@gmail.com

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Spiral Curriculum project we experienced at Mills College is one model for teachers to collaborate in curricular development and gradually deepened student learning across subject areas and grade levels. For this session we explore a STEM spiral curriculum example: an interdisciplinary exploration of the long-term goal of quantitative literacy. Foundational for engaged global citizenship is development of quantitative literacy as indicated by the Association of American College & Universities, CCSS and NGSS. Students competent in working with numerical data have the ability to reason about and solve quantitative problems across many contexts. They understand, critique and make claims supported by evidence and they can communicate in many formats including words, tables and equations.

As new teachers, we recognize the value of working together to develop a coherent, potentially transformative set of learning experiences for our student's experiences that intentionally build on one another so that the content learning experiences of the classrooms from which our students come, and to which they will go are connected. By contrast, a fragmented, repetitive curriculum make it difficult for students to develop a solid foundation of core ideas and skills. As new teachers we also recognize the difficulty of continuing our current collaborations and building new ones as we move out of the university into full time teaching. Join us in a discussion of the benefits, limitations and challenges such collegial efforts hold for the teaching and learning that goes on in our teacher preparation programs and in our STEM secondary classrooms.

1.11 This session includes two 30-minute presentations.

1.11a Who's Teaching Our Nation's High School Science Disciplines

Length of Session: 30 minutes

Brendan Callahan, Kennesaw State University (KSU), bcallah7@kennesaw.edu
 David Rosengrant, KSU, Co-PI, drosengr@kennesaw.edu

Yolanda Payton, KSU, Noyce Teaching Fellow, yjones7@kennesaw.edu
 Gene Ray, KSU, Project Staff, hray8@kennesaw.edu
 Samuel Polizzi, KSU, Project Staff, spolizzi@kennesaw.edu
 Greg Rushton, KSU, PI, grushton@kennesaw.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers
Topic: Research and Evaluation

Kennesaw State University (KSU) has been awarded five Noyce projects to recruit, prepare and retain STEM educators in K-12 teaching careers. Unique among Noyce granted institutions, KSU initiatives identify distinct STEM teacher disciplines with projects in physics/chemistry (3), biology (1) and math (1). Informing this targeted approach is our analysis of the US Schools and Staffing Survey (SASS). By performing a longitudinal analysis of seven teacher surveys spanning 1987-2011, and disaggregating the data into STEM disciplines, we examine the extent to which teacher populations can be treated as homogeneous with the remaining STEM and nonSTEM teacher workforce. While some STEM fields display similar trends in gender, race, age and experience, disaggregation reveals discipline-specific changes in the teacher workforce.

Our data indicate that approximately 70% of all chemistry teachers surveyed did not hold a chemistry degree at any level. Over the same period, we observe a large increase in biology teacher numbers and out-of-discipline teaching assignments. Physics contrasts other STEM disciplines by maintaining a higher proportion of male teachers and less racial diversity. We also find a stratification of math teacher experience that aligns with the sequence of math sub-disciplines, such that inexperienced teachers are more likely to be assigned algebra and senior teachers are more likely to teach calculus. Disaggregation of teacher disciplines is a crucial step in dispelling the 'diffusion of responsibility' associated with the aggregate STEM movement. Once trends specific to a stakeholder community have been identified, implications for targeted policies and (Noyce) programs can be discussed.

1.11b Evaluating Fellows' Trajectories and Teaching Practices Beyond Required Service

Length of Session: 30 minutes

William Zahner, Assistant Professor, Boston University
 Robert Afonso, Graduate Student, Boston University
 Suzanne Chapin, Professor, Boston University

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers
Topic: Research and Evaluation

This workshop will share methods and data from years one and two of a three year longitudinal study that tracks mathematics teachers supported by Boston University's Noyce Scholarship Programs. The career trajectories and teaching practices of Noyce program alumni are compared with those of mathematics teachers from the local Teach for America (TFA) program. The Noyce Fellows were recruited because they had STEM majors, and they followed a traditional pathway into teaching by completing a one-year master's and certification program. The TFA teachers were recruited, placed in schools, trained, and certified by TFA. However, during their program they also took some education courses at the same university as the Noyce Fellows. Data sources for the evaluation include a survey of alumni from both programs, samples of tasks submitted by inservice Noyce teachers, and observations. This workshop will focus on results from the survey, including a discussion of recruitment and retention differences between the two programs. We will also present preliminary results from survey items using illustrations of practice that were designed to elicit teachers' orientations to teaching and mathematics.

1.12 From a Bare "STEM" (Teacher) to a Fruitful Tree

Length of Session: 30 minutes

Brooke Busbee, Stephen F. Austin State University, aibrookie@hotmail.com
Alexa Dutton, SFASU Noyce Scholar, lexdutt@hotmail.com
Hannah Mattson, SFASU Noyce Scholar, hmattson111@gmail.com

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Talented Teachers in Training for Texas (T4) offers STEM scholars, seedlings, a nurturing community full of opportunities to prepare them for their future classrooms. Hear the scholars' perspectives about how these opportunities have borne fruit in their lives and will benefit the lives of their students both now and for years to come. Opportunities that will be discussed: job shadow experience, NASA program, bi-weekly meetings, classroom observations and other group activities.

1.13 Using Literature to Jump Start Science Education

Length of Session: 60 minutes

Anne Artz, Einstein Fellow, Department of Energy, an-neartz92024@gmail.com

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators
Topic: Resources for Teachers

The NGSS emphasizes reading comprehension in all domains. This presentation will demonstrate ways science teachers in all disciplines can use both fiction and non-fiction either in its entirety or just on chapter to help students make that connection from the classroom to the real world. Lessons on using vocabulary to build science content comprehension, exploring scientific research methods, and science ethics will be demonstrated. Participants will leave with an understanding of how to use parts or all of a piece of literature to start or wrap up a science unit including biodiversity, genetics, medicine, chemistry, space, technology, and the environment.

1.14 Assessing Program Quality with Noyce Teachers

Length of Session: 60 minutes

Anderson Norton, Virginia Tech, norton3@vt.edu
Catherine Ulrich, culrich@vt.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers
Topic: Research and Evaluation

We collected data from 15 first, second, and third year Noyce teachers who had completed Virginia Tech's five-year mathematics education program. This paper reports on indicators of teacher quality and program impacts resulting from classroom observations and interviews with the teachers and their peers. Findings suggest the critical role mathematical knowledge for teaching plays across several aspects of successful instruction, but only if teachers can leverage that knowledge to generate flexible instruction that responds to students' mathematical thinking. Findings also illuminate the pressures and obstacles that high quality teachers face in their first few years of professional practice.

Our presentation will share five case studies of Noyce teachers to illustrate teacher quality and program impacts. We will share implications of the study for improving our teacher education

program and our Phase II Noyce project. Then, we will invite discussion among workshop participants on each of the following:

- 1) How can we assess teacher quality among our Noyce teachers?
- 2) How can we assess the impacts of our teacher preparation programs on teacher quality?
- 3) How can we use these assessments to further improve our teacher preparation programs?
- 4) How might Noyce Phase I personnel design Phase II proposals to address these issues?

Session 2: Thursday, June 19, 2014 3:00pm - 4:15pm

2.1 Making Mathematics Accessible for English Learners and Students with Lower Literacy

Length of Session: 75 minutes

Karen Kuhel, Kennesaw State University, kkuhel@kennesaw.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators
Topic: Resources for Teachers

Effectively implementing the Common Core mathematics standards requires a significant shift in classroom planning and practice. Once you would hear that English learners could succeed in mathematics classes without strongly developed English language skills because it was a “universal language.” Or, that mathematics was the least literacy dependent content area for students who read or wrote below grade-level. Inaccurate claims that have finally been laid to rest with the increased content rigor of the Common Core standards, the integration of informational texts and development of argumentative writing tasks into the mathematics curriculum, and the strong focus on literacy in the Standards for Mathematical Practice.

This workshop will provide participants with specific knowledge, skills, and strategies to a) develop language objectives that will inform teaching language and math content simultaneously; b) incorporate specific reading strategies into lesson delivery; and c) develop both general academic and content specific vocabulary within context. Participants will have hands-on opportunities to work with activities in Geometry and Algebra. In addition to resources used within the workshop, participants will receive a list of online resources and references.

2.2 Building and Scaling Up Your Geometry Lesson to Common Core Standards

Length of Session: 60 minutes

Cesar Viteri, Cal Poly Pomona Noyce Master Teacher Fellows Progr, caviteri@yahoo.com
Roberto Garcia, Math Science Teacher, Master Teacher Fellow, robert.garcia@mac.com
Johnny Reyes, Math Teacher, Master Teacher Fellow, Johnny.Reyes@pomona.k12.ca.us

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers
Topic: Resources for Teachers

Explore a series of lessons offering students an intuitive approach to area, surface area, and volume. We will emphasize looking for patterns and repeated reasoning. In this workshop we will demonstrate the first lesson in a sequence that describes polyhedra. This presentation will look at how to guide students through inquiry based learning with the use of manipulatives and cognitive coaching.

The unit begins with a look at images of different types of buildings so that students can see the real world application of polyhedra and the other concepts developed in the series of lessons. With the use of unifix cubes students are guided to move from the concrete to the abstract. In addition to that students will get a good handle on orientation of three dimensional structures (polyhedra). The situations explored in this unit go well beyond common text book problems. Students are supported to think critically and to develop an intuitive sense about the connections between solids’ measurements, area, surface area, and volume.

The activities used in this unit include using unifix cubes to make three dimensional prisms, making isometric representations of prisms on isometric dot paper, using graph paper to create nets, and the use of graphic organizers to examine patterns when scaling up surface area and volume. The unit includes an assessment that is aligned to common core standards and tailored to assess understanding of the specific concepts taught in the unit. Participants will engage in classroom tested activities to support solving real-life and mathematical problems involving area, surface area, and volume. Take advantage of this geometry unit that promotes higher level thinking through engaging hands on activities.

2.3 Bringing Primary Scientific Literature into the Classroom

Length of Session: 60 minutes

Melissa McCartney, Science/AAAS, mmccartn@aaas.org

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

Topic: Resources for Teachers

“Science in the Classroom” (<http://scienceintheclassroom.org>) is a collection of annotated research papers and accompanying teaching materials designed to help students at the advanced high school, community college, and undergraduate level understand the structure and workings of professional scientific research. Each annotated Science paper contains a “Learning Lens,” which is used to selectively highlight and explain original text of the research article. An interactive glossary is included. Additionally, an educational scaffold containing an expanded explanation of the figures, often with a close-up of the relevant section of the figure itself, has been built into each research paper. Also accompanying the papers are discussion questions, additional activities, connections to the English Language Arts Standards and the 8 Practices of the Next Generation Science Standards, and raw data provided by the authors. We will present a tutorial on how to use this resource in a classroom and would appreciate feedback from the audience on how we can continue to make an expanded “Science in the Classroom” website a valuable resource for science teachers.

2.4 Understanding and Using Next Generation Science Standards

Length of Session: 75 minutes

Presenter(s): Jo Ellen Roseman, Director of AAAS Project 2061

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers
Topic: Resources for Teachers

This workshop will highlight methods for evaluating curriculum materials in light of the *Next Generation Science Standards* (NGSS), including the Educators Evaluating the Quality of Instructional Products (EqIP) rubric and Project 2061’s research-based curriculum materials analysis criteria. Participants will examine how a model unit integrates disciplinary core ideas, science practices, and crosscutting concepts and supports student learning.

2.5 Developing Fellows’ Leadership Capacity as Professional Learning Providers

Length of Session: 60 minutes

Cynthia Callard, University of Rochester, ccallard@warner.rochester.edu

Michael Occhino, University of Rochester, Project Leadership Team Member, Director of Science Outreach, mocchino@warner.rochester.edu

Deb Ortenzi, Rochester City School District, Noyce Master Teaching Fellow, debra.ortenzi@rcsdk12.org

Target Audience: Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

Topic: Teacher Leadership

Currently in Year 4, the University of Rochester Noyce Master Teaching Fellows Program is working to prepare a cadre of K-12 Mathematics and Science teacher leaders within the local city school system to serve as models, professional development providers and instructional leaders for their colleagues and pre-service teachers. The intent is to build long term capacity for sustaining high quality math and science teaching in urban schools. Our scaffolded leadership development program began with a focus on K-12 mathematics/science instruction by engaging Fellows in inquiring into their own practice as STEM teachers, then shifted the focus to influencing others through content-focused coaching (West & Staub, 2003) in Year 3, and has worked this year to support and scaffold Fellows’ ability to provide high quality math and science professional development. This session will describe the progression of supported activities and experiences that Fellows have engaged in to support their development as leaders through providing professional development. We will share what we have learned from this process both from a Project Leadership and a Fellow’s perspective.

2.6 Why Would Mathematicians and Scientists Become Math and Science Teachers?

Length of Session: 60 minutes

Michael E. Beeth, University of Wisconsin Oshkosh, beeth@uwosh.edu

Adam Kresl, kresla@centurylink.net

Albana Kume-Robertson, albana.kume@yahoo.it

Sebastian Pugliese III, sp3orb@charter.net

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel

Topic: Recruitment and Marketing Strategies

This session highlights the personal stories, motivations, and support systems for career switchers who completed the Alternative Careers in Teaching program (act!). The act! program offers a flexible path for practicing scientists or mathematicians to become licensed secondary (grades 6-12) teachers in Wisconsin. act! is an alternative licensure program - individuals must have at least 5 years of work experience as practicing scientists or mathematicians to enter the program, and they can receive credit for prior learning in some cases. More than 600 individuals wishing to switch careers have contacted act! since 2006: 160 individuals have enrolled in this licensure only program, and 61 of those have received math or science teaching licenses.

Participants in this session will hear from three former Noyce Scholars about why they choose to leave their careers as scientists and mathematicians to become professional educators, and from other act! students who have completed the program via Internet conferencing or through written testimonials. The range of personal, academic and financial supports needed in order to make this career change possible for act! students will be highlighted.

2.7 An Alternative Role for Master Teaching Fellows: PD Leader

Length of Session: 30 minutes

Stacia Prince, Stephen F. Austin State University, beverlyll@sfasu.edu
Julie Sandifer, Master Teaching Fellow, jsandifer@sfasu.edu

Target Audience: Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff
Topic: Teacher Leadership

As Master Teaching Fellows in the Texas Leadership Initiative: Mathematics Instruction Transformed (Texas LIMIT) project, we have developed expertise in the design and delivery of professional development in mathematics. We have worked with district administrators and examined district data to identify areas of need, researched best practices, and created professional development modules for implementation in districts as well as the districts of other MTFs.

In this presentation, we will share our training pathway and discuss the benefits and challenges of becoming a PD leader.

2.8 Design of Specialized Mathematics Courses for Pre-service Teachers

Length of Session: 60 minutes

Jerry Dwyer, Texas Tech University, jerry.dwyer@ttu.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

A critical need for the teaching of secondary school mathematics is a deep understanding of the mathematics taught at that level. Many pre-service teacher candidates complete higher level courses to fulfill their math major requirements but lack courses designed to meet their need for deep understanding of secondary school mathematics.

This workshop explores innovative approaches to providing such courses and how they can be incorporated into teacher training models, while fulfilling core requirements of the math major. Such courses are often taught in a collaborative manner between math faculty and education faculty.

2.9 Noyce Master Teachers in Science Methods Classes

Length of Session: 75 minutes

Keith Sheppard, Stony Brook University, keith.sheppard@stonybrook.edu
Angela Kelly, Stony Brook University, Co-PI, angela.kelly@stonybrook.edu,
Linda Padwa, Stony Brook University, Methods Instructor, linda.padwa@stonybrook.edu
Caren Gough, Stony Brook University, Methods Instructor, caren.gough@stonybrook.edu
Keith Millman, kmillman@bufsd.org, Noyce Master Teacher
Chuck Vessalico, cvessali@malverne.k12.ny.us, Noyce Master Teacher
Colin Morrell, Noyce Fellow
Jessica Narkiewicz, Noyce Fellow

Target Audience: Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

This session outlines how Noyce master teachers have been integrated into the pre-service STEM Education program at Stony Brook University as part of our Noyce I and Noyce II grants. The session includes an overview of the curriculum of the methods classes, the rationale for the inclusion of master teachers, details of activities from the courses and preliminary research data about the impact of their inclusion on our pre-service teachers. The workshop will include perspectives from all groups involved; the master teachers, the instructors of the methods courses, the Noyce Fellows who are going through our program, and the Noyce PIs. The workshop will conclude with a section on the newly established New York State STEM Master Teachers Program.

2.10 Mirroring Professional Mathematicians by Holding a School Math Conference

Length of Session: 75 minutes

James Matthews, Siena College, matthews@siena.edu
Renia Yoanidis, Siena College, Noyce Scholar, re09yoan@siena.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Research and common sense indicate that students who are engaged in rich, meaningful mathematics programs learn more and perform at higher levels than students who are in narrow, test-prep focused programs. Participants will learn about and discuss how to incorporate math symposia in their schools. Can your students name a living professional athlete, musician, actor, or writer? Of course they can. Can they name a living professional mathematician? More importantly, do they know there are professional mathematicians who are working on open problems? Do they know about any of these problems? Unfortunately, no is the answer to the last three questions for almost all of our students.

We will share how we have had a school successfully conduct mathematics symposia or conferences based on mathematical problem solving. Workshop participants will work on some of the problems we have used and some unsolved problems that are accessible to middle school students. The conferences we will describe are modeled after professional meetings of the Mathematical Association of America. They include poster sessions, contributed paper sessions, and keynote presentations. Conferences involved the participation of every student from the participating grade levels. Teachers have been surprised at the level and quality of the work of some of their students. In addition to examining and discussing mathematics problems that

may be used, participants will learn about the logistics of running a conference, and strategies for success. By their nature, these activities heavily engage students in Common Core Standards for Mathematical Practice.

2.11 This session includes two 30-minute presentations.

2.11a Noyce and the EdTPA: A Comparison of Program-Embedded Assessments and the EdTPA

Length of Session: 30 minutes

Frederick W. Freking, University of Southern California, freking@usc.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Evaluators/Education Researchers

Topic: Research and Evaluation

In this era of accountability and data-driven decision-making, Noyce programs must design assessments that can serve as gate keepers to our K-12 science classrooms and reflective tools for program improvement and candidate development. Towards this end, this presentation will share a series of program assessments that are used by candidates to reflect on their own development and the noyce program to determine candidate readiness for the science classroom. This presentation will also compare performance on noyce program-embedded assessments to the Science EdTPA.

2.11b Novice vs. Second Stage Teachers- Implementing the Workshop Model of Instruction

Length of Session: 30 minutes

Serigne Mbaye Gningue, Lehman College, serigne.gningue@lehman.cuny.edu
Gaoyin.Qian, gaoyin.qian@lehman.cuny.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Evaluators/Education Researchers

Topic: Research and Evaluation

Using the Lehman College Observation System adapted from Lawrenz et al's (2002) Classroom Observation Protocol designed to observe mathematics and science lessons, we investigated the degree to which 12 mathematics and 9 science

Noyce teachers who graduated from the Lehman Noyce program adhere to practices consistent with the “workshop model of instruction” (WOMI). Observers recorded whether various portions of the WOMI (Do Now, Mini-Lesson, Practice, Assessment, and Summary) were visible, the amount of time in minutes each portion consumed, and the type of instruction -17 specific types, ranging from lecture, to student presentations to lecture with discussion to hands-on activities- to determine student- or teacher-centeredness.

For lack of a comparable comparison group of teachers in their initial stages of teaching, we compared the scholars’ teaching performance to a group of fully certified experienced Cohort II participants of MTTI, a NSF-funded project that prepare mathematics teacher leaders, who averaged nine years of teaching experience. We also compared scholars’ teaching performance for SY2014 with their performance during SY2013.

Results show that MTTI teachers spend considerably more time than Noyce scholars on the Do Now and Mini-Lesson and less time on practice and assessment. MTTI teachers tended to use instruction that was a blend of student - and teacher-centered pedagogy: only 11% of their teaching types were exclusively teacher-or student-centered. In contrast, 51% of Noyce scholars’ instructional style was either unambiguously student - or teacher-centered. No change in Noyce Scholars’ approach to teaching was found from SY2013 to SY2014 with regard to student-and teacher-centered instruction.

2.12 Developing and Maintaining Purposeful Partnerships to Retain and Empower Teachers

Length of Session: 30 minutes

Craig Tucker, N.C. State University, Kenan Fellows Program, kctucker@ncsu.edu
Keenan Locklear, Public Schools of Robeson County, NC, Master Teaching Fellow, keenan.locklear@robeson.k12.nc.us

Target Audience: Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel

Topic: Partnerships

This session will examine the potential benefits and considerable challenges of building and maintaining partnerships to increase the efficacy and staying power of initially licensed and pre-service teachers in rural districts. Strategies to be shared are the result of experience in developing customized working partnerships between in-service teachers and local LEAs and colleges of education to support professional development and enhance

beginning teacher support systems. Noyce Master Teacher Fellows in the Kenan Fellows Program, a one year fellowship program that provides in-service teachers with experience in research labs or industry settings, initiated and designed programs to impact the success of early career teachers based on needs assessments in the Base Realignment and Closure (BRAC) Region in North Carolina which encompasses eleven counties in the south central part of the state. In this workshop, participants will be exposed to strategies to build collaborative, sustainable, mutually beneficial partnerships and preemptively address the obstacles inherent in an effort that involves multiple independent institutions.

2.13 Energy Literacy and Diversity in STEM Fields

Length of Session: 60 minutes

Joshua Sneideman, Einstein Fellow, Department of Energy, joshua.sneideman@ee.doe.gov

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators

Topic: Resources for Teachers

Energy literacy is a complex and important topic in education in light of many recent national developments such as presidential Climate Action Plan and the release of the next generation science standards which contains energy has a cross-cutting concept. The Department of Energy has lead in the effort to develop an energy literacy framework which details 7 essential principles and 49 fundamental concepts, which should be considered when developing energy related curriculum. The framework also highlights the inherent interdisciplinary nature of energy in our lives. The Department of Energy has funded various activities in support of energy education. This workshop will provide educators with resources to enhance the instruction of energy in their classrooms. Additional topics to be discussed include the Department of Energy minorities in energy initiatives and their women at energy series.

2.14 Reaching All Types of Students Through Interactive Lessons

Length of Session: 60 minutes

Caroline Albrecht, University of South Carolina, Mathematics Teacher at Wando High School, caroline_albrecht@charleston.k12.sc.us
Chloe Leech, University of South Carolina, Mathematics Teacher at R.B. Stall High School, chloe_leech@charleston.k12.sc.us

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Evaluators/Education Researchers

Topic: Resources for Teachers

This interactive workshop will focus on different methods to use in the classroom that reach all types of students. As former Noyce Scholars who have just completed their first year of teaching algebra and geometry, presenters will share resources that they have found most useful and effective in the past year. Participants will learn about implementing foldables, interactive notebooks, stations, discovery lessons, and technology into their own classroom. Everyone will leave with resources, files, and ideas to integrate into their own classrooms, whether you teach math or science!

Session 3: Friday, June 20, 2014
9:10am - 10:25am

3.1 'Green' Geometric Modeling: Capture Student Interest and Address the Common Core

Length of Session: 60 minutes

Sharon McCrone, University of New Hampshire,
sharon.mccrone@unh.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

Topic: Resources for Teachers

This workshop will offer hands-on experiences demonstrating how to take “green” efficiency packaging problems into the high school classroom. Participants will investigate mathematical modeling related to packaging objects of interest to students such as energy drinks and bike helmets. Both 2-D and 3-D objects, their measurements (e.g., surface area and volume) and relationships are vital in solving these modeling problems. Development of informal and formal arguments will also be investigated. Geometric Modeling and Measurement are highlighted in the Common Core Standards for Mathematics. Our activities introduce participants to ways of bringing the standards to life in their classrooms.

We will present the geometric modeling process through a brief introduction that also highlights the NCTM and Common Core Standards in these areas. We will then share a minimum of two tasks and encourage group work with appropriate hands-on manipulatives for solving the tasks. We will regroup to explore participants' solution strategies.

3.2 Developing Algebraic Reasoning from Quantitative Reasoning

Length of Session: 75 minutes

Osvaldo D. Soto, Math for America San Diego, osoto@sandi.net
Greg Guayante, Oceanside Union High School District, Math Teacher, gregory.guayante@oside.k12.ca.us
Frances Henderson, High Tech High International Point Loma, Math Teacher, fdhender@gmail.com

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

Topic: Resources for Teachers

One major shift represented by the CCSS-M is an increased focus on mathematical practice standards (MPS). While information about the CCSS-M is readily available online, what many want to know is how teaching should look different in the common core era. More specifically, what does a lesson designed with MPS look like? What is the role of the teacher? What will the experiences of learners look like? The goal of this session is for participants to experience a common core inspired lesson in mathematics as a way to begin to envision answers to these three interesting questions.

In this session we intend to demonstrate (rather than simply tell) what we hope a mathematics classroom will look like. For this reason, this session will be interactive. Come ready to solve a few fun math puzzles in a friendly environment and share your thinking with others as we explore together the roles of the teacher and learner in a student-centered environment designed to target how learners think and not just what learners think. The end of the session will summarize some of our key ideas about problem selection, which content standards and mathematical practice standards were targeted and how, and some thoughts on one key focus of the standards: the transition from proportional reasoning to algebraic reasoning.

3.3 Argument From Evidence: Literacy Strategies for Better Science

Length of Session: 60 minutes

Rebecca Sansom, National Science Foundation, rsansom@nsf.gov

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators

Topic: Resources for Teachers

One of the most significant challenges we face as chemistry educators is helping students make connections between what they can observe at the macroscopic level, the symbolic notation used in chemical equations, and an atomic/molecular level understanding of a chemical reaction. I will present argumentation strategies incorporating reading, writing and dialogue that engage the students more fully in their own learning by forcing them to support their position with evidence, and encouraging them to make the difficult conceptual connections between seemingly disconnected levels of chemical understanding. The example shared is related to the concept of a limiting reactant, but the principles of argumentation can be broadly applied in multiple contexts. This is an interactive workshop where participants will experience the literacy strategies as learners, then reflect on how they can apply the strategies in their classroom.

3.4 Teacher Development in Partnership: University and STEM Academy Collaboration

Length of Session: 60 minutes

Susan Benner, University of Tennessee, sbenner@utk.edu
Karen Cheng, Former Teaching Fellow, (Current Teacher)

Target Audience: Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

Topic: Partnerships

The session will focus on the comprehensive nature of a working partnership between the L&N STEM Academy and the teacher preparation program at the University of Tennessee, using the experiences of one former TEACH/Here teaching fellow to provide specific examples of the partnership at work. First we will address critical elements of the partnership, including provision of clinical placements based on a model of co-teaching and co-supervision; collegial administrative service on advisory boards and review teams; and engagement in shared professional development opportunities. Second, we will address critical elements of a successful ongoing university-school partnership specific to a STEM academy, covering staffing patterns within the Academy that promote the partnership and problem-based course development within the Academy. Third, we will highlight the curricular and experiential components of the induction support provided through TEACH/Here along with the professional development and mentor support provided by Knox County Schools. Finally, we will address unique curricular development and research opportunities that this teacher has experienced, including participation in a summer research program for teachers offered by CURENT, an electrical engineering research center housed at the UT; participation in efforts by the UT chapter of the Society for Women Engineers to establish a premier organization for high school girls interested in STEM fields and careers,

and the opportunities she had to work with teacher candidates during their clinical experiences at the Academy. She will address the challenges and accomplishments associated with a resident cohort model of teacher preparation within this focused school environment.

3.5 Blending Stem Industry Expertise into the Secondary Math or Science Classrooms

Length of Session: 60 minutes

Karen Nave, Rio Salado College, Karen.Nave@riosalado.edu
Jennifer Gresko, Rio Salado College, PI, Faculty Chair of Education, Jennifer.Gresko@riosalado.edu
Kim Tobey, Rio Salado College, Director, Teacher Education Innovations and Initiatives, Executive Director, National Association of Community College Teacher Education Programs (NACCTEP), Kimberly.Tobey@riosalado.edu,
Michael Yarish, Rio Salado College, Noyce Scholar, majylady@aol.com
Katy Westersund, Rio Salado College, Noyce Scholar, katy.westersund@cox.net

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The workshop will focus on innovative strategies and benefits of collaborative partnerships with school districts and recareering STEM professionals. Focus will be given to outlining and discussing best practices associated with practical field experiences and student teaching experiences. Additional emphasis will be given to building partnerships with industry experts and formalizing recruitment efforts that benefit employees who are seeking to recareer or nearing retirement and looking for another career. These transitioning STEM professionals can then make a social impact and influence the next generation of math and science classroom students.

Noyce Scholars will present their experiences of transitioning, preparing, and training for the 7-12 grade math or science classrooms and will specifically discuss their overall preparedness for working with students from high-poverty, high-need school districts. The Noyce Scholars will share their stories of successful navigation through the Rio Salado College online hybrid Teacher Preparation coursework, including its enhanced focus on STEM, 150 hours of field experience, nine weeks of student teaching, and support through its newly designed induction model for pre-service post-baccalaureate students. The workshop will be highly interactive with participants being invited to share how

their Noyce program is promoting hands-on experiences to prepare better STEM teachers.

3.6 Helping New Teachers Survive and Thrive: Florida's Online STEM TIPS Initiative

Length of Session: 60 minutes

Griffith Jones, University of Florida, gjones@coe.ufl.edu
Emma Brady, STEM TIPS Coordinator, ebrady@coe.ufl.edu
Regina Toolin, University of Vermont Robert Noyce Scholarship Program, Director, rtoolin@uvm.edu
Mark Olofson, University of Vermont Robert Noyce Scholarship Program, Ph.D. student, molofson@uvm.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project Pls, Co-Pls, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators
Topic: Supporting New Teachers

An online tiered-support system for the induction of new STEM teachers across the state of Florida will be presented. In addition to describing the conceptual framework, theory of action, and results of a pilot study, we will demonstrate features of the technology developed to support preservice-to-practice new STEM teacher engagement.

In the Fall of 2012, UF received a 2-year, \$2.3 million grant from the Florida Department of Education to create a prototype web-based, mobile-ready, coaching and professional development platform to support new science and math teachers in grades 6-12. The resulting platform, the Florida STEM Teacher Induction and Professional Support (STEM TIPS) system, addresses the challenges of retaining beginning math and science teachers and accelerating their growth by leveraging an innovative, all-in-one, online mentoring system to extend flexible, personalized content-focused support. Using a unique mobile-ready platform, online coaches provide immediate feedback and broker a wide range of vetted resources promoting high-quality instruction focused on improving teacher practice and boosting student achievement. This cutting-edge platform integrates remote video coaching technology with the combined knowledge of an online community of practice coupled with 24/7 access to classroom-tested resources. The STEM TIPS system also facilitates current university- or district-level induction efforts by providing seamless collaboration between new teachers and their university or district supervisors, curriculum specialists, induction staff, and school-based face-to-face mentors. Project implementation and field-testing is currently underway in 18 Florida districts supporting over 1000 new math and science teachers, as well as with the University of Vermont's Robert Noyce Scholarship Program.

3.7 Memory and Learning: A Practical Guide for Students

Length of Session: 75 minutes

Paul D. Heideman, College of William and Mary, pdheid@wm.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project Pls, Co-Pls, Other Faculty/Staff
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Students can benefit from understanding their own learning, and teachers can use an understanding of learning in their teaching. A one-credit add-on course for Noyce Scholars, "How Students Learn," was developed into a one-credit course for incoming college freshmen. The content could also be useful for high school students. In addition to content on learning, the two courses include exercises to assess and improve one's own learning in "metacognition experiments" and, for Noyce Scholars, a class experiment on learning that can be adapted to help students become more active studiers and learners. This workshop presents an overview of the two courses, course exercises, and the text (the text is available for free at a project website). Participants in this workshop will conduct sample exercises from the two courses, review course materials, assess the Noyce Scholar experiment from the fall 2013 Noyce class, and develop ideas to foster enduring changes in how students learn. For those who have attended earlier workshops on this project, there will be some overlap in content from earlier workshops on this topic.

3.8 Voices of Students of Color Preparing to Become STEM Teachers

Length of Session: 75 minutes

Deborah A. Harmon, Eastern Michigan University, deborah.harmon@emich.edu
JuaQuita Grady, Eastern Michigan University, Undergraduate Noyce Scholar, jgrad2@emich.edu
Amaris Evans, Eastern Michigan University, Undergraduate Noyce Scholar, aevans13@emich.edu
Casey Edgar, Eastern Michigan University, Undergraduate Noyce Scholar, cedgar3@emich.edu
Naema Aden, Eastern Michigan University, Undergraduate Noyce Scholar, naden@emich.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project Pls, Co-Pls, Other Faculty/Staff, School and District Administrators,

Higher Education Institution Administrators

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

There is a high demand for effective STEM teachers, particularly in urban and high-need schools. There is great concern about the low achievement of many low-income and culturally diverse students in urban schools. Many students do not find mathematics and science curriculum and instruction contextual and meaningful, and may not see its value. The absence of culturally diverse math and science teachers causes many students to perceive math and science as subject areas that are for White students.

Developing Urban Educators Teaching STEM (DUETS) Program addresses these issues by combining Creative Scientific Inquiry Experience (CSIE), a NSF program, focusing on integrated, interdisciplinary, academic service-learning with the Minority Achievement, Retention and Success Program (MARS), a proven urban-education teacher-preparation program. The MARS program guides students of color through their professional-education curriculum and induction with particular emphasis on specific challenges they face in teacher preparation and continues to support STEM teachers through their novice years of teaching in urban school districts. The MARS program, with a 100% graduation success rate for thirteen years, has had a positive impact on the DUETS Program.

This presentation features a panel of four Noyce DUETS Scholars who will share their experiences and challenges in a teacher preparation program and how the DUETS program impacted their success. In addition, Noyce DUET Scholars will share lessons learned and provide recommendations for effective urban STEM preparation programs and how to recruit and retain students of color.

3.9 Using Master Teachers to Unearth Hidden or Unmet Potential in Mathematics

Length of Session: 60 minutes

Peter Sheppard, University of Louisiana at Lafayette,
psheppard@louisiana.edu

Target Audience: Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

Topic: Teacher Leadership

Unfortunately, the abilities of large numbers of potential future STEM innovators, namely those from low-income families and underrepresented minority groups, currently go unrecognized and are underdeveloped (National Science Board, 2010). A key contributor to this phenomenon is that those students are more

likely to be taught by the least prepared mathematics teachers. A major consequence of this circumstance is that the talent of those students is often suppressed to the extent that the lay person and educators alike make faulty conjectures regarding their cerebral capacity. Conversely, we hold the position that these students, irrespective of their background, possess hidden or unmet potential in mathematics and thus the revelation of their potential can be accelerated when said students are exposed to high-quality mathematics teaching. Therefore, this presentation will discuss design, implementation and initial impact Louisiana Mathematics Masters in the Middle participants had on students who possess hidden or unmet potential (commonly referred to as at-risk students) in the two-week long achieving mathematics excellence camp.

3.10 Future Directions for a National Evaluation of the Noyce Program

Length of Session: 60 minutes

Ellen Bobronnikov, Project Director of the National Evaluation of the Noyce Program, Abt Associates,
ellen_bobronnikov@abtassoc.com

Beth Gamse, Principal Investigator, Abt Associates,
beth_gamse@abtassoc.com

Melissa Velez, Deputy Project Director, Abt Associates,
melissa_vez@abtassoc.com

Cristofer Price, Director of Impact Analysis, Abt Associates
cristofer_price@abtassoc.com

Amanda Parsad, Director of Survey Analysis, Abt Associates,
Amanda_parsad@abtassoc.com

Radha Roy, Director of Data Collection, Abt Associates,
radha_roy@abtassoc.com

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers
Topic: Research and Evaluation

We will briefly review the design and findings and discuss some of the limitations faced (e.g., collecting existing data from states and districts) in conducting the national evaluation of the Noyce Program. We would like to discuss with the audience ideas for future evaluation designs and questions and learn what kinds of questions local evaluators have addressed, and whether there are some potential synergies between the kinds of questions (and corresponding data collection activities) one can ask about the Noyce Program at local and national levels.

3.11 A Replicable Model for Noyce Project Management

Length of Session: 30 minutes

Nancy Overley, Kennesaw State University, noverley@kennesaw.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Evaluators/Education Researchers

Topic: Project Management

Our Noyce II project, I-IMPACT, the Initiative for Inspiring and Mentoring Chemistry and Physics Teachers, began in January 2011 with a primary focus at that time of recruiting Teaching Fellows and Master Teaching Fellows and developing a replicable and sustainable Professional Development program for high-school chemistry and physics teachers. The first two years of the project were devoted to recruiting two cohorts of TFs and two of MTFs, which included preparing advertising and marketing materials and the admission process, as well as compliance document preparation, website production, budget and cost-share analysis, and the creation and implementation of the PD process. With an increased emphasis on Professional Development, Research, and Dissemination in the third year, project management has evolved and taken on new responsibilities. This workshop will cover all of these areas, issues that were encountered and solved, along with successes and ideas that can be replicated and implemented in on-going and future projects. Hand-outs will include resource materials.

3.12 “Come on Board” with NASA Resources

Length of Session: 60 minutes

Melinda Higgins, Einstein Fellow, NASA, melinda.m.higgins@nasa.gov

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators

Topic: Resources for Teachers

Inspire and excite your students with STEM resources from NASA! This workshop will equip you with NASA resources to link you and your students to the wonderful world of science and engineering through STEM gateways. We will also engage in hands-on learning opportunities to involve your students in our missions and our science. NASA makes learning Fun.... Come along with us as we explore together!

3.13 International and Online Collaborations for Citizen Science

Length of Session: 60 minutes

Joe Isaac, Einstein Fellow, National Science Foundation, jiisaac@nsf.gov

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators

Topic: Resources for Teachers

The phenomenon of flattening classrooms through collaboration with different groups of students and educators, whether locally or internationally, has gained steam in the past decade with easier access to reliable internet, and Web 2.0 tools such as social networks, blogs, wikis, and media sharing sites. With easier access to these tools, teachers and students can easily share lessons, experiences and data with colleagues in virtually every corner of the globe. Since the release of Thomas Friedman’s book *The World is Flat* in 2005, the studies of globalization through commerce and information flow has seeped into the world of education and more specifically, STEM education.

The book “*Flattening Classrooms, Engaging Minds*,” by Julie Lindsay and Vicki Davis, is a prime example of how Friedman’s concepts can be easily translated into the realm of education. We will explore various examples of Globally Collaborative STEM Education and analyze the successes and challenges of each. Finally the presenter will describe his own experiences of trying to “flatten” his classroom to let his students know that they are just one spoke in a larger, increasingly interconnected, global wheel.

3.14 Resources for Chemistry Classes and Activities

Length of Session: 75 minutes

Patti Galvan, Marta Gmurczyk, Karen Kaleuati, James Kessler, Terri Taylor, Kenetia Thompson, and Jodi Wesemann, American Chemical Society

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators, Project PIs, Co-PIs, Other Faculty/Staff

Topic: Resources for Teachers

The Education Division of the American Chemical Society (ACS) serves learners and educators by building communities and providing effective chemistry education products, services and information. Join us for an interactive session that will combine hands-on activities for use in upper-elementary through high

school classrooms with rich discussion of approaches to classroom implementation. We will also share information about a variety of exciting programs/resources for pre-service and in-service teachers including our new "College to Career" web site, the ACS Student Chapter program, www.middleschoolchemistry.com, the award-winning ChemMatters magazine, the ACS High School Chemistry Club Program, ACS-Hach scholarship and grant programs, the launch of the American Association of Chemistry Teachers (AACT) in September 2014, and more.

Session 4: Friday, June 20, 2014
10:35am - 11:50am

4.1 Using Video Clips as Anticipatory Sets in Math Classes

Length of Session: 60 minutes

Donna Andrews, California State University, Stanislaus, dandrews@csustan.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars

Topic: Resources for Teachers

The Common Core and STEM Initiatives increase the need for math teachers to use interesting video clips to engage students in the learning process. Teachers can utilize video clips to help students learn mathematical/STEM concepts, apply literacy skills, and make relevant connections to real world issues.

4.2 Choosing the Right Technology for You and Your Students

Length of Session: 60 minutes

Ashley Morgan, Clemson University, amorga4@clemson.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

Topic: Resources for Teachers

Technology is becoming more commonly used in instruction, but how can we use it effectively in the classroom to assess our students aside from relying on technology associated with SMART and/or Promethean boards? There are many free Internet resources that help us do so, but how do we know which is best and which will also meet the needs of our classrooms and our

students? Socrative, InFuse Learning, Edmodo, Kahoot!, QuizStar, and ClassMarker are some of the Internet resources available to teachers, but how can we rate and evaluate these based on factors including effectiveness, student enjoyment, simplicity, preparation time, unique features, and user-friendliness? Participants at this workshop will have an opportunity to interact with the various media from both the students' and the teachers' perspectives. Attendees should bring a device (tablet, laptop, smart phone) to maximize participation.

4.3 Bringing Primary Scientific Literature into the Classroom

Length of Session: 60 minutes

Melissa McCartney, Science/AAAS, mmccartn@aaas.org

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

Topic: Resources for Teachers

"Science in the Classroom" (<http://scienceintheclassroom.org>) is a collection of annotated research papers and accompanying teaching materials designed to help students at the advanced high school, community college, and undergraduate level understand the structure and workings of professional scientific research. Each annotated Science paper contains a "Learning Lens," which is used to selectively highlight and explain original text of the research article. An interactive glossary is included. Additionally, an educational scaffold containing an expanded explanation of the figures, often with a close-up of the relevant section of the figure itself, has been built into each research paper.

Also accompanying the papers are discussion questions, additional activities, connections to the English Language Arts Standards and the 8 Practices of the Next Generation Science Standards, and raw data provided by the authors. We will present a tutorial on how to use this resource in a classroom and would appreciate feedback from the audience on how we can continue to make an expanded "Science in the Classroom" website a valuable resource for science teachers.

4.4 Science Netlinks - An Incredible Resource for Teachers and Students...and It's Free!

Length of Session: 60 minutes

Suzanne Thurston, AAAS, sthursto@aaas.org

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and

District Administrators
Topic: Resources for Teachers

AAAS Science NetLinks is an incredible resource for K-12 science teachers, especially those just starting out. This project, available free online, provides a wide variety of STEM resources for both teachers and students. Resources are developed and/or reviewed by AAAS staff and members. Science NetLinks is an engaging, dynamic and valuable resource and my workshop will focus on sharing resources and strategies for using Science NetLink in the classroom and incorporating rich media and mobile technology into everyday instruction.

In previous years this workshop has been well attended and well-received. Teachers appreciate the quality and depth of resources they find on Science NetLinks. The below description is from last year's workshop.

Did you know that AAAS provides FREE resources for K-12 educators and students? Did you know that you can go to one place and find lesson plans, podcasts, interactives, blog posts, mobile apps, and current science news? Science NetLinks, produced by AAAS, is in its 17th year of developing science resources for use in the classroom. The award-winning website provides engaging, thoughtful, and dynamic resources that will enhance instruction in all disciplines of science. Come learn the basics of this incredible website, try out some of its resources, and let Science NetLinks support your teaching and student learning.

4.5 Modeling Teacher Leadership Using an Online Venture/Vexation Scaffold

Length of Session: 30 minutes

Samuel Polizzi, Kennesaw State University, spolizzi@kennesaw.edu
Michelle Dean, Kennesaw State University, Co-PI, mdean28@kennesaw.edu
Donna Barrett, MetroRESA, Project Staff, donna.barrett@mresa.org
Greg Rushton, Kennesaw State University, PI, grushton@kennesaw.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers

Topic: Teacher Leadership

Strategies to plug the 'leaky bucket' of early career science teacher attrition include (1) supporting and mentoring novice teachers, (2) fostering dialogue and access between professional colleagues and (3) providing opportunities for leadership devel-

opment. Current induction programs focus on aims 1 and 2. Additional examples of professional development addressing aim 3 are needed before the education community can begin to understand the implications of teacher leadership on professional vision and retention. We provide a professional development model for teacher leader education which draws upon four leadership metaphors, including 'teacher as a...': fully functioning person, reflective practitioner, scholar and learning partner. Each metaphor is personified as a responder role within a modified Venture/Vexation scaffold. Briefly, a presenter offers a teaching venture (i.e. something they would like to try) or a vexation (i.e. an obstacle to overcome), to which responders adopt an assigned leadership metaphor and offer advice toward a conclusion. Interactions occur over the course of a month within an asynchronous online environment using an external facilitator. Analysis of the interactions indicates that each leadership persona is conducive with the Venture/Vexation scaffold of goal resolution. Further, both presenters and responders engage in a dialogue consistent with deeper levels of reflective practice. Collectively, results suggest that our leadership model can be successfully incorporated into an induction level support system, thereby addressing multiple teacher retention strategies simultaneously.

4.6 This session includes two 30-minute presentations.

4.6a Recruitment Challenges Faced by the Noyce Scholarship Program at Delaware State University

Length of Session: 30 minutes

Rayton Sianjina, Delaware State University, rsianjina@desu.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Project PIs, Co-PIs, Other Faculty/Staff
Topic: Recruitment and Marketing Strategies

The purpose of this presentation is to share some of the challenges we faced in recruiting program participants as well as proposed possible solutions to such challenges. The effort to recruit participants into the program is compounded by several variables. The following seem to pose a bigger challenge than what was anticipated:

- Program participants are housed in the College of Mathematics, Natural Sciences and Technology while the Noyce Program is housed in the College of Education. Making the connection from STEM areas to Education seems to be a problem for many participants.

- Participants seem to be highly concerned about and are fearful of the number of years that they have to give back to the teaching field for each year they receive support. Therefore, participants seem to be very reluctant to make such a commitment.
- Participants are fearful of taking and passing the Praxis examination which is a requirement for their admission into the Master of Arts in Teaching Program.

Based on these “fears,” the recruitment process proved to be more challenging than what the program had anticipated. As such, the program administrators had to formulate different strategies to transform recruitment challenges into opportunities.

4.6b Sending the Best to Students Who Need Them the Most

Length of Session: 30 minutes

David R. Erickson, University of Montana,
david.erickson@mso.umt.edu
Mariah Smith, University of Montana, Noyce Scholar,
mariah.smith@umontana.edu
Sara Killeen, University of Montana, Noyce Scholar,
sara.killeen@umontana.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Project PIs, Co-PIs, Other Faculty/Staff
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Learning Assistants Become Teachers (LABT) program at the University of Montana combines theory and practice to prepare future teachers in mathematics (and science) and send them forward to work in rural high needs secondary schools. In this session, we will address the two-year professional program in mathematics split between campus and field, and on towards a teaching career. Each scholar participates as a Learning Assistant in a university content course for future teachers as well as helping secondary schools adopt the Learning Assistant model for secondary students, for example, 11th grade students working with 9th grade students on statistics topics.

4.7 Trajectory of a Noyce Scholar in a High-Need School: From Novice Teacher to Exemplar

Length of Session: 60 minutes

Rabia Shahbaz, Georgia State University, rabia677@gmail.com

Christine D. Thomas, Georgia State University, PI,
cthomas11@gsu.edu
Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/
Education Researchers
Topic: Teacher Leadership

Research in K-12 education emphasizes the important role of teacher leaders, especially in high-need schools. The 1980s education reform initiatives have transformed the industrial leadership model in education into a distributed leadership model, in which teacher leaders play a pivotal role. Further, educational reforms have also advanced the concept of teacher professional development through the implementation of professional learning communities (PLCs) as an effective format for teacher learning. The easy accessible Internet and advanced virtual environments have expanded this contemporary concept of PLCs to online PLCs, which give teachers more flexibility and greater access to resources.

The PLCs play multifaceted roles by providing (a) sources of ongoing instructional support for teachers; (b) forums for collaboration and reflection; and (c) platforms for the development of teachers’ leadership skills. The Robert Noyce Urban Mathematics Educator Program (UMEP) at Georgia State University, which began in 2005 and is currently ongoing as a Phase II project, developed an online PLC in the 3D virtual world of Second Life (SL). In this presentation, one Noyce scholar describes the impact of this online PLC on her trajectory from a novice teacher, to an exemplar in the mathematics classroom, to a teacher leader. Using the engaging images and video clips of this multiuser virtual world, the presenter will provide an emic view of the culture of online PLC and will highlight the important factors that influenced her role as she evolved from novice classroom teacher to teacher leader within her school and across the school district.

4.8 Physics by Inquiry: Preparing Teachers for Inquiry-Based Teaching and Learning

Length of Session: 30 minutes

Paige Evans, University of Houston, pevans@uh.edu
Donna W. Stokes, University of Houston, PI, dstokes@uh.edu,
Simon G. Bott, sbott@uh.edu, University of Houston, Co-I,
sbott@uh.edu
Juan Nanez Rodriguez, University of Houston, Noyce Scholar,
jcnanezrodriguez@hotmail.com

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Evaluators/

Education Researchers

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

In order to teach science effectively, teachers must possess a strong background in science content as well as understand methods of teaching such as inquiry-based learning that will cultivate conceptual development of science concepts with their students. As a result, teachHOUSTON and Physics faculty at the University of Houston developed and implemented a “Physics By Inquiry” course to engage scholars in interactive, inquiry-based teaching pedagogies for physics.

This session examines the impact that an undergraduate physics course taught as inquiry had on preservice teachers in the teachHOUSTON program. Results highlight the potential benefit of including courses whereby content is taught as inquiry in preservice science teacher education programs and will show that participants who took the Physics By Inquiry Course had a greater understanding of inquiry-based learning and how to employ it in the classroom. Additionally, roadblocks encountered when altering mandated curriculum in schools will be discussed. Furthermore, other benefits of this course will be discussed including augmenting the content level of non-physics majors/minors who may teach physics in the future and the use of this course as a recruiting tool for potential physics minors. Digital stories from the field will be presented.

4.9 Lessons Learned and Analysis: Robert Noyce Scholarship Program Phase I and Phase II

Length of Session: 60 minutes

Sheila Vaidya, PI, Drexel University, vaidyasr@drexel.edu
Maurice Baynard, M.S., Part-time Noyce Project Coordinator
Paul Mungo, Noyce Physics Teacher, School District of Philadelphia

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

This presentation will address the process of developing urban education teachers in STEM subjects. We discuss the teacher's development from preparation to practice and the challenges as well as the positive experiences teachers encounter in their teaching. The first two years of teaching are a continuum along this learning trajectory and the proactive supports that teacher training and mentoring programs can provide to help novice teachers overcome challenges will increase the likelihood that

new teachers will remain in the teaching profession. We discuss interview and focus group data about why teachers leave teaching and why they stay in teaching. We provide recommendations based on our experiences to strengthen and sustain teaching.

4.10 STEMELL: Crafting a Science and Math Education Program Aligned to ELLs

Length of Session: 30 minutes

Gillian U. Bayne, Lehman College of CUNY, gillian.bayne@lehman.cuny.edu
Serigne Mbaye Gningue, Lehman College of CUNY, STEMELL PI, serigne.gningue@lehman.cuny.edu
Allison Merino, Lehman College of CUNY, STEMELL Administrative Coordinator, allison.merino@lehman.cuny.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The future of America's competitiveness, especially as it relates to STEM, is dependent upon how well we prepare students and provide them with the proper skills requisite to being college and career-ready. Within the K-12 education setting, meeting this challenge will involve providing ALL students, including those who are culturally diverse and English language learners (ELLs), access to a high-quality STEM education.

Recent data indicate that ELLs often do not have the same access to quality STEM instruction as their non-ELL peers (OELA, 2012). It is fitting, therefore, that the overarching goal of Science, Technology, Engineering, and Mathematics for English Language Learners (STEMELL) at Lehman College of the City University of New York is to successfully prepare new high quality secondary science and math teachers that are not only sensitized to the needs of English language learners and culturally diverse students, but also demonstrate success in their teaching of the content to those in high-need middle and high school classrooms.

We have developed a model for continuing the reform of teacher preparation through an innovative school-centered, needs-based 5 year teacher preparation program with integrated professional development and induction support programs that will produce demonstrated positive impacts on secondary science and mathematics teacher competency and the achievement of their culturally and linguistically diverse, high-need, low-performing urban (Bronx) students in grades 7 through 12.

4.11 Sustaining Programs in Physics Teacher Education: A Study of PhysTEC Supported Sites

Length of Session: 30 minutes

Monica Plisch, American Physical Society, plisch@aps.org

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Evaluators/Education Researchers

Topic: Sustainability

The Physics Teacher Education Coalition (PhysTEC) project conducted a study on the sustainability of teacher preparation programs at sites that had previously received PhysTEC funding (legacy sites). An education research consultant conducted site visits and/or telephone interviews with eight institutions, and gathered qualitative and quantitative data. We will present results to the following key questions:

- 1) Are PhysTEC legacy sites sustaining their production of physics teachers?
- 2) Did the PhysTEC award precipitate long-term support for physics teacher education at the legacy sites? And
- 3) (What features should be prioritized for building sustainable physics teacher education programs?)

4.12 Midwest Noyce Project Caucus: Building Communities of Practice

Length of Session: 60 minutes

William Hunter, Illinois State University, whunter@ilstu.edu
Wendy M. Smith, University of Nebraska-Lincoln, Assistant Director, Center for Science, Mathematics and Computer Education, wsmith5@unl.edu

Kim S. Nguyen, Director for Operations, Urban Center for the Advancement of STEM Education, IUPUI School of Education, knguyen@iupui.edu

Gina Post, Associate Professor of Education, Wittenberg University, rpost@wittenberg.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff

Topic: Other: Creating Noyce Networks

All active Noyce projects in the Midwest-Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, and Wisconsin are invited to participate in a planning workshop for the Midwest Regional Robert Noyce Connections: 2014 Conference October 2-3, 2014 in Omaha, Nebraska. This workshop will

be highly interactive and participatory in that attendees will make suggestions and proposals for valuable sessions they wish to have in the Midwest regional meetings over the next few years.

4.13 This session includes two 30-minute presentations.

4.13a I have an App for that! Apps that Support STEM Teachers

Length of Session: 30 minutes

Joanne Caniglia, Kent State University, jcanigl1@kent.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers

Topic: Resources for Teachers

This presentation will share a set of iPad apps that can be used by learners of all ages to overcome barriers to STEM coursework. Some of the accessibility features built into iOS 5 will also be covered. Research has established that each individual learns uniquely, so these tools can be used to great effect with a wide range of learners, not just those identified with specific "learning disabilities". Universal Design for Learning (UDL) will serve as the pedagogical framework for the presentation.

Almost all of the apps to be shared are either free or inexpensive. In addition to apps that offer effective text-to-speech and multiple options for text-input, the presentation will explore multimedia apps that give learners alternative ways of showing what they know.

4.13b Making Your iPad Work for You

Length of Session: 30 minutes

Farrah Jackson, Elizabeth City State University, fmjackson@mail.ecsu.edu

Lacey Gould, Noyce Scholar

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

Topic: Resources for Teachers

iPads are becoming a permanent fixture in STEM classroom around the country. This session will demonstrate the many

useful applications that will assist teachers in some of the following areas: managing attendance and behavior, tracking student's progress, and keeping parents informed.

4.14 Transforming Cookbook Labs into Inquiry Labs

Length of Session: 75 minutes

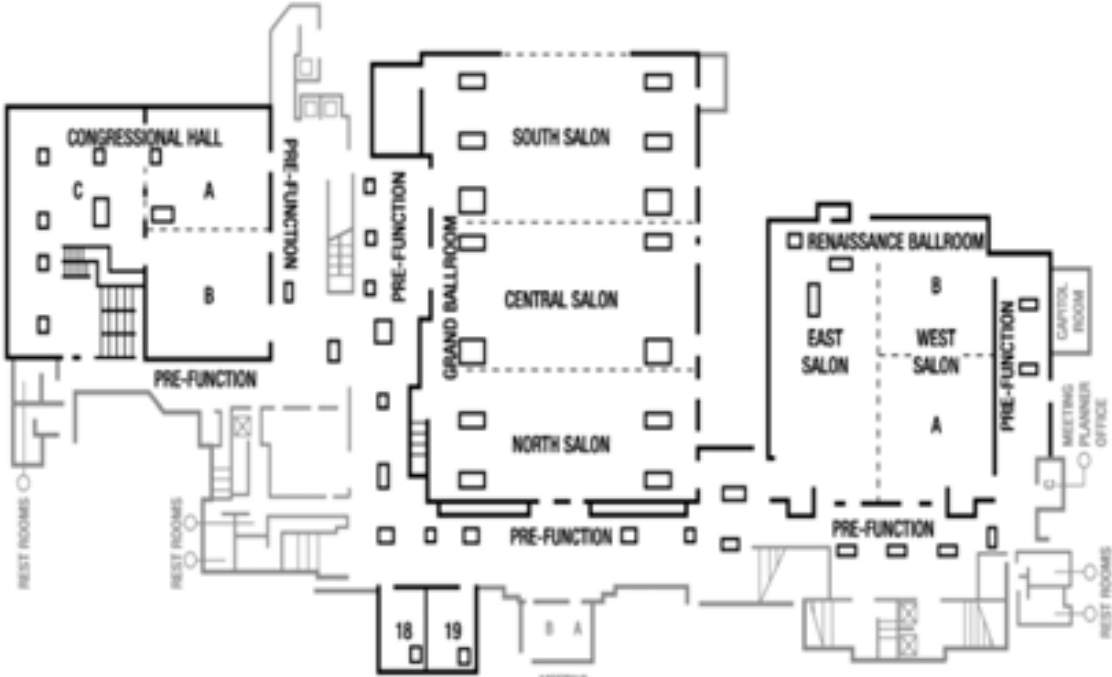
Margaret Shain Stieben, American Physiological Society,
mshain@the-aps.org

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators

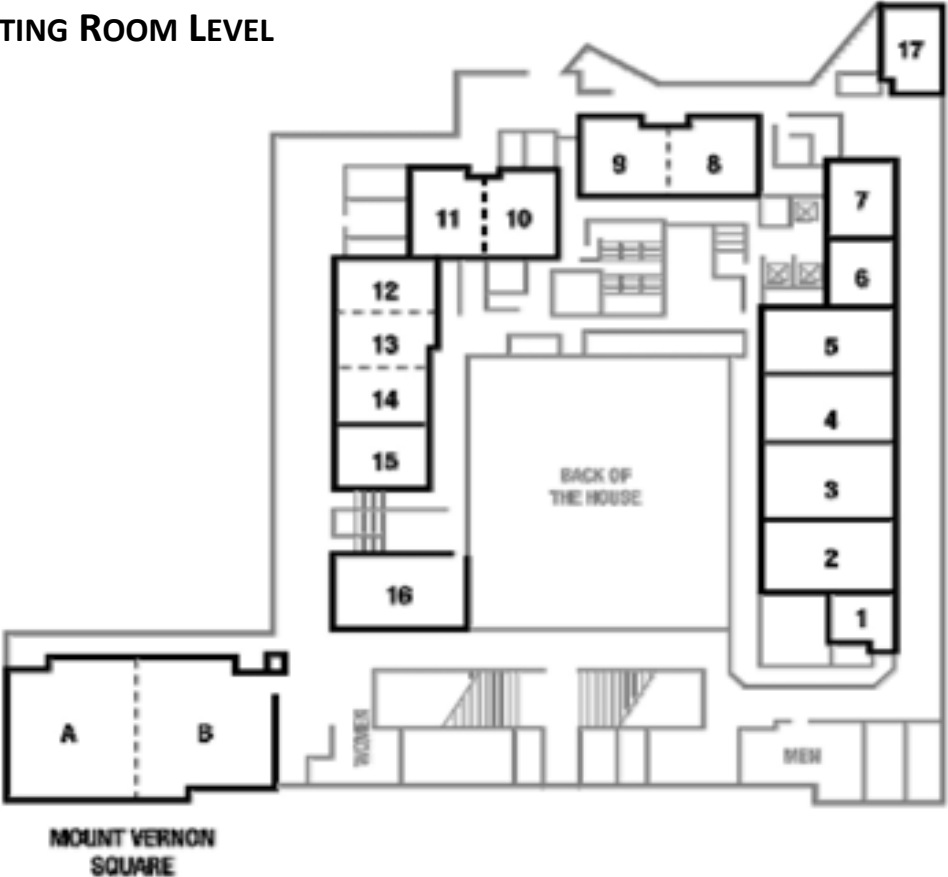
Topic: Resources for Teachers

This workshop will give participants a hands-on approach to transforming existing lessons to help implement Next Generation Science Standards and/or Vision and Change in their classrooms. Transformations focus on practical approaches to student-centered learning. Attendees will apply APS Six Star Science principals for student-centered learning to labs they currently conduct in their courses. Participants are encouraged (but not required) to bring a lab from a current course which they would like to adapt or use a sample provided. Take home "tool kits" will enable participants to apply Six Star Science principals to additional lessons.

BALLROOM LEVEL



MEETING ROOM LEVEL



WASHINGTON DC SUBWAY SYSTEM MAP



www.metro.com
 Customer Information Service: 202-637-7000
 TTY Phone: 202-638-3780

Legend

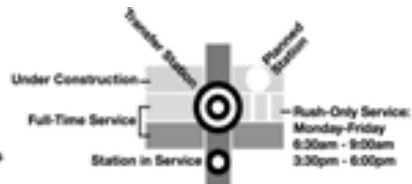
- RD** Red Line • Glenmont to Shady Grove
- OR** Orange Line • New Carrollton to Vienna
- BL** Blue Line • Franconia-Springfield to Largo Town Center
- GR** Green Line • Branch Ave to Greenbelt
- YL** Yellow Line • Huntington to Fort Totten
- SV** Silver Line • Future Dulles Corridor Line

Station Features

- Bus to Airport
- Parking
- Hospital
- Airport

Connecting Rail Systems

- Amtrak
- AISC



- No Smoking
- No Eating or Drinking
- No Animals (except service animals)
- No Audio (without earphones)
- No Littering or Spitting
- No Dangerous or Flammable Items

1**Title: PhysTEC Noyce Program**

NSF Noyce Award Number: 0833210

Principal Investigator (PI): Monica Plisch

PI Email: goertzen@aps.org

Institution: American Physical Society

Presenter(s): Renee Michelle Goertzen, American Physical Society, goertzen@aps.org

Project Discipline: Physics

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.phystec.org/noyce/Noyce.cfm>

The Physics Teacher Education Coalition (PhysTEC) aims to recruit more students into physics teacher education programs through the PhysTEC Noyce project. Six PhysTEC-supported sites participate in the PhysTEC Noyce project: Ball State University, Cornell University, Seattle Pacific University, the University of Arkansas, the University of North Carolina at Chapel Hill, and Western Michigan University. Students awarded PhysTEC Noyce grants are majors or minors in physics, which provides them with greater physics content knowledge than the average high school physics teacher. Our project supports Noyce scholars in the final years of their licensure and in the first few years of teaching through the mentoring of Visiting Master Teachers (VMTs). VMTs are experienced high school teachers who work several hours per week to provide mentoring, maintain contract, and help introduce scholars to the professional teaching community. We will report on successes and challenges in meeting the large national need for highly qualified physics teachers.

2**Title: Lab2Class: Science and Math Fellows in the Nation's Capital**

NSF Noyce Award Number: 0934758

Principal Investigator (PI): Sarah Irvine Belson

PI Email: sarah@american.edu

Institution: American University

Co-PI(s): Kiho Kim, American University, kiho@american.edu

John Nolan, American University, jpnolan@american.edu

Michael Keynes, American University, keynes@american.edu

Bianca Abrams, Carnegie Academy for Science Education (CASE), babrams@ciw.edu

Presenter(s): Michael Keynes, American University, keynes@american.edu

Project Discipline: Environmental Science

Topic: Teacher Leadership

URL(s): <http://www.american.edu/cas/seth/grants/lab2class.cfm>

From the Lab to the Classroom: Building Capacity for Math and Science Teaching in DC Secondary Schools (Lab2Class) is a collaborative Teaching Fellows project between American University's (AU) School of Education, Teaching, and Health (SETH),

Departments of Mathematics (M/S) and Statistics, and Environmental Science (ENVS), The Carnegie Institution of Washington, the District of Columbia Public Schools (DCPS), and DC Public Charter Schools (DCPCS). Lab2Class is designed to improve the teaching of secondary school science and mathematics in Washington, DC, by recruiting STEM professionals with strong backgrounds in science and math to teach in the DC schools for at least four years after completing a one-year intensive teaching certification program that provides participants with sound pedagogical content knowledge and skills. The project makes use of year-long teacher residencies for fellows and intensive pedagogical and content training. The program is in its second year, with our first cohort of science and math fellows beginning work in DC Schools and our second cohort beginning their programs during the Noyce Conference. The program has already begun developing participants' learning and transferring this learning into effective ways to improve student achievement in science and math.

3**Title: Science Teachers for AZ - Recruitment and Retention (STARR)**

NSF Noyce Award Number: 0833311

Principal Investigator (PI): Miles Orchinik

PI Email: suzanne.cassano@asu.edu

Institution: Arizona State University

Co-PI(s): Steven Semken, Arizona State University, semken@asu.edu

Presenter(s): Suzanne Cassano, Arizona State University

Project Discipline: Biology

In the Phoenix metropolitan area, the shortage of secondary science teachers is experienced by all districts. In high-need districts this shortage is compounded by an on-going migration of teachers in these schools to schools that are perceived to be less challenging. As a result, high-need schools often experience on-going vacancies in the teaching staff and a high turnover rate of qualified teachers. Science Teachers for Arizona - Recruitment and Retention (STARR) attempts to identify and support up to 60 qualified science teachers who will persist in high-need environments.

Using passive and active forms of recruitment, in conjunction with a marketing plan, science students will be identified and recruited to participate in undergraduate or post-baccalaureate programs that have extensive field experiences with diverse students, strong content knowledge requirements, and on-going opportunities to develop their science as inquiry instruction.

While students are completing their initial certification course work, field placements will be arranged in high-need settings that consist of students who are Native American, Latina/o, or African American. Upon graduation, STARR Noyce teachers will participate in science-focused induction programs, which specifi-

cally support their use of science as inquiry in diverse classrooms, their development as science teachers, and their socialization into the school community.

The intellectual merit of STARR Noyce resides in the theoretical grounding of this proposal, the attention to the continuum of development of a teacher, and the potential for the dissemination of knowledge pertaining to science teacher learning. The PI and co-PIs of this project are well-grounded in the research in science and science teacher education, as well as prominent contributors to this domain. The dissemination of these findings will ultimately direct future recruitment endeavors in this area.

The broader impact of qualified science teachers in the local community is limitless. Teachers supported through STARR Noyce will ultimately work with students who are most in need in terms of acquiring an education pertaining to science (e.g., students who are culturally and ethnically diverse). In addition, the funds from this program support current initiatives among faculty and staff at ASU to impact the production of science teachers. Support for teachers ultimately results in additional conversations about current ASU initiatives, as well as spurring the discussion of additional topics to be considered pertaining to science teacher education. STARR Noyce reinforces ASU's commitment to the community by providing citizens who are able to participate in scientifically-oriented endeavors.

Since 2009, STARR Noyce has supported a total of 34 Scholars and 19 Paid Interns at Arizona Science Center. Thirty-one have obtained teaching certification. Nineteen have fulfilled their high-need teaching requirement, three are currently working on certification, and thirteen will continue to receive Noyce support as teachers in local high-need schools through August 2014.

4

Title: Careers in Science Course

NSF Noyce Award Number: 1240091

Principal Investigator (PI): Allison Wilson

PI Email: awilson@ben.edu

Institution: Benedictine University

Co-PI(s): Niina Ronkainen, Benedictine University, nronkainen@ben.edu

Thomas Wangler, Benedictine University, twangler@ben.edu

Andrew Wig, Benedictine University, awig@ben.edu

John Zigmond, Benedictine University, jzigmond@ben.edu

Presenter(s): Allison Wilson, Benedictine University, awilson@ben.edu

Project Discipline: Biology

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.benuscience.org/best/>

The BEST program (Benedictine Educating STEM Teachers) piloted a Careers in Science course for all incoming freshmen and transfer students majoring in a program that is housed within the College of Science. The course was comprised of two parts: 1) information that enabled students to explore careers in the sciences and 2) attendance at a career panel session. The Careers in Science course was housed on our campus course management system and was made available to all science students. Repository information included educational requirements for jobs, starting salaries, the 5-10 year job outlook, green careers, number of jobs projected nationally and by state, profiles of people working jobs in the field and a typical day "on the job". Incoming freshmen and transfer students were asked to explore at least one career and complete the "career survey" which led them through a series of questions. 48% of these students completed the career survey. Students were asked to attend one career panel during the year. The panels consisted of three professionals from the fields of mathematics, chemistry or physics, one of which was a middle or high school teacher. Panelists were asked questions about their typical day, what inspired them to pursue their career, a piece of advice for students etc. and fielded questions from students. 90% of freshmen and transfer students attended at least one career panel. Quantitative data and written comments suggest that students benefited from course information. The challenge remains how to translate this interest into increased numbers in our teacher preparation programs.

5

Title: Noyce Summer Internships

NSF Noyce Award Number: 1240011

Principal Investigator (PI): Louis Nadelson

PI Email: henrycharlier@boisestate.edu

Institution: Boise State University

Co-PI(s): Henry Charlier, Boise State University, henrycharlier@boisestate.edu

Amy Moll, Boise State University, amoll@boisestate.edu

Presenter(s): Henry Charlier, Boise State University, henrycharlier@boisestate.edu

Louis Nadelson, Boise State University, louisnadelson@boisestate.edu

Janette Smith, Boise State University, janette-smith@boisestate.edu

Matthew Wigglesworth, Boise State University, mattwigglesworth@boisestate.edu

Amy Clink, Boise State University, amyclink@boisestate.edu

Jyh-haw Yeh, Boise State University, jhyeh@boisestate.edu

Project Discipline: STEM Education

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Noyce program at Boise State is implementing the first phase of its theoretical framework 'Trajectory to Teaching from Sparking Interest to Supporting Induction'. The goal of this first

phase is to recruit and sustain STEM Education majors early in their academic careers through participation in paid summer internships that took place within informal educational environments or involved participation in undergraduate research. The first round of internships took place in summer 2013 and were provided to 15 students who were in their initial year of participation of IDoTeach (Boise State University's STEM secondary education program). The insights gained from the first summer of the internship program will be discussed along with proposed improvements for the internship program in summer 2014.

6

Title: Exemplary Mathematics Educators for High-need Schools

NSF Noyce Award Number: 1339601

Principal Investigator (PI): Lillie R. Albert

PI Email: albertli@bc.edu

Institution: Boston College

Co-PI(s): Chi-Keung Cheung, Boston College, cheungc@bc.edu

Solomon Friedberg, Boston College, solomon.friedberg.1@bc.edu

Presenter(s): Lillie R. Albert, Boston College, albertli@bc.edu

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.bc.edu/content/bc/schools/cas/math/exemplarymathematics.html>

This project (Exemplary Mathematics Educators for High-need Schools) supports two programs at Boston College to address the needs of highly qualified mathematics teachers in high-need school districts. Faculty in Boston College's Department of Teacher Education (The Lynch School of Education) and Department of Mathematics (College of Arts and Sciences), working together with the non-profit Math for America Boston and with colleagues at Boston University and Education Development Center, offer a Teaching Fellow (TF) program and a Master Teaching Fellow (MTF) program. There are three comprehensive goals for this project: 1) Increase the output of the current Masters level mathematics teacher preparation program at Boston College by preparing eight Teaching Fellows (TFs) to become excellent mathematics teachers for high-need schools. 2) Recruit and support eight outstanding practicing teachers (Master Teaching Fellows/MTFs) in mathematics from high-need school districts to become highly qualified instructional leaders and mentors. 3) Build a strong and lasting professional community of mathematicians, mathematics educators and teachers in the greater Boston area by combining the resources of Boston College, MfA Boston and the EDC and to develop the long-term infrastructure to support this community. This poster presents an overview of the project, highlighting the major work of the TFs and MTFs with our collaborating partners.

7

Title: Recruiting, Preparing and Supporting One Noyce Scholar at a Time for BoNUSS

NSF Noyce Award Number: 1240055

Principal Investigator (PI): Peter Garik

PI Email: garik@bu.edu

Institution: Boston University

Co-PI(s): Donald DeRosa, Boston University, donder@bu.edu

Andrew Duffy, Boston University, aduffy@bu.edu

Dan Dill, Boston University, dan@bu.edu

Bennett Goldberg, goldberg@bu.edu

Presenter(s): Peter Garik, Boston University, garik@bu.edu

Project Discipline: Science Education

Topic: Supporting New Teachers

URL(s): www.bu.edu/noyce/science

The Boston University Noyce Urban Science Scholars Project (Project BoNUSS) has completed preparing its first cohort of Noyce Scholars and finished recruiting its second cohort. Our first cohort consisted of 8 Master of Arts in Teaching Noyce Scholars, and one undergraduate physics major Noyce Scholar. This year we have recruited another 8 MAT students and one more undergraduate physics major.

Recruitment: We recruit for Project BoNUSS from multiple streams of science majors and professionals. We find that personal contact and planning with each candidate is essential in order to attract and appropriately engage them in our program.

- We write to every science MAT Program applicant inquiring if they have an interest in being a Noyce Scholar, and describe the commitment and perks. We examine their transcripts to advise each candidate what the most suitable field of science teaching is for them to pursue.
- Our PhysTEC Teacher-in-Residence is pro-active in recruiting physics graduate students who may be interested in teaching. He hosts a quarterly gathering of physics teachers through which interested professional scientists and engineers develop an interest in teaching. Each graduate student and professional scientist who expresses interest is individually advised.
- The BU Learning Assistants (LA) Program helps undergraduate science majors develop an interest in teaching. The LAs are encouraged to take an additional teaching field placement; selected LAs are encouraged to apply for the Noyce Scholarship.

Coordinated Field Placements and Methods Courses: The BU MAT Program begins in the summer and runs for the next two academic semesters. In each semester, the Scholars have a field placement and a methods course. During the Summer, the first methods course is in conjunction with the Scholars assisting and tutoring in the Boston University Upward Bound Program.

Field placements are arranged for each Scholar separately. The objective is for the Scholars to be in the school of their future practicum on the first day of classes in September so that they can observe how their mentoring teacher creates the classroom culture. In conjunction with a first science methods course, each Noyce Scholar observes and assists as a tutor in the Boston University Upward Bound Program.

The second methods course during the Fall semester runs in parallel with a field experience (pre-practicum) in a high need school district in which each Noyce Scholar begins working with a mentor teacher (the supervising practitioner). The third methods course is taken during the Spring semester. Along with it, each Noyce Scholar's student teaches (their practicum) in the same classroom as in the Fall. For the Fall and Spring semesters, the BoNUSS Program PI and co-PI find field placements (pre-practicum and practicum) for each Noyce Scholar for the entire academic year. Finding the individual placements begins in May, after the cohort has been recruited. The placements are arranged one-by-one through emails and phone calls to school districts, science supervisors, and principals.

Supporting Noyce Scholars In the Job Search: With graduation of the first cohort, the PI and co-PIs for the project are discovering that the Noyce Scholar graduates need support as they look for jobs. Resumes need editing, contacts must be made with school district administrators to advertise the individual Noyce Scholars by science field, letters of recommendation must be written, and questions about which schools qualify as high need must be resolved. Each Noyce Scholar needs individual support in the job search.

The BoNUSS Noyce Scholar Program is cohort based, but when dissected the PIs find themselves recruiting and supporting each Scholar individually.

8

Title: Tracking Mathematics Teachers' Career Trajectories: Preliminary Results from a Three Year Longitudinal Study of Boston University's Noyce Scholarship Program

NSF Noyce Award Number: 1240057

Principal Investigator (PI): William Zahner

PI Email: wzahner@bu.edu

Institution: Boston University

Co-PI(s): Suzanne Chapin, Boston University, schapin@bu.edu

Tim Heeren, Boston University, tch@bu.edu

Presenter(s): William Zahner, Boston University, wzahner@bu.edu

Robbie Afonso, Boston University, rafonso@bu.edu

Project Discipline: Math

Topic: Research and Evaluation

This poster reports on data from years one and two of a three year longitudinal study that tracks the career trajectories and

teaching practices of mathematics teachers who were supported by Boston University's Noyce Scholarship Programs (Grant No. 0733762, and 0934851). The career trajectories and teaching practices of Noyce Fellows are compared with those of corps members from the local Teach for America (TFA) program who took some classes through the same university, but who were placed and certified by the local TFA office. Preliminary results from this study show: 1) Noyce Fellows are more likely to remain classroom teachers beyond required service, and the vast majority of Noyce Fellows are completing their required service within the required timeframe; 2) Noyce Fellows are significantly more likely to have a STEM major; 3) Though most Noyce Fellows work in high need schools, the schools where they are initially hired have a lower percentage of low SES students than the schools where TFA teachers are initially placed; and 4) Noyce Fellows who participated in a survey where they were asked to submit "high quality" instructional tasks, submitted tasks that averaged 2.33 on the Instructional Quality Assessment rubric (Boston & Smith, 2009) for task potential.

9

Title: Math for America Boston: Teaching Scholars Program

NSF Noyce Award Number: 0934851

Principal Investigator (PI): Suzanne Chapin

PI Email: schapin@bu.edu

Institution: Boston University

Co-PI(s): Glenn Stevens, Boston University, ghs@bu.edu

Steve Rosenberg, Boston University, sr@math.bu.edu

Project Discipline: Mathematics

The Math for America Boston: Teaching Scholars Program extends other Noyce programs at Boston University to recruit and support math teachers for work in high need districts. This program works with Master Teachers and Teaching Fellows. Master Teachers are highly qualified and experienced secondary math teachers (middle or high school) in high need Boston area school systems who also are instructional leaders in their schools. Teaching Fellows are outstanding STEM graduates or professionals who wish to change careers and become teachers of mathematics. This six-year program is a collaboration of faculty in the School of Education and the College of Arts and Sciences, the Math for America program, and seven high-need school districts.

Master Teachers must have majored in math and hold a master's degree in a related field. They take graduate-level courses at BU in order to support their development as leaders. These courses include an immersion experience in mathematics and offerings focused on mathematics curriculum and professional development. Some of the Master Teachers go on and get a graduate degree in mathematics education. Currently, there are seven Master Teachers. These Master Teachers have been active in Boston University's teacher preparation program as well as in their schools as curriculum leaders. They return to campus for seminars where they either develop materials for colleagues or

support new teachers. Master Teachers receive a stipend for five years while working as teacher leaders.

Teaching Fellows enroll in a one-year graduate program that leads to the Master of Arts in Teaching (MAT) degree and initial teacher licensure as either a middle school or high school math teacher. Clinical experiences and coursework are designed to support reflective teaching focused on student reasoning. Follow-up activities include workshops and seminars that keep Teaching Fellows connected to a robust and ongoing mathematical community of teachers, mathematics educators, and mathematicians. MfA Noyce Teaching Fellows are required to teach math in a high-needs district in the Boston area for a period of four years. They receive stipends while teaching in these districts. Currently, there are 12 Teaching Fellows: eight are teaching in high-need schools and four just finished the MAT degree program at BU and are seeking employment.

10

Title: Bringing Engineers into STEM Teaching (BEST) Project

NSF Noyce Award Number: 1340000

Principal Investigator (PI): Suzanne Chapin

PI Email: schapin@bu.edu

Institution: Boston University

Co-PI(s): Leslie Dietiker, Boston University, dietiker@bu.edu

Gretchen Fougere, Boston University, gfougere@bu.edu

Bringing Engineers into STEM Teaching (BEST) Project is a collaboration of the School of Education and the College of Engineering at Boston University and six schools or districts in the Boston area. This project is focusing on bringing the mathematical, technological, and design expertise of engineers into secondary classrooms. It is providing scholarships to 37 students to a one-year program that leads to a master's degree and licensure to teach secondary mathematics. It is facilitating the participation of undergraduate engineering students in a newly launched 4 + 1 program at BU in which students receive a BS degree in engineering and a master's degree in education in five years. Summer internships and academic year programs for undergraduate engineers to work with middle school students on design projects (Innovations in a Box) are being used to motivate and develop interest in education. The project is also recruiting practicing engineers. During the induction years, teachers will be supported through summer and academic-year workshops, seminars and mentoring. The BEST project started in 2013 and has three scholars who completed a Master's degree in 2013-14. These Noyce scholars are currently looking for employment as mathematics teachers.

The BEST program is providing an exemplar for an experience-rich and inquiry-based teacher preparation program that addresses the recommendations from the MET II Report and makes it possible for engineers to become educators. This project is supplying high-need districts with teachers who are

knowledgeable about the CCSSM and MA Engineering Standards and as a consequence, has the potential to positively affect large numbers of secondary students. It is testing a model for recruiting, training and retaining highly qualified engineers in teaching.

11

Title: Bridgewater State University, Science Teacher Scholars Program

NSF Noyce Award Number: 1339779

Principal Investigator (PI): Jeff Williams

PI Email: j7williams@bridgew.edu

Institution: Bridgewater State University

Co-PI(s): Nicole Glen, Bridgewater State University, nicole.glen@bridgew.edu

Marc Simmons, MCC, MSimmons@massasoit.mass.edu

Presenter(s): Jeff Williams, Bridgewater State University, j7williams@bridgew.edu

Project Discipline: Physics

Topic: Partnerships

URL(s): <https://my.bridgew.edu/departments/Noyce>

The Science Teacher Scholars Program is a partnership between Bridgewater State University, Massasoit Community College, and four Massachusetts public schools: Brockton, Fall River, Randolph and Freetown-Lakeville. Over the five year grant, we will award scholarships to support the final two years of 40 BSU science majors who decide to enroll in an undergraduate BSU education licensure program. The scholarships are valued at \$10,000 for each year, fully covering tuition, fees and books for the academic year. Twelve of the two-year scholarships will be specifically for science majors to become elementary education teachers. This summer, we will have eight 1st or 2nd year science majors completing paid internships.

12

Title: Noyce Teacher Scholarship Program

NSF Noyce Award Number: 0934831

Principal Investigator (PI): Victor Donnay

PI Email: bhallam@brynmawr.edu

Institution: Bryn Mawr/Haverford Colleges

Co-PI(s): Alice Lesnick, Bryn Mawr College, alesnick@brynmawr.edu

Josh Sabloff, Haverford College, jsabloff@haverford.edu

Presenter(s): Bonnie Hallam, Bryn Mawr College, bhallam@brynmawr.edu

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.brynmawr.edu/noyce

The goals and structure of a liberal arts education make it difficult for students to complete the extensive requirements for certification in four years. In response to these constraints, Bryn

Mawr and Haverford developed a fifth-year option whereby students who completed their A.B. degree could complete their remaining education requirements and carry out their student teaching in a postgraduate year.

The Bryn Mawr - Haverford Noyce Scholarships are offered in a variety of formats. Juniors are eligible for a two-year scholarship that provides funding for their senior year and for the 5th year Post-Baccalaureate Teacher Education Program. Seniors and alumni and alumnae from Bryn Mawr and Haverford are eligible for a one - year scholarship for the 5th year Post-Baccalaureate Teacher Education Program. Recently the program has added the Penn Master's 5th year option in which scholars awarded the Noyce Scholarship from Bryn Mawr/Haverford can receive their certification and a master's degree in education from the University of Pennsylvania in one year. In all cases, scholars must be math or science majors who will complete the requirements for teacher certification in Pennsylvania and then teach for two-years in a high-needs school district for each year of scholarship support received.

The program currently has 4 pre-service scholars, 4 scholars who have completed their certification program and are looking for full time teaching positions and 3 scholars who are currently teaching in some capacity. Twenty-six students have participated in school-based internships in Philadelphia area high need secondary schools.

Building the Philadelphia Regional Noyce Partnership with other institutions in the Philadelphia region that have Noyce programs (Drexel, La Salle, Penn, Temple and Saint Joseph's) has created synergies that support and further develop scholars in the Bryn Mawr/Haverford Noyce Program. Through the partnership, in addition to other benefits, our scholars have been able to attend professional development workshops, be placed in partnership affiliated master teachers classroom for student teaching and internships, have access to mentors in the Philadelphia Teacher Residency program and become part of a larger Noyce support network.

13

Title: Noyce Fellowship at CSU Bakersfield

NSF Noyce Award Number: 1136342

Principal Investigator (PI): Carl Kloock

PI Email: ckloock@csu.edu

Institution: California State University, Bakersfield

Co-PI(s): Ron Hughes, CSU Bakersfield, rhughes@csu.edu

Presenter(s): Carl Kloock, CSU Bakersfield, ckloock@csu.edu

Project Discipline: Science Education

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.csu.edu/ScienceEd

To supplement our offerings, we have begun providing our Fellows the opportunity, at Grant expense, to attend Advanced Placement Institutes to receive additional professional development. This additional preparation benefits our fellows by making them AP ready when they enter the workforce, and has the additional advantage of fortunate timing given the recent revisions in AP content and delivery to match the Next Generation Science Standards. This experience should significantly improve our Fellows ability to deliver high quality science experiences to their students (both AP and non-AP).

14

Title: TEMS II: Teaching Excellence in Math and Science Phase II

NSF Noyce Award Number: 1136431

Principal Investigator (PI): David Kagan

PI Email: dkagan@csuchico.edu

Institution: California State University, Chico

Co-PI(s): Brandi Aranguren, California State University, Chico, aranguren@csuchico.edu

Jennifer Oloff-Lewis, California State University, Chico, joloff-lewis@csuchico.edu

Deidre Sessoms, California State University, Sacramento, dsessoms@skymail.csus.edu

Presenter(s): David Kagan, California State University, Chico, dkagan@csuchico.edu

Project Discipline: Physics

Topic: Project Management

URL(s): http://www.csuchico.edu/cmse/csuc_students/noyce_scholar.shtml

http://www.csuchico.edu/cmse/csuc_students/noyce_program.shtml

This Phase II proposal continues the Noyce Phase I TEMS work. It remains a joint proposal from California State University, Chico and CSU Sacramento, in partnership with three area school districts and the Northeastern California Curriculum Committee representing all the rural schools of Northeastern California. We have awarded 24 scholars in mathematics and science.

15

Title: Master Science Teacher Fellowship

NSF Noyce Award Number: 0833206

Principal Investigator (PI): Kamal Hamdan

PI Email: khamdan@csudh.edu

Institution: California State University, Dominguez Hills

Presenter(s): Kamal Hamdan, California State University Dominguez Hills, khamdan@csudh.edu

Ayham Dahi, Los Angeles Unified School District, ayham.dahi@lausd.net

Juliet Ham, Los Angeles Unified School District, ham-julie@hotmail.com

Project Discipline: General Science, Biology, Chemistry, Physics, Geosciences

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Master Science Teacher Fellowship (MSTF) project is a collaborative between the College of Education and the College of Natural and Behavioral Sciences at California State University Dominguez Hills (CSUDH), the Los Angeles Unified School District (LAUSD), and the Los Angeles Educational Partnership. The project implements a research-based training model to create master science teachers that integrates content with pedagogy and leadership skills, linked to a set of clear competencies. The model combines creative, original ideas from the higher-education, K-12 education and nonprofit worlds, giving the model the potential not only to improve academic achievement in the target school district but also to influence the approach to developing exceptional master science teachers, who can enhance science education in a high-need district, develop the skills of pre-service and in-service teachers and help shape future strategies. The development of master science teachers is having a broad, cascading effect in high-need schools in Los Angeles Unified School District and beyond as they 1) support and mentor fellow teachers in 18 targeted high-poverty schools that enroll more than 26,000 students, 2) support and mentor pre-service teachers who will assume teaching positions in high-need schools throughout LAUSD, 3) mentor and model good teaching for undergraduate Noyce Scholars, 4) broadly disseminate science knowledge and pedagogical strategies to district teachers through various professional development activities, 5) disseminate results of their long-term action research projects and inquiry-based lesson designs at local, regional and national conferences. Given the ethnicities of the community, the project will recruit a diverse group of participants. To date, 30 science teachers representing 21 elementary and secondary schools are participating in the project and have accomplished the following:

- 26 fellows have completed at least one Lesson Study Cycle at their school and/or at another.
- 23 fellows have conducted more professional development activities at their school.
- 15 fellows have conducted professional development activities at another high need school.
- 23 fellows have mentored a new teacher at their school or another high need school.
- 19 fellows have presented at a local conference.
- 10 fellows have presented at a national conference.
- 9 fellows have participated in a summer internship at a research facility.
- 21 fellows are conducting action research; all fellows are required to publish their research findings before the end of the project.

16

Title: Teaching as a Primary Profession (TaPP) in Biology and Chemistry

NSF Noyce Award Number: 0934910

Principal Investigator (PI): Barbara L. Gonzalez

PI Email: bgonzalez@fullerton.edu

Institution: California State University, Fullerton

Co-PI(s): Victoria Costa, California State University Fullerton, vcosta@fullerton.edu

Chandra Srinivasan, California State University Fullerton, chandra@fullerton.edu

Marcelo Tolmasky, California State University Fullerton, mtolmasky@fullerton.edu

Presenter(s): Barbara L. Gonzalez, California State University Fullerton, bgonzalez@fullerton.edu

Project Discipline: Biology, Chemistry, Geosciences, Physics

Topic: Research and Evaluation

URL(s): tapp.fullerton.edu

California State University Fullerton has implemented Teaching as a Primary Profession (TAPP) in Biology and Biochemistry. The TAPP program encourages talented biology, biochemistry, geology and physics undergraduates to become highly qualified secondary teachers in two science disciplines. Scholarships support those who are in the process or have completed a science bachelor's degree and are enrolled in the CSUF secondary credential program with the intention of earning a teaching credential with authorization in California to teach two of the four science domains. TaPP Scholars meet regularly for mentoring, seminars and engage in science education outreach activities. Our aim is to prepare biology and biochemistry majors for service in public secondary schools who achieve highly qualified status in both biology and chemistry, and have research experience in both science and science education. Eight TaPP scholars are currently teaching in high need schools. Interviews by the external evaluator reveal that TaPP Scholars value the program, perceive that the science and science education research experiences strengthened their scientific professional skills, and enhanced their ability and confidence to teach science.

17

Title: SacMAST: Sacramento Math and Science Teaching Program

NSF Noyce Award Number: 1136419

Principal Investigator (PI): Deidre B. Sessoms

PI Email: sessoms@csus.edu

Institution: California State University, Sacramento

Co-PI(s): Kelly McDonald, California State University, Sacramento, mcdonald@saclink.csus.edu

Gary Shannon, California State University, Sacramento, shannon@saclink.csus.edu

Presenter(s): Jenna Porter, California State University, Sacramento, jmporter@csus.edu

Kelly McDonald, California State University, Sacramento, mcdonald@saclink.csus.edu

Deidre Sessoms, California State University, Sacramento, sessoms@csus.edu

Project Discipline: Science and Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

In its third year of funding, our Phase I Scholarship Program, SacMAST: Sacramento Math and Science Teaching, provided scholarships to six new and four continuing scholars training to teach in the fields of biology, physics, chemistry, earth science, and mathematics. Twelve Scholars so far have completed teacher certification and are employed in high needs districts. In collaboration with our Phase II Program with CSU Chico, we continued to offer a range of professional development activities to all Scholars, including the opportunity to participate in local, regional and national science and math education conferences. Scholars' cooperating teachers attended with them, in many cases. Three SacMAST Scholars were STAR (STEM Teacher and Researcher) Fellows during summer 2013, conducting scientific research in national laboratories; four SacMAST Scholars have been accepted as STAR Fellows for summer 2014. With our regional partner Los Rios Community College District, we again hosted a week-long summer biotech academy for students from a local title I high school. Four Noyce Scholars and five community college science students underwent a week of training, and then worked in teams to assist with the biotechnology workshops. This activity provided professional development and hands-on teaching opportunities for the Scholars, as well as strengthened the high school to community college to university pipeline for under-represented students.

18

Title: Noyce Fellowships Program at California State University San Bernardino

NSF Noyce Award Number: 0934761

Principal Investigator (PI): Davida Fischman

PI Email: szayas@csusb.edu

Institution: California State University, San Bernardino

Co-PI(s): Carol Cronk, VVUHSD, ccronk@vvuhd.org

Joseph Jesunathadas, CSUSB, jjesunat@csusb.edu

Ronnie Henderson, SBCUSD, ronnie.henderson@sbcusd.com

Presenter(s): Sarah Zayas, CSUSB, szayas@csusb.edu

Project Discipline: Math

Topic: Partnerships

URL(s): <http://noyce-fellowships.csusb.edu/>

The CSUSB Noyce Teaching and Master Teaching Fellowships program addresses local challenges by developing, implementing and evaluating a comprehensive professional development program in mathematics education that will result in improving the quality of instruction, and ultimately increasing student achievement among secondary students in the Inland Empire school

districts such as San Bernardino City Unified School District, Chaffey Joint Union High School District, Victor Valley High School District, Moreno Valley, Rialto, Hesperia, Perris, Ontario-Montclair, and Redlands Unified School Districts.

All Teaching and Master Teaching Fellows will earn a Master of Arts in Teaching Mathematics at CSUSB. It is our experience that most Master's degrees earned by teachers in our service area are not specifically content-related but rather focus on general curriculum and instruction or on administration; thus this degree will significantly enhance the depth and breadth of mathematical content knowledge as well as content knowledge for teaching among the Fellows.

During the five-year Fellowship, Teaching Fellows and Master Teaching Fellows engage in lesson study in mixed grade teams. Each team is provided ten full days to meet with a facilitator during the regular school day, to study mathematical concepts and prepare, teach, and analyze and discuss research lessons. The lesson study teams have formed a strong and supportive bond, and in addition to the designated lesson study time, the teachers frequently meet together on their own time to share strategies, do their own homework, and plan instruction.

The Fellows were so excited about the lesson study process that they attended the Chicago Lesson Study Conference in May 2011, and since then have shared their lesson study expertise with the larger Noyce community in breakout sessions at the Western Regional Noyce Conferences and the Annual Noyce Conferences. In 2012, they conducted a public research lesson and follow-up discussion at a State-funded lesson study conference in San Bernardino. As a result of the parallel processes of engaging in study for a Master's degree in teaching mathematics and ongoing lesson study, the Fellows have become a supportive and productive community of teachers focused on enhancing all aspects of their teaching.

The Professional Learning Community of Fellows has already expanded its influence in the area. Several have decided to apply for National Board Certification, and have included colleagues from their schools to join them in this effort. Others are bringing to their department meetings ideas and strategies they have learned in the lesson study sessions and in the MAT program.

19

Title: CSU San Bernardino Noyce Math and Science Scholarships Program

NSF Noyce Award Number: 1035229

Principal Investigator (PI): Davida Fischman

PI Email: deanne.miller@sbcusd.com

Institution: California State University, San Bernardino

Co-PI(s): Carol Cronk, VVUHSD, ccronk@vvuhd.org

Joseph Jesunathadas, CSUSB, jjesunat@csusb.edu

Presenter(s): Sarah Zayas, CSUSB, szayas@csusb.edu

Deanne Miller, SBCUSD, deanne.miller@sbcusd.k12.ca.us
 Project Discipline: Math
 Topic: Supporting New Teachers
 URL(s): <http://noyce.csusb.edu/>

The major components of the CSU San Bernardino Noyce program are mentored classroom experiences (2 full weeks in the beginning of the academic year, and weekly thereafter), monthly seminars attended jointly by scholars and mentor teachers, expanded supervision of Noyce scholars' student teaching by subject-matter faculty, and enhanced academic advising by Natural Sciences as well as Education faculty. All of these are firmly grounded in a strong partnership between the CSUSB College of Natural Sciences, College of Education, and the San Bernardino City Unified School District.

Additionally, we encourage and support financially scholars' attendance at local and regional meetings and conferences such as the Riverside-San Bernardino Counties Math Teachers Association Dinner Meetings, the Western Regional Noyce Conference, and the California Math Council South Annual Conference.

Structured mentoring experiences are at the core of our program; these are particularly valuable since our Noyce scholars are primarily undergraduates who have had little or no experience in the classroom. The program partners collaborate to identify lead teachers in the district who have outstanding skills both in teaching secondary students and in working with adults. The mentors and scholars are then matched, based on perceived needs of the scholars and skills of the teachers. While in the Noyce program, each scholar progresses through a series of benchmarks: at first the scholar observes classroom activities with a specific focus and records them, and then over time progresses from individual ad hoc tutoring to working with small groups, then co-planning and teaching portions of lessons, and eventually to independent planning and teaching of lessons under the supervision of the mentor teacher.

The Noyce seminars provide scholars and mentor teachers with additional opportunities to learn from university and district experts. Focus topics for 2013-14 are classroom management for scholars, Common Core State Standards for mentor-scholar teams, and mentoring skills and additional CCSS work for mentor teachers. Additional topics of particular interest during the years have been formative and summative assessment, making use of resources to teach conceptually, and standards-aligned teaching with understanding.

Many scholars have said that without the Noyce-sponsored mentored and structured classroom experiences, and the confidence they gain through them, they would not have made the decision to become a teacher. Noyce Graduates have said that their first year teaching is immeasurably more successful than it would otherwise have been after having learned so much about teaching in all its aspects from their mentor teachers and

through the Noyce seminars and conferences they have attended. Feedback from district personnel indicates a high level of satisfaction with the work of the Noyce teachers.

20

Title: CSUSM Noyce Teacher Scholars: Building Upon a Learning Assistant Model

NSF Noyce Award Number: 1240124
 Principal Investigator (PI): Brian R. Lawler
 PI Email: blawler@csusm.edu
 Institution: California State University, San Marcos
 Co-PI(s): Ed Price, California State University, San Marcos, eprice@csusm.edu
 Presenter(s): Brian R Lawler, California State University, San Marcos, blawler@csusm.edu
 Project Discipline: Education
 Topic: Recruitment and Marketing Strategies
 URL(s): <http://www.csusm.edu/noyce>

The most significant challenge to developing a strong cadre of highly prepared Mathematics and Science Teachers at CSUSM was an almost nonexistent connection between our undergraduates and the School of Education. A Learning Assistants program was initially implemented to begin to bridge this gap; the Noyce project was pursued with explicit efforts to draw more of our own undergraduates into our credentialing program. This poster presentation will describe some of our efforts, and the results 1.5 years into our project.

21

Title: Central Washington University Robert Noyce Scholarship Program Science and Mathematics Alliance for the Retention of Teachers (SMART)

NSF Noyce Award Number: 1035514
 Principal Investigator (PI): Martha J. Kurtz
 PI Email: kurtzm@cwu.edu
 Institution: Central Washington University
 Co-PI(s): Chris Black, Central Washington University, blackc@cwu.edu
 Jan Byers-Kirsch, Central Washington University, jbkirsch@cwu.edu
 Janet Shiver, Central Washington University, shiverj@cwu.edu
 Timothy Sorey, Central Washington University, soreyt@cwu.edu
 Presenter(s): Martha J. Kurtz, Central Washington University, kurtzm@cwu.edu
 Project Discipline: Biology, Chemistry, Earth Science, Mathematics and Physics
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models
 URL(s): www.cwu.edu/cesme

In response to a regional and nationwide teacher shortage in secondary science and mathematics, Central Washington Univer-

sity (CWU) in partnership with five community colleges has implemented a Phase I NSF Noyce Scholars Program to recruit and train STEM majors and STEM professionals to become science and mathematics teachers in high need schools. High priority is placed on recruiting students underrepresented in STEM fields. At the end of the fourth year of funding a total of 24 affiliates will have participated in four types of Affiliate experiences: academic year teaching or research, summer camp teaching, or a month-long summer research experience. The Noyce Summer Research Program involves Noyce affiliates in four weeks of intensive research in each of four different faculty research labs. The summer 2013 experience included research in computational mathematics, brain response to stimuli, regulation of *C. elegans*, and human genetic variation. A total of 26 Noyce scholars have participated in teaching, research, and professional development opportunities with 22 of them completing a year-long internship. Nine scholars are currently participating in a two-year induction program. The CWU Noyce program has been especially successful at recruiting under-represented students.

22

Title: TigersTeach Noyce Scholarship Initiative

NSF Noyce Award Number: 1136293

Principal Investigator (PI): Michelle Cook

PI Email: mskenne@clemson.edu

Institution: Clemson University

Co-PI(s): Lisa Benson, Department of Engineering and Science Education, Clemson University, lbenson@clemson.edu

Gautam Bhattacharyya, Department of Chemistry, Clemson University, gautamb@clemson.edu

Megan Che, Department of Teacher Education, Clemson University

Presenter(s): Marian (Molly) Kennedy, Department of Materials Science and Engineering, Clemson University, mskenne@clemson.edu

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.clemson.edu/hehd/education/tigersteach>

The TigersTeach Noyce Scholarship Initiative is a partnership among Clemson University's Eugene T. Moore School of Education, College of Engineering and Science, and College of Agriculture Forestry, and Life Sciences in collaboration with partner school districts in South Carolina. The TigersTeach Noyce Scholarship Initiative recruits students presently majoring in engineering, the sciences, and mathematics (STEM) and/or recent graduates with these degrees to become secondary science and mathematics teachers. In addition, the TigersTeach Noyce Scholarship Initiative provides co-curricular support mechanisms to create a vibrant learning community consisting of scholars, teachers in partner districts, as well as professors in STEM disciplines. These co-curricular activities include conference attendance and presentations at state and regional NCTM, NSTA, and

Noyce conferences, teacher panel presentations, and field trips to explore local resources. Within the first three years of the TigersTeach program, we had 55 applicants and selected 27 scholars. Of these, 24 scholars are enrolling in or graduating from Clemson's Master of Arts in Teaching (MAT) program in Secondary Mathematics or Secondary Science; 3 scholars are enrolled in one of Clemson's dual major programs (Mathematics/Secondary Education). Paid internships provide relevant experience for students who are considering applying to the TigersTeach Noyce program but have not yet fully committed to teaching as a career. In 2012-2013, we placed 35 interns in afterschool programs working with students in grades 3-6. In response to intern evaluations, we altered the program to place 17 interns with high school cooperating teachers during the 2013-2014. The interns work with students on an individual basis, co-plan and co-teach lessons with their cooperating teachers, and participate in faculty-led seminars. We have a mentoring program in place for all of our graduates during their first years of teaching. Next year, we plan to improve our recruitment of under-represented minorities, and expanding our internship activities to the high school level.

23

Title: Project-based Instruction: Opportunities and Challenges when Preparing Teachers for Integrated STEM Teaching Classrooms

NSF Noyce Award Number: 0934842

Principal Investigator (PI): Joanne E. Goodell

PI Email: j.goodell@csuohio.edu

Institution: Cleveland State University

Co-PI(s): Debbie K. Jackson, Cleveland State University, d.jackson1@csuohio.edu

Presenter(s): Joanne Goodell, Cleveland State University, j.goodell@csuohio.edu

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.csuohio.edu

In our program, known as CSUteach, we are fortunate not only to have close relationships with the Cleveland Metropolitan school district (CMSD), but also for CMSD to be one of the leading proponents of integrated STEM learning in the state, if not the nation. We have the 11th and 12th grade students of the flagship MC2STEM high school located on our campus, and have placed 5 of our teacher candidates in this school in 9th, 10th and 11th grade for their year-long student teaching experience. In addition, we have placed our candidates in three other schools in this district that have an integrated STEM focus.

In order to prepare our candidates for these experiences, we changed our final content-focused methods class to include readings and discussions of the principles of project-based instruction (PBI), as well as requiring their major planning project for this class be a 3-week PBI unit on a topic of their choice. We

encourage candidates to work in teams of 2 or 3 where their interests or field placements overlap. This planning takes place in the fall semester, during which the candidates are in the school for approximately 5 hours per week. Another requirement for the fall field experience is to teach a small problem-based sequence of lessons that they use to help them prepare for Teacher Performance Assessment (TPA) assessment in the spring semester. The integrated project they plan in the fall semester is then (hopefully) implemented in the spring semester student teaching experience, which is for 12 consecutive weeks. We also encourage them to use part of their project as the focus lesson for the spring semester TPA requirement.

Despite the fact that our program is aligned to a highly successful national model of STEM teacher preparation, which gives us access to colleagues in almost 40 institutions, and the plethora of STEM focused schools with which we have strong partnerships, our candidates have encountered roadblocks preventing full implementation of their PBI unit in their spring student teaching experience. In this poster, an overview of these issues will be presented, including sharing examples of projects that our pre-service teachers have written, and reflections from the students on what the main obstacles were to fully implementing their plans, as well as some improvement suggestions from them around the processes and timelines of their experiences.

24

Title: Robert Noyce Teacher Academy at the College of Staten Island (CUNY)

NSF Noyce Award Number: 0934533
 Principal Investigator (PI): Jane Coffee
 PI Email: Jane.Coffee@csi.cuny.edu
 Institution: College of Staten Island (CUNY)
 Co-PI(s): Susan Sullivan, College of Staten Island (CUNY), susan.sullivan@csi.cuny.edu
 Irina Lyublinskaya, College of Staten Island (CUNY), irina.lyublinskaya@csi.cuny.edu
 Presenter(s): Jane Coffee, College of Staten Island (CUNY), jane.coffee@csi.cuny.edu
 Project Discipline: Math, Biology, Chemistry, Physics
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models
 URL(s): www.csi.cuny.edu/teacheracademy

Activities in the Robert Noyce Teacher Academy at CSI in 2013-2014

- Each semester a Noyce Scholar interns at one of six host schools on Staten Island: Curtis High School, College of Staten Island High School, New Dorp High School, Port Richmond High School, Berta A. Dreyfus Intermediate School 49, William A. Morris Intermediate School 61 for a minimum of 5 hours per week for 10 weeks. There are fourteen Noyce Scholars in 2013-2014.

- Twelve Noyce Scholars have graduated in the last two years and 75% have been hired in full-time tenure track positions in New York City public high schools and middle schools.
- Summer Activities: 3 Noyce Scholars had teaching and research internships in the Galapagos Islands in summer 2013; 3 Noyce Scholars had teaching internships in Staten Island High School Summer 2013 session. Anticipated participation in summer 2014 by a CSI Noyce Scholar and Noyce co-PI in Nanograd 2014- a STEM Camp in Russia sponsored by RUSNANO (“Russian Nanotechnology”). Anticipated participation by 5 Noyce Scholars in Staten Island High School Summer 2014 session.

25

Title: The Noyce Project at Holy Cross: Reflecting on the Past Five Years

NSF Noyce Award Number: 0934793
 Principal Investigator (PI): Danuta Bukatko
 PI Email: hjohnson@holycross.edu
 Institution: College of the Holy Cross
 Co-PI(s): Daniel Bitran, College of the Holy Cross, dbi-tran@holycross.edu
 Heather Johnson, College of the Holy Cross, hjohnson@holycross.edu
 Catherine Roberts, College of the Holy Cross, croberts@holycross.edu
 Janine Shertzler, College of the Holy Cross
 Presenter(s): Heather Johnson, College of the Holy Cross, hjohnson@holycross.edu
 Project Discipline: Education
 Topic: Recruitment and Marketing Strategies
 URL(s): http://academics.holycross.edu/education/noyce

The Noyce project at the College of the Holy Cross has two main components: a teaching internship for first- and second-year students, and the scholarship award for third- and fourth-year students. While students have been eager to participate in the internship component of the program, there have been some distinct challenges in attracting STEM students to the scholarship opportunity. Students at high-tuition liberal arts colleges such as ours face considerable pressures to consider careers other than teaching. Nonetheless, we are now seeing a payoff from our five years of investment in cultivating Noyce candidates. We offer some reflections on key areas that seem to make a difference in attracting STEM liberal arts students to teaching: buy-in of STEM faculty, strong messaging about the justice-orientation of teaching careers, and opportunities for peers to influence each other in considering careers in education.

26

Title: Noyce Scholars Program at the College of William and Mary: Transitioning from Phase I to Phase II

NSF Noyce Award Number: 0833330

Principal Investigator (PI): Paul D. Heideman

PI Email: pdheid@wm.edu

Institution: College of William and Mary

Co-PI(s): Heather Macdonald, College of William and Mary, rhmacd@wm.edu

Marguerite Mason, College of William and Mary, mmmaso@wm.edu

Juanita Jo Matkins, College of William and Mary, jjmatk@wm.edu

Drew Stelljes, College of William and Mary, adstel@wm.edu

Presenter(s): Paul Heideman, College of William and Mary, pdheid@wm.edu

Project Discipline: Biology, Chemistry, Geosciences, Math, and Physics

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.wm.edu/as/sciencemathed/noyce/>

The College of William and Mary (W&M) has completed five years of a Phase I Noyce Scholars Program to produce 39 new science and mathematics teachers. Awards have been made to 47 Scholars (Years 1-4), and 6 new Scholars are entering for Year 6 (a no-cost extension). Our new teachers have been in mathematics (38%), biology (28%), earth sciences (10%), chemistry (17%), and physics (8%), with three-fourths at the graduate level and one-fourth at the undergraduate level. Our Noyce Program includes (a) two special one-credit academic courses for Noyce Scholars ("How Students Learn" and a Practicum focused on high-need settings), (b) science and mathematics summer internship opportunities for research, curriculum, and professional development for Noyce scholars; and (c) follow-up mentoring and support for graduates. Recruitment of students into STEM teaching at our institution has nearly tripled during our Noyce project, and visibility of STEM teaching careers has increased dramatically.

In the coming year, we will begin a Phase II Noyce project, in which we will assess the factors that encouraged our scholars to join the Noyce program, become teachers, and stay in teaching or decide to leave teaching. In addition, we will be testing a new model for preparation of teachers for high need schools that is applicable to institutions that are geographically not in easy commuting distance for student teaching in in high need schools.

27

Title: Columbus Region Academy of Future Teachers of STEM (CRAFT-STEM), Year 3 Update

NSF Noyce Award Number: 1136356

Principal Investigator (PI): Tim Howard

PI Email: thoward@ColumbusState.edu

Institution: Columbus State University

Co-PI(s): Deborah Gober, Columbus State University, gober_deborah@columbusstate.edu

Kimberly Shaw, Columbus State University, shaw_kimberly@columbusstate.edu

Cindy Ticknor, Columbus State University, ticknor_cindy@columbusstate.edu

Presenter(s): Tim Howard, Columbus State University, thoward@columbusstate.edu

Project Discipline: Biology, Chemistry, Earth and Space Science, Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://uteach.columbusstate.edu/stem/>

Through the CRAFT-STEM project (NSF #1136356), investigators utilize service learning experiences to attract students into STEM teaching careers. This will be accomplished by leveraging summer internships, scholarships, an array of existing university assets and a newly conceived STEM Honors Camp. A Teaching Connections Seminar cements the connections between university academic content and that to be taught in the K-12 setting. Key project elements include internships for university freshmen and sophomores, a summer STEM Honors Camp, CSU Centers of Excellence (Coca Cola Space Science Center, Columbus Regional Mathematics Collaborative, and Oxbow Meadows Environmental Learning Center), a Math and Science Learning Center, scholarships for pre-service teachers, and a teaching connections seminar.

28

Title: Lessons Learned: Noyce Program Phase I and Phase II

NSF Noyce Award Number: 0934809

Principal Investigator (PI): Sheila R. Vaidya

PI Email: vaidyasr@drexel.edu

Institution: Drexel University

Co-PI(s): Donald McEachron, Biomedical Engineering

Patricia Henry Russell, Mathematics Department

Presenter(s): Sheila R. Vaidya, Drexel University, School of Education, vaidyasr@drexel.edu

Project Discipline: General Science

Topic: Research and Evaluation

URL(s): <http://mobile.goodwin.drexel.edu/noyce/>

This poster will represent the retention data from thirty teachers in the Noyce program. We have followed Noyce teachers over a period of eight years to study how many have stayed in teaching beyond the two years of the Noyce requirement. Next, we interviewed teachers who have left high need schools and those who have left the profession. The interviews investigate the reasons for leaving and the reasons for staying. We also include here

lessons learned in the process of implementing the Noyce programs.

29

Title: Phase-I East Central University (ECU) Robert Noyce Teacher Scholarship Program

NSF Noyce Award Number: 0934030

Principal Investigator (PI): Robert Ferdinand

PI Email: rferdand@ecok.edu

Institution: East Central University

Presenter(s): Robert Ferdinand, East Central University, rferdand@ecok.edu

Project Discipline: Math

Topic: Project Management

URL(s): <http://cs.ecok.edu/~rferd/noyce/home.pdf>

The Phase-I East Central University (ECU) Robert Noyce Teacher Scholarship Program provides \$10,000 annual scholarships (for up to 3 years) for students in the ECU Math Teacher Certification Program. Noyce scholars start the Noyce program in the junior year of undergraduate study. In-service commitment is to teach secondary-level math in a high-need school district in the nation (preferably in Oklahoma) for two years for each year of scholarship money received. Within the pre-service Noyce program, Noyce scholars are provided professional development opportunities such as undergraduate research, funded travel to conferences and tutoring lower-level students in mathematics.

30

Title: DUETS Program: Developing Urban Educators Teaching STEM

NSF Noyce Award Number: 0833286

Principal Investigator (PI): Nina Contis

PI Email: deborah.harmon@emich.edu

Institution: Eastern Michigan University

Co-PI(s): Deborah A. Harmon, Professor, Teacher Education, Eastern Michigan University, deborah.harmon@emich.edu

Gary Hannan, Professor, Biology, Eastern Michigan University, ghannan@emich.edu

Presenter(s): Deborah A. Harmon, Eastern Michigan University, deborah.harmon@emich.edu

Project Discipline: Chemistry

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The DUETS Programs was built upon the foundation of two other highly successful programs aimed at recruiting STEM teachers and recruiting and retaining preservice teachers of color and teachers of color. EMU's Creative Scientific Inquiry Experience (CSIE) Program, an NSF-funded STEP initiative and the Minority Achievement, Resiliency, and Success (MARS) Program combined to support the preparation of STEM teachers for urban

schools. The merging of these two programs led to the creation of a comprehensive support system that follows DUETS scholars through preservice into 5 years of teaching. The result has been STEM teachers who are highly effective in urban schools who continue to receive support into their novice years of teaching.

31

Title: Co-Teaching between STEM Mentor Teachers and Pre-Service Teachers: Preparation for Student Teaching and Beyond

NSF Noyce Award Number: 1136394

Principal Investigator (PI): Shelton Ford

PI Email: sford2@uncfsu.edu

Institution: Fayetteville State University

Co-PI(s): Perry Gillespie, Fayetteville State University, pgillespie@uncfsu.edu

Erin White, Fayetteville State University, ewhite@uncfsu.edu

Kimberly Smith-Burton, Fayetteville State University, ksmith@uncfsu.edu

Presenter(s): Shelton Ford, Fayetteville State University, sford2@uncfsu.edu

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Creating a pipeline of highly qualified STEM K-12 Teachers will ensure our competitiveness as a nation. Fayetteville State University's (FSU) Preparing Future Educators for Placement in K-12 Mathematics and Science Classrooms (PrEP) Noyce Scholarship Program utilizes a mentorship approach to prepare pre-service teachers for the student teaching experience and beyond. Mentors and Noyce Scholarship participants attend monthly seminars focused on self-awareness and the use of technology in the classroom, as they relate to the Common Core Standards and North Carolina Essential Standards in Mathematics and Science. FSU's Noyce Scholars, who are pre-service candidates, co-teach with their respective mentors and are required to reflect upon the experience.

The goal of the pre-service candidate's co-teaching experience is two-fold. First, the experience expects to utilize the mentoring model to create a seamless transition to the student teaching capstone course. Also, the goal is to expose the pre-service teacher to the development and design of lesson plans, to create self-awareness and actualization and how this awareness impacts their interaction with students, and to the meaning of professional development and how their definition evolves over time. Research on mentoring indicates that mentoring can increase the retention rate of teachers. One of the most important pre-service experiences is student teaching. Being a mentor teacher for a pre-service candidate requires time, commitment, flexibility, and extensive collaboration.

Details of how the FSU's Noyce pre-service candidates and her or his mentor enter into a rich and important relationship prior to the student teaching experience will be shared, a relationship that may last years into the future and that influences both teaching careers and the new teacher's need for guidance and acceptance as a developing professional. Current processes and data will be shared regarding the effectiveness of this experience and how it has changed and impacted FSU's program participants readiness for teaching in the STEM classroom. FSU is a constituent institution of the University of North Carolina and the second-oldest public institution of higher education in the state. Founded in 1867 as the Howard School for the education of African Americans, today FSU serves a growing student body of over 6,300 and ranks among the nation's most diverse campus communities.

32

Title: Fordham University/Wildlife Conservation Society Robert Noyce Teacher Scholarship Program

NSF Noyce Award Number: 1035391

Principal Investigator (PI): John Craven

PI Email: vernon@fordham.edu

Institution: Fordham University

Co-PI(s): Deborah Lockett, Fordham University, lockett@fordham.edu

Presenter(s): Grace Vernon, Fordham University, vernon@fordham.edu

Project Discipline: Biology

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): http://www.fordham.edu/academics/colleges__graduate_s/graduate__profession/education/admissions__financia/financial_aid/gse_school_based_aid/scholarship__grant_g/science_education_sc/index.asp

The Fordham University/Wildlife Conservation Society Robert Noyce Teacher Scholarship Program at Fordham University is designed to incentivize (through scholarship and other supporting funds) talented STEM majors and professionals to become science teachers in high-needs, public schools. According to the 2008 Annual Report, the Noyce Foundation seeks to improve the potentiality of the lives of children in large part by strengthening the science instruction they are provided in K-12 educational systems particularly through informal science. That mission deeply resonates with the design of a unique science teacher preparation program launched in New York City in the year 2008 through a partnership between the Graduate School of Education (GSE) at Fordham University and the Wildlife Conservation Society/Bronx Zoo. These institutions, each a nationally renowned leader in education, have combined their expertise, institutional resources and leadership capacities to design and offer a nationally first-of-its-kind, New York State-approved Master of Science in Teaching (MST) program in science education that leads to New York State initial teacher certification in Ado-

lescence biology/Conservation Life Science Education (grades 7-12).

The Fordham University/WCS NSF Robert Noyce Scholarship program expands current partnership efforts to encourage talented science majors and professionals to become 9 -12 science teachers through a synergistic program of recruitment, education, support and induction. In doing so, this project responds to a well-documented need of highly qualified science teachers particularly in disadvantaged, high-needs urban schools. The project leverages the programmatic assets of the partnership and the awarded funds to ignite rapid growth of the new 5th Year Track science education program developed. In doing so, we fulfill the Fordham mission of serving the educational needs of urban schools in partnering districts in and around New York City.

33

Title: A Robert Noyce Scholarship Program Retrospective

NSF Noyce Award Number: 0833265

Principal Investigator (PI): James LoBue

PI Email: jlobue@georgiasouthern.edu

Institution: Georgia Southern University

Co-PI(s): Michelle Cawthorn, Georgia Southern University, mcawthor@georgiasouthern.edu

Joy Darley, Georgia Southern University, jdarley@georgiasouthern.edu

Delena Gatch, Georgia Southern University, dbgatch@georgiasouthern.edu

Marlynn Griffin, Georgia Southern University

Presenter(s): James LoBue, Georgia Southern University, jlobue@georgiasouthern.edu

Project Discipline: Math/Science

Topic: Project Management

At the "5-year mark" of our scholarship program we have recruited 36 scholars. Sixteen of these are currently teaching full-time in high needs schools, and 13 are still in the pre-service stage of teacher training. More than 25% of our scholars are from underrepresented groups. We will present these findings along with a description of key parts of our program including both on-line and face-to-face mentoring, our recruitment strategy, and our discussion of what we have learned at the end of the project. Finally, we will describe what we wish we had known about teacher recruitment and training before we began our program.

34

Title: A Preliminary Examination of a Teacher Internship Program on STEM Majors' Perceptions of Science Teaching

NSF Noyce Award Number: 0934795

Principal Investigator (PI): Gwen Benson

PI Email: tgul1@student.gsu.edu

Institution: Georgia State University
 Co-PI(s): Kadir Demir, Georgia State University, Kadir@gsu.edu
 Anton Puvirajah, Georgia State University, apuvirajah@gsu.edu
 Presenter(s): Tugce Gul, Georgia State University, tgul1@student.gsu.edu
 Mesa Davis, Georgia State University, mesa.davis@gmail.com
 Anton Puvirajah, Georgia State University, apuvirajah@gsu.edu
 Kadir Demir, Georgia State University, kadir@gsu.edu
 Project Discipline: STEM
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models

STEM majors are often dismayed at what being a teacher entails once they are placed in the classroom environment. Their discontent has detrimental effects on the quality of science education and contributes to the loss of many teachers during the induction period. In an effort to investigate this issue from a nontraditional perspective we placed STEM majors from a nationally ranked university in a six-week paid summer teaching internship opportunity where they taught science and gained authentic teaching experience in a low stakes environment. The study focuses on understanding any changes in perceptions of science teaching and the formulation of one's teaching identity as a result of those changes in perception. The rationale of this study is that providing pre-preservice teachers (PPTs) with teaching experiences before fully committing to teacher education programs will strengthen the commitment of STEM majors who enter the education pipeline.

35

Title: Influence of a Virtual Learning Environment: The Robert Noyce Urban Mathematics Educator Program Phase II at Georgia State University

NSF Noyce Award Number: 1136303
 Principal Investigator (PI): Christine D. Thomas
 PI Email: Cthomas11@gsu.edu
 Institution: Georgia State University
 Co-PI(s): Pier A. Junor Clarke, Georgia State University, pjunor@gsu.edu

Draga Vidakovic, Georgia State University, dvidakovic@gsu.edu
 Janice Fournillier, Georgia State University, jfournillier@gsu.edu
 Presenter(s): Christine D. Thomas, Georgia State University, cthomas11@gsu.edu
 Rabia Shahbaz, Georgia State University, rabia677@gmail.com
 Project Discipline: Math
 Topic: Sustainability
 URL(s): <http://umep.coe.gsu.edu/>

The Robert Noyce Urban Mathematics Educator Program (UMEP) began in 2005 as a project designed to address recruitment and retention of secondary mathematics teachers in urban high-need schools. The goal of the project was to recruit, prepare, induct, and retain 40 students with undergraduate back-

grounds in mathematics or mathematics related fields into teaching. Thirty-seven UMEP Scholars completed the degree program. Ninety-four percent of this group remained in teaching beyond the induction years. Currently, 89% of the UMEP graduates are teaching in urban high-need schools. The UMEP Phase II commenced in 2011. Monitoring, evaluation, and research within Phase II are focused on the engagement of the UMEP Scholars within the ongoing professional learning community (PLC) which transitioned from a face-to-face format to an online environment. A virtual learning environment (VLE) is used for continued support of the UMEP Scholars in developing as exemplary teachers of mathematics. Within this VLE, UMEP scholars share and examine a broad range of classroom situations. More specifically, the scholars are able to convene as a community interacting both with audio and with non-verbal cues where they model best practices, reflect on their experiences, discuss teaching the curriculum and other general topics pertinent to teaching in high-need schools such as differentiated instruction and classroom management. The UMEP Leadership Team is engaged in research designed to study the influence of the VLE on UMEP Scholars' retention in high-needs schools.

36

Title: The Effect of Infusing Problem-Based Learning (PBL) into Science Lessons on African-American NOYCE Teacher Scholarship Recipients' Science Self-Efficacy

NSF Noyce Award Number: 0934715
 Principal Investigator (PI): Carolyn Morgan
 PI Email: clairberube@hotmail.com
 Institution: Hampton University
 Co-PI(s): Clair Berube, Hampton University, clair.berube@hamptonu.edu
 Presenter(s): Clair Berube, Hampton University, clair.berube@hamptonu.edu
 LaTonia Kelley, Hampton University, kelley09@gmail.com
 Project Discipline: STEM
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models

This paper reports the results of a study of the effects of infusing problem-based learning (PBL) into science lesson plans required at the culmination of a summer STEM (science, technology, engineering and mathematics) internship at three different locations with African American NOYCE scholarship recipients. Interns' attitudes concerning science teaching were measured prior to instruction in PBL pedagogy, and again after instruction, creation and implementation of their respective PBL lessons/units using the STEBI-B instrument, which measures pre-service teachers' science self-efficacy. Results will be assessed in May, but the hypothesis is that the NOYCE scholars will have higher post-test scores on science self-efficacy as a result of their training in PBL.

37

Title: Hampton University Noyce Scholars Program for Future Biology and Mathematics Teachers- Advancing Research and Pre-Service Teaching

NSF Noyce Award Number: 0934715

Principal Investigator (PI): Carolyn B. Morgan

PI Email: carolyn.morgan@hamptonu.edu

Institution: Hampton University

Co-PI(s): Clair Berube, Hampton University,

clair.berube@hamptonu.edu

Presenter(s): Carolyn B. Morgan and Clair Berube

Project Discipline: Biology and Mathematics

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://science.hamptonu.edu/math/noyce/>

Hampton University (HU) has completed four years of a Phase I Robert Noyce Teacher Scholarship Program for future biology and mathematics teachers. The Hampton University Robert Noyce Teacher Scholarship program is designed to recruit and prepare talented science, technology, engineering, and mathematics (STEM) majors and professionals to become mathematics and biology teachers in high-need school districts. The program provides scholarships, stipends, and academic programs for undergraduate STEM majors who commit to teaching in the high-need school districts. As an undergraduate biology or mathematics major, a Noyce Teacher Scholar can receive scholarship funding during the junior year, senior year and one year of graduate study. Students can also be given a stipend for participating in the internship program in the summers.

In May 2012 we graduated one Noyce Teacher Scholar with a Master of Arts in Teaching- Biology who is currently employed by the Spotsylvania County School District as an Advanced Placement and Advanced Biology teacher for Courtland High School. She was recognized as the Spotsylvania County Teacher of the Year for 2012-2013. In May 2013 we graduated our second Noyce Teacher Scholar with a Master of Arts in Teaching- Mathematics. She is currently teaching in a high-need school district in her home state of California. Our third scholar obtained her Master of Arts in Teaching- Mathematics in May 2014 and will be teaching in the Newport News School District in the fall. Two other scholars anticipate completing their Bachelor of Science Degree in biology in the next academic year and then starting the Master in Teaching- Biology program.

Our Noyce scholars continue to be actively involved in great summer internships designed to enhance their pre-service teaching experience. One scholar served as an educational guide at the Richmond Science Museum. The Richmond Science Museum is a premier center for hands-on science education in Virginia. Our scholar worked as a guide and assisted visitors and summer camp students with the interactive exhibits on health, energy, cutting edge technology and natural science. Another scholar worked at the NASA Langley LARSS Summer of Innova-

tion (Sol) program. This program was proposed by President Barack Obama in an effort to strengthen the future STEM workforce. The Noyce Scholar worked with NASA Office of Education specialists and educators at summer camps, youth organizations, charter schools and churches to engage the underrepresented and underserved Hampton Roads middle school students in STEM activities. This poster will highlight some of the innovative summer internship program activities and some of the educational research investigations which the scholars are conducting related to statistical investigations of student assessment and infusing problem-based learning into science lessons.

38

Title: Noyce-STEM Teacher Education in the Arkansas Delta (N-STEAD)

NSF Noyce Award Number: 1239539

Principal Investigator (PI): Dionne Jackson

PI Email: jackson@hendrix.edu

Institution: Hendrix College

Co-PI(s): Liz Gron, Hendrix College, gron@hendrix.edu

James Jennings, Hendrix College, jennings@hendrix.edu

Todd Tinsley, Hendrix College, tinsley@hendrix.edu

Presenter(s): Dionne Jackson, Hendrix College, jackson@hendrix.edu

Project Discipline: Education

Topic: Recruitment and Marketing Strategies

URL(s): www.hendrix.edu/n-stead

Hendrix College's Noyce-STEM Teacher Education in the Arkansas Delta (N-STEAD) program will recruit and prepare outstanding science and mathematics majors to teach in secondary high-need schools (grades 7-12) in the Arkansas Delta, in addition to supporting them during their first two years of teaching in the Delta. The two major initiatives of the program are the N-STEAD Scholar program and the N-STEAD Internship. The N-STEAD Scholar program recruits STEM majors into teaching by significantly reducing the cost of teacher licensure. While the STEM and Education departments ensure the strength of content and pedagogy in the curriculum, newly refocused coursework and new science-based preservice apprenticeships in high-need areas reduce the cultural barriers to novice teacher success and persistence in their first high-need placement. A required two-year induction mentoring program provides on-site assessments and offers tailored assistance in content, pedagogy, and Delta culture from the Hendrix STEM and Education faculty, and Delta-based master teachers. The N-STEAD Internship allows freshman and sophomore STEM majors to teach within an informal STEM context. Students are introduced to the academic field of science education through planning lessons, presenting science to children, and assessing the outcomes through participation in a low-risk environment- the science outreach program known locally as Ridin' Dirty with Science. As a program in its second year, N-STEAD has recruited a total of six interns (two in

year one and four in year two), and a total of three scholars have been admitted into the program (one in year one and two in year two). Additionally, N-STEAD, through the assistance of Hendrix's Office of Marketing Communications, has developed a comprehensive marketing plan.

39

Title: Connecting Mathematics and Science Through a Project-Based Pedagogy

NSF Noyce Award Number: 0934766

Principal Investigator (PI): Bliidi Stemn

PI Email: catbss@hofstra.edu

Institution: Hofstra University

Co-PI(s): Behailu Mammo

Presenter(s): Behailu Mammo, Hofstra University, behailu.mammo@hofstra.edu

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.hofstra.edu/noyce

Project-based learning has evolved as a method of instruction that addresses core content through rigorous, relevant, hands-on learning. Projects tend to be more open-ended than problem-based learning, giving students more choice when it comes to demonstrating what they know.

The poster session provides an overview of Summer Institute at Hofstra University where Noyce Scholars and Fellows engage in designing project-based lessons. Noyce students then tried out this model with students during their classroom experiences. Students found out that this instructional model engaged the students and they also gained a deeper understanding of the concepts being taught through the projects.

40

Title: Indiana Noyce Science Scholars: Teachers for a New Decade

NSF Noyce Award Number: 1035234

Principal Investigator (PI): Robert Sherwood

PI Email: rdsherwo@indiana.edu

Institution: Indiana University Bloomington

Project Discipline: Biology, Chemistry, Geosciences, Physics

URL(s): <http://education.indiana.edu/noyce>

Faculty from the Indiana University Bloomington School of Education and the College of Arts and Sciences have partnered with local school districts in the Indiana Noyce Science Scholars: Teachers for a New Decade project. This project was funded in 2010 and is in its fourth full year of operation. Partner school corporations include Bartholomew Consolidated Schools, Monroe County Community Schools, North Lawrence Community

Schools and Paoli Community Schools; all in southern Indiana. All of these districts are considered "high-needs".

The Indiana Noyce Science Scholars project offers three different avenues for students to pursue teacher licensure. The first program is a joint BS/MS program where a student can complete a BS in a science area in the College of Arts and Sciences and an MS in Secondary Education in the School of Education in five years. A second program is the Secondary Transition to Teaching program where post-baccalaureate students attend an intensive 11 month program that prepares them for teacher licensure and provides them with 18 graduate credit hours. The third program is Community of Teachers, which has a strong clinical emphasis where a student will work intensely with a classroom teacher over a minimum of three semesters along with taking graduate coursework.

The project activities have focused on recruitment of students to apply for the Noyce Scholarships as well as collecting student and project data. They include:

- Updating the website with information and online application. (<http://education.indiana.edu/noyce>).
- Preparing flyers for distribution to science departments on campus and mailed to all colleges/universities in the state.
- Assisting in the preparation program for the current year (2013-14) cohort of Scholars
- Processing applications for the 2014-15 cohort of Scholars.
- Following-up with the first and second cohorts of Noyce Scholars (fourteen total) who completed their programs in 2012 and 2013.
- Collecting data on the characteristics of the first set of Scholars through both project personnel and the external evaluator.

Objectives for the next year of the project include:

- Increase communication with minority serving undergraduate institutions to increase minority scholars.
- Continue communication with both internal and external audiences.
- Work with the external evaluator for continued review of the program.
- Recruit with a scholarship goal of 12 students.
- Consider a possible expansion to undergraduate students.

41

Title: Urban Educators: Robert Noyce Scholarship for Mathematics and Science Teachers- Phase II

NSF Noyce Award Number: 0934555

Principal Investigator (PI): Kim Nguyen

PI Email: knguyen@iupui.edu

Institution: Indiana University Purdue University Indianapolis

Co-PI(s): Kathleen A. Marrs, Indiana University Purdue University Indianapolis, kmarrs@iupui.edu

Jeffrey X. Watt, Indiana University Purdue University Indianapolis, jwatt@iupui.edu

Presenter(s): Kim S. Nguyen, Indiana University Purdue University Indianapolis, knguyen@iupui.edu

Project Discipline: STEM Education

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.iupui.edu/~ucase/>

Noyce II Scholars at IUPUI are enrolled in the post-baccalaureate Transition to Teaching (T2T) program for STEM professionals. The scholars complete 18 graduate credits or one half of the MS in Secondary Education requirements and are placed in two-semester field experiences for teacher licensures in the sciences or mathematics at secondary level (grades 6-12) in one calendar year. The T2T program is built on the established collaboration between two schools: Science & Education in partnership with high-need school districts in Marion County, including Indianapolis Public Schools (IPS) system.

Noyce Phase II has three objectives: (1) continue to increase the number of secondary science and mathematics teachers - 10 teachers each year, with an emphasis on the recruitment of individuals from ethnic minorities, (2) enhance retention of novice teachers by providing ongoing mentoring for the new teachers, and (3) implement a longitudinal evaluation plan to assess the effectiveness of the Noyce Teacher Scholarship program at IUPUI.

Noyce Phase II is expected to achieve its enrollment goal in 2015. To date 17 scholars have completed the program and been teaching in high-need schools. Additionally, 5 students who will complete the training in June 2014 have secured teaching positions for 2014-15. The project has already met its goal for diversity: 15% to 20% of each cohort of Noyce II scholars are from the underrepresented minority groups.

The broader impact of Phase II project is the higher percentage of teachers retained in STEM teaching at high-need urban classrooms beyond the required service periods and the enhanced diversity of math and science teachers who commit to increasing the quantity, quality, and diversity of students in urban schools who will enter STEM fields in next decades.

42

Title: K-State TEACH: Robert Noyce Scholarship Program

NSF Noyce Award Number: 0934905

Principal Investigator (PI): Christopher T. Culbertson

PI Email: culbert@ksu.edu

Institution: Kansas State University

Co-PI(s): Carolyn Ferguson, Division of Biology, Kansas State University, ferg@ksu.edu

Sanjay Rebello, Physics Department., Kansas State University, srebello@phys.ksu.edu

Matthew Brueseke, Geology Department, Kansas State University, brueseke@ksu.edu

Presenter(s): Christopher T. Culbertson, Chemistry Department, Kansas State University, culbert@ksu.edu

Project Discipline: Chemistry

Topic: Project Management

URL(s): <http://www.coe.k-state.edu/annex/teach/>

The K-State Robert Noyce Scholarship Program is a Phase I program designed to increase the supply of highly qualified middle and high school teachers (Grades 6-12) in biology, chemistry, earth and space science, and physics.

The program seeks to:

1. provide opportunities for 25 freshmen and sophomores to work in informal STEM education settings both on and off campus;
2. increase by 17 the number of undergraduates in the targeted STEM disciplines receiving licensure; and
3. enable 12 graduates in the targeted STEM disciplines to gain licensure through a newly established Graduate Certificate in Teaching and Learning.

High needs schools have been identified and recruited through three existing partnerships: the Professional Development School Partnership, the Center for Intercultural and Multilingual Advocacy, and the Center for Rural Education and Small Schools. These targets schools serve a high percentage of individuals from families with incomes below the poverty line, a high percentage of English language learners (ELLs), and/or rural populations. The program is managed by a leadership team with members from Education, Chemistry, Biology, Physics and Geology.

The evaluation plan includes the development of a database for maintaining demographic data; the Scholars' academic progress and perceptions of the usefulness of the program elements; the effectiveness of program elements, especially new teacher support; and subsequent teaching challenges in high need schools. We have now graduated 12 students who are all employed in high-needs schools throughout Kansas with another 15 scholars presently in the program.

43**Title: Early Teaching Experiences as a Recruitment Strategy for Undergraduate Chemistry and Physics Education Students**

NSF Noyce Award Number: 1340019

Principal Investigator (PI): Michelle Dean

PI Email: drosenr@kennesaw.edu

Institution: Kennesaw State University

Co-PI(s): David Rosengrant, Kennesaw State University, drosenr@kennesaw.edu

Presenter(s): David Rosengrant, Kennesaw State University, drosenr@kennesaw.edu

Michelle Dean, Kennesaw State University, mdean28@kennesaw.edu

Project Discipline: Chemistry

Topic: Recruitment and Marketing Strategies

One of the major goals of the Pipeline to Teacher Preparation in Chemistry and Physics Noyce project at Kennesaw State University is to construct a conduit through which high school and college freshmen and sophomores are recruited through early teaching experiences. These early experiences include a summer camp and university-level service-learning course. Each of these opportunities are described here in the context of how they are used for recruitment into the teacher education degree tracks and the Noyce scholarship program.

44**Title: Having an I-IMPACT on Existing and Future Chemistry and Physics Teachers**

NSF Noyce Award Number: 1035451

Principal Investigator (PI): Greg Rushton

PI Email: noverley@kennesaw.edu

Institution: Kennesaw State University

Presenter(s): Nancy Overley, Kennesaw State University, noverley@kennesaw.edu

Project Discipline: Chemistry and Physics

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): kennesaw.edu/noyce

Our Noyce II project, I-IMPACT, the Initiative for Inspiring and Mentoring Chemistry and Physics Teachers, began in January 2011 with a primary focus at that time of recruiting Teaching Fellows and Master Teaching Fellows and developing a replicable and sustainable Professional Development program for high-school chemistry and physics teachers. The first two years of the project were devoted to recruiting two cohorts of TFs and two of MTFs and the creation and implementation of the Professional Development process. Now, with an increased emphasis on Professional Development, Research, and Dissemination, the project has evolved and taken on new responsibilities. This poster will cover all of these areas, with an emphasis on recruitment initiatives and results, the innovative Professional Development

plan and implementation, and our research and dissemination, with ideas that can be replicated and implemented in ongoing and future projects.

45**Title: I-IMPACT at Kennesaw State University: Developing Teacher Leadership Across State Lines Using an Online Induction Model**

NSF Noyce Award Number: 1035451

Principal Investigator (PI): Greg Rushton

PI Email: spolizzi@kennesaw.edu

Institution: Kennesaw State University

Co-PI(s): David Rosengrant, Kennesaw State University, drosenr@kennesaw.edu

Michelle Dean, Kennesaw State University, mdean28@kennesaw.edu

Presenter(s): Samuel Polizzi, Kennesaw State University, spolizzi@kennesaw.edu

Topic: Teacher Leadership

URL(s): <http://kennesaw.edu/noyce>

The Initiative to Increase and Mentor Physics and Chemistry Teachers (I-IMPACT) is a five year Noyce grant awarded to Kennesaw State University (KSU). Central to the I-IMPACT mission is the development of teacher leadership in Master Teaching Fellows and Teaching Fellows (TFs). TFs were recruited as career changers from STEM majors and professions and completed a pre-service Master of Arts in Teaching Chemistry or Physics degree at KSU. During their induction year, TFs engaged in an online Teacher Induction Network (TIN) through a collaboration with the University of Minnesota (Noyce PI Gillian Roehrig). TFs in Georgia and TIN participants in Minnesota accelerated their trajectory toward teacher leadership using a Venture/Vexation scaffold modified for the asynchronous online environment. Briefly, a presenter offered a teaching venture (i.e. something they would like to try) or a vexation (i.e. an obstacle to overcome). Responders were assigned different personas aligned to four teacher leader metaphors, including- teacher as a fully functioning person, reflective practitioner, scholar and learning partner. Interactions occurred over the course of a month within an asynchronous online environment using an external facilitator. Analysis of the interactions indicates that each leadership persona is conducive with the Venture/Vexation scaffold of goal resolution. Further, both presenters and responders engage in a dialogue consistent with deeper levels of reflective practice. Collectively, results suggest that our leadership model can be replicated in other teacher support systems.

46

Title: Increasing Mathematics Teachers for All Students -- Highlights of the Five Year Journey

NSF Noyce Award Number: 934791

Principal Investigator (PI): Desha Williams

PI Email: kkuhel@kennesaw.edu

Institution: Kennesaw State University

Co-PI(s): Karen Kuhel, Kennesaw State University, kkuhel@kennesaw.edu

Belinda Edwards, Kennesaw State University, bedward@kennesaw.edu

Adrian Epps, Kennesaw State University, aepps@kennesaw.edu

Presenter(s): Karen Kuhel, Kennesaw State University, kkuhel@kennesaw.edu

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.kennesaw.edu/noyce/

There is a continuing need for all teachers to be prepared to educate all students effectively in mathematics, including those who have limited English proficiency (Thomas & Collier, 2001). However, a small minority of teacher preparation programs actually prepare mainstream teachers to teach English learners (ELs) (Collins, 2012). Frequently, ELs are placed in mathematics classrooms while still in the early stages of learning English (Abedi, Courtney, Leon, Kao, & Azzam, 2006). The rationale has been that mathematics is a universal language. However, this rationale is not valid. Mathematics in K-12 classrooms is not focused on only numbers and equations; it also requires significant literacy skills (Moschkovich, 2012).

Teachers who are prepared to teach culturally and linguistically diverse students are better equipped with the knowledge, skills, and disposition to academically challenge all students. The Increasing Mathematics Teachers for ALL Students (IMTAS) project is designed to encourage and enable candidates with strong mathematical backgrounds to pursue careers in high school mathematics teaching while simultaneously focusing on innovative pedagogical techniques that combine best practices in social justice, culturally responsive pedagogy, and language support for ELs. At the completion of the program, candidates are certified to teach secondary mathematics and have an opportunity to earn an endorsement to teach ELs.

The IMTAS grant has reached the end of its fifth year. The grant has provided 38 two-year \$10,000 scholarships to academically talented mathematics majors and STEM professionals. Twenty-five of these alumni scholars are teaching in high-need schools. Five additional scholars are currently enrolled in the MAT Mathematics program at Kennesaw State University. We have collected a variety of data over the course of the grant. Data include: workshop surveys, interviews, application information, classroom assignments, and an attitudinal survey. Currently project investigators are examining a) the impact of culturally and

linguistically responsive pedagogy on graduates' practice; b) how the program impacts cultural dispositions; c) enactment of cultural dispositions in the mathematics classroom; and d) conceptualization of culturally and linguistically relevant mathematical tasks. The poster presentation will cover the accomplishments of the IMTAS grant, updates from data analysis, and next steps.

47

Title: Noyce STEMELL at Lehman College: A Model Program for Preparing Teachers of English Language Learners (ELLs)

NSF Noyce Award Number: 1339981

Principal Investigator (PI): Serigne M. Gningue

PI Email: serigne.gningue@lehman.cuny.edu

Institution: Lehman College

Co-PI(s): Gillian Bayne, Liesl Jones, Andrei Jitianu

Presenter(s): Serigne M. Gningue, Gillian Bayne, Allison Merino

Project Discipline: Mathematics Education

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The purpose of the Noyce STEMELL project is to prepare highly-qualified science and mathematics teachers for high-need middle and high schools by providing extensive support at both undergraduate and graduate levels with a special focus on teaching to English language learners (ELLs) in mainstream mathematics and science classrooms. Over a five-year period, the STEMELL Program will admit three cohorts of 8 prospective secondary school mathematics and science teachers each, a total of 24 teachers who will progress each through a three-year program: 2014-17; 2015-18; 2016-19. Students are currently being recruited from Lehman College's undergraduate population of mathematics or science majors.

To prepare the STEMELL pre-service Noyce teachers to meet the challenges of urban teaching in high-need schools, each cohort will progress through a 5th year BA/MA teacher preparation program beginning in the junior year. The BA/MA sequence will lead to: a BA degree in mathematics or science (STEMELL Year 2), NYS Initial Certification to teach mathematics or science in grades 7-12 (STEMELL Year 2), and a Master's degree in Science of Education (STEMELL Year 3). Rigorous and innovative coursework at undergraduate and graduate levels will be complemented with multi-layered internships at a Lehman School-Based ELL Center (SBELL), a school for newcomers that have agreed to house the first year internship activities of each cohort. All Noyce Scholars will experience three levels of supervised internship during which they will:

1. Have opportunities to observe and understand the needs of ELLs in classrooms at the SBELL and gradually take responsibilities for tutoring ELLs in Fall 1 (Level I);
2. Co-teach mathematics or science to ELLs at the SBELL on Saturdays in Spring 1 (Level II); and

3. Be mentored during student teaching in Spring 2 and during their first year of full time teaching in schools after being initially-certified to teach in New York State (Level III-Fall & Spring 3).

Noyce Teachers will receive in-depth mentoring from college mentors over the last year of their graduate study. The comprehensive mentoring system will include: monthly classroom observations by a college mentor, participation in an education seminar led by a college mentor, collective professional development through use of online resources such as Blackboard, and support of peers.

Throughout the process, Noyce Scholars will team up with mentor teachers to conduct action research to examine efficacy of particular practices for improving student mathematics or science achievement among ELLs. Noyce Scholars will develop an action research ePortfolio, culminating with a formal research project in the capstone research class. Research activities also include an in-depth look at how teacher induction that seeks the development of teachers' content and pedagogical knowledge within a community of practice will result in improved teacher self-efficacy, beliefs and attitudes toward ELL inclusion, and in the improvement of learning for ALL students.

48

Title: Lehman College Noyce Teachers' Beliefs and their Ways of Teaching in Urban Schools

NSF Noyce Award Number: 0833317

Principal Investigator (PI): Gaoyin Qian

PI Email: gaoyin.qian@lehman.cuny.edu

Institution: Lehman College

Co-PI(s): Serigne Gningue, Lehman College, serigne.gningue@lehman.cuny.edu

Liesl Jones, Lehman College, liesl.jones@lehman.cuny.edu

Andrei Titianu, Lehman College, andrei.titianu@lehman.cuny.edu

Presenter(s): Serigne Gningue, Lehman College, serigne.gningue@lehman.cuny.edu

Gillian Bayne, Lehman College, gillian.bayne@lehman.cuny.edu

Allison Merino, Lehman College, allison.merino@lehman.cuny.edu

Project Discipline: STEM

Topic: Research and Evaluation

In 2009, Lehman College admitted its first cohort of 9 Noyce Scholars through the Mathematics and Science Teacher Education Recruitment (MASTER) Program. The Program, designed to prepare 24 New York State Initially-Certified (NYSIC) mathematics and science teachers for high-need inner-city middle schools within a four-year period, provided a one-year scholarship for undergraduate STEM seniors to complete a BA Degree and earn a NYS-approved alternate certificate that enabled them to teach while completing a Masters' Degree in mathematics or science

education in grades 5-12. As in-service teachers, they received scholarships for two years and earned a full NYSIC at the completion of the program.

To date, 23 Noyce Scholars have completed the program with 16 of them now teaching mathematics or science in NYC public schools (1st year [n=4], 2nd-year [n=7], 3rd-year [n=5]). Using an Epistemological Belief Questionnaire ([EBQ], Schommer & Durnell's, 1995) and a Classroom Observation Protocol (COP) adapted from Lawrenz et al. (2002), we investigated: (1) The degree to which Noyce scholars adhere to practices that are deemed current and effective; (2) The influence of the program on Noyce scholars' beliefs about teaching and learning; and (3) The relationship between Noyce scholars' beliefs about teaching and learning and the types of instruction they tend to use in the classroom.

The COP included a number of discrete pedagogical behaviors (Lecture, demonstration, hands-on-activities, cooperative learning, etc) and a measure of the level of cognitive activity (Receipt of Knowledge [RK, Level 1], procedural knowledge [PK, L2], Knowledge representation [KR, L3], and Knowledge construction [KC, L4]) that was displayed during the lesson.

Students in Noyce Teachers' classes were engaged significantly more in higher order thinking skills activities than in RK activities. However, no differences were found between Levels 2 and 3 activities. No significant differences in Noyce Scholars' use of practices classified as RK, PK, KR, or KC were observed in the function of the Number of Years of Teaching. Noyce Teachers' beliefs were found significantly related to Knowledge Reception ($F(3,12)=4.77, p=.02$) and Skill Building ($F(3,12)=4.025, p=.03$). In both instances, certain knowledge was found to be a strong predictor of the instruction that requires Knowledge Reception and Skill Building. The relationship of Noyce Teachers' beliefs was not found to be significantly related to the types of instruction that requires Knowledge Representation and Knowledge Construction.

49

Title: Noyce TIGERS Enhances Key Components of GeauxTeach

NSF Noyce Award Number: 0934893

Principal Investigator (PI): David Kirshner

PI Email: sbesson@lsu.edu

Institution: Louisiana State University

Co-PI(s): Brenda Nixon, LSU, bnixon@lsu.edu

Paula Summers Calderon, LSU, pscald@lsu.edu

Presenter(s): Sharon Besson, LSU, sbesson@lsu.edu

Project Discipline: Biology, Chemistry, Math and Physics

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.lsu.edu/secondaryed

Noyce TIGERS, coupled with GeauxTeach, serves as a blueprint for a comprehensive, effective STEM teacher preparation program that includes not only the education components, but also the authentic research practices that should be embedded within teacher preparation models.

GeauxTeach engages undergraduate students in K-12 field experiences early in their academic careers, generally in their first semester as freshmen, thus creating a more field-intensive curriculum than traditional certification routes.

- Noyce TIGERS Internships build on this framework by including experiences in university laboratories of practicing researchers to further expand their knowledge and understanding of scientific and mathematical research practices to inform their classroom practices. From the first cohort in the summer of 2010 and including the interns for the summer of 2014, there have been 46 students participating in the 9-week summer research program.
- Noyce TIGERS Scholarships serve as a recruiting tool for high performing science and math undergraduates to commit to a long-term teaching career and work in high-needs schools. Since 2009, LSU has awarded Noyce TIGERS Scholarships to 28 students. Of the 28 students, 19 have graduated. The requirement of teaching for two years in a high needs school district has been met by 11 graduates. There are 6 graduates that have been teaching less than two years. There are 2 graduates that are not on track but still have 2 - 3 years to meet the requirements.

50

Title: Mercy College Intensive STEM Teacher Initiative

NSF Noyce Award Number: 1339951

Principal Investigator (PI): Meghan E. Marrero

PI Email: mmarrero3@mercy.edu

Institution: Mercy College

Co-PI(s): Marion Ben-Jacob, Amanda M. Gunning, Anthony Canger, William Farber

Presenter(s): Meghan E. Marrero, Mercy College, mmarrero3@mercy.edu

Project Discipline: Biology and Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.mercy.edu/misti

The Mercy College Intensive STEM Teacher Initiative (MISTI), a Track I, Phase I Noyce Teacher Scholarship Program, is a five-year program designed to produce 20 certified high school or middle school math and biology teachers, each with a major in biology or mathematics and each earning a Masters in Adolescence Education as well as New York State teaching certification.

Activities specifically designed for this program include STEM Summer Immersion Camps at the end of the freshman and sophomore years and, for juniors and seniors, an introduction to teaching that features classroom observations, peer teaching, pedagogical seminars, workshop development and presentation at the Mercy College Parent Center in the Bronx, and culminates in a full-year clinical residency in high-need middle and high schools. Noyce Scholars receive intensive mentoring at the undergraduate, graduate, and induction level through their interactions with faculty and the summer immersion experiences. The program puts an emphasis on community building through an online community of practice; and explicitly integrates STEM subjects through a summer engineering experience at the Polytechnic Institute of New York University.

The MISTI program is being enacted in concert with three local community colleges: Bronx Community College, Rockland Community College, and Westchester Community College. Together, faculty from the three colleges are developing new pathways for recruiting and retaining teachers in math and biology.

51

Title: Michigan Tech Noyce Scholars Program

NSF Noyce Award Number: 0934763

Principal Investigator (PI): Bradley Baltensperger

PI Email: jaszczak@mtu.edu

Institution: Michigan Technological University

Co-PI(s): Chris Anderson, Michigan Technological University, csanders@mtu.edu

Sarah Green, Michigan Technological University, sgreen@mtu.edu

John Jaszczak, Michigan Technological University, jaszczak@mtu.edu

Bradley Baltensperger, Michigan Technological University

Presenter(s): John A. Jaszczak, Michigan Technological University, jaszczak@mtu.edu

Project Discipline: Biology, Chemistry, Mathematics, Physics, Geosciences

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.mtu.edu/cls/education/certification/noyce/noyce.html>

The Michigan Tech Noyce Scholars program, now in its final year, has supported approximately 20 STEM majors and STEM graduates working toward teacher certification. Because the university is located in a rural region quite distant from major metropolitan areas and associated high need districts, the program established partnerships to better prepare Noyce Scholars for careers in urban school systems.

Michigan Tech has partnered with the public schools of Saginaw and Grand Rapids, and faculty from Saginaw Valley State Univer-

sity and Grand Valley State University. Saginaw Public Schools hosted scholars for three intensive field experiences for Scholars; both districts accepted several Scholars for student teaching. The partner universities provided pre-service mentoring of scholars; Michigan Tech faculty have provided pre-service instruction and overall program guidance.

The most successful aspect of the program has been a one-week field experience conducted in the Saginaw Public Schools. The scholars prepared intensively for their visit and faculty arranged assignments for them to help structure their classroom observations. Faculty from Saginaw Valley State University arranged appropriate placements for the scholars, handled supervision, and led discussions during the weeklong clinical experience.

Upon their return, the scholars presented a seminar on their experiences to the Noyce team and Scholars. Uniformly, participating scholars were inspired by the experience, even as their eyes were opened to the difficulties that teachers face in dealing with such issues as high absenteeism, classroom crowding, and student motivation.

52

Title: Connecting Scholar Cohorts for Optimal Success at Millersville University

NSF Noyce Award Number: 1136359

Principal Investigator (PI): Janet A. White

PI Email: jwhite@millersville.edu

Institution: Millersville University of PA

Presenter(s): Janet A. White, Millersville University, jwhite@millersville.edu

Project Discipline: Math

Topic: Supporting New Teachers

URL(s): <http://www.millersville.edu/math/Noyce/index.php>

The Millersville University (MU) Noyce Scholars Program recently accepted its 3rd cohort of scholars. The 1st cohort (5 undergrads and 1 post-bacc student) finished their certification in May 2014, are actively looking for employment and are participating in a summer graduate course: "Transitioning to the First Teaching Position." "The challenge for mathematics teacher education programs is to develop strategies to prepare the pre-service teacher with the theory, skills, and aptitude to teach all students" (Gardner, 2005). MU's program provides mathematics education majors with a greater opportunity to develop those necessary skills in preparation for the realities of any classroom. The 2nd cohort began in the fall of 2013 with 8 members, and was joined by a post-bacc student in May of 2014. In the fall of 2014, our 3rd cohort of 4 undergraduates will begin. Recruitment of a large number of candidates remains a challenge of the program.

While nurturing each scholar, we are creating a sense of community among scholars and faculty. Scholars engage in experiences designed to enrich their overall education. In addition to guest speakers, round table discussions, and webinars, our 1st scholars participated in an action research project related to reasoning and sense-making in mathematics classrooms. The scholars created tasks which foster habits of reasoning and conducted a presentation and poster sessions at the 2013 annual meeting of the Pennsylvania Council of Teachers of Mathematics. The 2nd cohort has begun to finalize their task utilizing technology (Geogebra) to strengthen the understanding of geometric topics.

Our Noyce program has continued to strengthen our partnership with a local secondary high-needs district. A school indicated a need for volunteers to assist with remediation of their students and our 1st cohort served as tutors/teacher aides within the high school. This cohort was also placed in the district for early field experience and for some student teaching. The 2nd cohort took over tutoring, and then worked regularly with a teacher's class on a rotating basis. The 2nd year also brought the two cohorts together for multiple gatherings - each learning from the other.

Our scholars participate in a Philadelphia Urban Immersion Seminar. The seminar is an existing MU program that immerses students in an urban school setting, under the supervision of MU and School District of Philadelphia professionals. The program is an intensive two-week for-credit experience that introduces students to the unique needs of urban schools and the positive cultural aspects of urban students, with the goal of helping pre-service teachers gain a more complete and positive view of working in urban schools. They experience urban culture as well as participate in community service projects. As a result, they gain additional field experience beyond their degree requirements.

53

Title: Sustaining Teachers as Learners; Inspiring Collegiality in Curriculum Development

NSF Noyce Award Number: 0833243

Principal Investigator (PI): Ruth Cossey

PI Email: rcossey@mills.edu

Institution: Mills College

Co-PI(s): Barbara Li Santi, Mills College, barbara@mills.edu

Presenter(s): Steven Luntz, Mills College

Ruth Cossey, Mills College, rcossey@mills.edu

Christine Aguzar, christine.aguzar@gmail.com, Mills College, Noyce Fellow

Ryan Cox, racox@mail.sfsu.edu, Mills College, Noyce Fellow

Zubin Hu, zhu@mills.edu, Mills College, Noyce Fellow

Lily Jefferies, lilyjefferies@gmail.com, Mills College, Noyce Fellow

Steve Luntz, sluntz@earthlink.net, Mills College, Faculty Supervisor of Noyce Student Teaching Fellows

Kimberly Padua, kimberlypadua@gmail.com, Mills College, Noyce Fellow
Lauren Stoll, laurenkstoll@gmail.com, Mills College, Noyce Fellow
Project Discipline: Math and Science Education
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Open the Gate is a partnership between ten San Francisco East Bay school districts and Mills College's Division of Natural Sciences, Mathematics and Psychology and the School of Education. Our goal is to: increase recruitment of female undergraduate science, technology, engineering and mathematics (STEM) majors and STEM professionals and recent college graduates into STEM teaching professions in area middle and high schools; offer comprehensive mentoring and support for STEM trained teachers; and, evaluate the factors influencing recruitment, preparation and retention of Open the Gate Scholars. The project includes research project to study the Mills' model of teacher education and the factors within it that support our teacher graduates' high retention rates in urban high-needs schools.

One component of our Noyce Teacher Scholars project is the engagement of mathematics and science pre-service and in-service teachers in projects that we hope sustain teachers as learners and to develop their capacity to critique and develop curriculum. We wished to uncover and highlight those experiences that allow our graduates to develop an inquiry approach to urban teaching within a collaborative, reflective frame grounded in an ethic of care and to maintain an orientation towards social justice. We hypothesized that such lenses would positively impact new teachers' success and longevity as STEM educators in high poverty schools.

We will discuss two common practices in the program: The Spiral Curriculum Project, and In-service classroom-based inquiry projects related to completion of our master's degree with an emphasis on teaching. The Spiral Curriculum Project is an integral part of the mathematics and science teaching curriculum at Mills College. We will report on the experiences of Scholars as they participated in curriculum study as a teacher 'owned' process of inquiry. We will also discuss the subsequent reflections on spiral curriculum development by graduates as teachers of record. Our graduates are also invited to prepare a classroom-based inquiry project during the first five years as teacher of record as an important part of the MEET master's degree program. Several Open the Gate Scholars have completed or are currently completing such projects. We report on those experiences as an amplification of the inquiry stance gained in the pre-service year.

54

Title: Noyce STEM Teachers Scholars Program: Developing 21st Century STEM Teachers

NSF Noyce Award Number: 0934886
Principal Investigator (PI): Linda T. Coats
PI Email: LCoats@colled.msstate.edu
Institution: Mississippi State University
Presenter(s): Linda T. Coats, Mississippi State University, LCoats@colled.msstate.edu
Project Discipline: Math
Topic: Supporting New Teachers
URL(s): www.noyce.msstate.edu

The Noyce STEM Teachers Scholars Program at Mississippi State University has produced highly qualified and effective STEM teachers to serve the educational needs of at-risk school districts in the states of Mississippi and Alabama. In addition to ensuring that STEM teachers are qualified to enter the classroom, efforts must be made to ensure that STEM teachers have access to and receive the knowledge and skills needed for them to remain in the classroom as effective teachers. This year's poster presentation will highlight the program's summer professional development, subject-matter enrichment, and summer teaching experiences for Noyce teachers.

55

Title: A Project for Montana's Underserved American Indian and Rural Populations

NSF Noyce Award Number: 1339919
Principal Investigator (PI): Kenneth W. Miller
PI Email: kmiller@msubillings.edu
Institution: Montana State University, Billings
Co-PI(s): Mark Jacobsen, [mjacobson@msubillings.edu](mailto:mjacobsen@msubillings.edu), Montana State University Billings
Stuart Snyder ssnyder@msubillings.edu, Montana State University Billings
Presenter(s): Kenneth Miller, Montana State University Billings, kmiller@msubillings.edu
Project Discipline: Broadfield Science and Mathematics
Topic: Innovative Noyce Program Practices and Teacher Preparation Models
URL(s): Noyce Scholarship Program Billings, Montana- www.msubillings.edu/nsp/
National Science Foundation- www.nsfnoyce.org
The Noyce Foundation- www.noycefdn.org

The Noyce Scholarship Program at MSU Billings is working to prepare 12 undergraduate and 6 STEM Math and Broadfield Science teachers with additional content and pedagogical skills to work with reluctant learners in Montana, particularly those on or near American Indian Reservations. Six additional courses in place-based design and additional pedagogical coursework dealing with cultural issues have been design and are in place. These

courses help to prepare our Noyce Scholars to work with our under-served American Indian and Rural populations.

56

Title: Montclair State University Noyce Teacher Scholarship Program

NSF Noyce Award Number: 1339956
 Principal Investigator (PI): Sandra D. Adams
 PI Email: adamssa@mail.montclair.edu
 Institution: Montclair State University
 Co-PI(s): Douglas Larkin, Montclair State University, larkind@mail.montclair.edu
 John Berger, County College of Morris, jberger@ccm.edu
 Presenter(s): Sandra D. Adams, Montclair State University, adamssa@mail.montclair.edu
 Project Discipline: Biology, Chemistry, Earth Science and Physics
 Topic: Partnerships
 URL(s): <http://www.montclair.edu/csam/noyce-teacher-scholarship/>

The Montclair State University Robert Noyce Teacher Scholarship Program is dedicated to recruiting, preparing and supporting new science teachers for New Jersey's high-need K-12 school districts, through a partnership with local community colleges. This project offers two years of scholarships equal to the amount of New Jersey in-state tuition and fees, as well as an annual stipend of \$3,000 to undergraduate chemistry, physics, earth science and biology majors admitted into the Montclair State Teacher Education Program. During year one of our program, eight students were selected as Noyce Scholars, with their support to begin during the 2014 - 2015 academic year. Students will participate in a Summer Career Experience in summer 2014.

57

Title: Teaching Pathways Opening Doors to STEM (TPOD STEM): Learning Assistants and Learning Communities

NSF Noyce Award Number: 1239965
 Principal Investigator (PI): Debra Poese
 PI Email: debra.poese@montgomerycollege.edu
 Institution: Montgomery College
 Co-PI(s): John Hamman, Montgomery College, john.hamman@montgomerycollege.edu
 Eugene Li, Montgomery College, eugene.li@montgomerycollege.edu
 Eun-Woo Chang, Montgomery College, eun-woo.chang@montgomerycollege.edu
 Barbara Hoberman, Montgomery College, barbara.hoberman@montgomerycollege.edu
 Presenter(s): Debra Poese, Montgomery College, debra.poese@montgomerycollege.edu
 Eun-Woo Chang, Montgomery College, eun-woo.chang@montgomerycollege.edu

Project Discipline: Multiple
 Topic: Recruitment and Marketing Strategies
 URL(s): www.montgomerycollege.edu/TPODSTEM

Teaching Pathways Opening Doors to STEM (TPOD STEM) This capacity building NSF Noyce grant project is designed to increase the number and diversity of highly qualified STEM teachers, by designing, developing and supporting coordinated pathways into K-12 mathematics and science teaching careers for high school and community college students, as well as the large population of skilled STEM professionals in the community who may also be interested.

Adapted for our community college environment from the Learning Assistant program at University of Colorado--Boulder, Learning Assistants are selected to work with faculty mentors across all STEM fields as they 'try on' the teaching experience and assist in implementing more student centered instruction. Learning community models, including sections of the "first courses" in the STEM teaching fields, provide cross-disciplinary STEM pedagogy exposure as well as strategies for student engagement.

58

Title: NSF Noyce Program at City Tech and BMCC--Year 1

NSF Noyce Award Number: 1340007
 Principal Investigator (PI): Fangyang Shen
 PI Email: fshen@citytech.cuny.edu
 Institution: New York City College of Technology (CUNY)
 Project Discipline: Computer Science

New York City College of Technology (City Tech) and Borough of Manhattan Community College (BMCC), neighboring CUNY institutions, are implementing a Noyce Teacher Scholarship Phase I program that increases the number of highly qualified STEM teachers in high need school districts in Brooklyn and the New York metropolitan area. The three-tiered Noyce partnership recruits students in their first and second years of STEM undergraduate studies and enrolls them as Noyce Explorers (Tier I). The Noyce Explorers, Scholars, Teachers (NEST) program leads Noyce Explorers through an engaging summer program at BMCC that offers a combination of STEM content, STEM pedagogy, and provides an opportunity to interact in a pedagogical role with peers and/or younger students, through peer tutoring, mentoring, and in other quasi-instructional capacities.

Results for first year: recruiting one Noyce scholar, 16 Noyce Interns, 20 Noyce summer program students

59

Title: Kenan Master Teaching Fellows: Linking Research Experiences and Curriculum Development with Leadership

NSF Noyce Award Number: 0934658

Principal Investigator (PI): Ruben Carbonell

PI Email: kctucker@ncsu.edu

Institution: North Carolina State University

Co-PI(s): Susan Parry, North Carolina State University, skparry@ncsu.edu

Presenter(s): Craig Tucker, North Carolina State University - Kenan Fellows Program, kctucker@ncsu.edu

Keenan Locklear, Public Schools of Robeson County - Kenan Fellows Program, keenan.locklear@robeson.k12.nc.us

Project Discipline: Teacher Development

Topic: Teacher Leadership

URL(s): <http://kenanfellows.org/>

The goal of the Kenan Fellows Program's Master Teaching Fellows program is to select, build and support a network of highly trained and influential master STEM teachers as part of a concerted effort among several high needs school districts, local institutions of higher education and regional community organizations. Kenan Master Teaching Fellows (KMTFs) participating in the National Science Foundation's Robert Noyce Teacher Scholarship Program from high-need schools in the eleven-county Base Realignment and Closure (BRAC)-region in North Carolina have completed two-year fellowships and have now transitioned into their role as "master teachers" in their districts and the region as a whole. Kenan Master Teaching Fellows have and will continue to engage pre-service programs in partner institutions of higher education as well as the new teacher induction programs in their respective school districts in the BRAC-region to help cultivate and better equip the next generation of educators. Their efforts to provide locally relevant professional development and support have already reached a significant number of pre-service, beginning and mentor teachers, as well as faculty and staff from both institutions of higher education and school districts in the region.

60

Title: Developing Teacher Leaders through PRIME

NSF Noyce Award Number: 934709

Principal Investigator (PI): Teri J. Murphy

PI Email: buckleyb1@nku.edu

Institution: Northern Kentucky University

Co-PI(s): Bethany Noblitt, Northern Kentucky University, noblittb@nku.edu

Brooke Buckley, Northern Kentucky University, buckleyb1@nku.edu

Sarah Kasten, Northern Kentucky University, kastens1@nku.edu

Presenter(s): Brooke Buckley, Northern Kentucky University, buckleyb1@nku.edu

Nolan Boone, Northern Kentucky University, boonen1@nku.edu

Project Discipline: Math

Topic: Teacher Leadership

URL(s): <http://prime.nku.edu>

The PRIME project (Preparing Regional Increases in Mathematics Educators) at Northern Kentucky University is designed to increase the number and effectiveness of secondary mathematics teachers in high-need schools by providing scholarships, travel funds, and professional development opportunities to pre-service teachers. The project includes two facets: internships for incoming freshmen and rising sophomores to engage in a summer experience designed to stimulate interest in becoming secondary mathematics teachers and scholarships for academically talented students in their junior and senior years. An overarching goal for both of these student experiences is to foster valuable leadership skills as they begin their teaching career. This poster will highlight the leadership development of our interns and scholars.

In summer 2013, grant personnel implemented a new experience for interns which incorporated the assistance of current pre-service and in-service Noyce scholars. An intensive three-week experience was offered which culminated in a week-long mathematics camp for middle grades students. Interns and scholars met together for two weeks to plan each day of camp under the direction of project personnel. A group of 12 middle school students attended camp during the third week. Each day of camp was led by a subset of scholars and interns. The process of planning and implementing an intensive 4-hour lesson gave both the interns and scholars valuable leadership experience.

From the inception of the grant, Noyce scholars have participated in monthly professional development opportunities. While the primary focus of these meetings is deepening content knowledge, they have also served as a mechanism by which pre-service teachers have increased their leadership capacity. In the past year, pre-service Noyce scholars have led professional development meetings for their peers and presented at state and national conferences. One scholar organized a mini-conference sponsored by the Northern Kentucky Council of Teachers of Mathematics for pre- and in-service teachers in the region. The mini-conference featured concurrent sessions, many of which were facilitated by Noyce scholars. The exposure to leadership opportunities pre-service teachers have been given through the PRIME project has poised Noyce teachers to take on leadership roles in their first several years of teaching.

The PRIME project is a collaboration between the Kentucky Center for Mathematics, the Center for Integrative Natural Sciences and Mathematics, the Departments of Mathematics and Statistics and Teacher Education, and three local school districts. To date, 13 interns have been funded by the project and 77 student-semester of scholarships have been awarded to 23 scholars. A total of 68 person-years of teaching in high-need districts is anticipated, 18 of which have already been completed.

61**Title: Northern New Mexico College Noyce Scholars Program**

NSF Noyce Award Number: 1035465
 Principal Investigator (PI): David Torres
 PI Email: davytorres@nmmc.edu
 Institution: Northern New Mexico College
 Co-PI(s): Alfredo Perez, Northern New Mexico College, ajperez@nmmc.edu
 Melissa Salazar, Northern New Mexico College, melissa.salazar@nmmc.edu
 Project Discipline: Math
 URL(s): <http://nmmc.edu/news/noyce>

Northern New Mexico College's poster will present information on Noyce scholars recruited, recruitment activities, Noyce seminars, and professional development activities. We will also present results from an article published using data from Noyce activities.

62**Title: The Robert Noyce Scholars Program at Purdue University: Supporting Beginning STEM Teachers in the Induction Years**

NSF Noyce Award Number: 0833298
 Principal Investigator (PI): Lynn Bryan
 PI Email: labryan@purdue.edu
 Institution: Purdue University
 Presenter(s): Lynn Bryan
 Project Discipline: Multiple STEM Disciplines
 Topic: Supporting New Teachers

The Robert Noyce Scholars Program at Purdue University aims to attract the very best teacher education candidates to STEM education in high need schools, particularly schools in rural Indiana communities. While the Noyce Scholars Program is able to recruit highly talented and successful STEM teachers, until recently less attention had been given to the retention of Noyce Scholar-Teachers, particularly during their induction years (first three years of teaching). In fact, research underscores the importance of providing a systematic, coherent induction experience for beginning teachers that: (1) includes opportunities for a community veteran and beginning teachers to learn together in a supportive environment that promotes collaboration and a gradual acculturation into the teaching profession; (2) allows time for mentoring and intentional reflection on practices; (3) focuses on growth and development throughout each year rather than end-of-year assessments; and (4) aligns with quality teaching standards. To this end, we have designed and will share the blueprint for a three-year induction program with a STEM-specific for Noyce Scholars that takes into account the key elements of a comprehensive induction program.

63**Title: Rio Salado College's Innovative Noyce Scholars Post Baccalaureate Teacher Preparation Program**

NSF Noyce Award Number: 1136435
 Principal Investigator (PI): Jennifer Gresko
 PI Email: Jennifer.Gresko@riosalado.edu
 Institution: Rio Salado College
 Co-PI(s): Shannon (Corona) McCarty, Rio Salado College, shannon.mccarty@riosalado.edu
 Richard Vaughn, Rio Salado College, rick.vaughn@riosalado.edu
 John Jensen, Rio Salado College, john.jenson@riosalado.edu
 Presenter(s): Kimberly Tobey, Director of Innovative Initiatives, Rio Salado College, Kimberly.Tobey@riosalado.edu
 Karen Nave, Noyce Scholars Program Manager, Rio Salado College, Karen.Nave@riosalado.edu
 Project Discipline: Math and Science
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models
 URL(s): www.riosalado.edu/noyce

A nationwide shortage of qualified math and science teachers has led to sustained local, state, and federal efforts to recruit and retain additional teachers in these areas. The Rio Salado College (RSC) Science and Math Innovative Learning Environments (SMILE) Program for Encore Careers in Education will support the recruitment and training of 40 STEM professionals to aid their transition into teaching careers in 7th-12th grade math and science classrooms in Arizona. Working with STEM-related industries in Arizona, Rio Salado College is identifying STEM professionals who are interested in transitioning to teaching careers and assist them in meeting eligibility requirements and applying to the program. Successful applicants will complete a comprehensive 15-month teacher certification program (based on the college's Post-Baccalaureate Teacher Preparation Program) with online course instruction and onsite student teaching experiences in conveniently located school districts. RSC will also provide mentoring and professional support to SMILE participants as they fulfill the required teaching commitment in high-need schools.

The primary goal of the SMILE program is to increase the number and quality of math and science teachers available to high-need schools in Arizona. During the first three years of the program sixteen (16) Post-Baccalaureate STEM Professionals have been recruited and have begun the program. Each Noyce Scholar has received a stipend of \$16,500 which helps to cover tuition, books, fees and some cost of living. The hybrid format of the SMILE program has allowed scholars to continue working as they complete online coursework, minimizing the financial impact of participation in the program and potentially limiting the period of unemployment to the time required for onsite student teaching. RSC has partnered with school districts and STEM industry to recruit and train STEM professionals who are re-careering to teach math or science in Arizona 7th - 12th grade classrooms.

Three cohorts of outstanding STEM professionals from Arizona industry bring their STEM expertise and real life experiences to Arizona students. The RSC Noyce Scholars Program is committed to helping transition these STEM professionals as well as train them in pedagogy, student engagement, classroom management, and other 21st century teaching strategies.

64

Title: Scientists, Technologists, Engineers and Mathematicians for Education Scholarship Program (STEM-ESP)

NSF Noyce Award Number: 1136381

Principal Investigator (PI): Ilene Rosen

PI Email: ilrosen@rci.rutgers.edu

Institution: Rutgers University, School of Engineering

Co-PI(s): Michael S. Brown, Rutgers School of Engineering, mikebr@rci.rutgers.edu

Eugenia Etkina, Rutgers Graduate School of Education, eugenia.etkina@gse.rutgers.edu

Thomas V. Papatomas, Rutgers School of Engineering, papatom@rci.rutgers.edu

Presenter(s): Ilene Rosen, Rutgers School of Engineering, ilrosen@rci.rutgers.edu

Michael S. Brown, Rutgers School of Engineering, mikebr@rci.rutgers.edu

Project Discipline: STEM Education

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://soe.rutgers.edu/stem-education-scholarship-program>

The goals of the STEM for Education Scholarship Program (STEM-ESP) at Rutgers University are to recruit, retain, and graduate a community of engineers and physicists who are dedicated to teaching physics, mathematics and engineering in high-needs, K-12 school districts. With an overarching theme of 'STEM for Humanity', the project enhances Rutgers existing programs by blending the physics and engineering undergraduate programs with the existing graduate teacher preparation programs, strengthening the focus on teaching physics and mathematics to students in high-needs districts and infusing these programs with seminars that illustrate the great impact STEM has on society. This poster focuses on the STEM for Humanity seminar series.

The STEM for Humanity seminar series aims to introduce scholars to the activities by students, staff and faculty in the STEM areas that have a component to benefit humanity through volunteerism for outreach and beyond-the-classroom activities (education, sustainability, health care, environment, economic development, etc.). Scholars will first attend informative lectures that are open to the public. Following the lecture, the scholars will engage in a workshop with the management team to develop lessons for their future classrooms based on the lecture topic. For example, our Engineers Without Borders (EWB) group

will present information on their international work. EWB is a student-run organization that partners with developing communities worldwide to improve their quality of life. The partnership involves the implementation of sustainable engineering projects, while involving and training internationally responsible engineers and engineering students. A recent project involved a group of Rutgers students developing water purification systems in Guatemala. After the presentation, Scholars will work through a hands-on project designed to teach students about water purification (designing and testing a home-made water filtration system). Scholars will identify relevant content and link to Core Content Standards and design lessons based on the content and hands-on project for their future pre-college classroom.

Another component of STEM for Humanity will afford Scholars' the opportunity to review relevant literature on high-needs schools in a journal club format. The management team will select readings that discuss issues of socio-economic disadvantage, critical race theory, urban schooling, and teacher professional development programs. Scholars will read and reflect in journals prior to attending seminar, discuss readings during the seminar with colleagues and management team, and submit reflections after the seminar to the facilitator. As cohorts graduate, they will be invited to continue engagement in the journal club to maintain their connection to the program, provide a venue for them to discuss what is happening in their classrooms, and share their experiences with those still in the pre-service phase.

65

Title: The Noyce Program at Saint Joseph's University

NSF Noyce Award Number: 934713

Principal Investigator (PI): Sandra Fillebrown

PI Email: sfillebr@sju.edu

Institution: Saint Joseph's University

Co-PI(s): Karen Snetselaar, Saint Joseph's University

Michael McCann, Saint Joseph's University

Michael Clapper, Saint Joseph's University

Tetyana Berezovski, Saint Joseph's University

Presenter(s): Sandra Fillebrown, Saint Joseph's University, sfillebr@sju.edu

Project Discipline: Math and Natural Sciences

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.sju.edu/5yrmsed

The Noyce Program at Saint Joseph's University (SJU) has just finished year 5 of its 5 year grant, but is continuing with a one year extension. Our summer internship program has placed 37 students at various sites in Philadelphia over the last 5 summers working with nature camps, traditional summer school programs and summer enrichment programs. Many of these students have chosen to go on to a career in STEM education, several by enroll-

ing in our 5-year math and science education programs. Our scholarship program has supported 15 students for either one or two years during their five year program. Almost all are currently teaching in Philadelphia, in various stages of their payback commitment. Our Urban Teacher Collaborative has been meeting regularly to support all of our pre-service and in-service teachers. Our Noyce Scholars have also been taking advantage of workshops sponsored by the Philadelphia Regional Noyce Partnership, several of which have taken place at SJU. Finally, our new interdisciplinary math and science education course has provided our Noyce Scholars with new insights and tools for how to better integrate the disciplines.

66**Title: Project Learn: SDSU Noyce Mathematics and Science Master Teaching Fellows Project**

NSF Noyce Award Number: 1240127

Principal Investigator (PI): Lisa Lamb

PI Email: DLRoss@mail.sdsu.edu

Institution: San Diego State University

Co-PI(s): Donna L. Ross, San Diego State University,

DLRoss@mail.sdsu.edu

Randy Philipp, San Diego State University,

rphilipp@mail.sdsu.edu

Kathy Williams, San Diego State University,

kathy.williams@mail.sdsu.edu

Susan Nickerson, San Diego State University, snick-

erson@mail.sdsu.edu

Presenter(s): Donna L. Ross, San Diego State University,

DLRoss@mail.sdsu.edu

Project Discipline: Math, Biology, Physics, Chemistry

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.sci.sdsu.edu/crmse/noyce

The San Diego State University Noyce Project Learn Mathematics and Science Master Teaching Fellows Project has just completed the first year with 32 experienced middle and high school teachers from six school districts. We have a strong focus on improving teaching practice through examining students' content-specific understanding. Teachers engage, individually and collaboratively, by interviewing students, producing videos of student discourse, analyzing student work and class discussions, reading current research, and planning instructional moves based on student thinking. Current teaching reforms, NGSS, and CCSS-M have been used to frame much of the work. All 32 teachers have met together for ten days of professional development this year. In addition, small groups meet between whole group meetings and teachers communicate in on-line forums. Some teachers recently presented their work at a local science conference. Many of the math and science teachers are planning to present at conferences next year. During a symposium in March, the teachers presented posters to share their work with

an audience that included district, school, and university administrators. Over the next four years, our project goals continue to focus on improving practice through an understanding of student thinking, while gradually increasing our emphasis on teacher leadership.

67**Title: The San Francisco State Robert Noyce Teacher Scholarship Program**

NSF Noyce Award Number: 1136335

Principal Investigator (PI): Larry Horvath

PI Email: lhorvath@sfsu.edu

Institution: San Francisco State University

Co-PI(s): Eric Hsu, San Francisco State University,

erichsu@sfsu.edu

Adrienne Cool, San Francisco State University, cool@sfsu.edu

Presenter(s): Larry Horvath, San Francisco State University,

lhorvath@sfsu.edu

Project Discipline: Math and Science

URL(s): <http://www.csmesf.org/students/noyce>

In January 2012, twelve future STEM teachers were inducted as the first cohort of San Francisco State University Robert Noyce Teacher Scholars (SFSU Noyce Scholars). As of May 16, 2014 twenty-two San Francisco State STEM majors have been selected to be SFSU Noyce Scholars. Including both undergraduate and credential year students, the SFSU Noyce Scholars are fully engaged as members of the much larger Center for Science and Math Education (CSME) Teacher Fellows program (formerly the MSTI program). As future STEM teacher leaders and teacher researchers, SFSU Noyce Scholars attend twice-monthly Noyce seminars; serve in special internships focused on inquiry into the teaching and learning of math and science; develop and implement inquiry based lessons as professional development for peers; and complete summer internships through, for example, the California Academy of Sciences or the California Teacher Pathways project. All SFSU Noyce Scholars are focused on and committed to teaching in high-needs schools and empowering students who have been most often underserved by our educational system.

We recognize our Noyce Scholars who are currently teaching as active members of the SFSU STEM education community. Teaching Scholars regularly present to our teacher fellows, current Noyce Scholars, and STEM credential candidates; host undergraduate teacher fellows in their classrooms; and continue to seek out and attend professional development offered through the greater California Noyce community.

68

Title: Three Innovative and Successful Noyce Program Components

NSF Noyce Award Number: 1136322

Principal Investigator (PI): James Matthews

PI Email: matthews@siena.edu

Institution: Siena College

Co-PI(s): Mark Jury, Siena College, mjury@siena.edu

Michele McColgan, Siena College, mmcolgan@siena.edu

Larry Medsker, Siena College, lmedsker@siena.edu

Lucas Tucker, Siena College, ltucker@siena.edu

Presenter(s): Jim Matthews, Siena College, matthews@siena.edu

Renia Yoanidis, Siena College Noyce Scholar

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Noyce Mathematics and Science Teaching Scholarship Program at Siena College is completing its third year. Thus far, Noyce has impacted our preparation of mathematics and science teachers in several notable ways. 1.) Our Noyce Scholars have participated in an innovative field experience resulting in highly successful school mathematics symposia. 2.) We are significantly increasing the number of our mathematics graduates who will be qualified to teach computer science. 3.) We are significantly increasing the percentage of our mathematics and science graduates who plan to teach in high-needs schools.

One way we are preparing our Noyce Scholars for success in high-needs schools is by involving them in an innovative school mathematics project. The project goal is to have middle school students work on challenging mathematics problems over a two-month period and then produce conference posters and conference presentations on their problems. The project culminates in a school mathematics symposium modeled after professional mathematics conferences. The symposium includes a keynote speaker, poster presentations, and contributed paper sessions.

At our institution we have a long history of success producing secondary mathematics teachers. Our Noyce project is requiring our mathematics scholars to complete a strong minor in computer science so they are qualified to teach computer science at the Advanced Placement level. In the 12 years prior to receiving our grant, we only had 4 out of 65 students take these computer science courses despite being strongly advised to consider doing so. Because of Noyce, we have six students from our first cohort and four from our second cohort and five from our third cohort taking the courses. Thus, in each of the first three years we have outperformed the sum of previous dozen years in this area. This success coincides with the "CS 10K Project" (supported by NSF) which has a goal of producing 10,000 computer science teachers for the pre-college level by 2016.

Over the past 30 years, less than 10% of our approximately 200 graduates entering the mathematics teaching profession chose to work in a high-needs school. Our first 15 Noyce students (13 in mathematics and 2 in science) stayed on campus after the spring semester of their sophomore year ended. They participated in an intensive five week program which included, course work, an 80 hour field experience at Schenectady High School, and a weekly seminar which exposed them to the challenges and rewards of working in high-needs schools. Post experience survey results indicate that almost all but one participant would like their first teaching position to be in Schenectady High School or a school like it.

Our success with this programming bodes well for increasing the number of Siena graduates pursuing teaching careers in high-needs schools and for increasing their ability to be successful in these schools.

69

Title: Master Teaching Fellows are Transforming Science and Math Education in Southern Illinois

NSF Noyce Award Number: 1136414

Principal Investigator (PI): Karen Renzaglia

PI Email: renzaglia@siu.edu

Institution: Southern Illinois University

Co-PI(s): Harvey Henson, Southern Illinois University, henson@cos.siu.edu

Sedonia Sipes, Southern Illinois University, ssipes@siu.edu

Lingguo Bu, Southern Illinois University, lgbu@siu.edu

Presenter(s): James Gray, Southern Illinois University, james.gray@siu.edu

Project Discipline: Science and Mathematics

Topic: Research and Evaluation

URL(s): <http://noyce.siu.edu>

Our Robert Noyce Master Teaching Fellowship program is completing a third year with noticeable results. The program is entitled: A Community of Problem-Solvers: Teachers Leading Problem-based Learning in Southern Illinois, and that is precisely what the program has become. Our community includes STEM and STEM education faculty from Southern Illinois University (SIU) and Shawnee Community College (SCC), and nineteen outstanding Master Teaching Fellows (MTFs) from regional rural schools. Our MTFs engaged in a two year program that prepared them as STEM education leaders. During the first year, they learned about and engaged in scientific research by completed a course on the Cache River Wetland ecosystem and another on scientific research methods. During the first summer, research designed by MTFs was conducted at the Cache River with support from graduate students and faculty from SIU and SCC. During the second year, MTFs completed graduate courses supporting the development of problem-based learning activities and accompanying action research. By the second summer, each

MTF had integrated problem-based learning activities and learning elements from their research into their classroom curriculum. In the third year, with support from a school leadership seminar, MTFs took on more active leadership roles in the program and in their schools and communities. Accomplishments include improving exhibits at the Carbondale Science Center, initiating place-based science activities throughout Southern Illinois, developing a hybrid course on problem-based learning at SIU for teachers in the region, and assuming the advisory role for the program by forming an MTF steering committee. MTFs have fully planned and will implement the 2014 summer program, which will engage new in-service and pre-service teachers from SIU and SCC. The 2014 summer research project will focus on pollination biology and was developed with consultation from an SIU expert in pollination biology, and will continue as a long-term, online, inter-institutional project led by MTFs.

70

Title: Significance of Cross Disciplinary Involvement for Launching the Noyce Program at SUNY Oswego

NSF Noyce Award Number: 1339955

Principal Investigator (PI): Sofia Windstam

PI Email: sofia.windstam@oswego.edu

Institution: State University of New York at Oswego

Co-PI(s): Jean E. Hallagan, State University of New York at Oswego, jean.hallagan@oswego.edu

Presenter(s): Sofia Windstam, State University of New York at Oswego, sofia.windstam@oswego.edu

Project Discipline: Biology, Chemistry, Earth Science, Mathematics and Physics

Topic: Project Management

The NSF Phase I funded Noyce program at the State University of New York (SUNY) at Oswego was launched in the fall of 2013. The goal of the SUNY Oswego Noyce program is to recruit Noyce teacher scholars among both STEM undergraduates and STEM degree holders in the fields of biology, chemistry, earth science, mathematics, and physics. STEM undergraduates will enroll in a fall and spring semester course sequence aimed at introducing the teacher scholars to STEM learning and teaching during their senior year, before entering the MAT/MST programs whereas STEM degree holders will enter the MAT/MST programs upon completion of any pre requisite course work. All the vital infrastructure and deliverables necessary to support the implementation of the SUNY Oswego Noyce program were designed in a series of interactive on-campus workshops as well as work carried out in specific committees through the support from a Noyce Capacity Building Grant (CBG).

In order to be able to achieve the long term goal of recruiting and training Noyce teacher scholars in such a disparate set of STEM disciplines and ensuring their seamless transition into the MAT/MST programs and beyond, it was vital to sample a broad

set of perspectives which brought together many STEM and education faculty members, practicing K-12 STEM teachers, and college administrators. Not only has the cross-disciplinary nature of the committee work yielded a robust organization for launching our first year, but it has also garnered strong support across campus and awareness about opportunities that exist within the Noyce program.

Furthermore, the underlying structure resulting from the CBG work has persisted as an important resource throughout our first year in the Phase I grant. As a result we have recruited one undergraduate and four graduate Noyce teacher scholars in our first year, along with two teaching and five research interns. Represented within this cohort are STEM majors or STEM degree holders in biology, chemistry, earth science, mathematics, and physics. Several students come from minority or otherwise underrepresented groups. In this poster we will discuss the building of the organizational structure of SUNY Oswego's Noyce program and benefits of the cross-disciplinary nature of it to our previous, current and future activities.

71

Title: Talented Teachers in Training for Texas

NSF Noyce Award Number: 1136416

Principal Investigator (PI): Lesa Beverly

PI Email: beverlyll@sfasu.edu

Institution: Stephen F. Austin State University

Co-PI(s): Keith Hubbard, Stephen F. Austin State University, khubbard@sfasu.edu

Dennis Gravatt, Stephen F. Austin State University, dgravatt@sfasu.edu

Karen Embry-Jenlink, Stephen F. Austin State University, kjenlink@sfasu.edu

Presenter(s): Lesa Beverly, Stephen F. Austin State University, beverlyll@sfasu.edu

Project Discipline: STEM

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://t4.sfasu.edu>

Talented Teachers in Training for Texas (T4) delivers five years of comprehensive support to preservice and early service STEM teachers. While in college, university faculty and teaching mentors meet regularly with T4 Scholars to discuss aspects of teaching, examine content and explore challenges for new teachers. Central to this experience is continuity in mentorship. Rather than have a different mentor for advising, for classroom observations, for student teaching, and for classroom induction, T4 fosters sustained relationships which transcend a variety of academic experiences. While scholars meet with a variety of practitioners, from novice teachers, to veterans, to administrators, the focus is on becoming a supportive, sustained academic community. Regular classroom observation and reflection is an integral

part of the program, as are local, regional, and national conferences.

72

Title: Texas Leadership Initiative: Mathematics Instruction Transformed

NSF Noyce Award Number: 0934878

Principal Investigator (PI): Kimberly Childs

PI Email: kchilds@sfasu.edu

Institution: Stephen F. Austin State University

Co-PI(s): Lesa Beverly, Stephen F. Austin State University, beverlyll@sfasu.edu

Debbie Pace, Stephen F. Austin State University, dpace@sfasu.edu

Presenter(s): Kimberly Childs, Stephen F. Austin State University, kchilds@sfasu.edu

Lesa Beverly, Stephen F. Austin State University, beverlyll@sfasu.edu

Debbie Pace, Stephen F. Austin State University, dpace@sfasu.edu

Project Discipline: Math

Topic: Teacher Leadership

URL(s): <http://stem.sfasu.edu>

The Texas Leadership Initiative: Mathematics Instruction Transformed (Texas LIMIT) project is focused on the development of a cadre of mathematics teacher leaders for high needs school districts in East Texas. The Master Teaching Fellows (MTFs) have been trained in the design and delivery of professional development in mathematics. The PD modules have been reviewed by external experts and will soon be available to Texas LIMIT MTFs through the Stephen F. Austin State University STEM Research and Learning Center.

73

Title: Noyce Initiatives at Stonehill College: The NUMB3RS Project and NURE

NSF Noyce Award Number: 1240046

Principal Investigator (PI): Karen L. Anderson

PI Email: karenanderson@stonehill.edu

Institution: Stonehill College

Co-PI(s): Kathleen McNamara, Stonehill College, KMcnamara@Stonehill.edu

Eugene Quinn, Stonehill College, EQuinn1@Stonehill.edu

Timothy Woodcock, Stonehill College, TWoodcock@Stonehill.edu

Eunmi Yang, Stonehill College, EYang@Stonehill.edu

Presenter(s): Karen L. Anderson, Stonehill College, KarenAnderson@Stonehill.edu

Bonnie Troupe, Stonehill College, BTroupe@Stonehill.edu

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Our poster will present the logistics and results of several of our ongoing initiatives:

I. The NUMB3RS Project was designed by members of the Noyce Project Team and Stonehill College undergraduates (including Noyce Scholars) to excite and motivate fourth, fifth and sixth grade students to explore mathematics through hands-on problem solving experiences. The afterschool program takes place at the Butler Elementary School in Avon, Massachusetts (one of our partner districts).

II. The Noyce Undergraduate Research Experience (NURE) Program is an eight week summer research opportunity for Stonehill College students. Selected NURE Scholars work full-time alongside Noyce Project Team members on substantial research projects related to mathematics and/or mathematics education. These opportunities are available to all declared mathematics majors as well as all declared educational licensure candidates.

Projects include:

Summer 2013: Informal Science Education: Mathematical Connections

Three NURE Scholars worked collaboratively with members of the Noyce Project Team and the education staff at The Natural Resources Trust of Easton (NRT) to develop “mathematical connections” (aligned with the Common Core State Standards) to supplement the existing pre-existing field trips and school-based programming offered by the NRT. (Focus: Mathematics Education / Developing Instructional Materials)

Summer 2014: Analyzing Volatility in Standardized Test Scores
There is currently a movement underway to directly link teacher performance with students’ standardized test scores. Yet, there is considerable volatility in measures derived from standardized test scores. What accounts for this volatility? Is it due to variation in differences between students? Is it due to variation to differences between schools and teachers? This NURE project will use statistical analysis techniques to explore this question. (Focus: Statistical Analyses)

Summer 2014: Developing Mathematical Connections: Laboratory, Field, Classroom & Home

Selected students will work collaboratively with members of the Noyce Project Team to create instructional materials focusing on mathematics content and concepts that bridge the gap between science in informal settings (The Farm at Stonehill) and both the home and school. (Focus: Mathematics Education / Developing Instructional Materials)

Recruitment materials, applications, and preliminary results (including samples of materials developed) will be shared.

74**Title: One Size Does Not Fit All: Supporting Future Math and Science Teachers to Successfully Teach in High-Need Schools**

NSF Noyce Award Number: 934777

Principal Investigator (PI): Gregory D. Phelan

PI Email: gregory.phelan@cortland.edu

Institution: SUNY College at Cortland

Co-PI(s): Larry Klotz, SUNY College at Cortland,

larry.klotz@cortland.edu

Rena Janke, SUNY College at Cortland,

Rena.Janke@cortland.edu

Mary Gfeller, SUNY College at Cortland,

Mary.Gfeller@cortland.edu

Anne Burns Thomas, SUNY College at Cortland

Presenter(s): Gregory D. Phelan, SUNY College at Cortland, gregory.phelan@cortland.edu

Project Discipline: Chemistry

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Fifty-five scholarships (14 graduate and 41 undergraduate) have been awarded since project inception. The average GPA of undergraduate Noyce Scholars at time of application is 3.6. One hundred eight qualified applications were received over the tenure of the grant.

Primary recruitment methods include campus and community outreach. Campus outreach includes Noyce-sponsored and led workshops and lectures, SUNY Cortland website articles and Scholar spotlights, campus and alumnae newsletters, posters, information sessions, and faculty education. Community outreach includes press releases, science fair participation, public service announcements, and rack card distribution at career centers and the local business showcase.

Our Annual Noyce Scholar Workshop continues both to build a solid Noyce community, within the campus and within the Central New York region, and to strengthen the skill set of Noyce Scholars by addressing issues related to successfully teaching in a high-need environment. The workshops have evolved beyond classroom management discussions to address issues surrounding students living in poverty. A State of Poverty Simulation, led by the Cortland County Community Action Program, roundtable discussion and book chat have helped our Scholars understand some of poverty's complexities and the obstacles people living in poverty may face and provided an opportunity to reflect on the impact this has on the students facing this reality. We have built a strong group of seasoned teachers to serve as Noyce Master Teachers. They participate in workshops and provide support to our undergraduate Noyce Scholars.

We also continue to support our Scholars to build math and science content knowledge beyond their traditional coursework by encouraging/sponsoring application to and participation in pro-

fessional societies and conferences, on-campus research, and summer research programs such as CAL State's STEM Teacher and Researcher program.

75**Title: The SU Noyce Scholars Program for Science and Mathematics Teachers: Engaging NYS Master Teacher Follows in Professional Development of STEM Teachers**

NSF Noyce Award Number: 934841

Principal Investigator (PI): John W. Tillotson

PI Email: jwtillot@syr.edu

Institution: Syracuse University

Co-PI(s): Joanna Masingila, Syracuse University,

jomasing@syr.eduJason Wiles, Syracuse University, jwiles01@syr.eduEileen Stempel, Syracuse University, stempel@syr.eduSharon Dotger, Syracuse University, sdtoger@syr.eduPresenter(s): John W. Tillotson, Syracuse University, jwtillot@syr.edu

Project Discipline: Science Education

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://noyce.syr.edu>

The Syracuse University Noyce Scholars Program for Science and Mathematics Teachers (SU-Noyce) is a multi-faceted project involving Syracuse University and the Upstate Louis Stokes Alliance for Minority Participation (LSAMP) consortium, partnering with area high-needs school districts and a network of informal STEM education centers from across central New York with the goal of increasing the number of highly-qualified science and mathematics teachers teaching in our nation's neediest schools. The specific goals of the project include: 1) Offering substantial scholarships to prepare 36 additional highly-qualified secondary mathematics and science teachers (years 2 - 5 of the project), a full 41% increase over the current capacity; 2) Creating a multi-media recruitment and advertising campaign to attract a diverse and academically gifted pool of applicants for the SU-Noyce Scholars Program (years 1 - 5); 3) Offering 24 paid summer internships (6 per year during years 2 - 5 of the project) for talented STEM undergraduates to participate in service learning programs working with students from high-needs schools; 4) Facilitating the supported transfer of diverse STEM majors from our community college partners into SU's teacher education programs; 5) Providing a robust and sustained mentoring and professional development program for the SU-Noyce Scholars during their first three years of teaching in a high-needs school; and 6) Conducting a rigorous external project evaluation to measure the overall effectiveness of the SU Noyce Scholars program on an annual basis. Our poster session will report on the various types of professional development programming that we have utilized with our cohorts of Noyce Scholars involving NYS Master Teacher Fellows focused on strategies for success in

teaching science and mathematics in high-needs urban and rural schools. Information regarding our evaluation model for examining how Noyce Scholars' ideas about effective teaching and learning evolve will also be shared.

76

Title: Project Tiger Teach

NSF Noyce Award Number: 1340099

Principal Investigator (PI): Elaine D. Martin

PI Email: emartin@tnstate.edu

Institution: Tennessee State University

Co-PI(s): Jeanetta Jackson, Tennessee State University, jwilliams@tnstate.edu

Artenzia Young-Seigler, Tennessee State University, ayoung@tnstate.edu

Heraldo Richards, Tennessee State University, hrichards@tnstate.edu

Presenter(s): Elaine D. Martin, Tennessee State University, emartin@tnstate.edu

Jeanetta Jackson, Tennessee State University, jwilliams@tnstate.edu

Project Discipline: Biology

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Project Tiger Teach (PTT) received funding from the Robert Noyce Teacher Scholarship Track Phase I to support training of STEM students leading to a degree in biology, chemistry or mathematics with teacher certification. It targets ten (10) undergraduate students per year (3 biology, 2 chemistry, and 5 mathematics majors), over a period of four years who have successfully completed sixty credit hours with a minimum GPA of 3.0. This project is a collaborative partnership between Tennessee State University's College of Agriculture, Human & Natural Sciences, College of Engineering, College of Education, and Metropolitan Nashville Public Schools.

The goals of PTT are to: 1) increase the number of highly-qualified certified teachers in biology, chemistry, and mathematics in high-need schools in Nashville, TN; 2) increase teacher diversity with emphasis on recruiting African American male teachers in biology, chemistry, and mathematics, and 3) provide four years of support to graduates in the form of mentoring and opportunities for professional development to assist in acquisition of tenure within the school system.

The summer component of the project includes two summer institutes. Tiger Teach Summer Institute I (TTSI-I), for rising sophomore science or math majors, provides tuition and fees for a three (3) credit hours course in Teacher Education. Tiger Teach Summer Institute II (TTSI-II), for rising junior science or math majors who have been admitted to the Teacher Certification Program, also provides tuition and fees for a three (3) credit hours course in Teacher Education.

77

Title: TTU STEM Majors for Rural Teaching (TTU-SMaRT)

NSF Noyce Award Number: 1136403

Principal Investigator (PI): Stephen Robinson

PI Email: sjrobinson@tntech.edu

Institution: Tennessee Technological University

Co-PI(s): Holly Anthony, Tennessee Technological University, hanthony@tntech.edu

Presenter(s): Steve Robinson, Tennessee Technological University

Project Discipline: Math, Physics, Chemistry

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.tntech.edu/noyce/

The Tennessee Technological University - STEM Majors for Rural Teaching (TTU-SMaRT) Noyce Scholarship Program aims to produce highly qualified teachers of mathematics, physics and chemistry to help address the high demand in the rural Upper Cumberland area of Tennessee. As of its fourth year, over 25 students have participated in the Early Teaching Experience (ETE) of the TTU-SMaRT program, with 6 moving on to be supported by Noyce scholarships. During the past year the program produced its first two graduates who both obtained Master's degrees in education and have moved to teaching positions.

The program works closely with the Millard Oakley STEM Center at TTU in several different ways. First, by assisting in the STEM Center's outreach programs for K-12 students and their schools and families, students in the program's Early Teaching Experience interact with students and teachers to explore whether teaching is a career option they wish to pursue. Second, in summer internships, Noyce scholars take a leadership role in these same outreach activities while working with the program directors to further enhance their teaching skills. Thirdly, Noyce scholars are fully integrated into the STEM Center User Group so that they are already members of the local science teacher community as they transition into their teaching careers. In fact one of our first program graduates now plays an ambassadorial role for the STEM Center, helping to organize and coordinate many of its outreach activities.

78

Title: TAMU aggieTEACH- Robert Noyce Scholarship Program

NSF Noyce Award Number: 0934887

Principal Investigator (PI): Timothy P. Scott

PI Email: tim@science.tamu.edu

Institution: Texas A&M University, College Station, Texas

Co-PI(s): Carolyn M. Schroder, Research Associate

Presenter(s): Elisabeth Armstrong, Texas A&M University, caity.armstrong@verizon.net

Sara Thigpin, Texas A&M University, sara@science.tamu.edu

Project Discipline: Biology

Topic: Supporting New Teachers

The goal of the TAMU aggieTEACH Program is to provide scholarships to approximately 30 junior/senior level undergraduate students majoring in science, technology, engineering, and mathematics (STEM) pursuing teaching careers in grades 8-12. To date, 31 students have been selected as aggieTEACH Noyce Scholars. For the fifth year, 5 scholarships have been awarded. All scholars for this year are mathematics majors. Texas A&M University continues to lead the state in the production of university prepared science and mathematics teachers. The aggieTEACH Noyce Scholarship Program offers financial support to these students as they complete their teacher preparation program as well as programmatic activities focused on preparing exceptional science and mathematics teachers.

Our poster presentation will describe the components of the aggieTEACH Program and the aggieTEACH Noyce Scholarship Program. We will demonstrate that our aggieTEACH Noyce Scholars rank high among their peers and that our recruitment efforts in maintaining a high level of STEM majors pursuing teaching have been successful. We will present all program activities that the Scholars have participated in and will spotlight collaboration among districts and other funded programs of the Center of Mathematics and Science Education linked to the aggieTEACH Noyce Scholarship Program. We will highlight seminars and activities of the Scholars over the year. Lastly, we will showcase aggieTEACH Noyce Scholars currently in the classroom and their progress.

79

Title: Texas Tech Noyce Scholars Program

NSF Noyce Award Number: 0833326
Principal Investigator (PI): Jerry Dwyer
PI Email: jerry.dwyer@ttu.edu
Institution: Texas Tech University
Co-PI(s): Dominick Casadonte, Texas Tech University, dominick.casadonte@ttu.edu
Jeffrey Lee, Texas Tech University, jeffrey.lee@ttu.edu
Lawrence Schovanec, Texas Tech University, lawrence.schovanec@ttu.edu
Tara Stevens, Texas Tech University, tara.stevens@ttu.edu
Presenter(s): Jerry Dwyer, Texas Tech University, jerry.dwyer@ttu.edu
Project Discipline: Multi-disciplinary

The Texas Tech Noyce Scholars program concludes its recruitment and training of new highly qualified STEM teachers in 2014. The poster summarizes the progress made over the six year life of the program. Approximately 45 students were recruited to the program with about 25 others receiving summer stipends. About 75% of participants were math majors. A major goal of the program was to recruit self-determined teachers who possess autonomy, competency, and relatedness. Annual evaluation surveys determine the success of this strategy. Novel

mentoring approaches, shared seminars, and overlap with other STEM area projects have been highlights of the program.

80

Title: The RECON Project at The Citadel

NSF Noyce Award Number: 1339901
Principal Investigator (PI): Lok Lew Yan Voon
PI Email: llewyanv@citadel.edu
Institution: The Citadel
Co-PI(s): Steve Cotter, scotter1@citadel.edu
Joel Gramling, gramlingj1@citadel.edu
Glenda La Rue, glarue@citadel.edu
Kathryn Richardson-Jones, jonesk2@citadel.edu
Lisa Zuraw, zulawl@citadel.edu
Presenter(s): Lew Yan Voon, The Citadel, llewyanv@citadel.edu
Project Discipline: Biology, Chemistry, Mathematics
Topic: Innovative Noyce Program Practices and Teacher Preparation Models
URL(s): <http://www.citadel.edu/root/noyce>

The Recruit, Educate, Certify, and Obtain New Teachers program at The Citadel started in 2013. Goals are to recruit 30 Noyce scholars for high-school teaching in Biology, Chemistry and Mathematics, of which 20 would be in MAT programs and 10 would be in undergraduate programs. Career changers are being targeted as well as underrepresented groups. An innovative aspect of our project is the availability of an accelerated MAT program that one could conclude in 4 semesters.

We have exceeded expectations in Year 1, when we were able to recruit 7 scholars instead of the promised 5. These include underrepresented groups. Our mentoring program will also be described.

81

Title: Supporting Noyce Scholars and Fellows with Professional Development School Partnerships

NSF Noyce Award Number: 0934836
Principal Investigator (PI): Shari Albright
PI Email: shari.albright@trinity.edu
Institution: Trinity University
Co-PI(s): Patricia Norman, Trinity University, pnorman@trinity.edu
Presenter(s): Shari Albright, Trinity University, shari.albright@trinity.edu
Stephanie Sanders, East Central ISD (Fellow), stephanie.sanders@ecids.net
Project Discipline: Education
Topic: Partnerships
URL(s): <http://new.trinity.edu/academics/departments/education>

<http://web.trinity.edu/academics/noyce-teaching-fellowships-for-career-changers>

The teacher education program at Trinity University maintains long-term relationships with several local schools that function as professional development schools (PDS). To foster these relationships, Trinity has one faculty liaison who spends a great deal of time at each PDS supporting MAT interns, holding practicum courses for undergraduates, and participating in school-based professional development for teachers. Trinity faculty are regarded as de facto members of the PDS faculty; likewise, mentor teachers from PDS campuses are recognized as clinical faculty members at Trinity.

Trinity's PDS relationships have facilitated the recruitment and preparation of Noyce Scholars and Fellows as well as the development of Noyce mentor teachers. As our Noyce program has matured, we have seen a productive feedback loop (in which past Noyce-supported students become PDS faculty) that continues to improve both our teacher education program and math/science instruction at our PDS partner schools.

82

Title: The Noyce Summer Internship for Recruiting Potential STEM Teachers

NSF Noyce Award Number: 0934835

Principal Investigator (PI): Shari Albright

PI Email: pnorman@trinity.edu

Institution: Trinity University

Co-PI(s): Pat Norman, Trinity University, pnorman@trinity.edu

Presenter(s): Pat Norman, Trinity University, pnorman@trinity.edu

Leah Wesselman, Trinity University, lwesselm@trinity.edu

Project Discipline: Education

Topic: Recruitment and Marketing Strategies

URL(s): <http://new.trinity.edu/academics/departments/education>

<http://web.trinity.edu/academics/noyce-scholarships-for-undergraduates-and-recent-college-grads>

At Trinity University, we have created a program called the Noyce Summer Internship, which provides rising sophomore and junior STEM majors with an opportunity to conduct research with a STEM faculty member and explore teaching by participating in Trinity's Upward Bound program as a near-peer tutor and mentor. Upward Bound is an academic enrichment and support program for aspiring first-generation and low-income college students. By coupling summer research with a teaching experience, the Noyce Summer Internship gives STEM students a relatively low-risk opportunity to explore a nascent interest in teaching while gaining valuable experience in a research setting. This hybrid research and teaching program has been very successful in attracting top STEM students, and most Interns have opted to continue taking education courses after the conclusion of their

summer experience. We will report from four years of program implementation (2010, 2011, 2012 and 2013), including findings and results from focus group interviews and survey data with the STEM majors.

83

Title: The Truman Noyce Scholars Program for Secondary Mathematics and Physics Teaching

NSF Noyce Award Number: 1340082

Principal Investigator (PI): Ian M. Lindevald

PI Email: lindy@truman.edu

Institution: Truman State University

Co-PI(s): Susan LaGrassa, Truman State University, la-grassa@truman.edu

Paul Yoder, Truman State University, pyoder@truman.edu

Presenter(s): Ian M. Lindevald, Truman State University, lindy@truman.edu

Project Discipline: Physics and Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://noyce.truman.edu/>

Truman State University is a highly-selective public liberal arts and sciences university located in rural Missouri. Our Masters of Arts in Education (MAE) is a signature program which in recent history has produced relatively few STEM teachers. Truman's new Noyce scholars program is aimed broadly at enhancing a local culture that values, encourages, and supports STEM teacher development. More specifically, the Truman Noyce scholars program capitalizes on the curricular overlap between mathematics and physics in developing secondary teachers who are dually certified to teach both subject areas. Truman Noyce scholars will complete Bachelor's Degrees in both mathematics and physics as well as a Master of Arts in Education.

84

Title: Tuskegee University Robert Noyce Teaching Scholars in Mathematics and Science Education in the Alabama Black Belt

NSF Noyce Award Number: 0934545

Principal Investigator (PI): Walter A. Hill

PI Email: cmorris@mytu.tuskegee.edu

Institution: Tuskegee University

Co-PI(s): Carlton E. Morris, Melvin Gadson, Mohammed A. Qazi

Presenter(s): Carlton E. Morris, Tuskegee University, cmorris@mytu.tuskegee.edu

Project Discipline: Biology

Topic: Partnerships

Tuskegee University Robert Noyce Teaching Scholars in Mathematics and Science Education in the Alabama Black Belt. This Noyce scholarship program is a partnership of Tuskegee University and seven high-needs school districts in the Alabama

Black Belt that has been formed to address shortages of science and mathematics teachers in these districts. The program responds to these shortages by encouraging juniors and seniors (Noyce Scholars) majoring in the fields of Animal Science, Biology and Mathematics at Tuskegee to concurrently pursue a second degree in general science education or in mathematics education. Once all the requirements for teaching certification are complete, for which a fifth year of study is needed, the graduates of the Tuskegee Noyce program assume teaching positions in one of the partnering schools. Equipped with a contemporary mathematics and science teacher education foundation and a solid formation in the STEM content areas, the Noyce program graduates are poised to make a positive impact in augmenting the quality and quantity of highly qualified teachers of science and mathematics in the Alabama Black Belt.

We anticipate recruiting a total of eighteen Noyce Scholars at Tuskegee during this five year project. In the five years since the project has been instituted, ten STEM majors have joined the Noyce program, three of whom have graduated.

This poster describes key programmatic aspects of the Noyce Scholarship program at Tuskegee University and its accomplishments to date.

85

Title: University of Alabama Noyce Scholars Program

NSF Noyce Award Number: 1340069

Principal Investigator (PI): Dennis W. Sunal

PI Email: dwsunal@ua.edu

Institution: University of Alabama

Co-PI(s): Kevin H. Shaughnessy, University of Alabama, kshaughn@ua.edu

James W. Harrell, University of Alabama, jharrell@ua.edu

Jeremy Zelkowski, University of Alabama, jzelkowski@ua.edu

Presenter(s): Dennis W. Sunal, University of Alabama, dwsunal@ua.edu

Marilyn Stephens, University of Alabama, mmstephens@crimson.ua.edu

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.uanoyce.ua.edu>

The 5 year, 2013-2018 Noyce Scholarship Program is designed increase the number and diversity of teachers graduating from UA in chemistry, mathematics, and physics. The UA Noyce program, funded through the National Science Foundation for has 3 major goals that include 1) recruitment using 8 collaborating community colleges through early teaching experiences with 120 summer internships, 2) extensive use of collaborative strategies supporting and sustaining preservice juniors, seniors and graduate students including 21 two year scholarships and an innovative preservice teacher university curriculum, and 3) deep and evolving multistage induction for inservice graduates aimed at retaining quality teachers in rural and urban high needs school

districts with a focus on underrepresented, diverse candidates. UA Noyce will have broad impacts on the state STEM workforce, high needs schools, collaboration between institutions, and within the university teacher education program. The model demonstrates the use and upgrading of existing infrastructure to enhance research-based STEM teacher education program development.

86

Title: Do you Want to be a Teacher? Giving High-performing Community College Students a Taste of Teaching Through Inquiry-based Summer Experiences

NSF Noyce Award Number: 1136327

Principal Investigator (PI): Michael Wyss

PI Email: jmwys@uab.edu

Institution: University of Alabama at Birmingham

Presenter(s): Michael Wyss

Project Discipline: STEM

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.uab.edu/cord

Minority and underserved students have few discovery-based opportunities that enhance their understanding of biology, and thus they often lose interest in science early and fail to enter the pipeline to biomedical careers. Similarly, the high performing students who get into the STEM pipeline in college are highly encouraged to pursue careers in the disciplines and are given little incentive to consider STEM secondary teaching as an option. CESAME offers high performing community college students the opportunity to spend a summer immersed in creative STEM education in its summer Science Camps and Institutes. In these programs, the students are afforded a chance to taste whether education is for them. Each student-facilitator is teamed up with a STEM postdoctoral fellow and an area teacher in one of the experiences, providing for close interactions (student/teacher ratio ~5/1). CORD's summer camps/institutes enhance MS and HS student interest in, and content knowledge of, science via inquiry-based STEM education, and by linking the experiences to the curriculum the students will enter the following fall, it enhances the students' abilities to be leaders in STEM courses in their classrooms. Further, while an increasing number of college students are potentially interested in careers in STEM education, there are relatively few opportunities for them to get a taste of education prior to committing to a STEM education major.

In this program, we have provided a pathway for high-achieving community college students to gain experience in effective, inquiry-based STEM education with middle and high school students. 75% of all MS and HS summer scholars are minority and 70% are financially high needs. The facilitators come from both community colleges in the area and UAB. About 50% of both

groups are minority and 50% are women. Over the past 3 years, 4-6 of the community college students (~50%) have entered the STEM education program at UAB, i.e., moving forward to complete their BS and an MS in STEM education in a total of 5 years. Relative to their STEM education initiating experience in summer camps/institutes, the community college students report learning many new laboratory skills, developing the abilities to use scientific equipment, and improving their abilities to teach through inquiry. They also said they could envision taking many of the activities from the camps back to their future classrooms to use with their own students. While all of the facilitators appeared to enjoy the experience, about 50% say that it taught them they do not want to pursue a teaching career, but that the experience gave them important insights into how to educate in the workplace or in the college classroom into which they eventually take their STEM training. Part of the enthusiasm of the facilitators comes from the joy and success that the campers/scholars have in learning.

87

Title: Robert Noyce Scholarship Program for Math, Science, and Engineering K-12 Teachers at the University of Arkansas

NSF Noyce Award Number: 0733841

Principal Investigator (PI): Gay Stewart

PI Email: gstewart@uark.edu

Institution: University of Arkansas

Co-PI(s): Deborah Korth, University of Arkansas,

dkorth@uark.edu

Adam Huang, University of Arkansas, phuang@uark.edu

Dennis Brewer, University of Arkansas, dbrewer@uark.edu

Michael Wavering, University of Arkansas, wavering@uark.edu

Presenter(s): Gay Stewart, University of Arkansas, gstewart@uark.edu

Project Discipline: Science and Mathematics

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Noyce Phase I Program at the University of Arkansas proposed to support 36 total teachers, supporting them through undergraduate completion as needed and the Masters of Arts in Teaching program from 2007 to 2012.

Over the course of funding, 10 undergraduate and 50 post-baccalaureate scholarships were awarded. Post-baccalaureate scholarships supported students through the Masters of Arts in Teaching program, following completion of their undergraduate STEM degrees. In total, 51 individual future teachers were funded. Many have gone on to leadership roles in their schools, but some have had significant challenges.

How we prepared them, where they are and what they are doing will be presented, as well as how many students we continue to recruit post-funding.

88

Title: UTeach Robert Noyce Scholarship Program: Using a Noyce Scholarship to Accelerate UTeach Replication

NSF Noyce Award Number: 1239804

Principal Investigator (PI): John Stewart

PI Email: johns@uark.edu

Institution: University of Arkansas

Co-PI(s): Gay Stewart, University of Arkansas, gstewart@uark.edu

Presenter(s): John Stewart, University of Arkansas, johns@uark.edu

Project Discipline: Physics

Topic: Partnerships

The University of Arkansas began its UTeach replication program in May 2012. This four year certification program was planned to graduate its first student in May 2016 by introducing one required UTeach course each semester. Before UTeach, the only path to science teacher certification at the University of Arkansas was a Master of Arts in Teaching program requiring an additional year of graduate work beyond the bachelor's degree. With the support of a Robert Noyce Scholarship grant, the time to fully implement the program has been halved, and our first UTeach cohort of three scholars, all physics majors, graduated in May 2014. Two of the three scholars were supported by Noyce scholarships. The Noyce program also allowed the support of an additional UTeach master teacher to promote the rapid growth of the UTeach site.

89

Title: Cal Teach Berkeley Noyce Program Continues to Increase the Number of Interns' and Scholars' Interest in STEM Teaching

NSF Noyce Award Number: 0934951

Principal Investigator (PI): Deborah Nolan

PI Email: acchan@berkeley.edu

Institution: University of California, Berkeley

Co-PI(s): George Johnson, University of California, Berkeley, gjohnson@me.berkeley.edu

Undergraduate students at UC Berkeley have the opportunity to participate in the internship or externship program as well as apply for a scholarship. Cal Teach Berkeley coordinates paid internships to lower division students with local organizations and externships with local schools. Moreover, the program awards scholarships to upper division students for their commitment and dedication to teaching in a high-needs school district. In addition to our annual program evaluations, we analyzed the survey responses from the Noyce interns across several years to identify their understanding, practice and commitment to STEM teaching. As we approach our final year of the grant, we present our findings and next steps of our cumulative evaluation of the program.

90

Title: Math for America Berkeley: Paving the Way for Teacher Leadership

NSF Noyce Award Number: 1136432

Principal Investigator (PI): Deborah Nolan

PI Email: kreid@berkeley.edu

Institution: University of California, Berkeley

Co-PI(s): George Johnson, University of California, Berkeley, gcjohnson@berkeley.edu

Presenter(s): Katherine L. Reid, University of California, Berkeley, kreid@berkeley.edu

Project Discipline: Math and Science

Topic: Teacher Leadership

URL(s): <http://www.mathforamerica.org/berkeley>

Math for America (MfA) Master Teacher Fellowship Program at UC Berkeley supports exceptional mathematics and science teachers in local public urban schools to become Master Teachers and leaders within their schools and districts. Our goal is to draw as many fellows as possible from nearby high-needs school districts, especially our primary partner Oakland Unified School District. MfA Berkeley's five year program begins with a focus on research and individual practice, then evolves to a more outward looking stance in which teachers are provided opportunities to become effective mentors, coaches, professional development facilitators, and instructional leaders within their schools and districts.

Fellows participate in cohort specific activities:

Year One: Project IMPACT - teacher inquiry project and summer IISME research project;

Year Two: National Board Certification;

Year Three: Teacher In Residence; and

Years Four and Five: Individual professional and leadership development proposals.

In addition to the cohort specific activities, fellows participate in a variety of mixed-cohort professional development opportunities including professional development workshops and community meetings.

Formal program evaluation addresses several research questions and includes the analysis of multiple data sources. Results:

- Fellows report a number of MfA activities have resulted in improved teaching practices.
- Conference funding and year three Teacher In Residence experiences are favored activities of the program.
- Fellows and their building administrators report a broadening of fellows' spheres of influence within the school, especially after year three.
- Fellows report strong positive impact on student learning.

91

Title: UCI Cal Teach Noyce Summer Internship and Scholarship Program

NSF Noyce Award Number: 0934928

Principal Investigator (PI): Brad Hughes

PI Email: bhughes@uci.edu

Institution: University of California, Irvine

Co-PI(s): Debra Mauzy-Melitz, University of California, Irvine, dmauzyme@UCI.EDU

Sue Marshall, University of California, Irvine, sue.marshall@uci.edu

Beth Van Es, University of California, Irvine, evanes@uci.edu

David Bader, AOP, DBader@LBAOP.ORG

Presenter(s): Brad Hughes, University of California, Irvine, bhughes@uci.edu

Project Discipline: STEM Education, BS with Credential

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://sites.uci.edu/ctblog/?p=20><http://www.education.uci.edu/calteach/><http://sites.uci.edu/edminor/2012/10/29/noyce-teaching-internship/>

UCI's Cal Teach Noyce Summer Internship and Scholarship Program has two objectives for undergraduates. The Noyce Internship allows freshmen and sophomores to explore teaching in informal classroom settings, such as Aquarium of the Pacific, Discovery Science Center, Crystal Cove Alliance, Inside the Outdoors, and UCI Sailing Summer Camps, recruiting them to explore teaching as an option for their future careers. The Noyce Scholarship funds STEM majors that are currently pursuing their teaching credential in the field and are committed to teaching in high needs schools.

For the 2013-2014 academic year, 32 UC Irvine undergraduate students participate in the school year to create interactive lesson plans that were presented at UCI's Open House (Celebrate UCI). In this event each group's hands-on activity featured a theme related to the Salton Sea Project and/or the Anza Borrego reserve. There are an additional two Advanced Interns, along with one of the Noyce Interns that were able to produce video in a San Diego elementary school classroom that integrates arts with science through hands-on activities. The interns are refining their lessons into a 5E lesson plan formats for K-12 teachers to utilize in the future. The lesson plans will include the video clips that demonstrate specific hands-on activities.

In addition to video based lessons, the Noyce program also fosters the use of video to improve pedagogical skill though video club analyses, as each of the lessons are video recorded and analyzed for various aspects of teaching skills and instructional issues. Noyce Interns have reflected on what kind of challenges they have faced during the lesson. This professional growth method of video clip analysis has allowed these interns to see

their lessons through expanding perspectives. This enables them to critically analyze what they have done well, what they didn't do well, and how they could change the lesson for the future. Based on UCI's Teacher Learning Research Group in the Department of Education, the Noyce Interns will meet weekly to analyze their lessons recorded in video. While watching the footage, the Noyce Interns and their fellow colleagues will look for important aspects of the lesson: classroom/student interactions, teacher-student interactions and analyze these processes in depth throughout the lesson. This will help enable teachers to notice any necessary changes to implement for the future. This is vital for new teachers to familiarize themselves in a reflective way on the classroom and its challenges while away from the stress of the action.

Over the five years of the grant we have trained 100 interns and for this year, 23 females and nine males are participating in the internship. Four of the students are under-represented, while 28 are Asian. There is one male and one female advanced intern, with the female being under-represented. There are five UCI Cal Teach students that are part of the Noyce (Advanced) Interns. The Cal Teach Program allows undergraduate students to obtain their secondary teaching credential in conjunction with their bachelor's in STEM field. The Noyce Program recruits and supports student entering into and completing the new Cal Teach degree program's five majors that come with a credential. This is a very innovative way of training teachers in California, since other than this program, all credentials are post-bachelor's degree.

Last year (2012-2013), interns rated their skills in technology has been the highest of the previous years. Still only 40% of the interns indicated they were sure they wanted to teach. Based on last year's cohort, students enjoyed the lesson planning and using technology so more use of these two were integrated this year. This year, interns are participating in remote teaching with a high school science classes to help students develop science fair projects. A sub group will be working with a UCI faculty member to develop lessons and activities that are related to research in mitochondria. The lessons involve the use of higher technology because K-12 students will take pictures of mitochondria and analyze them using NIH Image Analysis Program (Image J) through similar methods to what is done by the faculty researchers. Being the last year for the Noyce Internship, an Engineering Honors Society Group will continue this related activity with the K-12 students by collaborating with the Noyce Interns.

There are four Noyce Scholars, all female, who are currently in classrooms doing apprentice teaching. One of the scholars is being video-taped while student teaching and the other three are at earlier stages of their apprenticeship. The one scholar being video-taped will review her lesson and reflect on what kind of changes could be implemented into the classroom. Moreover, she is a 4th year Cal Teach student who is near to

obtaining her secondary teaching credential and her bachelor's in Physics. After being video-taped she is regularly meeting with a previous Noyce Scholar who is helping her conduct video analysis of her lessons to enhance her ability to notice interactions between students and teachers, while learning to predict cognitive dissonance that may arise in class to minimize students' misconceptions.

92

Title: Noyce-CalTeach Scholarship Program @ UCSD

NSF Noyce Award Number: 1339936

Principal Investigator (PI): Amanda Datnow

PI Email: d6carrillo@ucsd.edu

Institution: University of California, San Diego

Co-PI(s): Jeff Rimmel, University of California San Diego, jremmel@ucsd.edu

Chris Halter, University of California San Diego, chalter@ucsd.edu

Presenter(s): Daniel Carrillo, University of California San Diego, d6carrillo@ucsd.edu

Tyler Banta, University of California San Diego, tbanta@ucsd.edu

Project Discipline: Math, Physics, Biology, Chemistry, Geoscience

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://eds.ucsd.edu/noyce/>

Education Studies (EDS) and the Division of Physical Sciences (PS) at the University of California, San Diego initiated two Minors in Mathematics Education and Science Education. These minors engage lower-division STEM students in early field experiences and upper-division students in education foundation coursework, discipline-specific pedagogy and intensive teaching apprenticeship experiences. The program will include scholarships, internship opportunities, mentoring of K-12 students, mentoring relationships with Noyce Master Teacher Fellows, and community involvement. Features of the program include scholarships of \$14,000 available to CalTeach students during their senior and credential candidate years, extensive early fieldwork for STEM majors with partner schools, mentoring K-12 students with Noyce Master Teacher Fellows, and participation with the Teachers for Change, student organization for those interested in public education.

Noyce Scholarship funding would be used to recruit STEM majors into our undergraduate minors and to assist students into the transition to the graduate credential program. We propose a \$14,000 Robert Noyce Scholarship to pay for the academic year and summer fees of STEM seniors who are completing courses and graduate professional preparation courses. The Noyce-CalTeach program would offer field-based experiences to STEM majors enrolled in the CalTeach minor to serve as STEM Ambassadors.

sadors. These ambassadors would work with local schools in preparation for the annual San Diego Science & Engineering Expo held annually. Our CalTeach students would work with the classroom teachers and their students engaged in activities designed to prepare students from high-needs schools to fully participate at the expo. The ambassador program would also be open to Community College students enrolled in the equivalent Cal-Teach course at their school and who are planning to transfer to UCSD. The program combines and coordinates content knowledge and pedagogy throughout the program and in all courses. Faculty members from both Physical Sciences and Education Studies meet and discuss the overall program and the goals we have for our students. The field-based STEM Ambassador Internship will introduce our STEM majors to the idea of informal science and its potential impact on adolescent learners as they engage in activities with local K-12 public schools prior to and during the annual San Diego Festival of Science & Engineering. The ongoing collaboration between Noyce Scholars and Noyce Master Teachers will support the professional and intellectual development of our pre-service teachers. The mentoring relationships formed in the program will have career lasting impacts.

93

Title: Noyce Master Teacher Fellowship at UCSD

NSF Noyce Award Number: 1136369

Principal Investigator (PI): Amanda Datnow

PI Email: chalter@ucsd.edu

Institution: University of California, San Diego

Co-PI(s): Jeff Rimmel, University of California San Diego, jremmel@ucsd.edu

Chris Halter, University of California San Diego, chalter@ucsd.edu

Presenter(s): Chris Halter, University of California San Diego, chalter@ucsd.edu

Sheila Keegan, University of California San Diego, skeegan@ucsd.edu

Project Discipline: STEM Teaching

Topic: Teacher Leadership

URL(s): <http://eds.ucsd.edu/noyce/>

The Noyce Master Teacher Fellowship (MTF) at UCSD program recruited and provide professional development to 40 local teachers in the STEM content areas to serve as effective mentors and become strong education leaders within our high-needs schools and school districts. All selected MTF will receive online-based mentor teacher training at the beginning of the program. This initial training will be supported throughout the program with on-site consultation with university faculty and field supervisors as well as annual MTF conferences. Throughout the academic school year MTF will be able to participate in targeted online courses to further develop specific content and pedagogical skills. During the summer months MTF will join EDS and

Physical Science faculty at UCSD for summer institutes in either mathematics or science instructional topics. UCSD's program includes a Master Teacher in Residence (MTIR) program that recruits one MTF each year to join the university faculty engaging in teaching university coursework and supervising CalTeach Noyce Scholars at various local schools. The MTIR also designs and leads a professional development program for the cohort. A highlight of the program is the interconnections between Noyce Master teacher Fellows and Noyce Scholars who are hosted and mentored in the MTF teacher classrooms.

94

Title: CalTeach Physical Sciences and Engineering

NSF Noyce Award Number: 1240075

Principal Investigator (PI): Julie Bianchini

PI Email: ograin@math.ucsb.edu

Institution: University of California, Santa Barbara

Presenter(s): Christopher Ograin, University of California, Santa Barbara, Project Personnel, ograin@math.ucsb.edu

Chelsea Wallace, University of California, Santa Barbara, Teacher Education Program, Noyce Scholar

Project Discipline: Engineering

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://education.ucsb.edu/calteach>

CalTeach Physical Sciences and Engineering (CTPSE) is entering its second year of implementation at the University of California, Santa Barbara. CTPSE's purpose is to encourage and support prospective and preservice teachers who hold majors in physics, chemistry, engineering, and computer science. The program includes both an undergraduate component and a teacher education component. As part of both components, CTPSE Undergraduate Interns and CTPSE Noyce Teacher Candidate Scholars engage in the teaching and learning of physics, chemistry, and/or engineering with teachers and students at two local academies, the Dos Pueblos High School Engineering Academy and the Santa Barbara High School Green Academy. In year 1, we implemented our undergraduate component only. We followed our 12 Undergraduate Interns during their intensive summer experiences, and for a subset who continued, across their participation in these academies during the academic year as well. We collected a substantial amount of research and evaluation data, including surveys, interviews with both Interns and their mentor teachers, and video records of classroom instruction. We were particularly interested in how Interns' understanding of the eight science and engineering practices discussed in the Next Generation Science Standards changed over time. Our poster will present both details about the structure of our Noyce CPTSE program, as well as initial findings from our year 1 data collection efforts.

95

Title: CalTeach at Santa Barbara

NSF Noyce Award Number: 0934735

Principal Investigator (PI): Jane Conoley, Pierre Wiltzius

PI Email: ograin@math.ucsb.edu

Institution: University of California, Santa Barbara

Co-PI(s): Bill Jacob, Petra Van Koppen, Julie Bianchini

Presenter(s): Christopher Ograin, University of California, Santa Barbara, ograin@math.ucsb.edu, Project Personnel, Noyce Scholarship Program

Chelsea Wallace, University of California, Santa Barbara, Teacher Education Program, Noyce Scholar

Topic: Supporting New Teachers

URL(s): <http://education.ucsb.edu/calteach>

CalTeach at Santa Barbara (CTSB) is ending its fifth and final year of implementation at the University of California, Santa Barbara. The purpose of CTSB is to encourage and support prospective and preservice teachers who hold majors in STEM fields. The program includes both an undergraduate component and a teacher education component. At the undergraduate level, students take specially designed CalTeach courses that are focused on teaching and learning science and mathematics for students in grades 6-12. Undergraduates can further their study by completing the Science and Mathematics Education Minor, which combines a CalTeach course with courses in educational theory, a science or mathematics content course, and a practicum course. In the Teacher Education Program, the Noyce Scholarship is offered to deserving credential candidates in science and mathematics. Preference is given to students who have taken CalTeach classes or completed the Science and Mathematics Education Minor. Noyce Scholars participate in extra-curricular events that enhance their knowledge of activity-based and inquiry-based teaching practices. We continue to support inservice Noyce Scholar teachers by maintaining a UCSB Noyce Facebook page and by inviting them to participate in many kinds of professional development activities. Our poster will show the structure of integration of all of these science and mathematics education programs at UCSB.

96

Title: Streamline to Mastery: Realizing Agency and Leadership through Teacher-Driven Professional Development

NSF Noyce Award Number: 0934921

Principal Investigator (PI): Valerie Otero

PI Email: Laurie.Langdon@colorado.edu

Institution: University of Colorado, Boulder

Co-PI(s): Valerie Otero, University of Colorado-Boulder, Valerie.Otero@colorado.edu

Laurie Langdon, University of Colorado-Boulder, Laurie.Langdon@colorado.edu

Noah Finkelstein, University of Colorado-Boulder, Noah.Finkelstein@colorado.edu

Presenter(s): Valerie Otero, University of Colorado-Boulder, Valerie.Otero@colorado.edu

Laurie Langdon, University of Colorado-Boulder, Laurie.Langdon@colorado.edu

Project Discipline: Physical Sciences

Topic: Teacher Leadership

Streamline to Mastery is a theory-based teacher professional development model that was created to address two problems. First, dominant modes of science teacher professional development have been inadequate in helping teachers create learning environments that engage students in the practices of science, as called for most recently by the NGSS. Second, there is a lack of teacher presence and voice in the national dialogue on education reform and assessment. In this Master Teaching Fellow program, teachers lead and participate in a professional community focusing on STEM education research. Our studies of this community find that teachers become increasingly responsible for designing and enacting learning experiences for themselves and their colleagues. Investigations of characteristics of the science teachers' learning process suggest that teachers who participate in this model generate knowledge and practices about teaching and learning while simultaneously developing identities and practices as education reform advocates and agents of educational change. A summary of teacher research, activism, and future work will be presented.

97

Title: Teacher Research Teams: A New Model for Teacher Preparation, Induction, and Professional Development

NSF Noyce Award Number: 1240073

Principal Investigator (PI): Valerie Otero

PI Email: Carissa.marsh@colorado.edu

Institution: University of Colorado, Boulder

Co-PI(s): Laurie Langdon, University of Colorado, Boulder, Laurie.Langdon@colorado.edu

Valerie Otero, University of Colorado, Boulder, Valerie.Otero@colorado.edu

Noah Finkelstein, University of Colorado, Boulder, finkelsn@colorado.edu

Presenter(s): Carissa Marsh, University of Colorado, Boulder, carissa.marsh@colorado.edu

Laurie Langdon, University of Colorado, Boulder, laurie.langdon@colorado.edu

Valerie Otero, University of Colorado, Boulder, Valerie.Otero@colorado.edu

Project Discipline: Elementary and Secondary STEM

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

This Phase II Scholarship project builds on the Teaching to Learn philosophy that successful programs including the Colorado

Learning Assistant Program. It is designed to integrate, expand, and align teacher preparation, induction, and mastery by bringing together teams of teachers and prospective teachers with different types and levels of experience. The focus of each team of veteran teachers, new teachers, and Noyce scholars is on conducting classroom research and the goal of this centralizing activity is the critical examination of assumptions about teaching and learning. The mechanism by which such reflection occurs is scientific inquiry into one's own practice, the practices of others, and the practices of students. All participants play critical, productive roles as knowledge producers as well as expert learners.

The Teacher Research Team program is a collaboration of the University of Colorado Boulder and seven local school districts associated with former and current Noyce projects. In 2013/14, a total of 16 Noyce scholars, 10 new teachers, and 10 veteran teachers made up seven teams: one elementary science, two secondary math, and four secondary science. Each team conducted research in their classrooms, investigating an aspect of their teaching, curriculum, or student interests. Four veteran teachers were also Master Teaching Fellows in our Noyce Streamline to Mastery Program. Three new teachers were former Noyce scholars in their first year of teaching.

Thus, this project is structured to provide induction support for our new teachers, leadership opportunities for our veteran teachers, and strengthen the network of former and current Noyce scholars in the region. The program also seeks to strengthen our pool of highly qualified mentor teachers who work with all of our STEM teacher candidates in the CUTeach certification program. As an ongoing evaluation of this model, we are analyzing team interactions and meetings, as well as conducting periodic interviews with various participants. Preliminary results from this early implementation of Teacher Research Teams will be presented.

98

Title: Promoting Undergraduate Licensure in Science Education (PULSE) at UC Denver

NSF Noyce Award Number: 1136122

Principal Investigator (PI): Doris Kimbrough

PI Email: doris.kimbrough@ucdenver.edu

Institution: University of Colorado, Denver

Co-PI(s): Laurel Hartley, University of Colorado, Denver, laurel.hartley@ucdenver.edu

Robert Talbot, University of Colorado, Denver, robert.talbot@ucdenver.edu

Leo Bruederle, University of Colorado, Denver, leo.bruederle@ucdenver.edu

Bryan Wee, University of Colorado, Denver, bryan.wee@ucdenver.edu

Presenter(s): Doris Kimbrough, University of Colorado, Denver, doris.kimbrough@ucdenver.edu

Erin Howe, University of Colorado, Denver, erin.d.howe@ucdenver.edu

Project Discipline: Chemistry, Biology, Environmental Science, Physics

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://clas.ucdenver.edu/noyce>

In addition to the traditional preservice coursework provided to our Noyce scholars we have provided two additional modes of support:

- 1) Twice monthly seminar and
- 2) School-based mentors

Seminar topics, their effectiveness, and mentor feedback will be provided.

99

Title: The Rocky Mountain Noyce Scholarship Program

NSF Noyce Award Number: 0934945

Principal Investigator (PI): Diana White

PI Email: Erin.D.Howe@ucdenver.edu

Institution: University of Colorado, Denver

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://clas.ucdenver.edu/noyce>

The Rocky Mountain Noyce Scholarship Program began in 2009 and continues through 2015. In cooperation with the University of Colorado Denver and Aurora Public Schools, we have so far placed 14 students in the scholarship program. We have placed 33 students in our internship component. These opportunities include year-round and summer school support for middle and high schools students. Our goals are to increase the number of mathematics majors who pursue secondary teaching and improve the quality of their preparation to teach in urban school settings by integrating content and pedagogy throughout the students' college career from their freshman through senior years. We provide mentor support from their freshman year through their first year of teaching to ensure accomplished performance and understanding and commitment to teaching in urban communities. Recruitment activities include: Informational visits to undergraduate math classes, promotional flyers posted throughout campus, direct student emails to potential candidates in our math and science departments, outreach organizations, a Facebook page, and our website: <http://clas.ucdenver.edu/noyce>.

100

Title: Hawaii Noyce Teacher Scholarship Program: Using Virtual Place-Based Learning to Engage Students in Mathematics

NSF Noyce Award Number: 1035490

Principal Investigator (PI): Diane Barrett

PI Email: barrett9@hawaii.edu

Institution: University of Hawaii at Hilo

Presenter(s): Diane Barrett

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Hawaii Noyce Teacher Scholarship (HINTS) program is an innovative collaborative project involving University of Hawaii at Hilo (UHH), community colleges and K12 school complexes in Hawaii, which seeks to increase the number of highly qualified intermediate and high school mathematics teachers in Hawaii. HINTS provides Robert Noyce scholarships to UHH students who then have three years to complete both their undergraduate mathematics degree and teacher licensure requirements. Students who receive this support are obliged to spend six years teaching in a high need school.

The Hawaii Noyce Teacher Scholarship program provides substantial support to future Teachers pursuing certification and licensure in Mathematics in the State of Hawaii. If you are considering a career as a Secondary MATH Teacher this program could be for you! The HINTS program will provide a range of financial, academic and professional support to help your career goals come true. HINTS support includes:

- Full Tuition Scholarships
- Technology Support including laptops, iPads & calculators
- Enrollment in a Teacher Education Program at the University of Hawaii Hilo
- Travel to National Conferences
- Professional Development

This grant has increased interest in teaching in the area of mathematics. During interviews with the scholars it was discovered that most thought of going to graduate school and teaching at the college level. Upon hearing about the grant they chose to apply, and after understanding all the requirements of this scholarship they are thankful for the opportunity it provides.

In response to the publicity of this grant, the teacher education program is receiving more potential math teacher applications than in previous years. In previous years there were at most two mathematics teacher candidates per year, with less than that most years. Since the onset of this grant, there have been 3- 5 applicants each year. While this may not seem like much, it is more than double than previously.

In an effort to prepare our scholars, the Hawaii Noyce Teacher Scholarship Program hosts an annual Math Day to promote in-

terest in mathematics and to provide our scholars with practice writing and delivery engaging math lessons. This past Math Day focused on virtual place-based learning. While some of these experiences could be done in the actual place, such as with Modeling the Growth of the Kukui Nut Tree, others, such as, Taxi Cab Geometry in New York City used technology to transform the participants to the place virtually.

The participants consisted of freshman level students who were not current math majors. They were randomly divided into four groups. Each group rotated among the four different virtual, place-based lessons. These consisted of:

- Modeling the Growth of the Kukui Nut Tree: Place-Based Math in a Hawaiian Context where the goal of this activity was to understand the relationship between the height of the kukui plant and the pH level of the soil in which it grows by collecting data and analyzing the best-fit curve obtained from said data.
- Taxi Geometry in New York City: Walking, Cabs and Subways where participants had to find a combination of most efficient means of getting around the city, using the taxi metric for measuring distance. While subways were the fastest they often also involved walking part of the way which would slow you down.
- France during the 1700's to investigate Buffon's Needle. Where participants dropping toothpicks on a lined sheet of paper and determine the probability of the needle crossing one of the lines was directly related to pi.
- Ancient Greece to visit with Euclid and discover geometric constructions. Participant used Euclid's postulates to produce geometric objects using just a straight edge and a compass.
- Individual participants earned points as they solved the mathematics problems posed through each virtual, place-based activity.

At the end of the rotations, the five student participants with the greatest number of earned points competed in a play-off, flash round. Using a Qwizdom Audience Response System (aka clickers), the finalists answered questions related to the four virtual place-based mathematics lessons they just completed. The winner of the flash round received an award.

Based upon data collected, most participants felt the day was fun and worthwhile in addition to being educational (mean score of 3.8/4.0 on each of these data points).

101

Title: Successful Recruitment Strategies: The Noyce Scholarship Program at the University of Houston

NSF Noyce Award Number: 0833342

Principal Investigator (PI): Laveria F. Hutchison

PI Email: lhutchison@uh.edu
 Institution: University of Houston
 Co-PI(s): Jeffrey Morgan, University of Houston, jmorgan11@uh.edu
 Presenter(s): Laveria F. Hutchison, University of Houston, lhutchison@uh.edu
 Project Discipline: Math
 Topic: Recruitment and Marketing Strategies
 URL(s): www.uh.edu

Recruiting and selecting candidates that meet our criteria for Noyce scholars can be quite challenging. Our program has employed a variety of recruiting strategies to find caliber mathematics and science certification seeking students meeting our high standards at the undergraduate level. These strategies have ranged from recruitment websites to more direct forms of recruiting through job fairs and presentations held on our campus. Each semester our programs evaluate the recruiting strategies used and modify our plan according to the data results. Intertwining our program admission criteria with our Noyce selection criteria has allowed for focused recruitment plans further aiding in our success at finding Noyce scholars. Similar to our variety of recruiting strategies, we employ an array selection and interviewing tools aimed at uncovering the strongest candidates for admission into our programs. Our poster presentation will share our successes with recruiting and selecting candidates, data collected that shows the student achievement impact Noyce scholars have made in school settings, stories from our scholars and lessons learned for continued growth and success.

102

Title: University of Houston Robert Noyce Internship and Scholarship Program for Secondary Physics and Chemistry Education

NSF Noyce Award Number: 1240083
 Principal Investigator (PI): Donna W. Stokes
 PI Email: pevans@uh.edu
 Institution: University of Houston
 Co-PI(s): Paige K. Evans, University of Houston, pevans@uh.edu
 Simon G. Bott, University of Houston, sbott@uh.edu
 Presenter(s): Paige K. Evans, University of Houston, pevans@uh.edu
 Juan Nanez Rodriguez, University of Houston, jcnanezrodri-guez@hotmail.com
 Project Discipline: Physics
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models
 URL(s): <http://teachhouston.uh.edu/news-events/stories/2014/teachHOUSTON%20Noyce%20Scholarship%202014.php>
<http://teachhouston.uh.edu/news-events/stories/2014/noyce-internship.php>
<http://www.phys.uh.edu/scholarships/index.php>

The University of Houston Robert Noyce Scholarship Program is addressing the shortage of qualified teachers in high need areas of physics and chemistry through recruitment, preparation and retention of teachers for secondary physics and chemistry education. The program, in collaboration with the University's teachHOUSTON program, offers scholarships to junior and senior level physics and chemistry majors and minors, and post baccalaureate students seeking secondary teacher certification in physics or chemistry. The program also supports summer internships for a 6-week experience working with science master teachers in a summer camp for underserved students. This introduced the interns to teaching early in their academic careers and serves as a recruitment tool for the Noyce Scholarship Program. In addition, the program introduced a Physics by Inquiry course to engage scholars/students in interactive, inquiry-based teaching pedagogies for physics.

The program is nearing completion of its second year and is highlighting several successes.

- There are currently nine Noyce Scholars in the program. Six scholars have graduated which includes two physics majors and one physics minor. This is the most physics trained teachers that have graduated from a teacher certification program at the University of Houston in over a decade.
- The Physics By Inquiry Course was implemented and has been offered twice since inception of the program enrolling 32 students. This course serves Noyce scholars as well as STEM majors in the teachHOUSTON program, resulting in a larger number of teachers trained to effectively teach physics at the 8-12 level.
- Thirteen summer interns were exposed to student teaching through the ExxonMobil Bernard Harris Summer Camp. Of the thirteen, nine have applied for Noyce scholarships, three were chosen as recipients and all thirteen have remained in the teachHOUSTON preparation program. Both the internship and the Physics By Inquiry course are proving to be successful recruitment tools for the Noyce Scholarship Program.

The University of Houston Noyce Scholarship program has already provided six physics/chemistry content knowledgeable teachers to underserved schools in the Houston area. The program's promotion of active inquiry based methods for teaching, training, and learning physics/chemistry may lead to improved teacher knowledge which in turn may enhance student learning, and ultimately lead to an increase in the number of students, particularly those from underserved populations, entering into STEM-related professions.

103

Title: UHD Noyce Teacher Scholarship Program

NSF Noyce Award Number: 934913

Principal Investigator (PI): Brad Hoge

PI Email: hogeb@uhd.edu

Institution: University of Houston-Downtown

Co-PI(s): Jon Aoki, University of Houston-Downtown, Department of Natural Sciences

Akif Uzman, University of Houston-Downtown, College of Sciences and Technology

Ron Beebe, University of Houston-Downtown, Department of Urban Education

Presenter(s): Brad Hoge

Project Discipline: Multiple disciplines

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The NSF Noyce Teacher Scholarship Program in Natural Sciences at the University of Houston Downtown is currently in its fifth year. We have served 12 students through the formation of mentorship teams, summer experiences, trips to conferences, and through the online learning community, HUNSTEM (Houston Urban Network for STEM). We have identified three major accomplishments of the UHD Noyce program that have resulted from our ongoing formative assessment efforts. One was the development of a unique degree plan specific for Noyce Scholars, which has allowed our most recent scholars to complete their degrees with certification in two years. Another was the incorporation of student research into the teacher preparation experience, which has provided our scholars invaluable experience with scientific research and allowed them to develop ideas for applying their experiences into project-based learning in the classroom. The third achievement is the involvement of teachers and high school students in research projects with the Noyce Scholars. Summer research conducted by teams of Noyce Scholars, area teachers, and high school students will actively participate in research projects each summer. This summer's workshop is being conducted in collaboration with our Watershed Wonders Environmental Camp. Research teams will participate in research investigations targeting the Trinity River Watershed with support from the Buffalo Bayou Partnership. Noyce Scholars will also spend one week prior to the Watershed Wonders Research Camp learning about the pedagogy of inquiry and leadership.

104

Title: University of Houston Downtown Mathematics Teacher Scholarship Program

NSF Noyce Award Number: 1136222

Principal Investigator (PI): Rebecca Quander

PI Email: sackj@uhd.edu

Institution: University of Houston-Downtown

Co-PI(s): Jacqueline Sack, University of Houston Downtown, sackj@uhd.edu

Timothy Redl, University of Houston Downtown, redlt@uhd.edu
Nancy Leveille, University of Houston Downtown, level-len@uhd.edu

Presenter(s): Jacqueline Sack, University of Houston Downtown, sackj@uhd.edu

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.uhdnoycemath.org/>

In this session, we will discuss our current NSF Noyce Mathematics Teacher Scholarship program at the University of Houston-Downtown. The purpose of the project is to recruit strong mathematics majors to the field of secondary mathematics education. Recruiting college students to become secondary mathematics teachers has several benefits. Through the scholarship program, we plan to increase the number of high school mathematics teachers with a strong content background, by providing them with a combination of a rigorous mathematics degree program along with specialized courses designed for future high school teachers. We also seek to increase the number of minority and non-traditional students majoring in mathematics and teaching high school mathematics in the Houston area, by offering them scholarships and academic support through the program. Lastly, the program will continue to provide opportunities for UH-Downtown mathematics and education faculty to collaborate and jointly educate future teachers.

105

Title: Paid Tutoring Opportunities in Local Schools make Freshmen and Sophomores more Inclined to Pursue Teaching

NSF Noyce Award Number: 1239999

Principal Investigator (PI): Andrew Elby

PI Email: elby@umd.edu

Institution: University of Maryland

Co-PI(s): Lawrence Clark, University of Maryland, lmclark@umd.edu

Dan Levin, University of Maryland, dlevin2@umd.edu

Joelle Presson, University of Maryland, jpresson@umd.edu

Joe Redish, University of Maryland, redish@umd.edu

Presenter(s): Andrew Elby, University of Maryland, elby@umd.edu

Lawrence Clark, University of Maryland, lmclark@umd.edu

Topic: Recruitment and Marketing Strategies

URL(s): <https://sites.google.com/site/umdnoycescholars/>

In this poster, we focus on a Scholar recruitment strategy that has been fruitful for us at a large state university. We provide freshmen and sophomore STEM majors with paid opportunities to serve as tutors in local middle and high schools. Some of the tutoring slots are in classrooms, where the tutors work with individual students or with small groups. Other tutoring slots are part of an after-school program. Pre- and post-surveys show

that, as a result of these tutoring experiences, many tutors become more likely to pursue K-12 teaching. Furthermore, many tutors have ended up applying for Noyce Scholarships. This poster describes these results and uses quotes from tutors to illustrate what they get out of the tutoring program and why the program leads some of them to become more interested in teaching as a career.

106

Title: S2TLC: Learners- Teachers- Creators of Spheres of Communities

NSF Noyce Award Number: 1136392

Principal Investigator (PI): Kathleen Davis

PI Email: smadden@educ.umass.edu

Institution: University of Massachusetts, Amherst

Co-PI(s): Sandra Madden, Stephen Schneider, Paula Rees

Presenter(s): Sandra Madden, University of Massachusetts Amherst, smadden@educ.umass.edu

Jill Boski, Southwick Middle School, jill.boski@gmail.com

Project Discipline: Math and Science

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://blogs.umass.edu/nsfnoyce/>

<https://open.umass.edu/course/view.php?id=62>

Noyce Project Team Leaders, Master Teaching Fellows (MTFs) and Teaching Fellows (TFs) share how we are the learners, the teachers and creators in the midst of a transformative project. Participants in the NSF Noyce S2TLC: Supporting STEM Teaching and Learning through Communities project have developed many kinds of communities to support our work with youth, specifically utilizing effective inquiry-, problem-, place-based, and culturally responsive instructional practices. These communities include: 1) discipline and school-based face-to-face Communities of Practice (CoPs) to support MTFs and their colleagues with instructional practices that facilitate student learning; 2) a Virtual Community of Practice (VCoP), using Moodle, to support the collaborative professional practices of project MTFs, TFs, the Project Team and, in the future, teachers in the project's partner school districts and beyond; 3) MTF-TF community created in classroom/internship settings to support the development of new teachers' practices and which has moved to the virtual context for many; 4) classrooms with connections to community (community and professional organizations, families, and local resources); 5) advanced professional development communities to be created to meet specific teaching needs.

107

Title: University of Massachusetts Dartmouth NSF Robert Noyce Teaching Scholarship Program

NSF Noyce Award Number: 0833266

Principal Investigator (PI): Patricia Trina Crowley

PI Email: pcrowley@umassd.edu

Institution: University of Massachusetts, Dartmouth

Co-PI(s): Tesfay Meressi, Stephen Hegedus, Frank Scarano

Presenter(s): Patricia Trina Crowley

Project Discipline: Biology

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The University of Massachusetts Dartmouth NSF Robert Noyce Teaching Scholarship Program is now in its final year. This poster will summarize the grant's activities and results over the past six years including the cohorts of Noyce Scholar, the Noyce Summer Internship and the new Noyce Summer Institute.

108

Title: University of Massachusetts Dartmouth NSF TEACH! SouthCoast STEM Program

NSF Noyce Award Number: 1136382

Principal Investigator (PI): Karen O'Connor

PI Email: kwelty@umassd.edu

Institution: University of Massachusetts, Dartmouth

Co-PI(s): Tesfay Meressi, University of Massachusetts, Dartmouth

Abbey Spargo, Ocean Explorium at New Bedford Seaport

Presenter(s): Kimberly Welty, University of Massachusetts, Dartmouth, kwelty@umassd.edu

Project Discipline: Biology

Topic: Teacher Leadership

URL(s): <http://cuspma.org/programs/nsf-teach-southcoast/>

The University of Massachusetts Dartmouth NSF TEACH! SouthCoast Program is in its third year. Our program partners include the Ocean Explorium at New Bedford Seaport and the New Teacher Center in Santa Cruz, CA. Our PI, Karen O'Connor, is the Executive Director of the Center for University School and Community Partnerships (CUSP) and the program director is Patricia Trina Crowley, Associate Director of CUSP. The program's co-PI's represent the University's College of Engineering (Tesfay Meressi, Associate Dean) and the partnership with the Ocean Explorium (Abbey Spargo, Executive Director). Our school partners include three high need public school systems (Fall River, New Bedford & Wareham), two high need vocational technical high schools (Diman Vocational Technical High School and Greater New Bedford Vocational Technical High School) as well as a high need charter school (Global Learning Charter Public School). This poster will illustrate the results of the program to date, which include earning an initial teaching license endorsement from the Department of Elementary and Secondary Education and a Masters of Arts in Teaching degree for our 9 Teaching Fellows, as well as the completion of a Teacher Leadership program for our 13 Master Teaching Fellows. It will also illustrate the goals for the final three years of the program.

109

Title: Integrating Scientific and Mathematical Instructional Practices, Disciplinary Literacy, and Social Justice Pedagogies into STEM Teaching Intern's Clinical Learning Experiences.

NSF Noyce Award Number: 0934678

Principal Investigator (PI): Elizabeth Birr Moje

PI Email: dersh@umich.edu

Institution: University of Michigan

Presenter(s): R. Charles Dershimer, University of Michigan, School of Education, dersh@umich.edu

Project Discipline: Science and Mathematics

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.soe.umich.edu>

In 2014-2015, the University of Michigan Noyce fellows will participate in the School of Education's Master of Arts with Certification (MAC) program. The MAC program is a practice-based program that enables interns to enact rigorous inquiry-based teaching in STEM classrooms. The program consists of an intensive clinical practice experience; research-based course work; and the collection of evidence that demonstrates core teaching competencies. The program develops socially just, literacy-rich, scientific and mathematical teaching practices. In the coming year we will develop various programs and practices for continuously supporting and improving science and mathematics teaching practice.

110

Title: The University of Mississippi Noyce Teachers for a New Tomorrow (TNT) Program

NSF Noyce Award Number: 1240085

Principal Investigator (PI): John O'Haver

PI Email: amkilpat@olemiss.edu

Institution: University of Mississippi

Co-PI(s): Alice Steimle, University of Mississippi, asteimle@olemiss.edu

Project Discipline: STEM Majors

URL(s): <http://olemiss.edu/cmse/noyce>

Mississippi consistently demonstrates an urgent need for improvements in mathematics and science education. The University of Mississippi's Noyce Teacher Scholarship Program, Teachers for a New Tomorrow (TNT Program), provides support to expand and enhance the efforts of UM's Center for Mathematics and Science Education (CMSE) in combating this issue.

Through the TNT Program, the CMSE provides unique scholarship opportunities for STEM majors wishing to pursue a career in mathematics or science education, thus increasing the number of certified secondary school teachers with strong content knowledge in math/science. STEM majors obtain teacher certification in science or mathematics by enrolling as a dual degree candidate (in STEM and STEM Education) or by enrolling in the

School of Education's Master of Arts in Curriculum and Instruction (MACI) program.

In addition to meeting their course requirements, TNT scholars enrich their pedagogical knowledge by participating in the TNT Preparation Program, which is the CMSE's established programs, events, and activities designed to train pre-service teachers, plus additional programs created specifically for TNT scholars. Once certified, TNT scholarship graduates fulfill their program commitment by teaching in a partnered high-need school district at least two years for each year a scholarship award was received.

The University of Mississippi was awarded the Noyce scholarship funding in July 2012. During the first academic year (2012-2013), one Noyce scholar successfully completed the TNT Program while completing a degree in engineering. This academic year (2013-2014), the CMSE successfully recruited seven scholars. These scholars are currently completing the TNT Program while pursuing STEM degrees in engineering (2), mathematics (2), biology (2), and chemistry (1). Through the TNT Preparation Program, the scholars have had the opportunity to take part in a virtual learning community, research seminars, math/science camps, STEM ambassador programs, K-12 classroom visits, regional/state conferences, and professional development sessions.

111

Title: Tomorrow's Teachers with Dual Degrees

NSF Noyce Award Number: 0934839

Principal Investigator (PI): Patricia Friedrichsen

PI Email: souciema@missouri.edu

Institution: University of Missouri

Co-PI(s): Mark Volkmann, University of Missouri, volkmannm@missouri.edu

Marcelle Siegel, University of Missouri, siegelm@missouri.edu

Dorina Kosztin, University of Missouri, kosztind@missouri.edu

John Adams, University of Missouri, adamsje@missouri.edu

Alan Whittington, University of Missouri, whittingtona@missouri.edu

Presenter(s): Marilyn Soucie, University of Missouri, souciema@missouri.edu

Lea Selby, University of Missouri, lbsznf@mail.missouri.edu

Project Discipline: Biology, Chemistry, Earth Science, Physics and Science Education

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://t2d2.missouri.edu>

The goal of the T2D2@MU project is to double the number of secondary science teachers graduating from the University of Missouri. To recruit science majors into our secondary science teacher education program, we designed new dual degree majors. This new degree program allows students to earn a degree

in a science field (Biology, Chemistry, Environmental Geology or Physics) and a degree in Education. To recruit students into the dual degree program, we are using a variety of strategies. 1) Through brochures, fliers, guest speakers in large-enrollment science courses and our website, we are informing students of the dual degree program. 2) We are teaching an additional revised section of Introduction to Science Teaching to help students explore the dual degree program. 3) To explore science teaching as a career option, we are offering a total of 30 paid summer internships in informal science settings (Years 1-4). In addition, the Noyce program will provide a total of 50 1-year \$15,000 scholarships to eligible juniors and seniors in the dual degree program.

112

Title: Tomorrow’s Teachers with Dual Degrees in Mathematics and Mathematics Education (TDM)2

NSF Noyce Award Number: 1035446
 Principal Investigator (PI): James Tarr
 PI Email: soriav@missouri.edu
 Institution: University of Missouri
 Co-PI(s): Barbara Reys, University of Missouri, reysb@missouri.edu
 Carmen Chicone, University of Missouri, chiconec@missouri.edu
 Presenter(s): Victor Soria, University of Missouri, soriav@missouri.edu
 Project Discipline: Math
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models
 URL(s): <http://tdm2.missouri.edu>

Tomorrow’s Teachers with Dual Degrees in Mathematics and Mathematics Education is aggressively working to double the number of secondary mathematics teachers graduating from the University of Missouri’s undergraduate mathematics teacher education program through the recruitment of mathematics majors into mathematics teaching careers, preparation of these individuals to teach mathematics aligned with national standards, and support of mathematics teachers in their induction years.

The project is providing summer mathematics teaching internships, dual degree programs (B.S. in Mathematics (for Math Education Dual Majors) and B.S. Ed. in Mathematics Education), and \$10,000 annual scholarships for those committed to teaching mathematics in high-needs school districts. To increase teacher retention, the project will develop a cadre of mentor teachers in partner schools and supporting Noyce Scholars’ participation in professional mathematics teacher conferences.

The project’s broader impacts include:

- Improvement in the quality and quantity of mathematics teachers for Missouri schools.

- Building of new sustainable models for the recruitment, preparation, and retention of mathematics teachers to meet the teacher shortage.
- Expansion and deepening of relationships between MU mathematicians, mathematics teacher educators, and K-12 teachers and administrators .
- The dissemination of findings from the external evaluation via conference presentations and publications.

113

Title: Learning Assistants Become Teachers (LABT)

NSF Noyce Award Number: 1136412
 Principal Investigator (PI): David R. Erickson
 PI Email: david.erickson@mso.umt.edu
 Institution: University of Montana
 Co-PI(s): Richard L. Hutto, University of Montana, hutto@mso.umt.edu
 Presenter(s): Mariah Smith, University of Montana, mariah.smith@umontana.edu
 Sara Killeen, University of Montana, sara.killeen@umontana.edu
 Project Discipline: Math
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Learning Assistants Become Teachers (LABT) program at the University of Montana prepares secondary teachers with majors in mathematics or science through a series of courses, seminars, and field experiences focused on preparing to teach by helping students learn. This reflective practice allows our future teachers to focus on student learning. Our poster summarizes our unique model that takes the learning assistant approach into the secondary schools, thus giving future teachers an advanced start towards becoming highly effective secondary teachers.

114

Title: NebraskaMATH Noyce Scholars: New Teachers for the 21st Century

NSF Noyce Award Number: 1035268
 Principal Investigator (PI): Wm. 'Jim' Lewis
 PI Email: sswidler2@unl.edu
 Institution: University of Nebraska-Lincoln
 Co-PI(s): Stephen Swidler, Wendy Smith
 Presenter(s): Stephen Swidler, University of Nebraska-Lincoln
 Project Discipline: Math
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models
 URL(s): <http://scimath.unl.edu/noyce/>

A centerpiece of the NebraskaNOYCE project has been the creation of 14-month Master of Arts degree that emphasizes Mathematics Teaching (MAmt). This graduate certification program

targets recent college graduates and career-changers with STEM degrees. The MAmt has graduated 2 cohorts whose members are all employed and succeeding in high needs school districts. This tells the story of this degree program and the well-prepared and highly qualified teachers who comprise the first two cohorts of graduates from the University of Nebraska-Lincoln's Department of Teaching, Learning and Teacher Education. Six members of the first cohort are profiled.

115

Title: Midwest Regional Robert Noyce Connections: Building Communities of Practice 2014-2015

NSF Noyce Award Number: 1405512

Principal Investigator (PI): Wendy Smith

PI Email: wsmith5@unl.edu

Institution: University of Nebraska-Lincoln

Co-PI(s): Willy Hunter, Illinois State University

Kim Nguyen, IUPUI

Gina Post, Wittenberg University

Presenter(s): Wendy Smith, University of Nebraska-Lincoln, wsmith5@unl.edu

Topic: Partnerships

URL(s): <http://scimath.unl.edu/noyce/conference.php>

The Midwest Regional Robert Noyce Connections 2014-2015: Building Communities of Practice is a grant to support Midwest regional Noyce conferences in October 2014 and 2015 as well as other regional and online Midwest Noyce community activities. The goals of the project are to:

- increase the personal connections among Midwest Noyce project members;
- utilize these new and/or strengthened connections to share expertise and knowledge across Midwest Noyce projects;
- support the professional development of Noyce Scholars; and
- build a community of practice among Noyce Scholars.

The Midwest Regional Robert Noyce Connections 2014: Building Communities of Practice conference will be held in Omaha, Nebraska, on October 2-3, 2014. This conference is for Robert Noyce project personnel and participants in the Midwestern region, which consists of Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota and Wisconsin.

The conference will begin on Thursday, October 2, at 8 a.m. and end on Friday, October 3, at 2 p.m. Sessions will include plenary speakers; breakout sessions with presentations from the Noyce community; panel discussions targeting various conference audiences; and structured networking opportunities, including a poster session. Conference participants are encouraged to connect with one another via a closed, LinkedIn group. Each Principal Investigator of an active Noyce project is invited to send a

project delegation of four project personnel to the conference, with at least one co-PI and one Noyce Scholar included among the four attendees. Other potential delegation members could be an evaluator, project manager, Master Teaching Fellow, or Teaching Fellow or Scholar (in-service or pre-service). Other regional activities include local half-day workshops, online webinars, and discussions on closed LinkedIn groups for Noyce community members.

116

Title: Expanding STEM Opportunities through Rural Education: The Robert Noyce Scholarship Program at the University of New Hampshire

NSF Noyce Award Number: 1035443

Principal Investigator (PI): Sharon McCrone

PI Email: sharon.mccrone@unh.edu

Institution: University of New Hampshire

Co-PI(s): Neil Portnoy, University of New Hampshire, neil.portnoy@unh.edu

Dawn Meredith, University of New Hampshire, dawn.meredith@unh.edu

Nodie Oja, University of New Hampshire, sno@unh.edu

Judith Robb, University of New Hampshire, judith.robb@unh.edu

Presenter(s): Sharon McCrone, University of New Hampshire, sharon.mccrone@unh.edu

Project Discipline: Math

Topic: Supporting New Teachers

URL(s): www.unh.edu/noyce

The UNH Noyce Program has been providing a wide range of monthly workshops for Noyce Scholars as well as teachers and supervisors in the local schools. Over the past three years we have offered workshops that focused on a variety of issues, including: differentiated instruction, educational issues in rural New England, developing integrated STEM lessons, STEM education for English language learners, and noticing student thinking.

Our poster shares some of the details of a handful of workshops, highlighting our Noyce Scholars' contributions and reactions to these opportunities.

117

Title: 49erTeach: Building Capacity for Teachers of Chemistry and Physics

NSF Noyce Award Number: 1239935

Principal Investigator (PI): David K. Pugalee

PI Email: wjdibias@uncc.edu

Institution: University of North Carolina, Charlotte

Co-PI(s): Kathy Asala, University of North Carolina, Charlotte, kasala@uncc.edu;

Warren DiBiase, University of North Carolina, Charlotte,
 wjdibias@uncg.edu;
 Pedram Leilabady, University of North Carolina, Charlotte,
 pleilaba@uncg.edu
 Presenter(s): Warren DiBiase, University of North Carolina,
 Charlotte, wjdibias@uncg.edu
 Project Discipline: Chemistry, Physics
 Topic: Innovative Noyce Program Practices and Teacher Pre-
 preparation Models
 URL(s): [https://cstem.uncg.edu/stem-undergraduate-programs/
 noyce-scholarship](https://cstem.uncg.edu/stem-undergraduate-programs/noyce-scholarship)

The University of Carolina at Charlotte has established the UNC Charlotte 49er Teach Noyce Scholars Program to prepare 12 high-school chemistry and physics teachers with content expertise. Through a strong partnership among the Departments of Physics and Chemistry, the College of Education, and the Charlotte-Mecklenburg Schools, this high-quality teacher preparation program uses the Learning Coach model to engage the best chemistry and physics students in peer instruction, supported by faculty mentors. Those selected to become Noyce Scholars enroll in pedagogy courses, attend seminars enriching their knowledge of both science and pedagogy, attend state and national meetings on science education, have summer internship opportunities, and are supported by a three-person team of mentors, one each from the science faculty, the education faculty, and a classroom teacher. Having completed the certification program, new teachers continue to be mentored and supported during their first three induction years. This project's success rests on its seamless collaborations among disparate disciplines, strong administrative support, and the well-developed Learning Coach model. It addresses a key need for well-trained high-school chemistry and physics teachers, particularly in underserved areas such as rural North Carolina.

118

Title: Project ExSEL Examines the Value of Science Conference Attendance for Pre-Service Teacher Scholars at UNC Greensboro

NSF Noyce Award Number: 0833280
 Principal Investigator (PI): Jerry Walsh
 PI Email: jlwalsh@uncg.edu
 Institution: University of North Carolina, Greensboro
 Co-PI(s): Catherine Matthews, University of North Carolina,
 Greensboro cmatthews@uncg.edu
 Presenter(s): Carla Harris, University of North Carolina at
 Greensboro, clharri8@uncg.edu
 Jerry Walsh, University of North Carolina at Greensboro,
jlwalsh@uncg.edu
 Topic: Innovative Noyce Program Practices and Teacher Pre-
 preparation Models
 URL(s): www.uncg.edu

<http://soe.uncg.edu/exsel/>

The Teacher Education Department of the University of North Carolina at Greensboro typically requires our pre-service science teachers to attend state and regional science conferences as part of our Science Methods' courses. These professional development institutes usually occur in November. Project ExSEL further requires our scholars to attend as presenters or as participants and to report back to the Noyce cohort about their learning. The Regional National Science Teachers Association Conference was held in November, 2013, in Charlotte, North Carolina. Nine scholars attended and were given a pre- and post-survey about their experiences as they relate to teacher preparation. Data, with anecdotes, will be presented about the efficacy of requiring science conference attendance for pre-service teachers

119

Title: UNT Science and Mathematics Robert Noyce Scholarships

NSF Noyce Award Number: 1035312
 Principal Investigator (PI): Colleen Eddy
 PI Email: pam.harrell@unt.edu
 Institution: University of North Texas
 Co-PI(s): Pamela Esprivalo Harrell, University of North Texas,
pam.harrell@unt.edu
 Lee Hughes, University of North Texas, lee.hughes@unt.edu
 John Quintanilla, University of North Texas,
john.quintanilla@unt.edu
 Sarah Pratt, University of North Texas
 Presenter(s): Pamela Esprivalo Harrell, University of North
 Texas, pam.harrell@unt.edu
 Project Discipline: Biology
 Topic: Supporting New Teachers
 URL(s): <http://www.unt.edu/noyce/>

The University of North Texas is now in Phase II of the Science and Mathematics Robert Noyce Scholarship Program. The program began in 2010. As of May 2014, 33 undergraduate and four graduate students have been awarded scholarships. Among the 33 Phase II scholars, 66% are mathematics majors and the GPA mean is 3.45 (SD = 0.32). Phase II has seen an increase in the number of undergraduate candidates being awarded scholarships. This increase is primarily attributed to the undergraduate STEM education program called Teach North Texas, which is a replication of UTeach. Phase I scholars show a positive trend of teaching retention (98%) and continuing to teach in a high need school district (82%) past the teaching requirement of the scholarship.

120

Title: The Noyce Scholarship Program of the University of Northern Colorado

NSF Noyce Award Number: 1035333

Principal Investigator (PI): Rob Reinsvold

PI Email: robert.reinsvold@unco.edu

Institution: University of Northern Colorado

Co-PI(s): Valerie Middleton, Secondary Professional Teacher Education Program, University of Northern Colorado, valerie.middleton@unco.edu

Lori Reinsvold, Mathematics and Science Teaching (MAST) Institute, University of Northern Colorado, lori.reinsvold@unco.edu

Presenter(s): Rob Reinsvold, School of Biological Sciences, University of Northern Colorado, robert.reinsvold@unco.edu

Project Discipline: Science and Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://mast.unco.edu/programs/noyce/>

The Noyce Scholarship Program of the University of Northern Colorado began in September 2010. The overall goal of our project was to increase the number of science and math teachers graduating and then teaching in high-need schools. To implement the program, UNCO partnered with 25 school districts, 19 of these are in rural communities.

To date, we awarded scholarships to 33 Noyce Scholars (11 more than our proposed target of 22). The amount of scholarship per semester was the same, just distributed over more students. Of these, 21 have graduated, secured teaching licenses, and either are currently or will be teaching in high-need schools. Five Noyce Teachers have already completed their teaching obligation in high-need schools as required for receipt of the scholarship. All of these teachers show proficient to advanced scores in pedagogical skills, diversity skills, professional skills, pedagogical content knowledge, and content knowledge.

We also awarded eight Noyce Post-Bac Stipends to STEM professionals that changed their careers to science or math teaching. Of these, six Noyce Post Bacs are now teaching in high-need schools or will start in fall 2014. Two of the Noyce Post Bacs have met their teaching obligation. Fifty Noyce Interns received early educational experiences through of suite of internships; ten of these later became Noyce Scholars.

The practices that are making an impact are: 1) the scholarships and internships are helping potential teachers to commit to teaching; 2) the support of Noyce Teachers during their induction year is critical; 3) creating a network for STEM teachers and teacher candidates has increase support from peers; 4) the lessons learned from the Noyce Program influenced the redesign of our teacher preparation program by increasing early educational experiences; and 5) the Noyce Program has increased the awareness of the need for science and math teachers and established it as a priority for support from our dean, provost, and university president.

Three additional projects developed as a direct result of the activities of our Noyce Program. First, a new student organization was created to support future science teachers, the Science Educators Alliance (SEA). Second, we hosted the first inaugural Colorado STEM Teacher Preparation Symposium at UNCO. Seventy five representatives from major teacher prep programs and state agencies gathered to develop a collective vision of STEM teacher prep. Finally, negotiations have started between the University of Northern Colorado and Colorado School of Mines to provide a path for Mines students of applied sciences, math, and engineering to eventually secure a teaching license in a new collaborative program between the two campuses.

121

Title: The Majority of Math and Science Teachers Produced in Iowa come out of Three State Universities: The University of Northern Iowa, Iowa State University, and The University Of Iowa

NSF Noyce Award Number: 0934866

Principal Investigator (PI): Jeff Weld

PI Email: ted-neal@uiowa.edu

Institution: University of Northern Iowa

Co-PI(s): Ted Neal, University of Iowa, ted-neal@uiowa.edu

Thomas Greenbowe, Iowa State University,

tgreenbo@iastate.edu

Presenter(s): Ted Neal, University of Iowa, ted-neal@uiowa.edu

Katie Wilford, University of Northern Iowa

Project Discipline: Biology

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.iowastem.gov

Iowa Model: The majority of math and science teachers produced in Iowa come out of three state universities: the University of Northern Iowa, Iowa State University, and the University of Iowa. The state has a shortage of mathematics and science teachers and the Noyce scholarships have helped increase the number of candidates in the pipeline by 22 percent (for math) and 63 percent (science) over the last four years. A variety of pathways to licensure exist: traditional undergraduate science or math majors plus certification, post-bachelors certification, MAT, and new options for nontraditional licensure or a 4 + 1 BA/MAT program. The three universities joined forces for Noyce.

Noyce Supports State STEM Education Initiative: The 4 year-old Iowa Math and Science Education Partnership, a state-funded initiative of Iowa's universities charged with increasing the production of quality science and math teachers (among other things), supports programming to recruit talented incoming STEM majors for teaching, as well as to draw upper level STEM majors, post-bacc STEM students, and STEM professionals, into teaching.

Five Year Goal: Noyce scholarships leverage the state's investment by increasing by some 30 percent the number of teaching majors in the pipeline, for a total of almost 80 additional teachers by 2014.

122**Title: The Noyce Internship: A University of Portland and Saturday Academy Partnership**

NSF Noyce Award Number: 1240040

Principal Investigator (PI): Stephanie Anne Salomone

PI Email: salomone@up.edu

Institution: University of Portland

Co-PI(s): Sharon Jones, University of Portland, jones@up.edu

Tim Doughty, University of Portland, doughty@up.edu

Tisha Morrell, University of Portland, morrell@up.edu

Jacque van Hoomison, University of Portland, van-hoomi@up.edu

Presenter(s): Stephanie Anne Salomone, University of Portland, salomone@up.edu

Project Discipline: Math

Topic: Partnerships

URL(s): www.up.edu/noyce

Paired with master teachers and mentors, Noyce Interns work for eight weeks in the summer to gain practical experience working with grade 2-12 students to improve interns' understanding of STEM instruction both through a traditional tutoring program and through Saturday Academy STEM classes and camps. The tutoring and SA classes provide programming for underserved students as about 40% of the students participating in these are low income, under represented minorities, or First Generation College bound.

Through reflections, group meetings, and formal evaluations, we will determine whether and how these informal teaching experiences are influencing these STEM majors to consider teaching as a profession. We will present what we feel have been successful components of the internship program and what improvements we are continuing to make.

123**Title: Developing Leadership Through the Design of a Professional Development Curriculum**

NSF Noyce Award Number: 0934820

Principal Investigator (PI): Michelle Borrero

PI Email: edwinmorera@yahoo.com

Institution: University of Puerto Rico at Rio Piedras

Co-PI(s): Edwin Morera, University of Puerto Rico at Cayey, edwinmorera@yahoo.com

Marta Fortis, University of Puerto Rico at Rio Piedras, fortismarta@gmail.com

Presenter(s): Edwin Morera, University of Puerto Rico at Cayey,

edwinmorera@yahoo.com

Project Discipline: Math

Topic: Teacher Leadership

URL(s): http://alacima.uprrp.edu

One of the goals of the Puerto Rico Master Math Teacher Program is to develop our Fellows as models of exemplary teaching of mathematics and leaders among their peers to promote improvements in students' academic achievement. As part of their certification curriculum we had them design and impart professional development unit to K-9 math teachers, as well as train other faculty and teachers as trainers. The objective of the designed units is to promote math content learning with understanding and transfer to the classroom. We have data that supports that the Master Math Teacher Fellows were successful in the design and implementation of these units as evaluated by both the trainers and the teachers that received professional development directly from the Fellows. Through this process they have become empowered to lead their peers in the development of content knowledge while modeling practices that support students' learning with understanding.

124**Title: University of Rhode Island's Robert Noyce Teacher Scholarship Program**

NSF Noyce Award Number: 1339963

Principal Investigator (PI): Anne Seitsinger

PI Email: jlibertini@mail.uri.edu

Institution: University of Rhode Island

Co-PI(s): David Byrd, University of Rhode Island, dbyrd@mail.uri.edu

Cornelis de Groot, University of Rhode Island, de-grootc@mail.uri.edu

Jay Fogleman, University of Rhode Island, fogleman@mail.uri.edu

Jessica Libertiini, University of Rhode Island, jlibertini@mail.uri.edu

Joan Peckham, University of Rhode Island

Presenter(s): Jessica Libertini, University of Rhode Island, jlibertini@mail.uri.edu

Project Discipline: STEM

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Over the next 5 years, our program will recruit and support 20 undergraduate STEM majors and 5 STEM professionals to teach elementary, middle, and high school students in high-need districts. In addition, 50 freshmen and sophomores from URI will be afforded paid summer internships in STEM education areas. Scholarships for \$10,000 support 20 juniors and seniors over the 5 years of the grant. One-year stipends (\$40,000) are offered to five STEM professionals seeking teacher certification. The program also mentors Scholars during the first 3 years of teaching.

Our program seeks to increase the overall number, diversity, and percentage of our teacher education candidates with STEM backgrounds. This program collaborates with five urban school districts and several non-profit organizations in Rhode Island.

125

Title: University of Rochester Noyce Scholars Program: Preparing Highly-Qualified Mathematics and Science Teachers for High Needs Schools

NSF Noyce Award Number: 1136212

Principal Investigator (PI): Raffaella Borasi

PI Email: mocchino@warner.rochester.edu

Institution: University of Rochester

Co-PI(s): Jeffrey Choppin, University of Rochester, jchoppin@warner.rochester.edu

Michael Gage, University of Rochester, michael.gage@rochester.edu

April Luehmann, University of Rochester, april.luehmann@rochester.edu

Terry Platt, University of Rochester

Presenter(s): Michael Occhino, University of Rochester, mocchino@warner.rochester.edu

Tyler Lucero, Hellmer Nature Center, lucerotc@gmail.com

Project Discipline: Math and Sciences

Topic: Supporting New Teachers

The University of Rochester's commitment to increasing high quality STEM teachers for high needs schools through the Warner Graduate School of Education initial teacher preparation programs has three key activities currently in progress:

1. Noyce Phase I scholarship recipients have graduated and received their teaching certificates; they are receiving support through Warner School mentoring and networking efforts.
2. The Noyce Scholars in science programs are receiving additional support through a Noyce Supplement grant. A new Warner School course, Implementing Reform-based Science Education, engages graduates from the science education programs in an opportunity to do action research in their classroom with the support of their colleagues and Warner faculty.
3. The recruiting of new Noyce Scholars for the University of Rochester's Phase II Robert Noyce Scholarship grant which started in January 2012.

In this poster, we report on these efforts to support novice STEM teachers in their teaching, to continue the growth of Science teachers as they grapple more deeply with reform-based pedagogy and to recruit new cohorts of STEM teacher candidates.

126

Title: University of Rochester Noyce Master Teaching Fellows Program: Preparing Highly Qualified K-12 STEM Teacher Leaders for Urban Schools

NSF Noyce Award Number: 1035283

Principal Investigator (PI): Cynthia Callard

PI Email: ccallard@warner.rochester.edu

Institution: University of Rochester

Co-PI(s): April Luehmann, University of Rochester, april.luehmann@rochester.edu

Judith Fonzi, University of Rochester, judith.fonzi@rochester.edu

Raffaella Borasi, University of Rochester, rborasi@warner.rochester.edu

Carl Mueller, University of Rochester

Presenter(s): Cynthia Callard, University of Rochester, ccallard@warner.rochester.edu

Debra Ortenzi, Rochester City School District, debra.ortenzi@rcsdk12.org

Project Discipline: STEM

Topic: Teacher Leadership

The University of Rochester Noyce MTF Project is a partnership with the University of Rochester, the Rochester City School District, and the Rochester Museum and Science Center. Currently in Year 4, we have been working towards developing a cadre of highly qualified educational leaders in math and science who have a deep understanding of how people learn, instructional practices that support learning, and of leadership and the process of change. Our poster will showcase our project's main components, partners, initiatives, beliefs, and evaluation and data collection plan.

We are working towards developing sustained leadership in math and science in an urban setting. Fellows are engaging in a combination of post-Master's coursework and mentored practice to increase their knowledge and skills in STEM content, pedagogy, assessments, leadership, and professional development so they can serve as models, professional development providers and instructional leaders for their district.

Our scaffolded professional development program began with a focus on K-12 mathematics/science instruction by engaging Fellows in inquiring into their own practice as STEM teachers, then shifted the focus to leading others and introduced Fellows to the many possible dimensions of the role of teacher leader. During the first 2 years courses, mentoring, and performance tasks centered on how people learn, innovative instructional practices informed by how people learn, deepening math/science content knowledge through experiences as learners, planning and implementing instruction in formal and informal settings.

In the subsequent 3 years the primary focus of courses, mentoring, and performance tasks was to foster agents of change.

Through the lens of individual change and systemic reform Fellows were supported to develop effective practices for visioning, communicating, mentoring in-service and pre-service STEM teachers, and provided professional development through workshops and summer institutes for STEM teachers. Each year Fellows attended graduate level courses and undertook a series of mentored field experiences most pertinent to the focus for that year.

We are engaged in a formative and summative systematic evaluation to determine:

1. The quality of the professional development offered to the Fellows.
2. The learning and understandings that Fellows gain from the project.
3. The Fellows' increased effectiveness as STEM teachers.
4. The Fellows' leadership involvement

127

Title: University of South Alabama Pathway to Mathematics

NSF Noyce Award Number: 0934829

Principal Investigator (PI): Andre Green

PI Email: green@southalabama.edu

Institution: University of South Alabama

Co-PI(s): Madhuri S. Mulekar, University of South Alabama

Phillip Feldman, University of South Alabama

Katherine Malone, Bishop State Community College

Presenter(s): Andre M. Green, University of South Alabama, green@southalabama.edu

Ramsey Willis, Noyce Scholar, University of South Alabama, rjw1102@jagmail.southalabama.edu

Project Discipline: Math

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): www.usapathwaytomathematics.com

Pathways to Mathematics (PTM) is a collaborative program between the University of South Alabama Colleges of Education, Arts & Sciences, Engineering, the Alabama State Department of Education through its Alabama Math Science and Technology Initiative, and the Mobile County Public Schools System. PTM will address the desperate need to increase the number of mathematics teachers in the MCPSS through enabling recent mathematics and engineering bachelor degree graduates to complete secondary mathematics certification in an intensive four-semester program that culminates with certification and an earned master's degree. To ensure that the investment in these newly certified teachers (Noyce Scholars) is successful, they will participate in a two-year post-employment mentoring program designed to provide classroom support after graduation.

Goals:

1. PTM will prepare a total of up to 25 mathematics teachers (over the five-year period) who will be certified to teach mathematics at the secondary level. PTM seeks to create a steady stream of future alternative master's degree mathematics education majors, which in turn will increase the number of mathematics teachers available to teach in local school systems.
2. PTM will enhance middle and high school student achievement by providing certified mathematics teachers in high needs schools that currently lack certified math teachers.
3. PTM will create a replicable model to provide ongoing mentoring and professional development for novice mathematics teachers that will increase the likelihood that they will be retained and become career teachers.
4. PTM will double the number of math teachers (8 candidates total) who earn their certification from the University of South Alabama by creating a pipeline of undergraduate students beginning at the community college level and culminating in an earned master's degree and certification in secondary mathematics education.

128

Title: The University of South Florida Robert Noyce STEM Scholar Program - Reflections from Three Cohorts

NSF Noyce Award Number: 1035273

Principal Investigator (PI): Gladis Kersaint

PI Email: kersaint@usf.edu

Institution: University of South Florida

Co-PI(s): Gladis Kersaint, Kersaint@usf.edu, University of South Florida

Larry Plank, larry.plank@sdhc.k12.fl.us, Hillsborough County Public Schools

Allan Feldman, afeldman@usf.edu, University of South Florida

Mile Krajcevski, mile@mail.usf.edu, University of South Florida

Presenter(s): Gladis Kersaint, Kersaint@usf.edu, University of South Florida

Larry Plank, larry.plank@sdhc.k12.fl.us, Hillsborough County Public Schools

Maranda Holley, maranda.holley@sdhc.k12.fl.us, Hillsborough County Public Schools

Project Discipline: Math

Topic: Supporting New Teachers

URL(s): http://www.coedu.usf.edu/noyce/index.html

Now concluding its third academic year, the USF Noyce STEM Scholar Program has awarded 24 scholarships to applicants of the USF College of Education's Master of Arts in Teaching (MAT) programs in secondary science and secondary mathematics. Relying on data collected from each of the first three cohorts of Scholars, the poster will share the progress of the program through a variety of lenses.

The objectives of the USF Robert Noyce STEM Scholar program are to:

- Recruit content knowledgeable STEM professionals, both change-of-career and recent graduates, to participate in a state-approved initial teacher certification MAT program for mathematics or science at the secondary level (grades 6-12)
- Prepare STEM professionals to be effective mathematics or science teachers of diverse learners (e.g., English language learners, minority, and students of low socioeconomic status) in high needs county-wide school districts in the Tampa-bay area.
- Continue relationships with and provide support to USF Robert Noyce STEM Scholars throughout their first two years of teaching.
- Engage USF STEM Scholars in ongoing professional development through non-coursework activities and experiences designed to develop a professional learning community to provide long-term peer support.

Now that the Program has had its first cohort complete their second year of teaching, we seek to consider the ways in which program objectives have been met. To do so, the presentation will include:

- Demographic and interest surveys to document experience and diversity of student participants
- Performance assessments from course experiences
- Evaluations from preservice teaching experiences
- Evaluations from inservice teaching experiences
- Records of professional development activities completed by Scholars

We will also provide feedback from Scholars in each cohort, in an effort to investigate the extent to which program objectives have been met; as well as ideas for filling in any gaps between intended and actual outcomes.

129

Title: The Tampa Bay Robert Noyce Master Teacher Fellows Program - Year 1 Reflections

NSF Noyce Award Number: 1239946

Principal Investigator (PI): Gladis Kersaint

PI Email: larry.plank@sdhc.k12.fl.us

Institution: University of South Florida

Co-PI(s): Gladis Kersaint, kersaint@usf.edu, University of South Florida

Larry Plank, Hillsborough County Public Schools,

Larry.Plank@sdhc.k12.fl.us

Diane Yendol-Hoppey, dyhoppey@usf.edu, University of South Florida

Robert Potter, potter@usf.edu, University of South Florida

Presenter(s): Gladis Kersaint, kersaint@usf.edu, University of South Florida

Larry Plank, Hillsborough County Public Schools,

Larry.Plank@sdhc.k12.fl.us

Barbara Emil, Barbara.Emil@sdhc.k12.fl.us, Hillsborough County Public Schools

Project Discipline: STEM Education

Topic: Teacher Leadership

URL(s): <http://anchin.coedu.usf.edu/NoyceMTF.html>

The poster in development will highlight Fellows' participation in an innovated graduate certificate program at USF. During their first full year as Master Teacher Fellows (MTFs), 20 Hillsborough County Public School (HCPS) math and science teachers completed the Teacher Leadership for Student Learning (TLSL) Graduate Certificate program at the University of South Florida (USF). This certificate program was collaboratively designed with practitioners from HCPS and courses were co-taught by a USF faculty member and an HCPS leader to assure strong linkages between the coursework, field work, and ongoing professional development activities.

The TLSL certificate program was designed to prepare non-administrative school leaders to participate in and facilitate professional learning. These teacher leaders are prepared with the knowledge, skills, and abilities needed to facilitate professional knowledge development in individuals, teams, and schools. The TLSL Graduate Certificate is a 12-credit, four course sequence that examines the links between teacher leadership, job-embedded professional learning, and student learning. Each course was modified to meet the specific needs of the Fellows. The four courses that comprise this certificate are:

- Teacher Leadership for Student Learning. This course prepared MTF to become facilitators of program improvements that target student learning as they explored the various teacher leadership roles in the K-12 contexts, including exemplary practitioner, curriculum decision maker, researcher, advocate, and facilitator of job-embedded professional development.
- Teacher Research for Student Learning. This course familiarized MTF with the application of classroom teacher research methodologies to strengthen teaching and learning in schools.
- Coaching for Student Learning. This course prepared MTF to facilitate preservice and inservice educator learning with a specific focus on student learning.
- Professional Development for Student Learning. This course prepared MTF for facilitating job-embedded educator learning with a specific focus on student learning.

The poster to be presented at the Noyce Conference will describe the TLSL Certificate Program, and will share specific examples of the job-embedded learning experiences Fellows engaged in. Example products from each course will be available.

130**Title: The Impact of Participation in an Online Community of Science Teacher Practice on Embedded Program Assessments**

NSF Noyce Award Number: 1136442

Principal Investigator (PI): Frederick W. Freking

PI Email: freking@usc.edu

Institution: University of Southern California

Co-PI(s): Anthony Maddox, University of Southern California, amaddox@rossier.usc.edu

Doug Capone, University of Southern California, capone@usc.edu

Su Oh, Museum of Natural History, suoh@nhm.org

Presenter(s): Frederick W. Freking, University of Southern California

Project Discipline: Biology

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The core of the USC Noyce Science Scholarship program is an online community of practice that aims to support beginning science teacher development. Science teacher candidates participate in both synchronous and asynchronous activities to develop their ability to develop their students science practices. This presentation will share data on how these candidates transfer their learning from the online community of practice to their student teaching placements through an analysis of program-embedded assessments.

131**Title: Math for America Los Angeles Teacher Fellows Program**

NSF Noyce Award Number: 0934923/1136415

Principal Investigator (PI): Karen Gallagher

PI Email: pam@mathforamerica.org

Institution: University of Southern California

Co-PI(s): Darryl Yong, Harvey Mudd College, dyong@hmc.edu

David Drew, Claremont Graduate University, david.drew@cgu.edu

Presenter(s): Pam Mason, Math for America Los Angeles, pam@mathforamerica.org

Project Discipline: Math

Topic: Teacher Leadership

URL(s): <http://www.mathforamerica.org>

Math for America Los Angeles (MfA LA) is a non-profit organization formed by the partnership of University of Southern California (USC), Claremont Graduate University (CGU), and Harvey Mudd College. MfA LA's main goal is to improve student achievement in math by developing transformational secondary school math teachers. The Teacher Fellows Program was designed to attract individuals to the teaching profession with a talent and passion for math. The program provides these individuals with high-quality training and the resources needed to become successful teachers that will make a difference in their

schools, districts, and students' lives. Specifically, the Program provides tuition to obtain a master's degree in teaching at USC or CGU, an annual stipend, mentoring, professional development activities, and support for national board certification.

NSF Noyce funds have supported Fellows after they completed their teacher prep program and secured a full-time teaching position in a greater Los Angeles area school. Evaluation results indicated that MfA LA Fellows appreciated the sense of community and professional support provided through the Program. Also important was the opportunity to attend conferences, engage in collaborative lesson planning, and share resources with other Fellows. A high percentage of Fellows intend to continue in the teaching profession and students of Fellows are outperforming or performing as well as students of other, more experienced teachers on assessments of Algebra I. Future evaluation efforts will continue to investigate the connections between program implementation and longer-term outcomes.

132**Title: Math for America Los Angeles Master Teacher Fellows Program**

NSF Noyce Award Number: 0934923/1136415

Principal Investigator (PI): Karen Gallagher

PI Email: pam@mathforamerica.org

Institution: University of Southern California

Co-PI(s): Darryl Yong, Harvey Mudd College, dyong@hmc.edu

David Drew, Claremont Graduate University, david.drew@cgu.edu

Presenter(s): Pam Mason, Math for America Los Angeles, pam@mathforamerica.org

Project Discipline: Math

Topic: Teacher Leadership

URL(s): <http://www.mathforamerica.org>

Math for America Los Angeles (MfA LA) is a non-profit organization formed by the partnership of University of Southern California, Claremont Graduate University and Harvey Mudd College. The Master Teacher Fellows Program is focused on improving math teacher quality to improve student achievement. The program seeks to recruit existing math teachers to work in pairs/small groups at their school sites to improve math teaching in their schools/districts. The Program aims to improve student achievement by providing experienced math teacher-leaders with increased teacher leadership capacity and effectiveness, and by initiating systemic change at schools/districts. Program components include monthly professional development meetings, attendance at the Park City Mathematics Institute, an annual stipend, and support to carry out a long-term, school-specific project to positively impact each team's school site.

Evaluation activities to determine Program impact are on-going. Evaluators have collected data such as observations at school

sites, surveys, interviews, and student achievement data. These data will serve as baseline measures to determine Program impact.

133

Title: Unique Aspects of UTK's Robert Noyce Grant Activities Associated with the VolsTeach Program and its Noyce Scholars and Interns

NSF Noyce Award Number: 1136102

Principal Investigator (PI): Susan Riechert

PI Email: riechert@utk.edu

Institution: University of Tennessee

Co-PI(s): Susan Benner, University of Tennessee, sbenner@utk.edu

Presenter(s): Susan E Riechert, Jada Russell

Project Discipline: Biology

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://www.utk.edu/>

<http://www.volsteach.utk.edu/>

<http://www.biologyinbox.utk.edu/>

In addition to reporting on our Noyce Scholar and intern activities and accomplishments, we make special reference here to two unique aspects of our Noyce grant program at the University of Tennessee, The Robert Noyce STEM Issues Seminar Series and our Research Methods in STEM Disciplines course. The three topics the seminar series has addressed to date are the Teaching of Climate Change (Yr 1) and of Evolution (Yr 2) and Synergy in STEM: Math and the Sciences (YR3). In the first two years we brought research specialists, educators and science advocacy specialists in for discussions. This past spring term we emphasized the interdisciplinary nature of STEM with particular reference to the synergy between mathematics and the sciences, bringing in a math professor who is active in STEM outreach and two award winning teachers that combine the offering of math and science in project-based classes.

UTK's NSF Noyce Phase I Project also supports the continued development of teaching skills in the area of "doing science" in the high school classroom and environs. In our research methods course, future teacher teams complete modules on collaboration, research design and analysis while working through a semester long project of their choosing that entails the cooperative effort of a 3-4 member team of mathematics and science majors. The model systems they choose to work on must be ones that can be applied in the high school classroom and emphasis is placed on broad areas of investigation that can be built on from year to year as new classes review the progress made by previous years' classes.

134

Title: Building Tomorrow's Teachers: The University of Tennessee at Chattanooga's STEM Education Program

NSF Noyce Award Number: 1132284

Principal Investigator (PI): Margaret Kovach

PI Email: Mark-Harvey@UTC.Edu

Institution: University of Tennessee at Chattanooga

Co-PI(s): Pam Carter

Presenter(s): Mark Harvey, Avalon Gourlay, Pam Carter, Margaret Kovach

Project Discipline: STEM Education

Topic: Project Management

URL(s): www.utc.edu/stem-education

Initiated in 2010, the STEM Education Program, a replication of the UTeach model, was specifically designed to increase the number of highly qualified secondary math and science educators graduating from UTC. Our program has identified a set of specific goals focusing on the recruitment of qualified STEM students, the development of content rich experiences, improving educator preparation, and increasing the overall number of STEM graduates. In addition, four specific standards were developed to ensure program success; administration of minimum GPA standards, implementation of a robust recruitment strategy, development of intense summer internship opportunities, and provision for two years of education support for select students enrolled in the STEM Education Program.

Since its inception, 180 students have enrolled in the STEM Education Program. Current distribution of majors represented by the student population is 40% Math, 30% Biology, 14% Computer Science, 12% Chemistry, 2% Engineering, 2% Geology, <1% Physics. Within this group, the NSF Robert Noyce grant has provided 17 scholarships and 11 intense summer internships to highly qualified STEM Education students.

The first cohort of STEM graduates was in the spring of 2013. In total, 18 students have graduated with 78% electing to pursue an education career path and 22% choosing to pursue an advanced degree in their chosen STEM discipline. Enrollment has shown growth during the first three years of implementation but has leveled off to 100 students per academic year. Retention rates are lowest for those students in introductory courses (45%) but steadily improve (60-100%) as students advance through the program. Since the success of this program hinges on growth and retention, we have developed a sustainability plan that targets student engagement in the university community, provides academic support, and fosters experiential learning. The target for enrollment and graduation has been set at 150 students/semester and 15 graduates/year.

As the STEM Education Program enters the final two years of the Phase I initiative, program participants have identified additional activities and goals that will enhance the program effectiveness and overall quality of graduates. Specifically, the STEM Educa-

tion Program will make a concerted effort to recruit STEM based students transferring from 2-year institutions, grow a diversified internship program that will focus on both local and national opportunities, expand campus research opportunities through partnerships with other STEM based departments, and foster community partnerships that offer full semester internship options. Finally, we will begin the Phase II initiative focusing on scholarships and internship opportunities and monitoring of recent STEM Education graduates as they engage in careers in secondary education.

135**Title: TEACH/Here STEM Teacher Induction Support**

NSF Noyce Award Number: 1035455

Principal Investigator (PI): Susan Benner

PI Email: sbenner@utk.edu

Institution: University of Tennessee, Knoxville

Co-PI(s): Stu Elston, University of Tennessee, selston@utk.edu

Dan Challener, Public Education Foundation,

dan@pefchattanooga.org

Presenter(s): Susan Benner, University of Tennessee,

sbenner@utk.edu

Karen Cheng, L&N STEM Academy, kcheng2@utk.edu

Project Discipline: STEM

Topic: Supporting New Teachers

The Teach/Here Urban Teacher Residency program is a partnership between the University of Tennessee, the Public Education Foundation, Hamilton County Schools, and Knox County Schools. It was designed to attract, prepare and retain high potential math/science teachers for high need, urban schools. The impact of the initiative is unfolding as our second cohort completes its first year of teaching and the third cohort is nearing the end of the residency year. Through this focused year-long residency program that provides tuition waivers, stipends, and supportive mentoring into the first years of teaching, we have created an effective new approach to pre-service teacher development.

A total of 26 graduates from three cohorts are now teaching. These graduates are supported by the TEACH/Here Induction Coordinator and their respective schools. In addition to ongoing frequent classroom visits, the coordinator collaborates with site-based instructional coaches to help graduates implement best practices as determined by school leadership.

Graduates have also participated in monthly seminars that are focused on assigned readings and ongoing critical incidents within their classrooms. The poster will highlight induction supports provided to program graduates.

136**Title: Paleontology Field Trips for Math Majors**

NSF Noyce Award Number: 1035502

Principal Investigator (PI): Eric A. Hagedorn

PI Email: ehagedorn@utep.edu

Institution: University of Texas at El Paso

Co-PI(s): Amy Wagler, University of Texas at El Paso,

awagler2@utep.edu

Ron Wagler, University of Texas at El Paso, rrwagler2@utep.edu

Olga Kosheleva, University of Texas at El Paso, olgak@utep.edu

Laura Serpa, University of Texas at El Paso, lserpa@utep.edu

Presenter(s): Eric A. Hagedorn, University of Texas at El Paso,

ehagedorn@utep.edu

Kristin Vandal, University of Texas at El Paso, knvan-

dal@miners.utep.edu

Project Discipline: Math and Natural Science

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): <http://noyce.utep.edu>

Why should biology and geology majors have all the outdoor fun? The University of Texas at El Paso is located within several miles of Middle Cretaceous dinosaur tracks at Cerro de Cristo Rey, Sunland Park, New Mexico. While fascinating to see up close, measurements from these tracks can be used back in the classroom to make estimates of the stride length and pace of the dinosaurs that made them roughly 100 million years ago. Preliminary investigation indicates that such interesting and local resources capture the attention of students at all levels and provide a great mathematics learning experience.

137**Title: Recruitment of Future Science and Math Teachers at Community Colleges**

NSF Noyce Award Number: 1340056

Principal Investigator (PI): Aaron Cassill

PI Email: aaron.cassill@utsa.edu

Institution: University of Texas at San Antonio

Co-PI(s): Lorena Claeys, University of Texas at San Antonio, lo-

rena.claeys@utsa.edu

Gloria Crisp, University of Texas at San Antonio, glo-

ria.crisp@utsa.edu

Daniel Sass, University of Texas at San Antonio,

daniel.sass@utsa.edu

Claudia Verdin, Northwest Vista Community College,

cchagoyaverdiin@alamo.edu

Presenter(s): Aaron Cassill, University of Texas at San Antonio,

aaron.cassill@utsa.edu

Lorena Claeys, University of Texas at San Antonio, lo-

rena.claeys@utsa.edu

Project Discipline: Science and Math

Topic: Recruitment and Marketing Strategies

URL(s): <http://utsa.edu/gems/acc.html>

Funding from the Noyce Scholarship program will be used to actively recruit potential science and math teachers from local community colleges. We will provide mentoring and tutoring services to these students to increase the likelihood of their success. The best of these students will be supported during their two years at UTSA while they participate in our GEEMS program. This will enable them to finish in two years with a degree in science or math and teacher certification. We will study the effectiveness of these supports to create a model of a system that can be used throughout the country to efficiently recruit this important group of students.

138

Title: The UT Arlington Robert Noyce Scholarship Program for Mathematics, Chemistry and Physics Teachers

NSF Noyce Award Number: 1035483

Principal Investigator (PI): Ann Cavallo

PI Email: relopez@uta.edu

Institution: University of Texas, Arlington

Co-PI(s): Greg Hale, James Epperson, Ramon Lopez

Presenter(s): Ann Cavallo, University of Texas, Arlington, cavallo@uta.edu

Greg Hale, James Epperson, Ramon Lopez

Project Discipline: Physics, Chemistry, Math

Topic: Research and Evaluation

URL(s): www.uta.edu/uteach

The Robert Noyce Scholarship Program for Science and Mathematics Teachers (I) recruits and prepares highly qualified high school mathematics, chemistry, and physics teachers to teach in the Dallas, Arlington, and Fort Worth Independent School Districts. Our program is a collaborative effort among the University of Texas at Arlington's College of Education and Health Professions, College of Science and these surrounding urban school districts. Students in the Noyce program are enrolled in UTeach Arlington, initiated in 2010, which yielded our first graduates spring 2014. UT Arlington's Noyce program objectives include: 1) recruiting mathematics and science teacher candidates from baccalaureate programs and career changers from local industry, 2) providing a quality two-track teacher certification program for our candidates, and 3) inducting, monitoring, and mentoring our teacher candidates through the program and their early years of teaching. This poster will present our Noyce program along with program evaluation and research findings on our scholar-teachers' self-efficacy toward teaching science and math; views of nature of science; and understanding and use of inquiry-based, constructivist teaching practices. The poster will include best practices/lessons-learned on teacher recruitment, preparation, and induction, and discuss how research and evaluation have guided our successful Noyce program.

139

Title: The University of Texas at Arlington Robert Noyce Scholarship Program for Mathematics, Chemistry and Physics Teachers

NSF Noyce Award Number: 0833343

Principal Investigator (PI): Ann M.L. Cavallo

PI Email: epperson@uta.edu

Institution: University of Texas, Arlington

Co-PI(s): James Epperson, University of Texas at Arlington, epperson@uta.edu

Greg Hale, University of Texas at Arlington, greg@hale.uta.edu

Ramon Lopez, University of Texas at Arlington, relopez@uta.edu

Presenter(s): Ann Cavallo, University of Texas at Arlington, cavallo@uta.edu

James Epperson, University of Texas at Arlington, epperson@uta.edu

Greg Hale, University of Texas at Arlington, greg@hale.uta.edu

Ramon Lopez, University of Texas at Arlington, relopez@uta.edu

Project Discipline: Chemistry, Mathematics and Physics

Topic: Research and Evaluation

URL(s): <http://www.uta.edu/cos/noyce/>

The Robert Noyce Scholarship Program for Science and Mathematics Teachers (I) recruits and prepares highly qualified high school mathematics, chemistry, and physics teachers to teach in the Dallas, Arlington, and Fort Worth Independent School Districts. Our program is a collaborative effort among the University of Texas at Arlington's College of Education and Health Professions, College of Science and these surrounding urban school districts. Students in the Noyce program are enrolled in UTeach Arlington, initiated in 2010, which yielded our first graduates spring 2014. UT Arlington's Noyce program objectives include: 1) recruiting mathematics and science teacher candidates from baccalaureate programs and career changers from local industry, 2) providing a quality two-track teacher certification program for our candidates, and 3) inducting, monitoring, and mentoring our teacher candidates through the program and their early years of teaching. This poster will present our Noyce program along with program evaluation and research findings on our scholar-teachers' self-efficacy toward teaching science and math; views of nature of science; and understanding and use of inquiry-based, constructivist teaching practices. The poster will include best practices/lessons-learned on teacher recruitment, preparation, and induction, and discuss how research and evaluation have guided our successful Noyce program.

140

Title: Preparing STEM Majors Become Highly-Qualified Chemistry and Physics High School Teachers in a Predominantly Hispanic Region

NSF Noyce Award Number: 1035467

Principal Investigator (PI): Edgar de Guzman Corpuz

PI Email: ecorpuz@utpa.edu

Institution: University of Texas, Pan American
 Co-PI(s): Jaime Curts, University of Texas-Pan American, jbcurts@utpa.edu
 K. Christopher Smith, University of Texas-Pan American, kcsmith@utpa.edu
 John Villarreal, University of Texas-Pan American, vil-lajr@utpa.edu
 Liang Zeng, University of Texas-Pan American
 Presenter(s): Edgar de Guzman Corpuz, University of Texas-Pan American, ecorpuz@utpa.edu
 Project Discipline: Physics and Chemistry
 Topic: Recruitment and Marketing Strategies

The Robert Noyce Teacher Scholarship project at the University of Texas-Pan American through collaboration with several independent school districts in the south Texas region, aims to address the acute shortage of highly-qualified and certified high school chemistry and physics teachers in the South Texas region by enabling Science, Technology, Engineering and Mathematics (STEM) majors to obtain a BS in Physical Science or BS in Chemistry degree with 8-12 teaching certification.

As part of the recruitment activities of the project, two summer camps had been conducted. The summer camps included workshops and presentations that introduced the participants to the different exciting aspects of STEM teaching. The camp activities included: (1) developing demonstration activities for teaching a particular concept/principle in Chemistry and Physics; (2) Discussion of the common misconceptions in Chemistry and Physics; (3) introduction of the use of classroom interaction systems in teaching Chemistry and/or Physics; (4) Inquiry-based approach in teaching Physics; (5) presentation on the use of technology in teaching Chemistry and Physics; (6) developing mini-lesson in Chemistry and Physics; and (7) panel discussion with experienced high school Chemistry and Physics. The summer camp culminated with a mini-teaching by each of the summer camp participants. Although most of the camp participants indicated that the camp activities increased their desire to teach, so far none of the camp participants have applied to the Noyce Scholarships.

To date, three students had been receiving Noyce Scholarship to pursue BS in Physical Science (Chemistry and Physics) and BS in Chemistry with 7-12 Teaching Certification. These recipients indicated in their application and interview that the financial support through the Noyce scholarship will greatly help them focus on their degree and graduate in a more timely manner.

In this poster, we will present the challenges that the project team faced or is facing in recruiting STEM majors become certified physics and/or chemistry teachers

141**Title: The University of Vermont Robert Noyce Scholarship Program**

NSF Noyce Award Number: 0934714
 Principal Investigator (PI): Regina Toolin
 PI Email: rtoolin@uvm.edu
 Institution: University of Vermont
 Co-PI(s): Lesley-Ann Dupigny-Giroux, University of Vermont, Ldupigny@uvm.edu
 Rory Waterman, University of Vermont, Rory.Waterman@uvm.edu
 Presenter(s): Regina Toolin, University of Vermont, Rtoolin@uvm.edu
 Project Discipline: All Science Disciplines
 Topic: Recruitment and Marketing Strategies
 URL(s): <http://www.uvm.edu/~noyce/>

The goal of UVM's Robert Noyce Scholarship Program is to address the deficiency of highly qualified science teachers in the nation's high need schools by identifying and cultivating STEM undergraduate students and professionals who are interested in pursuing a secondary science teaching career. The program is based on innovative and culturally responsive science pedagogy combined with expertise in up-to-date scientific research and is being implemented in two parts. First, the program has provided 30 first- and second-year STEM undergraduates with opportunities to conduct scientific research and explore science teaching as a career alongside scientists through a 10-week summer science program. Second, the UVM Noyce Program has supported 24 STEM undergraduate and professionals to pursue coursework at UVM toward an MAT degree with opportunities to engage in professional internships and peer mentorship programs. This poster presentation will highlight recruitment and retention strategies as well as an online mentoring program.

142**Title: Former Mathematicians and Scientists who Became Teachers: Hear them Explain why they did it**

NSF Noyce Award Number: 0833324
 Principal Investigator (PI): Michael Beeth
 PI Email: beeth@uwosh.edu
 Institution: University of Wisconsin Oshkosh
 Presenter(s): Michael E. Beeth, University of Wisconsin Oshkosh, beeth@uwosh.edu
 Adam Kresl, kresla@centurylink.net
 Albana Kume-Robertson, albana.kume@yahoo.it
 Sebastian Pugliese III, sp3orb@charter.net
 Project Discipline: Biology
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models
 URL(s): <http://www.uwfox.uwc.edu/academics/act2teach/>

This poster showcases Noyce Scholars in the Alternative Careers in Teaching program (act!) - an alternative path to teaching for former mathematicians and scientists. The goals for the act! program are to increase the number of licensed, highly qualified math and science teachers in Wisconsin and to recruit individuals who bring real-world experiences as mathematicians or scientists to their teaching. act! targets non-traditional adults with a Bachelor's degree or higher and 5 or more years of work experience in math or science fields to transition into careers as professional educators. More than 600 individuals have inquired about this alternative pathway to becoming a teacher of math or science, 160 individuals have enrolled in act! since it began in 2006, and 61 have completed the program and received math or science teaching licenses.

Our poster presents information on the customization of our curriculum to meet the needs of non-traditional adult learners, demographic and academic information about the individuals accepted into act!, information on the employment option for the math and science teachers who have completed our program, the administration of this multi-institution partnership, and the professional growth and development activities our program completers are choosing during their induction years. Testimonial statements from current and former act! students are also included in our poster.

143

Title: SWARMS: Sustaining Wyoming's Advancing Reach in Mathematics and Science

NSF Noyce Award Number: 1339853

Principal Investigator (PI): Andrea C. Burrows

PI Email: amyers14@uwyo.edu

Institution: University of Wyoming

Co-PI(s): Tim Slater, University of Wyoming, tslater@uwyo.edu

Farhad Jafari, University of Wyoming, fjafari@uwyo.edu

Danny Dale, University of Wyoming, ddale@uwyo.edu

Paul Escoto, Northwest College,

Paul.Escoto@northwestcollege.edu

Presenter(s): Adam Myers, University of Wyoming, amyers14@uwyo.edu

Project Discipline: STEM

Topic: Supporting New Teachers

URL(s): UWswarms.org

<http://www.uwyo.edu/uw/news/2013/10/uw-receives-1.2-million-nsf-award-to-train-70-new-wyoming-certified-math-and-science-teachers-.html>

Sustaining Wyoming's Advancing Reach in Mathematics and Science (SWARMS) was funded in January 2014 at the University of Wyoming (UW). SWARMS' goal is to certify 70 new science and mathematics teachers over a 5-year period (2014-2018) and include several agencies such as UW Colleges, Northwest College, and Veterans Services. SWARMS targets potential second-

dary physics, chemistry, Earth science, and mathematics teachers. SWARMS also targets minority students. The program utilizes the already existing UW Secondary Education post-bac program, and adds an additional 14 post-bacs (students that have previously graduated with a STEM degree) a year. Additionally, SWARMS recruits up to three STEM senior Noyce undergraduates per year. All in all, up to 17 students per year can receive Noyce funding from UW's SWARMS and complete the post-bac program for Wyoming teaching certification. Aggressive recruitment began in Spring 2014 and continues today. The total amount awarded for SWARMS was \$1,186,365 and is managed by PI Andrea Burrows. Her efforts are enhanced with the efforts of four CoPIs (Dale, Escoto, Jafari, and Slater) and 4 Senior Personnel (Decker, Hutchison, Leonard, and Myers).

144

Title: VCU Noyce Initiative Phase II: A Recruitment Summary

NSF Noyce Award Number: 1340012

Principal Investigator (PI): Jacqueline McDonnough

PI Email: lmwaller@vcu.edu

Institution: Virginia Commonwealth University

Co-PI(s): Rosalyn Hargraves, Christine Trinter

Presenter(s): LaChelle Waller, Virginia Commonwealth University, lmwaller@vcu.edu

Project Discipline: Genetics, Bioinformatics and Computational Biology

Topic: Recruitment and Marketing Strategies

URL(s): <http://www.noyce.vcu.edu/>

The Phase II Virginia Commonwealth University (VCU) Noyce Initiative is continuing the work of the original VCU NOYCE grant to increase the number and retention of highly effective, diverse secondary science teachers and expanding it to include mathematics (math) teachers in high-needs districts in the metro-Richmond Area. Through our strategic partnerships, academic instruction, and induction program we have successfully trained and placed more than 15 new Noyce funded science teachers and significantly increased the number of students in our MT secondary science program. This poster highlights our successful recruitment techniques of Noyce Undergrad Scholars, Noyce Master Scholars, Noyce Teaching Mentors, and Noyce Interns.

145

Title: The Genesis of a Noyce Mathematics Scholarship Program: Challenges, Lessons Learned and Next Steps.

NSF Noyce Award Number: 1240064

Principal Investigator (PI): Cheryl Adeyemi

PI Email: cadeyemi@vsu.edu

Institution: Virginia State University

Co-PI(s): Sandra Richardson, Joyce Glaise, Kenneth Bernard, Ken Williams

Presenter(s): Cheryl Adeyemi, Virginia State University, cad-eyemi@vsu.edu
 Project Discipline: Math
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Central Virginia Undergraduate Mathematics Scholarship Program (CVUMSP), a 2012 grantee of the NSF Robert Noyce Scholarship Program, began a journey towards producing 41 highly effective mathematics teachers in September 2012. The first cohort of 15 students officially came on board as interns in the CVUMSP summer 2013 internship program. CVUMSP has undergone 1 year of joys and pains, assessments and evaluations, revampings and modifications, networking with NSF mentors and others in the NOYCE Scholarship family and reflections and resolutions. This poster presentation will feature qualitative artifacts and photos and qualitative analyses including tables, and graphs to highlight the genesis, the evolution, the challenges, and the lessons learned in the first in of the CVUMSP.

146

Title: Assessing Program Quality with Noyce Teachers

NSF Noyce Award Number: 0832992
 Principal Investigator (PI): Anderson Norton
 PI Email: norton3@vt.edu
 Institution: Virginia Tech
 Co-PI(s): Sue Hagen, Virginia Tech
 Betti Kreye, Virginia Tech
 Katy Ulrich, Virginia Tech
 Megan Wawro, Virginia Tech
 Jesse Wilkins, Virginia Tech
 Presenter(s): Anderson Norton, Virginia Tech, norton3@vt.edu
 Project Discipline: Math
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models
 URL(s): http://www.mathed.soe.vt.edu/Virginia_Teach/virginia_teach-home.html

Researchers collected data from 15 first, second, and third year Noyce teachers from Virginia Tech. This presentation reports on indicators of teacher quality and program impacts. Data consisted of classroom observations and interviews with the teachers and their peers. Findings suggest the critical role mathematical knowledge for teaching plays across several aspects of successful instruction, but only if teachers can leverage that knowledge to generate flexible instruction that responds to students' mathematical thinking. Findings also illuminate the pressures and obstacles that Noyce teachers face in their first few years of professional practice.

147

Title: Action Research at Wake Forest University

NSF Noyce Award Number: 0934693
 Principal Investigator (PI): Leah McCoy
 PI Email: mccoey@wfu.edu
 Institution: Wake Forest University
 Presenter(s): Kristen McGahan, Wake Forest University, mcgakm9@wfu.edu
 Project Discipline: Math
 Topic: Innovative Noyce Program Practices and Teacher Preparation Models
 URL(s): <http://college.wfu.edu/education/about-the-department/initiatives/wins/>

This poster will describe and illustrate action research as an integral part of the Noyce program at Wake Forest University. The action research project investigating a pedagogical practice is required of all Noyce scholars in the master's degree program.

First, scholars complete a comprehensive Educational Research course. Next, in the Action Research course, they select a pedagogical topic and complete a formal proposal for the project, including extensive literature review and IRB approval. The project is carried out during the student teaching internship, where they implement the pedagogical method and observe and measure its impact on student learning. In the capstone course, they report their findings, including results, conclusions, and reflection on their instructional practice.

A sample study will be illustrated in detail. A Noyce scholar studied "Algebra Tiles in the High School Mathematics Classroom." She will fully describe the process, outcomes, and implications of her project.

The PI and the Noyce scholar will answer questions and describe both the program and that particular project at Wake Forest University.

148

Title: Supporting Noyce Scholars in WV through Interdisciplinary STEM Mentoring

NSF Noyce Award Number: 0833111
 Principal Investigator (PI): Jennifer Kasi Jackson
 PI Email: kasi.jackson@mail.wvu.edu
 Institution: West Virginia University
 Co-PI(s): David Miller, West Virginia University, millerd@math.wvu.edu
 Johnna Bolyard, West Virginia University, johnna.bolyard@mail.wvu.edu
 Jeffrey Carver, West Virginia University, jefrey.carver@mail.wvu.edu
 Michelle Richards-Babb, West Virginia University, Michelle.Richards-Babb@mail.wvu.edu

Michelle Withers, West Virginia University, michelle.withers@mail.wvu.edu
Presenter(s): J. Kasi Jackson, kasi.jackson@mail.wvu.edu
Project Discipline: Women's and Gender Studies
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Noyce TEACH-WV (Teaching Excellence for High Achievement in West Virginia) program aims to recruit West Virginia University (WVU) STEM majors to become certified to teach science and math in grades 5-12. Students receive \$10,000 per year and agree to teach for two years per each year of funding (up to three years) in high need schools in West Virginia. Scholarship recipients will earn a physics, chemistry, biology or math bachelor's degree, as well as a master's degree in education.

The project supports students in two programs: the Benedum Collaborative Five-year teacher education program and the Post-Baccalaureate Program in Secondary Science Education. As part of their Noyce program, the TEACH-WV Scholars engage in a mentoring project with Noyce faculty in the STEM content departments in the Eberly College of Arts and Sciences and the STEM teacher training program in the College of Education and Human Services. The aims include to provide training and support for the Noyce Scholars and to enhance the vertical alignment between K12 and college STEM teaching.

The potential pedagogical strategies include interdisciplinary teaching, enhancement of active learning, linking STEM with issues of societal relevance, and other best practices. Scholars have engaged in a range of projects including collecting survey data to identify high school students' readiness for college and their perceived barriers to college attendance; conducting literature reviews and collecting other information on interdisciplinary teaching strategies; designing and implementing "In the News" segments to demonstrate the relevance of math; partnering with a microbiologist to develop an active learning exercise with leeches, implementing a NASA rocket building exercise outreach activity with Upward Bound students, and providing NASA based professional development for in-service teachers in aviation and 3D printing. Student reactions to the value added to their preparation from these projects will be shared.

149

Title: Winthrop Initiative for STEM Educators

NSF Noyce Award Number: 1035322

Principal Investigator (PI): Beth Costner

PI Email: bellc@winthrop.edu

Institution: Winthrop University

Co-PI(s): Beth Costner, Winthrop University, costnerb@winthrop.edu

Kelly Costner, Winthrop University, costnerk@winthrop.edu

Lisa Johnson, Winthrop University, johnsonle@winthrop.edu
Presenter(s): Cassandra Bell, Winthrop University, bellc@winthrop.edu

James Salters, Winthrop University, saltersj2@winthrop.edu

Project Discipline: Math, Chemistry and Biology

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

URL(s): Winthrop University- <http://www.winthrop.edu/>
Winthrop Initiative for STEM Educators (NSF Noyce program at Winthrop)- <http://birdnest.org/wise/index.shtml>

This poster will report on the fourth year of the Winthrop Initiative for STEM Educators (WISE) program, by highlighting activities and numbers of WISE Interns and Scholars. Activities during the WISE Internship introduce mathematics, biology and chemistry majors to both research and education career opportunities, and include four days of service learning in local math and science classrooms. Scholars have multiple pathways to complete teacher licensure at Winthrop. As Scholars, they attend teacher conferences and also contribute to the program in various ways, such as presenting both at conferences and to the WISE Interns. Our poster will also provide an overview of possible future goals and lessons learned as we come to the end of our current round of funding.

150

Title: Building a STEM Education Community

NSF Noyce Award Number: 1035431

Principal Investigator (PI): Gina Post

PI Email: rpost@wittenberg.edu

Institution: Wittenberg University

Co-PI(s): Kathy Reinsel, Wittenberg University, kreinsel@wittenberg.edu

Presenter(s): Gina Post, Wittenberg University, rpost@wittenberg.edu

Project Discipline: Math Education

URL(s): <http://www5.wittenberg.edu/academics/noyce>

Wittenberg University's Noyce project is committed to providing STEM Education students with internships, a two-year placement in a high needs school, faculty and school district mentors, colloquia, and opportunities to engage in activities related to content and teaching. We have several graduates that have been hired in the same school where they completed their two-year placement and, as a result of this long term placement, they not only had an 'edge' in the selection process, but also 'feel at home' and ready to begin their first year of teaching. We have created publications, a website, and a 'chat' room for scholars and mentors as a part of ongoing work to stay connected as mentors and teachers.

151**Title: Exposing Students to Teaching Through a Range of Community Partner Experiences**

NSF Noyce Award Number: 1239995

Principal Investigator (PI): Gary Lewandowski

PI Email: lewandow@xavier.edu

Institution: Xavier University

Co-PI(s): T. Michael Flick, Xavier University, flick@xavier.eduCarla Gerberry, Xavier University, carla.gerberry@xavier.eduPresenter(s): Gary Lewandowski, Xavier University,
lewandow@xavier.edu

Project Discipline: Biology, Chemistry, Math, and Physics

Topic: Partnerships

URL(s): <http://www.xavier.edu/noyce>

Xavier University's Noyce Scholar Program explores the premise that community service-oriented STEM majors are more likely to be interested, and more successful, in teaching in high-need districts. The program and its community partners offer STEM students a variety of opportunities to experience tutoring and teaching with student from urban high need districts.

Our partners include several schools in the Cincinnati Public Schools, Boys Hope Girls Hope, and Breakthrough Collaborative. We present details of the range of activities involving these partners: tutoring, STEM enrichment activities, and Noyce summer internships. We also provide some initial feedback of the participants and partners.

S/F1

Title: Building and Scaling Up Your Geometry Lesson to Common Core Standards

Presenter(s): Cesar Viteri, Master Teaching Fellow

Email: caviteri@yahoo.com

Institution: Cal Poly Pomona

School Name and District Currently Teaching: Onatrio-Montclair

Project Discipline: Math

Explore a series of lessons offering students an intuitive approach to area, surface area, and volume. We will emphasize looking for patterns and repeated reasoning. In this workshop we will demonstrate the first lesson in a sequence that describes polyhedra. This presentation will look at how to guide students through inquiry based learning with the use of manipulatives and cognitive coaching. The unit begins with a look at images of different types of buildings so that students can see the real world application of polyhedra and the other concepts developed in the series of lessons. With the use of unifix cubes students are guided to move from the concrete to the abstract. In addition to that students will get a good handle on orientation of three dimensional structures (polyhedra). The situations explored in this unit go well beyond common text book problems. Students are supported to think critically and to develop an intuitive sense about the connections between solids measurements, area, surface area, and volume. The activities used in this unit include using unifix cubes to make three dimensional prisms, making isometric representations of prisms on isometric dot paper, using graph paper to create nets, and the use of graphic organizers to examine patterns when scaling up surface area and volume. The unit includes an assessment that is aligned to common core standards and tailored to assess understanding of the specific concepts taught in the unit. Participants will engage in classroom tested activities to support solving real-life and mathematical problems involving area, surface area, and volume. Take advantage of this geometry unit that promotes higher level thinking through engaging hands on activities.

S/F2

Title: Partners in Student Success: Co-Teaching as a Model of Teacher Preparation

Presenter(s): Megan Ziegler, Current Noyce Scholar

Email: ziegler.megan@gmail.com

Institution: California Polytechnic State University, San Luis Obispo

Project Discipline: Biology

The Cal Poly San Luis Obispo School of Education has adopted a co-teaching model for their single subject teacher preparation program. Each pre-service teacher is matched with a veteran teacher at a placement site, with whom they partner with for the duration of their student teaching. The shift from a “sink or swim” model to a collaborative and supportive partnership

benefits pre-service teachers, teaching veterans, and most importantly, students. Pre-service teachers have a mentor and consistent resource, someone committed to guiding and supporting future educators as they navigate the classroom for the first time. Veteran teachers benefit from an additional teacher with differing skills and ideas to collaborate with in planning, instruction, and assessments. Students benefit from having two competent, committed teachers investing in their education and striving to help them be successful. They also benefit from more individualized attention, pull out groups, and targeted support that is possible through co-teaching. The most common co-teaching strategies are: team teach, stations teaching, alternative teaching, parallel teaching, one teach/ one assist, and one teach/ one observe.

S/F3

Title: Cal Poly Pomona Noyce Scholars

Presenter(s): Michelle Salce, Current Noyce Scholar, dpsacs19@aol.co

Dennis Blackman, Current Noyce Scholar, dennisblackman33@hotmail.com

Institution: California State Polytechnic University Pomona

Project Discipline: Biology and Agriculture

The philosophy of Cal Poly Pomona is to learn by doing both inside and outside of the classroom. As future science teachers, we are charged with educating students using the latest technology and methods available. The Noyce Scholars Program has allowed us to expand our knowledge on new methods by providing us with opportunities to collaborate with colleagues all across the state and country through various conferences and monthly seminars. From the perspective of an undergraduate, the Noyce Scholars Program not only provides financial support but allows students to get a step ahead of their peers to learn the latest standards and methods being taught in progressive classrooms. From the perspective of a graduate student, the Noyce Scholars Program allows students to gain valuable insight through research and analysis of current standards and how they can be implemented into a classroom full of diversity. The funding provided by this program has allowed for more time to focus on researching what other teachers are doing in order to incorporate next generation science standards in order to prepare students for common core assessments.

S/F4

Title: Apprenticeship Model

Presenter(s): Jesse Venegas, Current Noyce Scholar

Email: jessevenegas@hotmail.com

Institution: California State University of San Bernardino

Project Discipline: Math

An aspect that distinguishes our program is that we follow an apprenticeship model. Throughout our involvement scholars are

paired with mentors in a middle school or high school classroom. Scholars become actively involved with students and take over classes. This provides a vivid experience for aspiring teachers. This hands on approach gives scholars a realistic view of what it means and takes to become an effective educator. Scholars regularly collaborate with mentors to reflect on their teaching, focus on teaching strategies or to enhance their experience as a scholar. Monthly seminars are held to have all scholars and mentors come together to create a powerful collaborative group of educators.

S/F5

Title: From Noyce Scholars to Teachers

Presenter(s): Yona Ipanaque, Former Noyce Scholar, yipanaque@yahoo.co

Kasey Kelly, Former Noyce Scholar, kaseykelly04@gmail.com

Institution: California State University, Dominguez Hills

School Name and District Currently Teaching: Bret Harte Preparatory Middle School, LAUSD

Project Discipline: Math

Our journey began during our junior year of college when we saw a banner about Noyce. The words that caught our eyes were "Teach" and "Math". We were both already Math Education majors and decided Noyce might be a good fit. We were wrong. Noyce was the perfect fit and the first stepping-stone to following through on our passion to teach.

After meeting with the Noyce staff and interviewing for the program, we were in! We were immediately offered an opportunity that we couldn't pass up, working with a first year teacher as a teacher assistant. We were each placed with a first year teacher that came from either Transition to Teaching (TTT) or Urban Teacher Residency (UTR) credential program which are both fed into by Noyce Scholars and other aspiring math and science teachers. We were each given the opportunity to work in a middle school and a high school. This gave us a chance to either solidify the choice to teach in middle or high school or make a choice. From each experience we gained new knowledge about teaching. From the high school students we learned that seating arrangement plays a big role in classroom environment and from the middle school students we learned that changing activities keeps them engaged. Along with being teacher assistants during the school week we were also involved in Saturday Lab School at Gage Middle School. Lab School focuses on math and science and was open to 6th, 7th and 8th grade students that attend Gage Middle School. At lab school we were each placed in a classroom with a master teacher and other teacher assistants. This was our first opportunity to actually get in front of a classroom full of students and teach alone. However it was comforting to have the master teacher in the room with us because we could look to her when nervous or stuck. Teachers at lab school were able to spend time on key skills that have already been taught but need to be reinforced, do more activities, and pro-

jects. The best part of lab school is that math and science work together to show students that the two subjects intertwine. Students also had ample help in each classroom because there were anywhere from 4-7 teacher assistants in one room. This gave us an opportunity to work closely with students and start to see many of the gaps that students have in learning. The experience at Saturday Lab School was overall very enlightening and rewarding.

The transition from being a Noyce Scholar to being in the TTT Online program was very smooth. After many discussions about the different credential programs offered, we decided that the TTT Online program was the best fit for us both. A big deciding factor was being able to stay on campus after school and not have to deny a child from receiving extra assistance. At our TTT Online orientation we were presented with the opportunity of our lives when the science professor of our online program placed a note in front of us. After the orientation we were told that our presence was requested at Harte Prep Middle School the following Monday.

After meeting with the principal and both vice principals, they offered us a position. The principal had mentioned that we would both be teaching 6th grade math. We could not believe that just happened; we went to college together, we both love math, we are both in TTT Online, and we both like each other!!! It was really too good to be true.

Now we were ready for our Summer Lab School experience to begin. During Summer Lab School we were placed with Mr. Hernandez, who is a 6th grade math teacher. To say the least he was amazing. We both could not be any happier with our placement. Mr. Hernandez was extremely helpful. From the beginning of Summer Lab School, he had a schedule of which TA was going to teach. It was a bit stressful to find out that we both were scheduled to teach more than the other TA's. In the end it was for our own benefit, and we were both very grateful to have had the opportunity to collaborate with him on lesson plans, receive constructive criticism and to be able to implement the changes during the next period. The valuable resources he provided us with, was and continues to be very valuable.

As first year teachers having TA's was an enormous help. Our TA's helped each of us to catch up with grading, catch students up that had missed class, and were also able to get their own experience by taking over segments of the lesson. Having TA's were also helpful because they served as an extra set of eyes in the room.

Noyce set the path for us to reach our goal of teaching in a high need school and to this day the connections we have made with people through out our journey continue. We continue to keep in contact with Mr. Hernandez and even contact him to bounce planning ideas off of him. Having been two of the early TTT Online cohort members, we are planning on working with in-

SCHOLAR/FELLOW POSTER ABSTRACTS

coming candidates to help guide them through the struggles we had. It feels good to be able to give back to a program that has done and helped us so much.

S/F6

Title: Project MT2: Three-Fold Impact of the Paired Teaching Model

Presenter(s): Susanna Meza, Teaching Fellow,
szmuez@gmail.com

Shannon Muramoto, Current Noyce Scholar, shan-
non.muramoto@gmail.co

Institution: California State University, Fullerton

School Name and District Currently Teaching: Valadez MS Pla-
centia-Yorba Linda USD / El Modena HS Orange USD

Project Discipline: Math

This project presents the Paired Teaching Model for master teaching Fellows and Teaching Fellows at an urban, high-impact school.

S/F7

Title: Students' Conceptions in Determining Evolutionary Relationships of Animals

Presenter(s): Keane Vu, Current Noyce Scholar

Email: keanevu113@csu.fullerton.edu

Institution: California State University, Fullerton

School Name and District Currently Teaching: Student Teaching:
Santiago High School, Garden Grove Unified School District

Project Discipline: Biology

The fundamental tenants of evolution are that life is related and that life has changed over time. Understanding the evolutionary relationships among animals is a key skill for introductory college biology majors, yet it can be challenging to master because superficial similarities among distantly related organisms may be confounding. Children (grades 4-8) naturally group animals based on their habitat and mode of locomotion even after learning the appropriate taxonomic categories. Our research question was the following: What cues do introductory college biology majors, who have nearly completed their first semester of evolution and biodiversity, use to determine evolutionary relationships of animals? We used habitat and the paraphyletic grouping of "invertebrates" as distractors to investigate how these students (n=155) determined these relationships. We developed and administered a six-question survey. Each question consisted of four line drawings of animals in which students indicated which two were most closely related, diagrammed the relationships of these animals, and explained why they diagrammed the relationships in this way. We selected familiar animals and each question included examples of two animals that shared a habitat (e.g., terrestrial; coyote and roadrunner), and one that did not (e.g., sea turtle); we hypothesized that students using habitat as

a cue would group those sharing the habitat together, and students using evolutionary-based features would not. We used a similar strategy to design questions around the presence/absence of a backbone. Following instruction, the average correct score across all six questions was 43.3%. Of the 56.7% of questions answered incorrectly, a substantial proportion used habitat and invertebrate misconceptions to determine relationships. Introductory college students appear to use similar cues as younger children when making decisions about how to group animals. These alternate conceptions negatively impact student learning and should be directly confronted in instruction.

S/F8

Title: CSUSB Master Fellow-Lesson Study

Presenter(s): Tamara Bonn, Master Teaching Fellow

Email: mathmom81@me.com

Institution: California State University, San Bernardino

School Name and District Currently Teaching: Indian Springs
High School, San Bernardino Unified School District

Project Discipline: Math

The CSUSB Noyce Master Teaching Fellowship program allows teachers from different schools and districts to come together and work towards developing lessons that will improve the quality of instruction and increase student achievement in the Middle and High School classrooms.

Each teacher in the program is either currently enrolled or has recently completed their course work for a Master of Arts in Teaching Math from California State University San Bernardino.

The sixteen Master Teaching fellows meet once a month during the school year to choose a topic of study, develop a lesson on that topic and then teach the lesson to a class of students. Lessons are taught, then re-taught based upon the student results from the lesson.

The lesson recently taught by one of the lesson study groups was on the Sine Curve. This lesson required that students be able to see how trigonometry functions can be used in mathematical modeling problems. The purpose of this lesson was to increase student's depth of knowledge of trigonometry functions. Time was given for cooperative learning along with exploration of their solutions using technology.

This type of lesson gives the Noyce fellows a greater understanding of how to create lessons aligned to the common core, lessons that are integrated with other disciplines and lessons that allow students multiple opportunities to discover solutions using technology.

S/F9

Title: Building Cross-Disciplinary Collaboration Skills Among Secondary Biology, Chemistry, and Physics Students

Presenter(s): Jennifer Jacobs, Current Noyce Scholar
 Email: jenniferjacobs12@yahoo.com
 Institution: Chicago State University
 Project Discipline: Chemistry

The Chicago State University secondary biology, chemistry and physics programs include two courses with explicit cross-disciplinary assignments. The 'Methods of Teaching Secondary Science' course requires pre-service teachers to collaborate in design and implementation of an inquiry investigation. This past year the investigation was re-envisioned to align with the Next Generation Science Standards focus on engineering practices. Physics and biology pre-service teachers combined their expertise to design and test an inexpensive purification scheme for an aquaponics system. They built filtration prototypes and measured chemical composition and microbial density before and after filtering aquaponics effluent. The activity is intended to give first hand experience for the sort of investigation their future high students might undertake. For some students this was the first time they designed an investigation. It strengthened their knowledge of scientific practices including the use of simple statistical methods to analyze data. Class surveys and oral interviews indicated gains were achieved in students' understanding of methods used by other science disciplines and they enjoyed the collaborative nature of the project. The 'Readings in Science Education' course also includes pre-service teachers from the three disciplines and each spring, they are asked to develop and implement a cross-disciplinary science lesson for middle school children. Lesson topics are chosen by the students and in the past have included 'what is light?' and, this spring semester, 'energy transformation.' The lessons typically include an opening and closing interactive lecture supported by 3 or 4 discipline-specific activities. Surveys and oral interviews indicate that pre-service students find it challenging to make the lesson 'cohesive' in how it integrates the disciplines, and this is perpetuated by using a stations approach. However, students find the course overall has increased their appreciation of ways that the different science disciplines overlap, and they also value the interdisciplinary discourse each week. Ideally, the cross disciplinary collaboration fostered by the two courses will carry over to the students' in-service experiences.

S/F10

Title: Freshkills: A Reclaimed Ecosystem

Presenter(s): Edita O'Brien, Current Noyce Scholar
 Email: editaobrien@gmail.com
 Institution: College of Staten Island (CUNY)
 Project Discipline: Biology

Freshkills: A Reclaimed Ecosystem is an educational lesson that

allows students to understand the reclamation of Staten Island's infamous former landfill and its transformation into Freshkills Park, through the lenses of different stakeholders. These lesson plans allow students to research the ecological science of Freshkills Park, while learning about stakeholders' roles, responsibilities and interactions. Classroom teachers who use this lesson can tie it into high-school 'Living Environment' courses that allow students to understand some of the necessary science behind ecosystem degradation and reclamation.

The Mini-unit is broken down into three lessons. In the first lesson, students are introduced to the history of Freshkills. Here we examine how pollution destroys ecosystems and communities. Students take on the roles of separate stakeholders involved in the process of reclaiming Freshkills. Students begin to study the park through several articles and videos, assuming the roles of environmental ecologists, local residents, and urban park planners. In the second lesson, students then venture to Freshkills Park on a field trip in order to interact with an expert park representative, and ask questions from the perspective of their designated stakeholder role. The final lesson in the unit allows students to present their findings to the class through the perspective of their stakeholder role, and to offer constructive ideas for the future of Freshkills Park.

All lessons for this unit are aligned with New York State 'Living Environment' Common Core Standards and offer multiple writing and reading exercises with the necessary rigor required by the Department of Education.

S/F11

Title: 'Flipping' Your Classroom

Presenter(s): Caitlin Broznak, Former Noyce Scholar
 Email: catie.broznak@gmail.com
 Institution: College of William and Mary
 School Name and District Currently Teaching: Chatfield Senior High, Jefferson County Public Schools
 Project Discipline: Geosciences

In a "flipped" classroom model, lectures are done at home through videos and assignments are done in class. The videos take the place of direct classroom instruction; therefore students get more individualized help on coursework. This year, I partially flipped my high school Earth Science class. The greatest benefits I noticed in using the "flipped" model were (1) increased student engagement, (2) better awareness of student knowledge due to increased contact with students, (3) all students could learn at their own pace, and (4) archived videos for review.

This poster also addresses the drawbacks of the "flipped" model which include, (1) student access to technology, (2) lectures not watched on time, and (3) students not fully listening to lectures.

SCHOLAR/FELLOW POSTER ABSTRACTS

Suggestions for mitigating these disadvantages are discussed. At the end of the semester, students and parents were given a survey about the success of the “flipped” classroom and suggestions for further improvement. The results from the questionnaire are presented.

S/F12

Title: Untapped Opportunities in Online Education

Presenter(s): Mohammad Qarghah, Former Noyce Scholar

Email: meqarghah@gmail.com

Institution: College of William and Mary

School Name and District Currently Teaching: Alexandria City Public Schools

Project Discipline: Math

As the math teacher at T.C. Williams Satellite Campus, a hybrid-online program, since its inauguration in the fall of 2012, I've worked with a wide array of students from returning dropouts to those graduating early. In supporting these diverse needs, I've explored a variety of online learning options, including four different vendors.

In this poster, I outline challenges and emerging solutions in blended and traditional classrooms. Two major challenges in online education are universal: the scope of traditional student-teacher interaction is limited and the students that the courses serve represent a huge diversity of needs. The challenge can be exacerbated in mathematics because the course material is abstract, skill-driven and cumulative. Each of these challenges presents an even larger hurdle in a high need setting.

Improving data on student progress, engagement, and areas of challenge is increasingly useful to help direct interventions, though online courses have traditionally offered limited intervention options. This is changing as programs become more dynamic, adapting to give students both automated and directed scaffolding appropriate to their needs. Moreover, dynamic problem sets and virtual manipulatives are providing a means by which to build new concepts, while remediating the skills that have chronically inhibited student achievement in mathematics.

While I've learned from my experiences at the intersection of online education and the high needs arena that there remain many practical issues with implementation, I am optimistic that these tools will eventually be appropriately adapted to better support students in a high needs environment.

S/F13

Title: Noyce PrEP Teacher Preparation Put to the Test: Strategies for Thriving in a High Needs School

Presenter(s): Gabrielle Alexander-Lee, Current Noyce Scholar

Email: g.alexanderlee@yahoo.com

Institution: Fayetteville State University

School Name and District Currently Teaching: Spring Lake Middle School, Cumberland County
Project Discipline: Math

The thought of beginning my first formal teaching assignment during the middle of an academic year was altogether daunting. A culmination of the previous years of teacher education preparation at Fayetteville State University coupled with hands on, relevant and cutting edge exposure afforded through the Noyce PrEP Scholar's Program would prove its worth in the high needs 6th grade math classroom. The TPACK framework for integrating technology into classroom instruction, through an understanding of how technological knowledge, pedagogical knowledge and content knowledge come together, has been an important focus for Noyce Scholars at Fayetteville State University, and an ongoing process of adjustment with every bit of new information gained. As steps are taken to link teachers' pay to performance, it is crucial that educators continually improve in our respective fields. This is a look at the merits of self assessment. From pre-service, student teaching 8th graders, in Fall 2013 to teaching 6th graders in January 2014, I share some of the strategies which have helped and continue to facilitate my growth as a “highly qualified” math teacher. Embracing self assessment and external evaluations have been essential in this journey, as forthcoming data reflecting student performance on End of Grade exams draw near.

S/F14

Title: Tilt? Orbit? Rotation? Oh My! - Investigating the Causes of the Seasons

Presenter(s): Bernard Smith, Current Noyce Scholar

Email: smithbr@hendrix.edu

Institution: Hendrix College

URL(s): www.hendrix.edu/n-stead

Project Discipline: Math

The project was designed to answer questions regarding student misconceptions in science. Specifically: What are student misconceptions regarding the seasons? We partnered with an urban conversion charter middle school as part of this research project. The 7th grade science class consisted of mostly minority students, predominately African-American and Hispanic. Students were involved in a lesson on the seasons, using a graphing activity comparing temperatures from the Northern and Southern Hemisphere. We measured how many students had misconceptions about the cause of the seasons and what misconceptions existed. The data was derived from answers given in the pre-assessment, given a day before the lesson, and the post-assessment, given upon completion of the lesson. The researcher will present details of the lesson and student outcomes.

S/F15

Title: Rio Salado College's Innovative Noyce Scholars Post Baccalaureate Teacher Preparation Program

Presenter(s): Katy Westersund, Current Noyce Scholar
 Email: katy.westersund@cox.net
 Institution: Rio Salado College
 URL(s): www.riosalado.edu/noyce
 Project Discipline: Math

A nationwide shortage of qualified math and science teachers has led to sustained local, state, and federal efforts to recruit and retain additional teachers in these areas. The Rio Salado College (RSC) Science and Math Innovative Learning Environments (SMILE) Program for Encore Careers in Education supports the recruitment and training of 40 STEM professionals to aid their transition into teaching careers in 7th-12th grade math and science classrooms in Arizona. Working with STEM-related industries in Arizona, Rio Salado College identifies STEM professionals who are interested in transitioning to teaching careers and assists them in meeting eligibility requirements and applying to the program. Successful applicants complete a comprehensive 15-month teacher certification program (based on the college's Post-Baccalaureate Teacher Preparation Program) with online course instruction and onsite student teaching experiences in conveniently located school districts. RSC will also provide mentoring and professional support to SMILE participants as they fulfill the required teaching commitment in high-need schools.

The primary goal of the SMILE program is to increase the number and quality of math and science teachers available to high-need schools in Arizona. During the three years of the program sixteen (16) Post-Baccalaureate STEM Professionals including myself have been recruited and have begun the program. Receiving a stipend of \$16,500 helped me cover tuition, books, fees, and some living expenses. The concept behind this program is an incredibly good idea. Helping people who are in the math and science fields to make the transition into teaching, and getting them into high needs classrooms makes me excited that someone had a great idea that came to fruition. My poster will highlight the programs scholars, district partnerships, and industry partnership.

I have a wealth of experience to offer students because I bring real life application from my career as an environmental engineer and an environmental chemist for eleven (11) years. Teaching will afford me an incredible opportunity to touch the future of our country and to share my life skills and community involvement with my students. While instilling an excitement about learning math, I also hope to provide a role model for students to emulate and to help students become contributing citizens in our communities. I plan to finish my student teaching this fall, beginning my teaching career the spring of 2015.

S/F16

Title: Listening to Students Explain their Scientific Thinking

Presenter(s): Brenda Mueller, Master Teaching Fellow
 Email: brendamueller@mac.com
 Institution: San Diego State University
 School Name and District Currently Teaching: De Portola Middle School, San Diego Unified School District
 Project Discipline: Middle School Science - Life Science Focus

During the past year, as members of the San Diego State University Noyce Master Teaching Fellowship Project LEARN, we have renewed our interest in supporting our students' scientific learning by implementing the NGSS Scientific and Engineering Practices. We have observed and listened to our students engage in the practices of asking questions, developing and using models, and constructing explanations. Though we have always valued listening to our students, our work with Project LEARN has made us more aware of how very crucial it is for teachers to truly listen to and analyze their students' ideas about science and plan lessons that allow for students' scientific growth.

S/F17

Title: Engaging Math Communities

Presenter(s): Maya Cook, Current Noyce Scholar
 Email: mcook@mail.sfsu.edu
 Institution: San Francisco State University
 School Name and District Currently Teaching: San Francisco Unified School District
 Project Discipline: Math

How do we engage our students? How do we develop their desire to learn? How can we provide them access to the content we present? What kind of classroom encourages student learning? These are some of the daily challenges educators face. To get an idea I went straight to the source, my students.

My initial interest was how to use student's hobbies to create more engaging curriculum. I wanted to see if filtering mathematics through their interest would lead to better access to the content. I became increasingly curious as to why students enjoyed their interests. Can we help students feel similar to the way they feel during a hobby? By focusing on the common reasons students are engaged in extracurricular activities, perhaps we can increase engagement in the classroom. Rather than solely focus on what a student's favorite sport is, it's important to look at why students like sports in general. Whether it's teamwork, exercise or a way to make friends, that is what the classroom community should be ideally based upon.

Students were given a handout my first day of teaching. I asked them about their interests and hobbies. Most importantly I asked why they enjoy these hobbies.

S/F18

Title: Using Action Research to Measure the Impact of Problem-Based Learning on Students' Content Knowledge, Skills, and Attitude towards Light Pollution

Presenter(s): Chris Midden, Master Teaching Fellow

Email: cmidden@roe30.k12.il.us

Institution: Southern Illinois University, Carbondale

School Name and District Currently Teaching: Unity Point

School, Unity Point School District 140

Research studies have reported the impact of Problem-Based Learning (PBL) approach on students' science content knowledge and skills. However, there is a dearth of research on the use of Action Research (AR) as a framework for measuring the impact of PBL on students' science learning.

In this study, an Action Research was conducted on Light Pollution unit that was taught using PBL approach in one middle school science classroom. Twenty-seven students received instruction on Light Pollution through the PBL approach for a period of five days.

Three research questions guided this study: To what extent does PBL approach increase students' knowledge about Light Pollution? To what extent does PBL on Light Pollution increase students' scientific skills? To what extent does PBL on Light Pollution increase students' attitude towards science?

Results show significant differences between the pre- and post-tests on students' content knowledge and scientific skills. However, results show that students maintained their positive attitude towards science. Qualitative results also suggest that PBL had little impact on enhancing students' skills for asking and answering scientific questions.

Based on these results and those in previous studies, it is evident that PBL has the potential to enhance students' science content knowledge and scientific skills. This study also suggests that Action Research is a potential framework for measuring the impact of PBL on student learning. These findings have implications on science teaching and learning, and teacher professional development.

S/F19

Title: Growing a Family of STEM Teachers

Presenter(s): Alexa Dutton, Current Noyce Scholar

Email: lexdutt@hotmail.com

Institution: Stephen F. Austin State University

Project Discipline: Math

The Talented Teachers in Training for Texas (T4) program focuses on the nurturing and development of pre-service students into flourishing STEM educators. The theme of "Growing a Family of STEM Teachers" will be highlighted by illustrating how every T4,

or family member, grows up through the T4 program. Most T4s began as seedlings in the soils of our Job Shadow and NASA Program; their interests then took root in the STEM teaching field where they began their life as a T4 scholar. Our poster highlights each stage of development, branch, in the life of a T4 scholar.

S/F20

Title: Texas Leadership Initiative: Mathematics Instruction Transformed

Presenter(s): Stacia Prince, Master Teaching Fellow, princes@sfasu.edu

Julie Sandifer, Master Teaching Fellow, jsandifer@sfasu.edu

Institution: Stephen F. Austin State University

School Name and District Currently Teaching:

Project Discipline: Math

The Texas Leadership Initiative: Mathematics Instruction Transformed (Texas LIMIT) project is focused on the development of a cadre of mathematics teacher leaders who are trained in the design and delivery of mathematics professional development. The Master Teaching Fellows (MTFs) are experiencing the process of identifying the needs of teachers in their districts, researching solutions, and designing professional development strategies. In addition, MTFs are working with their administrators to design an implementation plan. The resulting PD modules are externally reviewed and made available to all Texas LIMIT MTFs through the Stephen F. Austin State University STEM Research and Learning Center.

S/F21

Title: Teach to Learn

Presenter(s): Leslie Embrey, Former Noyce Scholar

Email: leslie.embrey@gmail.com

Institution: University of Arkansas

School Name and District Currently Teaching: Apopka High School/Apopka, FL/Orange County Public School District

Project Discipline: Physics

During my Noyce internship, I was put in charge of a project in which my high school students were to create, design, and carry out a series of quick labs to demonstrate for the students from a local middle school. The objective of the project was to reinforce learned concepts for the middle school students just prior to their benchmark tests. The middle school students took a pre-test, observed the lab demonstrations done by the high school students, then took a post test. A staggering number of middle school students' scores dramatically increased from the pretest to the post test.

A colleague and I at my current high school are currently planning to do this project again with a local middle school during the 2014-2015 school year.

S/F22

Title: Equity in the Classroom: 30 Students + 1 Teacher = 31 Learners

Presenter(s): Sarah Rominger, Current Noyce Scholar
 Email: srominger@berkeley.edu
 Institution: University of California, Berkeley
 Project Discipline: Math

In Fall 2011, I took an education class that focused on equity in the classroom. This class prompted me to write a slightly unorthodox lesson plan for a remedial geometry class that focused on the Golden Ratio. In the course of preparing and teaching this lesson, I was able to experiment with my own definition for equity in the classroom, how a lesson plan could reflect that, and how I would ensure it while teaching. My lesson challenged my mentor teacher's traditional views of a math classroom, and provided new opportunities and perspectives for his students. Group discussions, partner work, and other methods that were new to this math classroom gave each student the opportunity to add his or her unique perspective to the lesson. The students left that class with a new outlook on math, and I left having cemented some techniques for encouraging and ensuring equity in the classroom.

S/F23

Title: Motivating the Reluctant Learner in Science

Presenter(s): Diane Santamarena, Master Teaching Fellow
 Email: diane.santamarena@gmail.com
 Institution: University of California, Berkeley
 School Name and District Currently Teaching: San Jose Middle School, Novato Unified Schools, Novato, CA
 URL(s): <http://nusdsjis.ss4.sharpschool.com>
<http://scienceconnection.weebly.com>
 Project Discipline: Chemistry

Motivating reluctant learners has been a focus in many studies over the last 30 years. Project Based Learning (PBL) is a teaching platform that is said to motivate more students to want to learn by empowering them to own their learning. This approach fosters academic growth by meeting students where they are and allowing them to learn at various rates compared to teacher driven instruction. Thus, the PBL platform appears to allow access to the curriculum to a broader student population.

PBL uses real-world scenarios and inquiry to empower students to take ownership of their learning. However, not all middle school students are intrinsically motivated to learn, no matter how engaging the project may seem. Therefore, all students may not be learning at the deepest levels possible. This raises the question: What strategies are best to increase the motivation to learn of reluctant learners within a Project Based Learning platform?

During the course of one project based learning endeavor, I implemented a wide variety of student learning activities. At the conclusion of each activity I engaged my focus students in discussion about their interpretation of any change in motivation to learn on their own.

Each students' intrinsic motivation to learn stems from various, independent and collective experiences making the desire to learn unique among individuals. This explains the results obtained from my focal students in that there is no single strategy that is guaranteed to positively impact intrinsic motivation. Instead, I found the teachers' interest in the individual students' success, coupled with a supportive classroom environment, fostered more change in student motivation than any one activity.

S/F24

Title: Teacher Learning via Video Club Analyses

Presenter(s): Alice Kim, Former Noyce Scholar
 Email: Akim32@uci.edu
 Institution: University of California, Irvine
 Project Discipline: Biology

During my fourth year at UCI, as a Cal Teach student, I heard about the Robert Noyce Scholarship that I was eligible for. The Cal Teach program allows undergraduates to obtain their secondary teaching credential concurrently with their baccalaureate in the STEM field. As a past Noyce Scholar, I had the experience to teach in a classroom setting and focus on reflecting upon my instruction techniques. My experience with a professor in one of the Cal Teach required courses (including classroom interaction) peaked my interest in using video as a tool for teachers.

Using videos as a teaching tool, I have recorded numerous lessons in my classroom and studied classroom interactions between students to teacher and students to students. These videos gave me a whole new perspective of the classroom other than direct observation and it became an advantage, especially if there were any questions that were not brought to my attention during the lesson. With them, I was able to understand the need for constant reflection and it became easier to notice what parts of the lesson were weak. I began to deeply understand the way I teach and what I needed more work on as a teacher.

After graduation, I wanted to pursue higher education in the field of research dedicated to how videos could improve teaching methods and ways they could be applied to the Teaching Event (TE). I began my masters at UCI's Biological Sciences and Educational Media Design Program in the summer of 2013. In this program, I have the advantage of focusing on the integration of science, media, and education. For my Master's Project, I had the privilege to work closely with the Noyce Project and the interns during the academic years 2012-2013 and 2013-2014. Working with the undergraduate Noyce Interns, I was able to

oversee the interns planning lessons, demonstrating hands-on activities at Celebrate UCI, proctor a Video Club analysis that allowed these interns to reflect on their teaching and provide feedback to their peers. This allowed me to see the gradual changes in how these interns thought about teaching and the kind of techniques that could be applied in order to intrigue learners.

Right now I am focusing on proctoring video analyses with the interns through Video Clubs. Throughout their lesson planning, the interns were videotaped. These videos will ultimately culminate into a documentary for the Noyce Project. The interns have been able to see their lessons and understand how their lessons went in a different angle. This has allowed interns to formulate ideas of the kind of issues that may have risen in the other side of the room while teaching the lesson or if the students in the corner had no idea what part of the lesson was being conducted. Moreover, the video clips are records that could be used as time capsules for the interns to observe their transition through the internship. Looking at the footages of each intern, it has been clear how students have the advantage to integrate technology into their lessons, provide hands-on activities to foster motivation and engagement, and realize the advantage of experience of teaching in informal classroom settings.

To advance my research, I plan on applying the Video Club analyses to pre-service teachers. Teachers need to participate in the TE, where they are evaluated on how well they can explain their reasoning of lesson techniques and what kind of methods could best serve a diverse classroom. One of the tasks in the TE requires teacher candidates to record their lesson and explain the reasoning behind the students' thoughts, lesson, and structure. Not many teacher candidates have the experience of analyzing lessons. The Video Club analyses would help candidates complete the Teaching Event and it would be less stressful for the teachers.

S/F25

Title: Exploring Habits of Mind in the Secondary Science Classroom

Presenter(s): Julie Shaeffer, Teaching Fellow

Email: julie.shaeffer@gmail.com

Institution: University of Colorado

School Name and District Currently Teaching: Boulder High School

Project Discipline: Biology

Traditionally, student learning primarily focuses on specific content curriculum, and less so on integrating knowledge from multiple disciplines. Art Costa, author and educational theorist, identified a set of Habits of Mind (HoM) that characterize successful problem solving in a variety of settings. During the 2014 spring semester three high school science teachers offered instruction

that focused on developing two HoM in their students. Instruction involved a lesson introducing and defining eight HoM, a student generated rubric concerning two HoM, journaling and a student produced video on HoM. In order to measure changes in HoM, students completed a self-assessment HoM survey, both pre- and post-instruction. Though results were not statistically significant, comparison between pre and post demonstrated a decrease in self report rating for the eight HoM measured but an increase for the two HoM explicitly taught. In addition to the self assessment survey, semi structured interviews and classroom observation provided anecdotal evidence for improvements in HoM or at least an increase in awareness over the course of the intervention period. Based on our self report data, observations, and students receptiveness to the continuation of HoM lessons, we believe extending our research further would be advantageous for both students and teachers.

S/F26

Title: Development and Applications of a New Method for Diatom Extraction from Clay

Presenter(s): Francisco Colón, Current Noyce Scholar

Email: colonf1@gator.uhd.edu

Institution: University of Houston-Downtown

Project Discipline: Chemistry

As it has been well established that an accurate population distribution of diatoms in an environment can be a significant tool in evaluating the health of the environment over time and in measuring the impact of climate, weather, and human activity a method for abstracting diatom tests from soil is a very useful tool in the ecological research. The soil composition of the golf coast is predominately clay, which makes chemical separation of diatom tests from the nearly identical soil matrix difficult due to the relative lack of distinguishing properties. By using the slight differences in density between the diatom tests and the soil matrix this separation has been accomplished by first treating the soil sample with an oxidizing agent and then floating the diatom tests in a dense solution of zinc chloride. The method shows little damage to diatom tests, allowing for easy identification at the genus level, and little apparent selection bias as the genera identified are compared to counts accomplished using purely mechanical methods for abstraction. Integration of diatom population assessments into ecology or chemistry education at the high school level is now possible. This creates a number of interdisciplinary learning opportunities incorporating mathematics in data analysis, biology and microbiology in evaluating and identifying diatoms, and the social sciences in encouraging student activism in environmental protection and remediation.

S/F27

Title: Evolution of the Early START STEM Noyce Program at the University of Louisville

Presenter(s): Christopher Applegate, Current Noyce Scholar
 Email: ctappl02@louisville.edu
 Institution: University of Louisville
 School Name and District Currently Teaching: Jefferson County Public Schools
 Project Discipline: Math

Our Noyce Program, a partnership between the University of Louisville (UofL) which was responsible for coursework and certification, the Jefferson County Public School System which provided employment and TEACH Kentucky (TKY) whose initial role was to provide mentoring support for new teachers. However, during the past two years TKY has been a valuable partner in recruiting students to the alternative certification program (ALT CERT). The Noyce program began as a recruiting tool for a UofL Program called EARLY START STEM which allows undergraduates to complete up to nine credit hours of Masters in the Art of Teaching (MAT) courses concomitant with completion of their disciplinary degrees. Recruiting through this pathway alone was a challenge so with the permission of NSF we added a 'career changers' pathway where science and math majors go directly into a four semester MAT program. We expanded the career changer track to include STEM majors wishing to pursue the ALT CERT track. ALT CERT is a two year program providing intensive training during the summer before placing individuals in classrooms in the fall as the teacher of record. Those in this track simultaneously pursue a MAT during the evening. Over the course of the grant, four scholars followed the early start stem track, eight enrolled in the full time MAT program and seventeen in the ALT CERT track, thirteen of which were recruited jointly with TKY. We are at the end of our grant and two scholars did not complete their program, one was certified but her whereabouts are currently not known. This means that thirty of the thirty three scholars supported by this grant will be in the classroom in the fall of 2014, six beginning their third year, twelve their second year and twelve their first year.

Our external evaluator helped us create a survey that was sent to all scholars in 2013. We found that the availability of the Noyce grant influenced only 30% of our scholars to become teachers but it influenced 100% of our scholars to teach in a high needs school. Social events were ranked highly for enjoyment and above average for helpfulness and productivity. Although all scholars knew that TKY is a partner in the grant, only 40% of scholars not recruited jointly with TKY took advantage of TKY programming. Scholars who attended the National Noyce meeting ranked the experience highly. Kentucky also hosted a local workshop last summer and the scholar from UofL who attended gave it high marks as well. We will be doing an additional survey to include responses from those scholars who joined the program after the last survey was sent.

S/F28

Title: Improving Attendance of Title 1 Math Night

Presenter(s): Jill Boski, Teaching Fellow
 Email: jill.boski@gmail.com
 Institution: University of Massachusetts
 School Name and District Currently Teaching: Powder Mill Middle School
 URL(s): <http://www.stgrsd.org/pmms>
 Project Discipline: Math

I am currently working with students to work on probability models in 7th grade and to use these models to make a game with at least three levels. They will present their games at the Title 1 math night to younger students and describe their chances of winning and how much they plan to make if the game was real.

S/F29

Title: Rural School Districts in Colorado: A Student and Teacher Perspective

Presenter(s): Karen Allnutt, Current Noyce Scholar
 Email: karen.allnutt@gmail.com
 Institution: University of Northern Colorado
 Project Discipline: Biology

According to data collected in 2010, there are 180 school districts in Colorado. Nearly half of these districts are considered rural and have fewer than 600 students within the entire district. More than half of these rural districts have fewer than 300 students. If you were to combine all of these rural districts into one, it would still have fewer students than one district in the Denver-Metro region, which may be over 25,000 students. I grew up attending one of these small rural schools and just recently completed my student teaching at a school slightly larger. Many of these districts have one school building for students in kindergarten through 12th grade, which may provide high school students the opportunity to mentor both elementary and middle school students. Elementary classrooms may be combined to serve more than one grade, and in high school, courses are often offered on an every-other year basis. Elective classes may be limited, but in today's technology age, students may be able to take online classes through a nearby college. As a high school teacher working in a rural district, one should expect to have several different classes to prepare for. However, the student: teacher ratio is often as low as 10:1 and rarely exceeds 25:1. I had three different classes to plan for in student teaching but my largest class had 20 students. Students are able to receive a lot of one-on-one attention from the teacher and are able to build great relationships with all staff members. The percentage of students involved in extra-curricular activities is quite high and allows the students to gain leadership experience, serve their community, and build their individual character. I still talk to all of my teachers from high school because I had them at least

SCHOLAR/FELLOW POSTER ABSTRACTS

once every year or as coaches, sponsors, or neighbors. I was involved all throughout the year in one activity or another and I was able to use my own experiences as a student to connect with my students and built good relationships.

S/F30

Title: Using an Interdisciplinary Project-based Learning (PBL) Strategy to Learn Mathematical Concepts

Presenter(s): Marilyn Santiago, Master Teaching Fellow

Email: marilyn.1177@hotmail.com

Institution: University of Puerto Rico at Rio Piedras

School Name and District Currently Teaching: Nueva Intermedia Piletas at Lares, Lares, Puerto Rico

Project Discipline: Math

As Robert Noyce Fellows we are also participating in the Project Maximizing Yield Through Integration that aims to foster action research and educational practices focused on the solid waste problem in Puerto Rico. I selected a project entitled Impact of Solid Waste to our Community in Terms of the Volume and Surface Area it Occupies to develop with middle school students. Some of the educational strategies used were the design of a plan where students provided solutions to solid waste management considering the capacity of their community landfills. Through this initiative, we have been able to demonstrate our leadership as we have integrated parents, teachers, students, and the community in general to work on this project. Moreover, our action research demonstrates that this strategy was successful to improve our 7-12 grade student's understanding of the selected concepts in math.

S/F31

Title: University of South Alabama Pathway to Science

Presenter(s): Jose Diaz-Acosta, Current Noyce Scholar

Email: jdiaz246@gmail.com

Institution: University of South Alabama

Project Discipline: Biology

Pathway to Science (PTS) is a collaborative program between the University of South Alabama (USA) Colleges of Education and Arts and Sciences, the Alabama State Department of Education through its Alabama Math Science and Technology Initiative (AMSTI), and the Mobile County Public Schools (MCPSS). Pathway to Science will address the desperate need to increase the number of science teachers in the MCPSS through enabling recent science bachelor's degree graduates to complete secondary science certification in an intensive four-semester program that culminates with certification and an earned master's degree. To ensure that the investment in these newly certified teachers (Noyce Scholars) is successful, they will participate in a two-year mentoring program designed to provide classroom support after graduation.

Goals:

1. PTS will prepare a total of up to 20 science teachers over the five year period (current average of four graduates per year) who are highly qualified to teach chemistry, physics, biology, or general science. In short, PTS seeks to double the size of the current education program and to create a steady stream of future science education majors, which will in turn increase the number of science teachers.
2. PTS will enhance student achievement by providing certified science teachers in those classrooms that currently have no certified teachers.
3. PTS will create a replicable model that will provide ongoing mentoring and professional development for novice science teachers to increase the probability that they will be retained and become career teachers.

S/F32

Title: B-Wet: Making Watershed Ecology Relevant

Presenter(s): Tami May, Former Noyce Scholar

Email: tmay@mcps.com

Institution: University of South Alabama

School Name and District Currently Teaching: Semmes Middle School, Mobile County Public School System

Project Discipline: Biology

Seventh grade Life Science students of Semmes Middle School are uniquely geographically located in the part of the County that contains J.B. Converse Lake, the drinking water source for Mobile County and the Mobile Bay which is a short drive (45 minutes) away. As it is with many lessons, students feel disconnected from the information they are investigating and the "real" world. Furthermore, it is human nature to be egocentric when it comes to impacting the environment. When designing this inquiry project it was important to connect the watershed ecology the students were familiar with in their county to the ecology of the nearby bay and Gulf of Mexico. This quarter long project aimed at using local water to introduce water quality testing and measurements and a classroom experiment that modeled proper scientific method techniques. The students were also asked to investigate processes that effect water quality in their area to the water quality in the bay.

Lastly they studied bivalve anatomy and ecology, specifically their filter feeding ability and its effect on water quality. The information was compiled in a journal and rewarded with a field trip to Dauphin Island Sea Lab. The students were asked to write a summary report on their experience and reported gaining an appreciation as well as an understanding of watershed ecology.

S/F33

Title: Incorporating Green Infrastructure on an Inner City School Campus

Presenter(s): Maranda Holley, Former Noyce Scholar
 Email: mbholley@mail.usf.edu
 Institution: University of South Florida
 School Name and District Currently Teaching: Adams Middle School, Hillsborough County, FL
 Project Discipline: Biology

The focus of the project is storm water management on Adam's Middle School campus. Throughout the project, students incorporate a multidisciplinary approach using Science, Technology, Engineering and Mathematics (STEM) principles to repurpose green spaces on campus as alternative low impact developments. The objective of the project is to create and establish low maintenance rain gardens to assist with storm water runoff within the existing campus grounds. This is a joint effort between the Education and Civil and Environmental Engineering departments at the University of South Florida.

The project incorporates current curriculum standards for 6th grade science. The monies from grants are used to purchase native and/or Florida friendly plants, shovels, various media (pea gravel, limestone, sand and mulch), and other miscellaneous items. The total project costs vary depending on the size, location and depth of the rain garden, which may be implemented with as little as a few hundred dollars for the simplest of designs or into the thousands for more complex and expansive systems. This project is the first step to incorporating numerous green spaces on the school campus.

This project fosters a science technology engineering, arts, and mathematics (STEAM) discipline. Students are charged with determining the areas in need of storm water management and possible solutions to fit within scope and budget of the project. Lessons are designed to incorporate an understanding of the need to solve an existing problem, research possible solutions and alternative raingarden sites, and ultimately the implementation of a viable and sustainable solution. The rain garden idea is centered on the importance of storm water management as well as reducing the environmental impact storm water has on the campus and the surrounding community. Additionally, students work in groups to design green infrastructure and to gain an understanding of Florida's ground structure and an introduction of concepts like cost estimates, design bids/argumentation, biological treatment, and low impact developments.

S/F34

Title: Water Quality in our Community and School: A Digital Scientific Poster Created by Ms. Felix's 5th Grade Students at Sheridan Elementary, Room 47

Presenter(s): Dieuwertje Kast, Current Noyce Scholar

Email: dkast@usc.edu
 Institution: University of Southern California
 Project Discipline: Biology

In the past few years, the scientific field has made large strides toward implementing and making more use of technological advances. An area we can definitely see the union between science and technology is how data and research are being presented by scientist, researchers and teachers to their peers and students. There has been an increase in the widespread use of technological aids such as scientific posters by professionals in the field of science. Introducing the concept of a visual display of information and data that is currently used by the professional science field is vital in representing and preparing students for careers in STEM (Science, Technology, Engineering and Math). As more and more technology being integrated into the classrooms, the teachers can now instruct students in the use of such aid. Heavy text based components of the poster such as the introduction and conclusion can be handwritten first, typed in a computer lab, and then added to the PowerPoint slide scientific poster template. Photos or other visual markers of the project can be easily incorporated into the poster while introducing the fundamentals of STEAM (Science, Technology, Engineering, Art and Math) through concepts of graphic design, photos, charts, and graphs which teaches students to not only analyze and digest information but also learn how to display information in a format that is comprehensible to a reader.

S/F35

Title: A Survey of Advantages and Disadvantages of High School Multi-Grade Mathematics Classrooms

Presenter(s): Karen Cheng, Former Noyce Scholar
 Email: karen.cheng@knoxschools.org
 Institution: University of Tennessee, Knoxville
 School Name and District Currently Teaching: L&N STEM Academy, Knox County Schools
 URL(s): <http://Instemac.knoxschools.org>
 Project Discipline: Math

Multi-grade classrooms and instruction have been used as effective educational strategies for increasing student engagement, particularly for elementary and middle school grades. On the broad spectrum of subjects, incorporating the multi-grade approach is relatively easier to accomplish at an elementary and middle school level, as students have not yet been separated by aptitude into advanced, honors, nor regular sections for courses. At this early stage in learning, students collaborating among multiple grades benefit from a mixed socio-cultural approach to cognitive development by interacting with peers of different age groups. Differentiation occurs naturally, as students readily discover and explore new concepts both individually and as a group. With the building of foundations of core subjects in elementary and middle school education, multi-grade classrooms

can lend to open discussions and curiosity for learning, in addition to building character skills such as responsibility, leadership, and respect for peers. However, how might this grouping strategy translate to high school classrooms, where students are often classified and ranked into very precise course level choices, especially in courses with a STEM (Science, Technology, Engineering and Mathematics) focus? What are some advantages and disadvantages for implementing this strategy among a high school mathematics classroom? In this survey, four mathematics classrooms were observed over the course of one school year at a public magnet school with a STEM focus in East Tennessee. Four total classrooms were observed during this study: three geometry classrooms (honors and college prep enrollments combined) and one AP Statistics classroom. In the three geometry classrooms, the student grade levels were composed as follows: (Geometry Class A: 24 freshmen, 2 sophomores, 1 junior; Geometry Class B: 27 freshmen, 2 sophomores; Geometry Class C: 28 freshmen, 1 sophomore; AP Statistics: 3 sophomores, 7 juniors, 6 seniors). Among these four classrooms, observations were gathered based on student achievement as well as responses through questionnaires given to students about their dispositions and confidence in general study skills, mathematics, and problem solving.

S/F36

Title: Honors Physics Lesson: Projectile Motion and Newton's 2nd Law

Presenter(s): Michael Johnson, Current Noyce Scholar
Email: gvy773@mocs.utc.edu
Institution: University of Tennessee, Chattanooga
Project Discipline: Engineering

As an Engineering student in the University of Tennessee Chattanooga STEM Education program, I believe that the development of problem solving skills is very important in high school science classes. With that in mind, I developed a Projectile Motion lesson for an Honors Physics class at Ooltewah High School as part of a field placement assignment in the fall of 2013. The engagement portion of this "5-E" lesson included a simple projectile motion problem where the students were given the formulas and many of the unknown quantities. The students, as a class, then worked through the problem with some guidance from the instructor. During the exploration portion of the lesson, student groups were provided a marble launching device and were challenged to use their knowledge of projectile motion physics and Newton's Second Law to launch a marble into a paper cup. This activity represented the type of multi-step problem solving process that students will likely be exposed to in higher education settings. I would recommend that this lesson be used toward the end of a unit on Projectile Motion as it requires the students to be very comfortable with the formulas and terminology.

S/F37

Title: The Use of Forensic Science in a STEM Classroom

Presenter(s): Kristine Vandal, Current Noyce Scholar
Email: knvandal@miners.utep.edu
Institution: University of Texas at El Paso
Project Discipline: Math

Students can have trouble with understanding the relevance of math in their future careers. With the popularity of crime shows, showing students how math can be used to help catch criminals can peak their interest and develop their understanding of the subject at the same time. Using footprints to find the height of a suspect as well as the speed of their movement is something that has occasionally been used in television crime dramas. Students will use the formula developed by Paul Topinard to discover that a person's height can be estimated by just their foot length. To discover the speed of one's movement, students will use the ratio of stride length (length of two steps), and an estimated leg length to identify if a person was walking, trotting, or running. This lesson can tie in with a Geology class as Paleontologists use similar methods to calculate the height and movement of dinosaurs. It can also be used in a computer science class where students create programs to model their discoveries.

A

Abrams, Bianca, A1
 Adams, John, A48
 Adams, Sandra, A25
 Adeyemi, Cheryl, A62
 Afonso, Robbie, A4
 Aguzar, Christine, A23
 Albert, Lillie, A3
 Albright, Shari, A35, A36
 Alexander-Lee, Gabrielle, A70
 Allnutt, Karen, A75
 Anderson, Chris, A22
 Anderson, Karen, A32
 Anthony, Holly, A34
 Aoki, Jon, A46
 Applegate, Christopher, A75
 Aranguren, Brandi, A62
 Armstrong, Elisabeth, A34
 Asala, Kathy, A50

B

Bader, David, A39
 Baltensperger, Bradley, A22
 Banta, Tyler, A40
 Barrett, Diane, A44
 Bayne, Gillian, A20, A21
 Beebe, Ron, A46
 Beeth, Michael, A61
 Bell, Cassandra, A64
 Ben-Jacob, Marion, A22
 Benner, Susan, A58, A59
 Benson, Gwen, A14
 Benson, Lisa, A10
 Berezovski, Tetyana, A28
 Berger, John, A25
 Bernard, Kenneth, A62
 Berube, Clair, A15, A16
 Besson, Sharon, A21
 Beverly, Lesa, A31, A32
 Bhattacharyya, Gautam, A10
 Bianchini, Julie, A41, A42
 Bitran, Daniel, A11
 Black, Chris, A9
 Blackman, Dennis, A66
 Bolyard, Johnna, A63
 Bonn, Tamara, A68
 Boone, Nolan, A26
 Borasi, Raffaella, A54
 Borrero, Michelle, A53
 Boski, Jill, A47, A75
 Bott, Simon, A45

Brewer, Dennis, A38
 Brown, Michael, A28
 Broznak, Caitlin, A69
 Bruederle, Leo, A43
 Brueseke, Matthew, A18
 Bryan, Lynn, A27
 Bu, Lingguo, A30
 Buckley, Brooke, A26
 Bukatko, Danuta, A11
 Burns Thomas, Anne, A33
 Burrows, Andrea C., A62
 Byers-Kirsch, Jan, A9
 Byrd, David, A53

C

Callard, Cynthia, A54
 Canger, Anthony, A22
 Capone, Doug, A57
 Carbonell, Ruben, A26
 Carrillo, Daniel, A40
 Carter, Pam, A58
 Carver, Jeffrey, A63
 Casadonte, Dominick, A35
 Cassano, Suzanne, A1
 Cassill, Aaron, A59
 Cavallo, Ann, A60
 Cawthorn, Michelle, A14
 Challener, Dan, A59
 Chang, Eun-Woo, A25
 Chapin, Suzanne, A4, A5
 Charlier, Henry, A2
 Che, Megan, A10
 Cheng, Karen, A59, A77
 Cheung, Chi-Keung, A3
 Chicone, Carmen, A49
 Childs, Kimberly, A32
 Choppin, Jeffrey, A54
 Claey, Lorena, A59
 Clapper, Michael, A28
 Clark, Lawrence, A46
 Clink, Amy, A2
 Coats, Linda, A24
 Coffee, Jane, A11
 Colon, Francisco, A74
 Conoley, Jane, A42
 Contis, Nina, A13
 Cook, Maya, A71
 Cook, Michelle, A10
 Cool, Adrienne, A29
 Corpuz, Edgar de Guzman, A60
 Cossey, Ruth, A23
 Costa, Victoria, A7

Costner, Beth, A64
 Costner, Kelly, A64
 Cotter, Steve, A35
 Cox, Ryan, A23
 Craven, John, A14
 Crisp, Gloria, A59
 Cronk, Carol, A8
 Crowley, Patricia, A47
 Culbertson, Christopher, A18
 Curts, Jaime, A61

D

Dahi, Ayham, A6
 Dale, Danny, A62
 Darley, Joy, A14
 Datnow, Amanda, A40, A41
 Davis, Kathleen, A47
 Davis, Mesa, A15
 de Groot, Cornelis, A53
 Dean, Michelle, A19
 Demir, Kadir, A15
 DeRosa, Donald, A3
 Dershimer, R. Charles, A48
 Diaz-Acosta, Jose, A76
 DiBiase, Warren, A51
 Dietiker, Leslie, A5
 Dill, Dan, A3
 Donnay, Victor, A5
 Dotger, Sharon, A33
 Doughty, Tim, A53
 Drew, David, A57
 Duffy, Andrew, A3
 Dupigny-Giroux, Lesley-Ann, A61
 Dutton, Alexa, A72
 Dwyer, Jerry, A35

E

Eddy, Colleen, A51
 Edwards, Belinda, A20
 Elby, Andrew, A46
 Elston, Stu, A59
 Embrey, Leslie, A72
 Embry-Jenlink, Karen, A31
 Emil, Barbara, A56
 Epperson, James, A60
 Epps, Adrian, A20
 Erickson, David, A49
 Escoto, Paul, A62
 Esprivalo Harrell, Pamela, A51

POSTER ABSTRACT INDEX

Etkina, Eugenia, A28
Evans, Paige, A45

F

Farber, William, A22
Feldman, Allan, A55
Feldman, Phillip, A55
Ferdinand, Robert, A13
Ferguson, Carolyn, A18
Fillebrown, Sandra, A28
Finkelstein, Noah, A42
Fischman, Davida, A8
Flick, T. Michael, A65
Fogleman, Jay, A53
Fonzi, Judith, A54
Ford, Shelton, A13
Fortis, Marta, A53
Fougere, Gretchen, A5
Fournillier, Janice, A15
Freking, Frederick, A57
Friedberg, Solomon, A3
Friedrichsen, Patricia , A48

G

Gage, Michael, A54
Gallagher, Karen , A57
Garik, Peter, A3
Gatch, Delena, A14
Gerberry, Carla, A65
Gfeller, Mary, A33
Gillespie, Perry, A13
Glaise, Joyce, A62
Glen, Nicole, A5
Gningue, Serigne, A20, A21
Gober, Deborah, A12
Goertzen, Renee, A1
Goldberg, Bennett, A3
Gonzalez, Barbara, A7
Goodell, Joanne, A10
Gourlay, Avalon, A58
Gramling, Joel, A35
Gravatt, Dennis, A31
Gray, James, A30
Green, Andre, A55
Green, Sarah, A22
Greenbowe, Thomas, A52
Gresko, Jennifer, A27
Griffin, Marlynn, A14
Gron, Liz, A16
Gul, Tugce, A15

Gunning, Amanda, A22

H

Hagedorn, Eric, A59
Hagen, Sue, A63
Hale, Greg, A60
Hallagan, Jean, A31
Hallam, Bonnie, A5
Halter, Chris, A40, A41
Ham, Juliet, A6
Hamdan, Kamal, A6
Hamman, John, A25
Hannan, Gary, A13
Hargraves, Rosalyn, A62
Harmon, Deborah, A13
Harrell, James, A37
Harris, Carla, A51
Hartley, Laurel, A43
Harvey, Mark, A58
Heeren, Tim, A4
Hegedus, Stephen, A47
Heideman, Paul, A12
Henderson, Ronnie, A8
Henry Russell, Patricia, A12
Henson, Harvey, A30
Hill, Walter, A36
Hoberman, Barbara, A25
Hoge, Brad, A46
Holley, Maranda, A55, A77
Horvath, Larry, A29
Howard, Tim, A12
Howe, Erin, A43
Hsu, Eric, A29
Hu, Zubin, A23
Huang, Adam, A38
Hubbard, Keith, A31
Hughes, Brad, A39
Hughes, Lee, A51
Hughes, Ron, A6
Hunter, Willy, A50
Hutchison, Laveria, A44
Hutto, Richard, A49

I

Ipanaque, Yona, A67
Irvine Belson, Sarah, A1

J

Jackson, Debbie, A10
Jackson, Dionne, A16
Jackson, Jeanetta, A34
Jackson, Jennifer Kasi , A63
Jacobs, Jennifer, A69
Jacobsen, Mark, A24
Jafari, Farhad, A62
Janke, Rena, A33
Jaszczak, John, A22
Jefferies, Lily, A23
Jennings, James, A16
Jensen, John, A27
Jesunathadas, Joseph, A8
Jitianu, Andrei, A20
Johnson, George, A38, A39
Johnson, Heather, A11
Johnson, Lisa, A64
Johnson, Michael, A78
Jones, Liesl, A20, A21
Jones, Sharon, A53
Junor Clarke, Pier A., A15
Jury, Mark, A30

K

Kagan, David, A6
Kast, Dieuwertje, A77
Kasten, Sarah, A26
Keegan, Sheila, A41
Kelley, LaTonia, A15
Kelly, Kasey, A67
Kennedy, Marian, A10
Kersaint, Gladis, A55, A56
Keynes, Michael, A1
Killeen, Sara, A49
Kim, Alice, A73
Kim, Kiho, A1
Kimbrough, Doris, A43
Kirshner, David, A21
Kloock, Carl, A6
Klotz, Larry, A33
Korth, Deborah, A38
Kosheleva, Olga, A59
Kosztin, Dorina, A48
Kovach, Margaret, A58
Krajcevski, Mile, A55
Kresl, Adam, A61
Kreye, Betti, A63
Kuhel, Karen, A20
Kume-Robertson, Albana, A61
Kurtz, Martha, A9

L

La Rue, Glenda, A35
 LaGrassa, Susan, A36
 Lamb, Lisa, A29
 Langdon, Laurie, A42
 Larkin, Douglas, A25
 Lawler, Brian, A9
 Lee, Jeffrey, A35
 Leilabady, Pedram, A51
 Lesnick, Alice, A5
 Leveille, Nancy, A46
 Levin, Dan, A46
 Lew Yan Voon, Lok, A35
 Lewandowski, Gary, A65
 Lewis, Wm. 'Jim', A49
 Li, Eugene, A25
 Li Santi, Barbara, A23
 Libertini, Jessica, A53
 Lindevald, Ian, A36
 LoBue, James, A14
 Locklear, Keenan, A26
 Lopez, Ramon, A60
 Lucero, Tyler, A54
 Luckett, Deborah, A14
 Luehmann, April, A54
 Luntz, Steven, A23
 Lyublinskaya, Irina, A11

M

Macdonald, Heather, A12
 Madden, Sandra, A47
 Maddox, Anthony, A57
 Malone, Katherine, A55
 Mammo, Behailu, A17
 Marrero, Meghan, A22
 Marrs, Kathleen, A18
 Marsh, Carissa, A42
 Marshall, Sue, A39
 Martin, Elaine, A34
 Masingila, Joanna, A33
 Mason, Marguerite, A12
 Mason, Pam, A57
 Matkins, Juanita, A12
 Matthews, Catherine, A51
 Matthews, James, A30
 Mauzy-Melitz, Debra, A39
 May, Tami, A76
 McCann, Michael, A28
 McCarty, Shannon, A27
 McColgan, Michele, A30
 McCoy, Leah, A63

McCrone, Sharon, A50
 McDonald, Kelly, A7
 McDonnough, Jacqueline, A62
 McEachron, Donald, A12
 McGahan, Kristen, A63
 McNamara, Kathleen, A32
 Medsker, Larry, A30
 Meredith, Dawn, A50
 Meressi, Tesfay, A47
 Merino, Allison, A20, A21
 Meza, Susanna, A68
 Midden, Chris, A72
 Middleton, Valerie, A52
 Miller, David, A63
 Miller, Deanne, A9
 Miller, Kenneth, A24
 Moje, Elizabeth Birr, A48
 Moll, Amy, A2
 Morera, Edwin, A53
 Morgan, Carolyn, A15, A16
 Morgan, Jeffrey, A45
 Morrell, Tisha, A53
 Morris, Carlton, A36
 Mueller, Brenda, A71
 Mueller, Carl, A54
 Mulekar, Madhuri, A55
 Muramoto, Shannon, A68
 Murphy, Teri, A26
 Myers, Adam, A62

N

Nadelson, Louis, A2
 Nanez Rodriguez, Juan, A45
 Nave, Karen, A27
 Neal, Ted, A52
 Nguyen, Kim, A18, A50
 Nickerson, Susan, A29
 Nixon, Brenda, A21
 Noblitt, Bethany, A26
 Nolan, Deborah, A38, A39
 Nolan, John, A1
 Norman, Pat, A35, A36
 Norton, Anderson, A63

O

O'Brien, Edita, A69
 Occhino, Michael, A54
 O'Connor, Karen, A47
 Ograin, Christopher, A41, A42
 Oh, Su, A57

O'Haver, John, A48
 Oja, Nodie, A50
 Oloff-Lewis, Jennifer, A6
 Orchinik, Miles, A1
 Ortenzi, Debra, A54
 Otero, Valerie, A42
 Overley, Nancy, A19

P

Pace, Debbie, A32
 Padua, Kimberly, A24
 Papathomas, Thomas, A28
 Parry, Susan, A26
 Peckham, Joan, A53
 Perez, Alfredo, A27
 Phelan, Gregory, A33
 Philipp, Randy, A29
 Plank, Larry, A55, A56
 Platt, Terry, A54
 Plisch, Monica, A1
 Poese, Debra, A25
 Polizzi, Samuel, A19
 Porter, Jenna, A7
 Portnoy, Neil, A50
 Post, Gina, A50, A64
 Potter, Robert, A56
 Pratt, Sarah, A51
 Presson, Joelle, A46
 Price, Ed, A9
 Prince, Stacia, A72
 Pugalee, David, A50
 Pugliese III, Sebastian, A61
 Puvirajah, Anton, A15

Q

Qarghah, Mohammad, A70
 Qian, Gaoyin, A21
 Quander, Rebecca, A46
 Quinn, Eugene, A32
 Quintanilla, John, A51

R

Rebello, Sanjay, A18
 Redish, Joe, A46
 Redl, Timothy, A46
 Rees, Paula, A47
 Reid, Katherine, A39
 Reinsel, Kathy, A64

POSTER ABSTRACT INDEX

Reinsvold, Lori, A52
Reinsvold, Rob, A52
Remmel, Jeff, A40, A41
Renzaglia, Karen , A30
Reys, Barbara, A49
Richards, Heraldo, A34
Richards-Babb, Michelle, A63
Richardson, Sandra, A62
Richardson-Jones, Kathryn, A35
Riechert, Susan, A58
Robb, Judith, A50
Roberts, Catherine, A11
Robinson, Stephen, A34
Rominger, Sarah, A73
Ronkainen, Niina, A2
Rosen, Ilene, A28
Rosenberg, Steve, A4
Rosengrant, David, A19
Ross, Donna, A29
Rushton, Greg , A19
Russell, Jada, A58

S

Sabloff, Josh, A5
Sack, Jacqueline, A46
Salazar, Melissa, A27
Salce, Michelle, A66
Salomone, Stephanie, A53
Salters, James, A64
Sanders, Stephanie, A35
Sandifer, Julie, A72
Santamorena, Diane, A73
Santiago, Marilyn, A76
Sass, Daniel, A59
Scarano, Frank, A47
Schneider, Stephen, A47
Schovanec, Lawrence, A35
Schroder, Carolyn, A34
Scott, Timothy, A34
Seitsinger, Anne, A53
Selby, Lea, A48
Semken, Steven, A1
Serpa, Laura, A59
Sessoms, Deidre, A6, A7
Shaeffer, Julie, A74
Shahbaz, Rabia, A15
Shannon, Gary, A7
Shaughnessy, Kevin, A37
Shaw, Kimberly, A12
Shen, Fangyang , A25
Shertzer, Janine, A11
Sherwood, Robert , A17

Shiver, Janet, A9
Siegel, Marcelle, A48
Simmons, Marc, A5
Sipes, Sedonia, A30
Slater, Tim, A62
Smith, Bernard, A70
Smith, Janette, A2
Smith, K. Christopher, A61
Smith, Mariah, A49
Smith, Wendy, A49, A50
Smith-Burton, Kimberly, A13
Snetselaar, Karen, A28
Snyder, Stuart, A24
Sorey, Timothy, A9
Soria, Victor, A49
Soucie, Marilyn, A48
Spargo, Abbey, A47
Srinivasan, Chandra, A7
Steimle, Alice, A48
Stelljes, Drew, A12
Stemn, Blidi , A17
Stephens, Marilyn, A37
Stevens, Glenn, A4
Stevens, Tara, A35
Stewart, Gay, A38
Stewart, John, A38
Stokes, Donna, A45
Stoll, Lauren, A24
Stempel, Eileen, A33
Sullivan, Susan, A11
Summers Calderon, Paula, A21
Sunal, Dennis, A37
Swidler, Stephen, A49

T

Talbot, Robert, A43
Tarr, James , A49
Thigpin, Sara, A34
Thomas, Christine, A15
Ticknor, Cindy, A12
Tillotson, John, A33
Tinsley, Todd, A16
Titianu, Andrei, A21
Tobey, Kimberly, A27
Tolmasky, Marcelo, A7
Toolin, Regina, A61
Torres, David, A27
Trinter, Christine, A62
Troupe, Bonnie, A32
Tucker, Craig, A26
Tucker, Lucas, A30

U

Ulrich, Katy, A63
Uzman, Akif, A46

V

Vaidya, Sheila, A12
Van Es, Beth, A39
van Hoomison, Jacquie, A53
Van Koppen, Petra, A42
Vandal, Kristine, A59, A78
Vaughn, Richard, A27
Venegas, Jesse, A66
Verdin, Claudia, A59
Vernon, Grace, A14
Vidakovic, Draga, A15
Villarreal, John, A61
Viteri, Cesar, A66
Volkman, Mark, A48
Vu, Keane, A68

W

Wagler, Amy, A59
Wagler, Ron, A59
Wallace, Chelsea, A41, A42
Waller, LaChelle, A62
Walsh, Jerry, A51
Wangler, Thomas, A2
Waterman, Rory, A61
Watt, Jeffrey, A18
Wavering, Michael, A38
Wawro, Megan, A63
Wee, Bryan, A43
Weld, Jeff , A52
Welty, Kimberly, A47
Wesselman, Leah, A36
Westersund, Katy, A71
White, Diana , A43
White, Erin, A13
White, Janet, A23
Whittington, Alan, A48
Wig, Andrew, A2
Wigglesworth, Matthew, A2
Wiles, Jason, A33
Wilford, Katie, A52
Wilkins, Jesse, A63
Williams, Desha, A20
Williams, Jeff, A5
Williams, Kathy, A29
Williams, Ken, A62

Willis, Ramsey, A55
Wilson, Allison, A2
Windstam, Sofia, A31
Withers, Michelle, A64
Woodcock, Timothy, A32
Wyss, Michael, A37

Y

Yang, Eunmi, A32
Yeh, Jyh-haw, A2
Yendol-Hoppey, Diane, A56
Yoanidis, Renia, A30
Yoder, Paul, A36
Yong, Darryl, A57
Young-Seigler, Artenzia, A34

Z

Zahner, William, A4
Zayas, Sarah, A8
Zelkowski, Jeremy, A37
Zeng, Liang, A61
Ziegler, Megan, A66
Zigmond, John, A2
Zuraw, Lisa, A35

THE NATIONAL MALL

SMITHSONIAN MUSEUMS

ELSEWHERE AROUND THE WASHINGTON, D.C., AREA

ANACOSTIA COMMUNITY MUSEUM
1901 Fort Place, SE

NATIONAL ZOO
3001 Connecticut Avenue, NW

STEVEN F. UDVAR-HAZY CENTER
14390 Air and Space Museum Parkway
Chantilly, Virginia

LEGEND



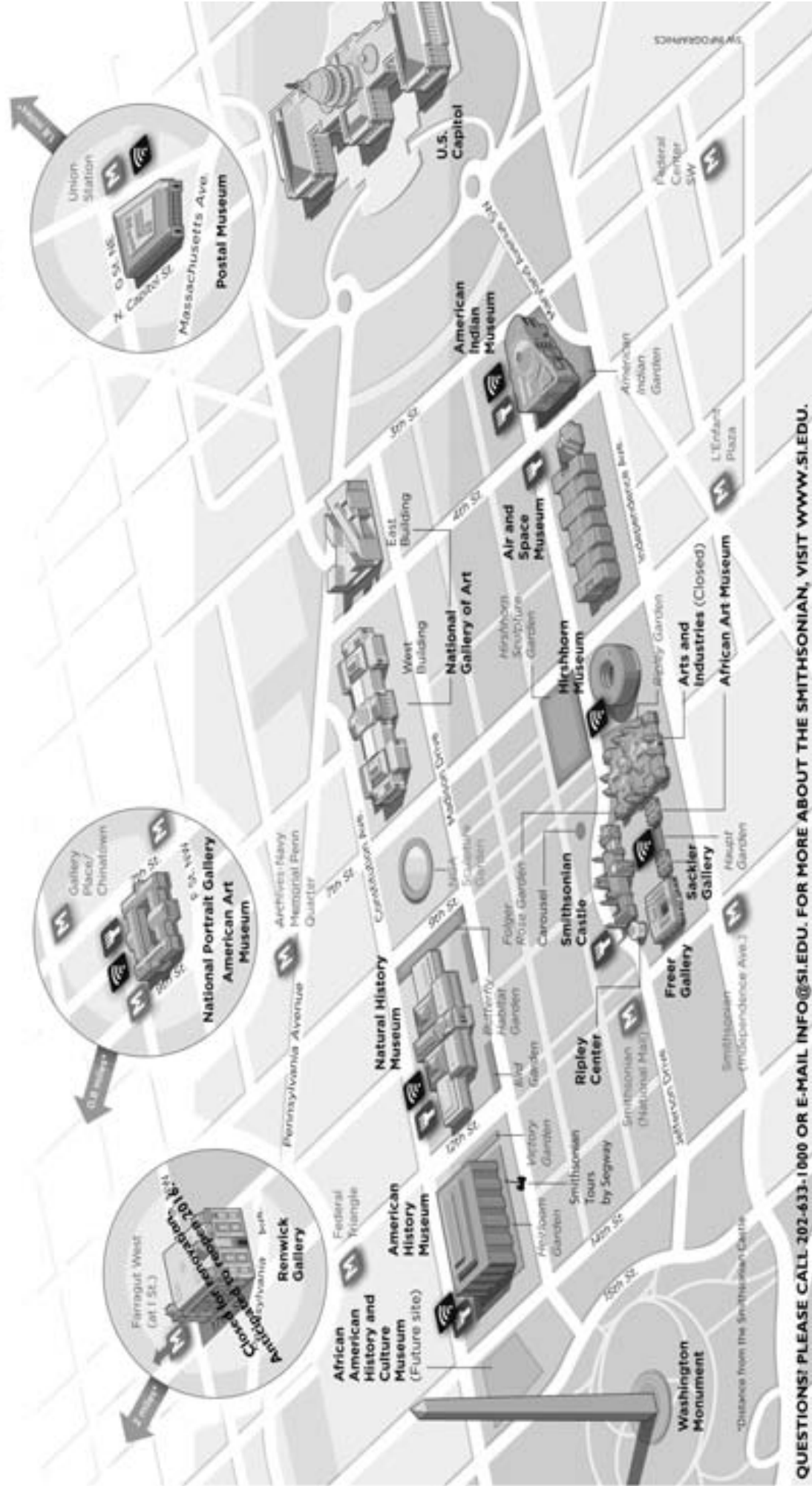
Metro station



Restaurant service



Museum offers free Wi-Fi



QUESTIONS? PLEASE CALL 202-633-1000 OR E-MAIL INFO@SI.EDU. FOR MORE ABOUT THE SMITHSONIAN, VISIT WWW.SI.EDU.