

NSF Robert Noyce Teacher Scholarship Program Conference

Building Excellence in STEM Teaching

July 1-3, 2009

Conference Program



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The National Science Foundation (NSF)

Robert Noyce Teacher Scholarship Program

Increasing the Number of K-12 STEM Teachers in High-Need School Districts

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) 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. 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 STEM professionals who enroll as NSF Teaching Fellows in master's degree programs leading to teacher certification by providing academic courses, professional development, and salary supplements while they are fulfilling a four-year teaching commitment in a high need school district. This new component also supports the development of NSF Master Teaching Fellows by providing professional development and salary supplements for exemplary math and science teachers to become Master Teachers in high need school districts.

The American Association for the Advancement of Science (AAAS) is working with the NSF Robert Noyce Teacher Scholarship Program to identify and disseminate information about effective practices and strategies for attracting, selecting, and preparing new K-12 STEM teachers and retaining them in the STEM teacher workforce. Project components include:

- Co-sponsoring and implementing the 2009 and 2010 NSF Robert Noyce Teacher Scholarship Program annual conferences.
- Producing a general publication that highlights the accomplishments of the NSF Noyce Teacher Scholarship Program.
- Developing and maintaining an NSF Noyce Teacher Scholarship Program Web site.
- Organizing proposal preparation workshops.

The American Association for the Advancement of Science (AAAS)

The American Association for the Advancement of Science (AAAS) is the world's largest general scientific society and publisher of the journals, *Science* (www.sciencemag.org) and *Science Signaling* (www.sciencesignaling.org). *Science Translational Medicine* (www.sciencetranslationalmedicine.org) will be published beginning in the fall 2009.

AAAS was founded in 1848, and serves 262 affiliated societies and academies of science, reaching 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 1 million.

The nonprofit AAAS (www.aaas.org) 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 largest research news, log onto EurekAlert!, www.eurekalert.org, the premier science-news Web site, a service of AAAS.

AAAS has four primary program areas, including Education and Human Resources, International Activities, Project 2061, and Science Policy.

Visit the AAAS website at <http://www.aaas.org/>.

Robert Noyce Teacher Scholarship Program Conference
Building Excellence in STEM Teaching
 Co-Sponsored by NSF and AAAS
Grand Hyatt Washington, D.C.
July 1-3, 2009

Wednesday, July 1, 2009

4:30 pm - 5:30 pm New Awardees Session with NSF Staff
 7:00 pm - 10:00 pm Registration and Poster Setup

Thursday, July 2, 2009

7:00 am - 8:00 am Registration and Poster Setup
 Continental Breakfast

8:00 am - 9:00 am Opening Session - Constitution A&B

Welcome: Joan Prival, Noyce Lead Program Director, NSF
 Remarks: Linda Slakey, Division Director, Division of Undergraduate Education, NSF

Keynote: *A Conversation with Steve Robinson: Teacher, Scientist, Policy Advisor*
 Shirley Malcom, Head, Education and Human Resources Programs, AAAS
 Steve Robinson, Special Advisor to the Secretary, U.S. Department of Education

9:15 am - 10:45 am Concurrent Workshops Session 1 - TBA

11:00 am - 12:00 pm *Voices from the Field*

Moderator:

Linnea Fletcher, Program Director, NSF

Panelists (Former NSF Noyce Scholars):

Meredith Ashbran, Poly High School (Long Beach, CA)
 Bethany Filipow, Philo Junior High School (Philo, Ohio)
 Penny McCool, Lee High School and the STEM Academy - (San Antonio, TX)
 Ariel Smith, Maynard Holbrook Jackson High School - (Atlanta, GA)
 William Quintana, Martin Luther King Middle School - (San Bernardino, CA)

12:15 pm - 2:15 pm Working Lunch and Keynote - Constitution A&B
Adventures in Non-Euclidean Geometry
 Daina Taimina, Cornell University

2:15 pm - 2:30 pm Break

2:30 pm - 4:00 pm Concurrent Workshops Session 2 - TBA

4:00 pm - 5:00 pm Birds of a Feather Groups:

Regional Caucuses

Northeast

Southeast

Midwest

Southwest

West

Noyce Scholars & Teachers

5:00 pm - 6:00 pm Poster Session 1/Networking - Constitution C, D, E and C Corridor

6:00 pm - 7:00 pm Poster Session 2/Networking - Constitution C, D, E and C Corridor

AGENDA

Friday, July 3, 2009

- 7:00 am - 8:00 am Continental Breakfast -Constitution A&B
- 8:00 am - 9:00 am Plenary Panel
Teacher Recruitment: Strategies from the Physics Teacher Education Coalition
Moderator:
Monica Plisch, American Physical Society
Panelists:
Jon Anderson, Teacher-in-Residence, University of Minnesota
Eric Benzel, Noyce Scholar, University of Colorado
Belinda Hendley, Noyce Scholar, University of Arkansas
Valerie Otero, University of Colorado
Annie Venturo, Noyce Scholar, University of Colorado
- 9:15 am - 10:45 am Concurrent Workshops Session 3 - TBA
- 11:00 am - 12:00 pm Plenary Session - Constitution A&B
"Teacher Accountability v. Teacher Autonomy: Must we Choose?"
Sheila Tobias, Author
- 12:00 pm - 12:30 pm Closing Session

Speaker: Wanda E. Ward, Acting Assistant Director, Directorate for Education and Human Resources, NSF

Yolanda S. George

Yolanda Scott George is Deputy Director and Program Director, Education and Human Resources Programs, American Association for the Advancement of Science (AAAS). Her duties and responsibilities include planning, development, management, implementation, and evaluation of multi-year science, mathematics, and technology (SMT) education and educational research projects. She has served as Director of Development, Association of Science-Technology Centers (ASTC), Washington, DC; Director, Professional Development Program, University of California, Berkeley, CA, a pre-college academic enrichment, university retention, and pre-graduate school program in SMT for minorities and women, and as a research biologist at Lawrence Livermore Laboratory, Livermore, California involved in cell cycle studies using flow cytometer and cell sorters.

George conducts evaluations, project and program reviews, and evaluation workshops for both the National Institutes of Health and National Science Foundation, as well as reviews SMT proposals for private foundation and public agencies, including the Sloan Foundation, the Carnegie Corporation of New York, the Ford Foundation, and the European Commission. She develops and coordinates conferences and workshops related to recruitment and retention of minorities, women, and persons with disabilities in SMT. She works with UNIFEM, UNESCO, and non-governmental organizations on gender, science, and technology initiatives related to college and university recruitment and retention and women leadership in SMT.

Over the last 25 years she has raised over \$70 million for a variety of SMT education initiatives for colleges and universities, associations, and community-based groups. She currently serves as principal investigator (PI) or co-PI on National Science Foundation (NSF) grants related to developing evaluation capacity of PIs, project directors and evaluators for the Alliance for Graduate Education and the Professoriate (AGEP); development of a National Science Education Digital Library (NSDL) Biological Sciences Pathways for biological sciences educators in undergraduate, graduate and professional schools; Women's International Scientific Cooperation Program (WISC); Historically Black Colleges and Universities-Undergraduate Programs (HBCU-UP); and Course, Curriculum, and Laboratory Improvement (CCLI) for undergraduates. She serves on the board of the International Women in Science and Engineering Network (INWES); American Institute of Biological Sciences (AIBS) Education Committee, Award Advisory Committee; Maria Mitchell Women in Science Award, McNeill/Lehrer Productions Online Science Reports and Resources Advisory Committee, Great Science for Girls: Extension Services for Gender Equity in Science Advisory Committee, Academy for Educational Development, and the South Dakota Biomedical Research Network Advisory Committee. George 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.

Shirley M. Malcom

Shirley M. Malcom is Director, Education and Human Resources (EHR) Programs at AAAS. EHR includes programs in education, activities for underrepresented groups, and public understanding of science and technology. Malcom was head of the AAAS Office of Opportunities in Science from 1979 to 1989. Between 1977 and 1979, she served as a program officer in the Science Education Directorate of the National Science Foundation (NSF). Before this, she held the rank of assistant professor of biology, University of North Carolina, Wilmington. Other work experience includes two years as 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 15 honorary degrees.

Malcom serves on several boards, including the Heinz Endowments, Commission on Professionals in Science & Technology, and University Corporation for Atmospheric Research. She serves as a trustee of Caltech and as a Regent of Morgan State University. In addition, she has chaired a number of national committees addressing education reform and access to scientific and technical education, careers, and literacy. 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 Advisers on Science and Technology from 1994 to 2001.

BIOGRAPHIES

Monica Plisch

Dr. Monica Plisch serves as the Assistant Director of Education at the American Physical Society (APS) in College Park, Maryland. She leads several initiatives within the Physics Teacher Education Coalition (PhysTEC) project, including a coalition of more than 130 institutions committed to improving the education of future physics teachers. She also leads a project to develop an education module for high school physics students on nuclear forensics. Before coming to the APS, Dr. Plisch served as the director of Education Programs at the Center for Nanoscale Systems at Cornell University, where she developed programs and curriculum on nanotechnology for undergraduate students and physics teachers. Dr. Plisch completed her doctoral studies in physics (nanomagnetism) at Cornell University. She enjoys competitive rowing and is an avid bicyclist.

Steve Robinson

Steve Robinson recently joined the Department of Education as a Special Advisor to Secretary Arne Duncan. Prior to joining the Department, Robinson served as the Legislative Assistant for education in the office of then-Senator Barack Obama, advised on policy development during the presidential campaign, and worked on education issues with the Obama-Biden Presidential Transition Team. Steve first joined the office of Senator Obama in July 2005, supported as a fellow through the Albert Einstein Distinguished Educator Fellowship Program. During his time as a Senate staffer, he also served as a mentor for students in DCPS, as a reading tutor for elementary grade students and as a math tutor with middle school students.

Prior to joining Senator Obama's office, Steve was a high school science teacher in Eugene, Oregon. He grew up in the suburbs of Chicago, earned a degree in Biology at Princeton University, and then a Ph.D. at University of Michigan. On the Biology faculty at the University of Massachusetts, he headed a laboratory and mentored PhD students. His teaching experience includes more than 15 years in the classroom at middle school, high school, and postsecondary levels.

Linda L. Slakey

Dr. Slakey is a graduate of Siena Heights College (B.S. in Chemistry), and the University of Michigan (Ph.D. in Biochemistry.) She did postdoctoral research at the University of Wisconsin. Dr. Slakey was appointed to the faculty of the Department of Biochemistry at the University of Massachusetts Amherst in 1973. Her scientific work focused on lipid metabolism and vascular biology, and was funded by the National Institutes of Health, the American Heart Association, and the National Science Foundation. She was Head of the Department of Biochemistry from 1986 until 1991, and Dean of the College of Natural Sciences and Mathematics (NSM) from 1993 until 2000. In September of 2000, she was appointed Dean of Commonwealth College, the honors college of the University of Massachusetts Amherst. As Dean of NSM and of Commonwealth College she was active in supporting teaching and learning initiatives throughout the University, with particular attention to engaging undergraduate students in research, to faculty development activities that promote the transition from lecturing to more engaged pedagogies, and to the support of research on how students learn. She joined the National Science Foundation in November of 2006 as Director of the Division of Undergraduate Education.

Daina Taimina

Dr. Daina Taimina is a researcher and teacher in the Department of Mathematics at Cornell University. Born in Riga, Latvia, she has taught mathematics in her native country and has led a range of workshops for teachers in Europe and the United States. She has given numerous presentations at professional conferences as well as public lectures on mathematics, mathematics education, and art. Dr. Taimina is the co-author of *Experiencing Geometry*, a widely used textbook on both Euclidean and non-Euclidean geometry, and the author of *Crocheting Adventures with Hyperbolic Planes*.

When she became an educator, Dr. Taimina decided that no student, regardless of aptitude level, would feel out of place in her classroom. One way she assured that was by using everyday objects to explain theories. One example is helping students understand the high-level geometry concept called the hyperbolic plane. Dr. Taimina used crochet needles and some yarn, and the problem of getting tactile educational models was solved.

Sheila Tobias

Sheila Tobias has made an art and a science of being an outsider to science and mathematics, where hers is a household name for the books, *Overcoming Math Anxiety*, *They're not Dumb, They're Different*, *Breaking the Science Barrier*, and *Rethinking Science as a Career*.

She has just co-authored a new book, *Science Teaching as a Profession*. It is currently available as a free PDF download and will soon be available in print.

Tobias is equally well known in academic and popular circles as a feminist and for her books, *Women, Militarism and War* (with Jean Elshtain) and *Faces of Feminism: An Activist's Reflections on the Women's Movement*.

Supported by the Ford Foundation, Rockefeller Foundation, Research Corporation, and the Alfred P. Sloan Foundation, her work has made her a sought-after consultant on college and university curricula, general education, post-baccalaureate alternatives, professional master's in science and mathematics, and women's studies. Tobias is a popular speaker on all these topics and is available for formal addresses as well.

Educated in history and literature at Harvard/Radcliffe, Tobias earned a master's in history and an M.Phil at Columbia University and eight honorary doctorates, the most recent from Michigan State University and Worcester Polytechnic Institute.

Wanda E. Ward

Dr. Wanda E. Ward is the Acting Assistant Director for Education and Human Resources, National Science Foundation (NSF). Throughout her tenure at NSF, Ward has served in a number of science and engineering policy, planning, and program capacities in the Directorate for Education and Human Resources (1992-1997; 2006-present), Office of the NSF Director (1997-1999); and Directorate for Social, Behavioral and Economic Sciences (1999-2006). From 2001-2002 she was on assignment at the Council on Competitiveness as Chief Advisor to the initiative, BEST (Building Engineering and Science Talent), where she provided leadership in the launch and development of this public-private partnership, established to carry out the implementation of a national diversity initiative called for by the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development.

Since joining the Foundation, Dr. Ward has also led or served on several NSF and interagency task forces, working groups, commissions and committees. These include: Co-Chair, Subcommittee on Social, Behavioral and Economic Sciences (SBES), the President's National Science and Technology Council (NSTC) Committee on Science (COS, 2004-2005); NSF representative to the Interagency Working Group on the U.S. Science and Technology Workforce of the Future, NSTC COS (1997-1999); Executive Liaison to the Co Vice-Chair of the NSTC former Committee on Education and Training (CET) and Executive Secretary of the NSTC CET Subcommittee on Excellence in Science, Mathematics, and Engineering Education (1994-1996). She has forged international research and workforce development collaborations in both developed and developing nations, including in China, Europe and Africa. Since 2007, she has served as a member of the International Social Science Council (ISSC) Committee for Developing and Transition Economies (CoDATE).

Prior to joining NSF, Dr. Ward served as tenured Associate Professor of Psychology and Founding Director of the Center for Research on Multi-Ethnic Education at the University of Oklahoma, Norman. She took the B.A. in Psychology and the Afro-American Studies Certificate from Princeton University and the Ph.D. in Psychology from Stanford University. She was awarded the Ford Foundation Fellowship, the 2005 American Psychological Association Presidential Citation, the 2006 Presidential Rank Award for Distinguished Executive and the 2006 Richard T. Louttit Award.

SESSION I: JULY 2, 9:15 – 10: 45 AM

1.1. Action Research as an Integral Process: Developing and Retaining Highly Effective Mathematics Teachers in High Need Schools

Janice Fourniller, Georgia State University
Pier A. Junor Clarke, Georgia State University
Ariel Smith, Georgia State University, Noyce Scholar
Christine D. Thomas, Georgia State University
Draga Vidakovic, Georgia State University

In this session we will describe how a course in action research is used to develop and sustain our Noyce scholars as effective mathematics teachers. We will discuss how the process and the experiences influence retention of the scholars in high need schools beyond the induction years.

1.2. Models for Online Teacher Professional Development and Support

Deanne Erdmann, Baylor College of Medicine
Nancy Moreno, Baylor College of Medicine

Web-based opportunities for teachers are proliferating rapidly and have the potential to reach large audiences of educators with high quality resources, any time, anywhere. Learn about current models being used by Baylor College of Medicine for just-in-time teacher education and support, and how to use the resources for your own programs.

1.3. Woodrow Wilson Indiana Teaching Fellowship (WWITF) – A Partnership Model Led by Shared Commitment to Improve STEM Teacher Education

Constance K. Bond, Woodrow Wilson National Fellowship Foundation
Kathleen Marrs, Indiana University Purdue University Indianapolis
Kim S. Nguyen, Indiana University Purdue University Indianapolis

IUPUI is one of the four universities in Indiana that received a \$500,000 grant from the Woodrow Wilson National Fellowship Foundation. The grant has given us the opportunity to examine best practices, build a partnership among Education, Science, and Engineering & Technology (within our institution and with those at the other three institutions) and implement changes in the STEM teacher education curriculum that we have wanted to try (such as continued mentoring) but did not have the manpower or resources to pursue. WWITF is about building partnerships with non-profit organizations, State Government, University Provosts and Deans of STEM Departments to change, and thus to improve STEM Teacher Education Programs, one state at a time.

1.4. The Not-so-boring Bohr

Arla Jo Anderton, Lubbock ISD
John Como, Texas Tech University, GK-12 Fellow

A unique module, based loosely on the Bohr atomic model, has been developed for teaching properties of waves, circuits and light. The inquiry-based unit is colorful, engaging and full of scientific content. An interdisciplinary approach incorporates Texas standards from high school physics, chemistry and mathematics, as well as some standards from related subjects at the middle school level. The lesson gives the learner information about a portion of the history of the development of atomic theory, along with helping him/her to develop an understanding of how Bohr related the light from hydrogen gas to the spectrum of that gas.

Approximately 15 minutes of this session will be used to give a quick overview of two additional modules developed by this team. They are entitled “Lego my Lego” and “Measuring Meandering Meadowlarks.” The Lego lesson is a cluster of activities designed to teach the chemistry concepts of average atomic mass, polyatomic ions and balancing equations. The second overview (Meandering Meadowlarks) is about a module which changes the usual beginning-of-the-year lectures or “cookbook labs” to an integrated inquiry-based lesson that teaches about use of various pieces of lab equipment, measuring techniques, accuracy, precision, significant figures, etc.

1.5. Online Professional Development Resources for Science Educators

Flavio Mendez, National Science Teachers Association Learning Center
Ed Rock, National Science Teachers Association

The National Science Teacher Association offers enormous support and resources to science educators. In addition to our publications, there are two important programs that specifically reach out to new science educators. They are the e-mentoring program for new 1-3 year science teachers called the New Science Teacher Academy and our Online Learning Center. This session will provide an overview of the e-mentoring program that is showing significant positive research results in supporting, training, and retaining new science teachers. Second, this session will provide an overview and hands-on access to the NSTA Learning Center. The Learning Center is an online professional development tool that science educators anywhere in their career arc can use as their home-base for professional development planning, tracking, and delivery. We'll spend some time focusing on an administrator/researcher's ability to track and analyze the participant's usage rates and performance on various Learning Center tasks. NSTA materials and Learning Center accounts will be provided to all session attendees at no charge.

1.6. Integrating Digital Literacies into STEM Education

Jana Bouwma-Gearhart, University of Kentucky
Kayla Gifford, University of Kentucky, Noyce Scholar
Margaret Mohr-Schroeder, University of Kentucky

This session will introduce teacher educators and pre-service teachers to the various digital literacies that are available for integration into teacher preparation programs and classrooms. Specifically, NING, Twitter, and Wordle.net, will be explored with examples shown. The NING is a social networking tool, similar to Facebook except private, where students can post blogs reflecting on their classroom observations and student teaching, post discussion items related to a class assignment or a news article, have their own page to post videos, pictures, and even write on each others' walls! Wordle.net is a powerful text analysis tool in which the output is a picture of words that students can reflect on. Noyce Fellows participated in the NING this past semester and reflected on their year in the Master's with Initial Certification program through the NING and Wordle.net. Their experiences will also be shared with the audience.

1.7. Resources for the Classroom from AAAS and NCTM

Suzanne Thurston, American Association for the Advancement of Science
Patrick Vennebush, National Council of Teachers of Mathematics

Science NetLinks (<http://www.sciencenetlinks.com>), produced by AAAS, and Illuminations (<http://illuminations.nctm.org>), produced by the National Council of Teachers of Mathematics, develop innovative, standards-aligned lessons, interactives, and activities for teachers and students. The resources developed by these two expert organizations provide educators with content background and instructional strategies that support STEM education in the classroom. Even better, all the resources are FREE! Join us to learn more about these two programs so that you can take advantage of all their incredible resources.

1.8. Digital Resource Showcase for K-12 Science Education

Patricia Jacobs, NSDL Computational Science Education Reference Desk (CSERD)

Kim Lightle, NSDL Middle School Portal Math & Science Pathways (MSP2)

Eileen McIlvain, NSDL Resource Center

Robert Payo, NSDL Resource Center

Support your teaching with some of the best online educational materials available through the National Science Digital Library (NSDL.org), the nation's network of organizational partners supporting online resources in science, technology, engineering and math education funded by NSF. In this session, we'll explore resources, where to find them, and discuss their use in the classroom based on participant interest.

Experts from the NSDL community will feature specific K-12 resources and tools to build content knowledge and to enhance lessons with just-in-time materials as well as ways to implement these materials for effective learning. The collections showcased include the BiosciEdNet (managed by AAAS); the NSDL Middle School Portal for Mathematics and Science; CSERD, the NSDL Computational Science Pathway, and AAAS' Project 2061's Atlas Tool.

1.9. Productive Classroom Culture

Carol Cronk, San Bernardino County Superintendent of Schools

The first step to having an effective math or science program is developing a Productive Classroom Culture. Learn how to have a great first school year. Based on the work of Fred Jones, participants will learn to establish procedures and routines at the beginning of the school year, which will ensure appropriate student behavior for the rest of the year. Also included in this session are how to arrange a classroom for success, how to keep from turning in to a nag, how to manage the use of manipulative and other classroom/lab materials, and how to use positive reinforcement to encourage students to think independently and responsibly.

SESSION 2: JULY 2, 2:30 – 4:00 PM

2.1. Research on Induction of Science and Math Teachers: Rethinking Traditional Induction Practices

This session includes two presentations.

2.1.A. Beginning Secondary Science Teachers in Their First Three Years of Teaching: The Importance of Induction for Content Majors

Julie Luft, Arizona State University

This presentation addresses the overlooked topic of beginning content specialists by sharing the findings from a longitudinal study of 115 first-year secondary science teachers. The teachers in this study were followed during their first three years of teaching as they participated in different induction programs. In this study, I wanted to understand the development of the teachers' practices, knowledge, and beliefs about teaching during this period. The findings from this mixed-methods study reveal that teachers have the potential to move towards more student-centered orientations during their first years in the classroom, and that induction programs that specifically support content specific practices are important in this process.

2.1.B. Examining the Induction of Middle School Mathematics Teachers: Are Novices Receiving Supports for Math Teaching?

Kristin McGraner, Vanderbilt University

This presentation reports second year findings from a four-year study of new middle school math teachers, designed to analyze the relationship between induction, improved math instruction, and student learning. Preliminary analyses reveal critical contributors to high and low quality induction experiences and suggest novices have little access to math-focused support.

2.2. Out-of-School Learning-to-Teach Experiences: Scaffolding Dilemmas

April Luehmann, University of Rochester

Christopher Young, University of Rochester, Noyce Scholar

Learning reform-based pedagogy is challenging – understanding what is involved, developing competence with its implementation, as well as fostering an appreciation for and commitment to its importance is a tall order for pre-service teachers who have little experience with student-centered, inquiry-based science instruction as learners and even less as teachers. This presentation will explore the value of engaging teacher-learners in nontraditional learning-to-teach experiences outside a classroom context. In such learning experiences opportunities are created to better prepare teacher candidates to implement the inquiry-based approach to science teaching advocated by most professional organizations. Many scholars suggest that informal experiences hold unique and powerful affordances for the learner including access to uncommon discourse-authentic tools, increased support and feedback, motivational contexts and problems, and individualized accountability through collaborative participation. Building on this principle, the Get Real! Science teacher preparation program offered at the University of Rochester was designed so that, early in their program, pre-service teachers would engage in the collaborative design and implementation of an inquiry-based science camp for urban middle school students. In this presentation, the designer of the Get Real! Science program and a Noyce fellow/program graduate will report on the theoretical foundation for this program design, the specifics of its implementation, and the tensions and affordances of the lived experiences from both researcher and participants' perspectives.

2.3. Building Locally, Linking Globally: Tales from Scholar Leaders

David Andrews, California State University-Fresno

Jaime Arvizu, California State University-Fresno

Meredith Ashbran, Long Beach Polytechnic High School, Noyce Scholar

Frank Garcia, California State University-Fresno, Noyce Scholar

Laura Henriques, California State University Long Beach

Sara Meadows, California State University-Fresno, Noyce Scholar

Han Nguyen, California State University Long Beach, Noyce Scholar

Greg Phelan, SUNY Cortland

The NSF funded *Building Locally, Linking Globally* project was developed to support 16 local Noyce programs throughout the State of California while simultaneously linking them via the web. The project provides Noyce Scholars with access to various on-line teaching, planning, and learning resources. Scholars participate in live and virtual training workshops with follow-up assignments which help them incorporate the new technologies into their teaching repertoire. This session will provide an overview of the Noyce NSDL project and stories from Scholars who have used the various project resources during student teaching, the job search, and in their own classrooms. To improve networking between Scholars we have a Noyce presence on Facebook and Noyce Voices in MERLOT whereby scholars are able to communicate via email, discussion forums, and live chat, and are also able to share lessons or other relevant documents.

2.4. Topolo-what? Exposing Students to Graduate Math

Pam Callahan, Powell County Schools
Casey Gregory, University of Kentucky, GK-12 Fellow

Toplo-what? is a lesson plan designed for the secondary geometry classroom. This lesson is a great motivator for students because it explains high-level mathematics in an understandable, low-stress environment. This lesson acts simultaneously as a challenge to more accomplished students and as a creative outlet for those who struggle with the technicalities in mathematics.

Audience members will first participate as if they were geometry students, and then will learn about the reactions of Mrs. Callahan's students. The lesson consists of a twenty-minute interactive Powerpoint presentation, and two projects. The Powerpoint outlines the birth of Topology, basic definitions of sets, functions, a topology, equivalence classes, homeomorphisms and quotient maps. Basic topological shapes are also introduced. The first project is a sample of preliminary exam problems at the graduate level. The second project involves using topological manipulatives to understand non-orientable surfaces.

2.5. Online Professional Development Resources for Science Educators

Flavio Mendez, National Science Teachers Association Learning Center
Ed Rock, National Science Teachers Association

The National Science Teacher Association offers enormous support and resources to science educators. In addition to our publications, there are two important programs that specifically reach out to new science educators. They are the e-mentoring program for new 1-3 year science teachers called the New Science Teacher Academy and our Online Learning Center. This session will provide an overview of the e-mentoring program that is showing significant positive research results in supporting, training, and retaining new science teachers. Second, this session will provide an overview and hands-on access to the NSTA Learning Center. The Learning Center is an online professional development tool that science educators anywhere in their career arc can use as their home-base for professional development planning, tracking, and delivery. We'll spend some time focusing on an administrator/researcher's ability to track and analyze the participant's usage rates and performance on various Learning Center tasks. NSTA materials and Learning Center accounts will be provided to all session attendees at no charge.

2.6. Unlocking the World of Science for the Middle School Student

Andrea Allen, Howard University, GK-12 Fellow
Michelle Taylor, Howard University Middle School

This presentation will focus on teaching "inquiry-based science" in the middle school setting. Middle school students need curriculum that is exploratory and informative. New innovative techniques and technologies were introduced to generate interest, and curiosity in pursuing a career in science and/or mathematics. Through incorporating a "role playing" perspective, the students took on characteristics of "scientists in training." This methodology has allowed students to identify with the lives of various scientists, become exposed to cutting-edge research projects and fields through the use of interactive dialogue and hands-on interaction. A model will be shown that will give ideas to create and implement inquiry-based lessons for your students. On a continuous basis, the public school standards are integrated into the activities to meet the teaching and learning goals of the instructor. You will also learn how to build a strong relationship between the graduate fellow and students. With use of a teacher-fellow dyad module, we have found the students very engaged in pursuing disciplines within the STEM fields. One essential element of inquiry-based learning is the use of a curriculum that focuses on fostering an environment that encourages students to decide on how they learn best and collaborate with others.

2.7. Using Inquiry in Math and Science

Jana Bouwma-Gearhart, University of Kentucky
Garnett Coy, University of Kentucky, Noyce Scholar
Margaret Mohr-Schroeder, University of Kentucky

This session will introduce fellows to modeling-based science and mathematics education. The session will open with a modeling activity of a scientific phenomenon. Fellows will engage with the phenomenon as students, making observations, identifying patterns in their data, creating a scientific model of explanation to account for the phenomenon, and communicating with fellow “scientists” to develop the most accurate model. Session leaders will then help fellows reflect on their experiences to solidify the processes involved in modeling activities and to consider the application of modeling in the secondary classroom, especially in terms of having students construct their own deep disciplinary concept and processes knowledge. Session leaders will also help fellows acknowledge the promise that modeling-based education holds for challenging students’ misconceptions and encouraging conceptual change. Fellows will leave with other research-tested modeling-based lesson plans in both science and mathematics to use with their secondary students.

2.8. Digital Resource Showcase for K-12 Science Education

Patricia Jacobs, NSDL Computational Science Education Reference Desk (CSERD)
Kim Lightle, NSDL Middle School Portal Math & Science Pathways (MSP2)
Eileen McIlvain, NSDL Resource Center
Robert Payo, NSDL Resource Center

Support your teaching with some of the best online educational materials available through the National Science Digital Library (NSDL.org), the nation's network of organizational partners supporting online resources in science, technology, engineering and math education funded by NSF. In this session, we'll explore resources, where to find them, and discuss their use in the classroom based on participant interest.

Experts from the NSDL community will feature specific K-12 resources and tools to build content knowledge and to enhance lessons with just-in-time materials as well as ways to implement these materials for effective learning. The collections showcased include the BiosciEdNet (managed by AAAS); the NSDL Middle School Portal for Mathematics and Science; CSERD, the NSDL Computational Science Pathway, and AAAS' Project 2061's Atlas Tool.

2.9. University of Houston NOYCE Scholarship Program

Sara Barber, University of Houston, Noyce Scholar
Robert Houston, University of Houston
Laveria F. Hutchison, University of Houston
Eileen Westerman, University of Houston
Susan E. Williams, University of Houston

The NOYCE Scholarship Program at the University of Houston is designed to recruit, prepare and retain individuals with content knowledge as STEM educators who will teach in underserved areas and is marketed at both the undergraduate and graduate level. At the undergraduate level, the program selects scholars from *teachHouston* candidates who are majors in the STEM fields of science and mathematics seeking initial secondary teacher certification. At the graduate level, the program selects scholars from the Transition to Teaching program who demonstrate academic merit and are seeking initial secondary teacher certification in the STEM areas of science and mathematics. This multimedia presentation will include a description of the selection process and evaluation data, video clips of scholars’ activities in authentic high need classroom environments, and handouts. The presentation will focus on the results of awarding the first cohort participants scholarships and the impact of the scholarship awards on their educational achievement by documentation of GPAs, retention results, and placement of candidates in high need school settings for practice and demonstration teaching.

WORKSHOP ABSTRACTS

SESSION 3: JULY 3, 9:15 – 10:45 AM

3.1. Research Topics: Teaching in High Needs Schools

This session includes two presentations.

3.1.A. *Just What is a High Needs School District?*

Carol Rigler, University of Arkansas, Noyce Scholar
Sally Robison, University of Arkansas

This workshop focuses on current research on teaching in high needs school districts. The session will discuss just what this means to the Noyce scholar as they meet their teaching obligations in the classroom. Noyce scholars will learn of the challenges and demands as well as the effective methods that work in a high needs environment.

3.1.B. *Noyce Scholars' Perceived Teaching Goals and Implementation*

Enrique Ortiz, University of Central Florida

Results of a follow-up study analyzing Noyce Scholars' perceived teaching goals and their current implementation at high-need schools after graduation from a master's degree program in middle school mathematics teaching. Implications of the findings for the professional development of this type of teachers and environments will be discussed.

3.2. Issues and Challenges for Supporting Noyce Scholars in Rural High Need Schools

Johnna Bolyard, West Virginia University
Kasi Jackson, West Virginia University

Group discussion/brainstorming session on how programs can enhance recruitment and retention of Noyce Scholars for schools in rural high need areas. The goal will be to establish a supportive network of Noyce programs targeting rural areas. Discussion topics may include the following:

In what way do rural high need schools differ from urban high need schools? What issues do they share? What retention issues affect teachers in rural schools? What preparation and support do teachers from suburban/urban backgrounds need to thrive in rural schools? What preconceptions might these teachers have about rural schools?

Are there support programs/training targeted to teachers in rural high need schools? How can Noyce programs develop and support cohorts and learning communities programs for these teachers?

What issues face rural students? Are they less prepared? Do they have advantages? (e.g. access to advanced courses [AP], access to technology, effects of poverty, and so on) In some rural areas due to school consolidation and low population, students are bused long distances to centralized schools. How does this affect the students' learning and the teachers' jobs? In general, rural schools are much less ethnically diverse than many urban schools. How can rural students be prepared to function in a globalized, multicultural society?

3.3. Integrating Technology to Support Math and Science Teaching

Noelle Kreider, Rialto Unified School District

Gain an overview of technologies related to math and science instruction that all Noyce scholars should be aware of when designing instruction and participating in school planning. Learn about free online tools for collecting and analyzing data and visualizing thinking.

Discover tools that should be included in every school plan for hands-on, higher-level thinking in math and science. Additionally, explore the potential of free tools such as social bookmarking, blogs and Twitter to support Noyce program collaboration and teacher engagement.

3.4. Writing in Mathematics: Using Writing to Support Teaching and Learning in Secondary School Classrooms

Robert LaColla, Secondary School for Research in Brooklyn
Jesseca Long, Bronx International High School

Two Math for America (MfA) Master Teachers will present a variety of perspectives that incorporate writing into a secondary school mathematics class, including low-stakes, informal and process writing within the context of problem solving. The interactive session focuses on how best to motivate and assess writing through activities while ensuring that the writing reinforces the mathematics.

Founded in 2004, Math for America is a nonprofit organization with a mission to improve math education in our nation's public schools by attracting, training and retaining highly qualified public school teachers. MfA provides aspiring math teachers a full tuition scholarship for a master's degree in Math education, a stipend in addition to their teacher's salary and the opportunity to be part of a community of math teachers dedicated to student success with numerous professional development opportunities. Currently there are 260 MfA Fellows and Master Teachers in NYC public schools with new programs starting in Los Angeles, San Diego and Washington, DC.

3.5. Density: Teaching for Understanding

Jodye Selco, Cal Poly Pomona

Density is a scientific property that appears in all areas of science, yet it is so difficult to teach and understand. Discover some hands-on ways to make density easier for your students to understand. Learn about connections to mathematics as you explore densities of solids and liquids.

3.6. The Not-so-boring Bohr

Arla Jo Anderton, Lubbock ISD
John Como, Texas Tech University, GK-12 Fellow

A unique module, based loosely on the Bohr atomic model, has been developed for teaching properties of waves, circuits and light. The inquiry-based unit is colorful, engaging and full of scientific content. An interdisciplinary approach incorporates Texas standards from high school physics, chemistry and mathematics, as well as some standards from related subjects at the middle school level. The lesson gives the learner information about a portion of the history of the development of atomic theory, along with helping him/her to develop an understanding of how Bohr related the light from hydrogen gas to the spectrum of that gas.

Approximately 15 minutes of this session will be used to give a quick overview of two additional modules developed by this team. They are entitled "Lego my Lego" and "Measuring Meandering Meadowlarks." The Lego lesson is a cluster of activities designed to teach the chemistry concepts of average atomic mass, polyatomic ions and balancing equations. The second overview (Meandering Meadowlarks) is about a module which changes the usual beginning-of-the-year lectures or 'cookbook labs' to an integrated inquiry-based lesson that teaches about use of various pieces of lab equipment, measuring techniques, accuracy, precision, significant figures, etc.

3.7. A Focus on Student Learning: How to Build an Induction Community Around the Collegial Analysis of Classroom Practice

Anna Kramer, University of Washington, Noyce Scholar
Mark Windschitl, University of Washington

Because pre-service preparation can only begin new educators on the long trajectory towards expert teaching, it is important to help novices develop strategies and habits of mind to *learn from practice* as they enter the profession, laying the foundations for career-long development. Learning from teaching is best achieved through systematic cycles of inquiry into practice with other colleagues, and using evidence generated by these inquiries to re-shape instruction.

In this workshop, we will explore a research-based model for maintaining an intellectual community among Noyce Scholars during induction. Presenters will engage participants in using specific tools and practices that support the collegial analysis of teaching, by examining records of practice—pupil work, video, etc.—and then using that analysis to make productive changes to instruction.

3.8. Social Networking/Community Building

Kimberly Bigioni, University of Toledo, Noyce Scholar
Lisa Jones-Gast, University of Toledo, Noyce Scholar
Janet Struble, University of Toledo

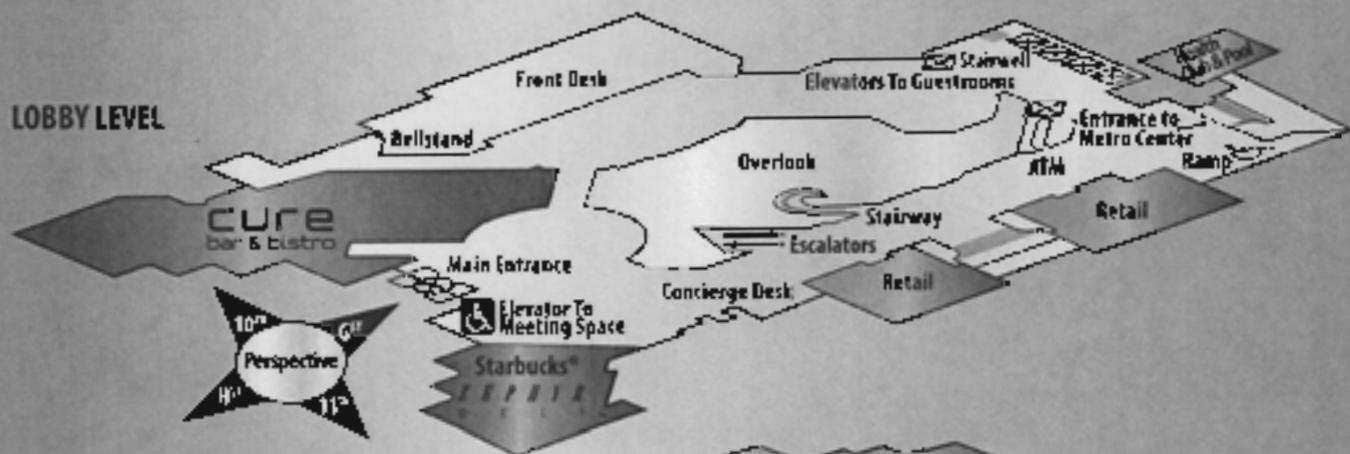
Returning to college after being in the workforce for twenty or more years can be a frightening experience for career changers. The college setting has changed tremendously. UT³ (UToledo.UTeach.UTouch the Future) at The University of Toledo welcomes the Noyce scholars into an established network of undergraduate and graduate students, faculty, Toledo Public School principals and teachers, and newly licensed teachers located throughout the United States. The interactions are a combination of face-to-face and online (NING website) experiences. Time will be given for participants to share their techniques of how to build community within their Noyce programs.

3.9. Strategies and Tips for Successful Physics (and Physical Science) Teaching

Meredith Ashbran, Long Beach Polytechnic High School, Noyce Scholar
Laura Henriques, California State University Long Beach

Do you need some dramatic physics demonstrations, engaging labs and projects, or ideas about how to teach physics which don't cost much (or anything!)? This session will provide successful strategies for engaging your students in physics. We'll share our best activities from across the high school physics standards. Many can be adapted for middle school physical science. In addition to live activities and demonstrations we will share free, online simulations that can be used to supplement presentations or as inquiry labs. As part of the Noyce NSDL project we've been collecting physics teaching resources which can be easily used in high need science classrooms. We'll share those with you as well.

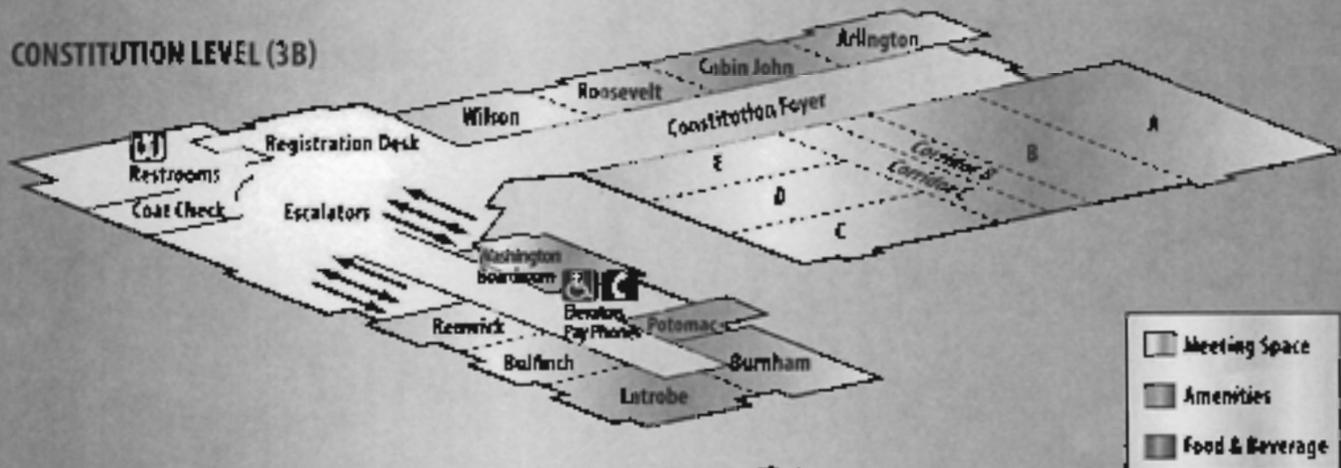
LOBBY LEVEL



LAGOON LEVEL (1B)

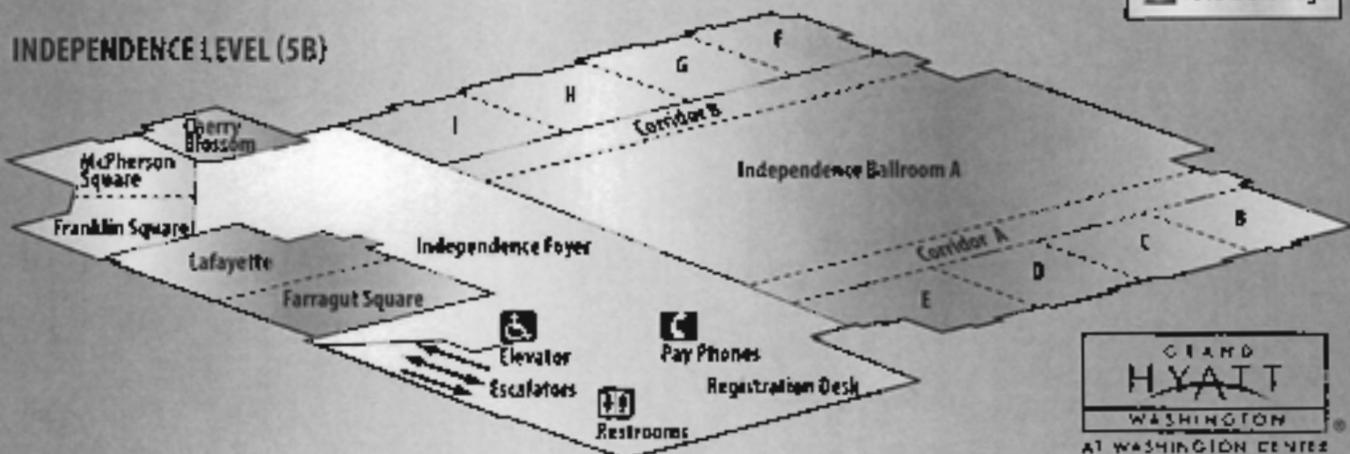


CONSTITUTION LEVEL (3B)



	Meeting Space
	Amenities
	Food & Beverage

INDEPENDENCE LEVEL (5B)



GRAND
HYATT
WASHINGTON
AT WASHINGTON CENTER

POSTER ABSTRACTS

1

Title: PhysTEC Noyce Scholars
NSF Noyce Award Number: 0833210
Principal Investigator: Monica Plisch
Institution: American Physical Society
Email: plisch@aps.org
Co-PI(s): Warren Hein, Robert Thorne, Laurie McNeil, and Alvin Rosenthal
Presenter(s): Monica Plisch, American Physical Society, plisch@aps.org
Discipline: Physics
URLs: <http://www.phystec.org/noyce/>

Abstract: Physics is the STEM discipline with the greatest teacher shortage. As the number of students taking high school physics continues to increase by 1% per year, the shortage will worsen unless an effort is made to increase the number of qualified physics teachers. The goal of PhysTEC Noyce Scholars is to recruit more students into physics teacher education programs at 6 PhysTEC institutions. PhysTEC institutions have received substantial support from the PhysTEC project to build comprehensive physics teacher education programs. PhysTEC is led by professional societies in physics (APS, AAPT, AIP) with a mission to improve the education of physics and physical science teachers.

2

Title: Science Teachers for AZ - Recruitment and Retention (STARR)
NSF Noyce Award Number: 0833311
Principal Investigator: Julie A. Luft, Professor, Mary Lou Fulton, College of Education
Institution: Arizona State University
Email: Julie.Luft@asu.edu
Co-PI(s): Steven Semken, Assistant Professor, School of Earth and Space Exploration; George Hynd, Dean, Mary Lou Fulton College of Education; Mari Koerner, Dean, College of Teacher Education and Leadership; and Sid Bacon, Dean of Natural Sciences
Presenter(s): Julie A. Luft, Arizona State University, julie.luft@asu.edu
Steve Semken, Arizona State University, semken@asu.edu
Discipline: Earth & Space Science, Biology, Chemistry, Physics

Abstract: 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 specifically 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.

3

Title: Medical College Noyce Fellows
 NSF Noyce Award Number: 0335679
 Principal Investigator: Nancy P. Moreno
 Institution: Baylor College of Medicine
 Email: nmoreno@bcm.tmc.edu
 Presenter(s): Deanne Erdmann, MS, Baylor College of Medicine, derdmann@bcm.edu
 Ronald McNeel, DrPH, Baylor College of Medicine, rmcneel@bcm.edu
 Discipline: Science and Mathematics
 URLs: www.bioedonline.org and www.k8science.org

Abstract: The Noyce Fellowship Program at Baylor College of Medicine (BCM) aims to improve the quality and quantity of certified secondary science teachers in Texas by reducing barriers faced by scientists and other science professionals who desire to transition into secondary science teaching careers. The project combines resources available from the Noyce Fellowship Program at NSF with a collaborative project conducted by BCM and Texas A&M University (TAMU), to provide academic routes and supporting structures for science students, postdoctoral fellows and professionals to become certified secondary science and mathematics teachers in Texas. The program combines online instruction, small-group experiences and mentored teaching under the guidance of highly-qualified teachers and project faculty.

The BCM-awarded Noyce Fellowships eliminate financial barriers and make it possible for professionals in science and related fields to attain careers in secondary science teaching and teach in high-need schools. The Fellowships cover all program-related costs and allow recruitment of talented and motivated candidates. By completing certification coursework online, participants may remain employed and/or finish a graduate degree or postdoctoral fellowship while beginning their teacher preparation. In addition, the program provides face-to-face sessions; content review in preparation for the state teacher certification examination; opportunities to learn and practice content-specific pedagogy; continued opportunities for professional development; and within-school mentoring. Teacher preparation resources are being made available on the related websites, BioEd Online (www.bioedonline.org) and K8 Science (www.k8science.org).

Through our alternative teacher certification partnership with TAMU and support from NSF's Robert Noyce Teacher Scholarship program, we have contributed to the development of 78 new certified science and math teachers for Texas. Of these, 29 are certified in life science, 13 in general science, 10 in mathematics, five in physical science and one in technology applications. Twenty-five of these certified teachers have received Noyce scholarships. We currently are developing an additional partnership with the Houston Independent School District (HISD) to identify and recruit mid-career science professionals or students with advanced degrees or outstanding academic science achievement to enter an alternative certification program called Science and Mathematics Alternative Route to Teaching (SMART).

4

Title: Robert Noyce Scholarship/Fellowship Grant: Second Year
 NSF Noyce Award Number: 0629559
 Principal Investigator: Dr. Louis Nadelson
 Institution: Boise State University
 Email: louisnadelson@boisestate.edu
 Co-PI: Dr. Margaret Kinzel

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URL: <http://education.boisestate.edu/cifs/NationalScienceFoundation.htm>

Abstract: The Noyce Scholarship/Fellowship continues to focus on two separate methods of gaining certification through Boise State University. The first method is the traditional one in which the students receive a Bachelor of Science degree in Mathematics, Physics, Chemistry, Biology, Geoscience, or Engineering along with secondary certification. The second method is a graduate Certificate for those who already have a degree and meet the state course requirements for certification in their area of expertise. The Graduate Certificate program is a 13-month intensive program that begins the latter part of May (first summer session) and ends the following May in the spring semester.

As of the Spring 2009, the Boise State Noyce Scholars program has graduated five students in the Graduate Certificate program. One student in Earth Science is now teaching in a small rural school in Washington. Two students in Math, one student in Chemistry and one student in Biology have just completed the program and are presently applying for jobs. We have also graduated twelve students in the undergraduate programs. One student, in Physics, is presently teaching high school science in the areas of Biology and Earth Science due to a minor in Natural Science. The other 11 students just graduated and are presently applying for jobs. We continue to have ten students who will complete their degrees in Spring 2010.

All of our Noyce Scholars are students of distinction that we know will have highly successful teaching careers due to the quality of the program that they have completed. Each thought that their experience would make them much better teachers for all students.

5

Title: Science Educators for Urban Schools! (S.E.U.S.!)

NSF Noyce Award Number: 0833278

Principal Investigator: Audrey A. Friedman, Ph.D.

Institution: Boston College

Email: friedmaa@bc.edu

Co-PI(s): Katherine McNeill, Ph.D. and Vidya Madahvan, Ph.D.

Presenter(s): Audrey A. Friedman, Ph.D., Boston College, friedmaa@bc.edu

Discipline: Curriculum & Instruction

Abstract: The need for adequately prepared science teachers is dire in urban schools. Science Educators for Urban Schools! will recruit and support 22-24 individuals pursuing undergraduate degrees in science to earn Master's Degrees in Education: Secondary Science to teach in urban schools (8-12). This model for preparing science teachers for urban schools presents a unique integration of social justice, focus on teaching English Language Learners, well-developed mentoring and induction, institutionalized tracking and evidence-gathering about graduates, close collaborations with urban schools, and strong relationships between School of Education and Arts and Sciences faculty. These 22 teachers will impact the learning of thousands of students in urban schools who are often underrepresented in science and can serve as inspirations for potential science educators.

Science teachers armed with culturally relevant pedagogy and strategies and skills to teach non-native English speakers and pupils with special needs in mainstream classrooms, increase the chances of diverse pupils' success and participation as critical citizens in a democratic society. Science teachers who represent underrepresented minority and gender populations serve as effective role models that further enhance the achievement and aspirations of diverse urban students. All these variables combine to improve teacher self-efficacy, pupil achievement, and teacher retention, reduce district spending to hire and orient new teachers, and reinforce staff stability in schools. On a grand scale, effective science teachers help close the achievement gap, improve the life chances of urban children, and make society more just.

In conjunction with the Office of Graduate Admissions and the Career Center, S.E.U.S.! presented 4 Open Houses, a panel presentation, direct mailings, initial and follow-up emails, letters, and flyers to all juniors and seniors (~500 students) majoring in biology, chemistry, physics, geosciences, and premed/pre dental programs in the College of Arts and Sciences inviting them to learn about the scholarship. Approximately 80 students combined attended the Open Houses and panel presentation. Eleven candidates applied for the scholarship. We accepted 4 candidates: 3 biology and 1 biochemistry

major; 3 females and 1 male; 2 candidates of color and 2 white; 2 bilingual. We sent both informal and formal letters of acceptance, met with the accepted candidates, and had an informal luncheon to build a sense of cohort. Noyce Scholars have begun summer courses and established programs of study. All will be placed at Brighton H.S. (a Boston Public School) for their pre- and full practicum experience. These students are being mentored by the PI and Co-PIs and will participate in cohort courses in Social Context in the Fall and Inquiry (Fall-Spring).

6

Title: Boston University's Noyce Scholars Program in Mathematics
 NSF Noyce Award Number: 0733762
 Principal Investigator: Suzanne Chapin
 Institution: Boston University
 Email: schapin@bu.edu
 Co-PI(s): Glenn Stevens, Boston University
 Presenter(s): Suzanne Chapin, Boston University, schapin@bu.edu
 Discipline: Mathematics
 URLs: www.bu.edu/sed/noyce

Abstract: Boston University's Noyce Scholars Program in Mathematics, awarded in September 2007, is designed to respond to the critical demand for highly trained middle and high school mathematics teachers in high-need school districts in the state of Massachusetts. This program is partnering with English High School in Boston and with five high-need school districts: Arlington, Chelsea, Lawrence, Waltham, and Watertown. It provides full scholarships to qualified students. BU's Noyce Program is built around an established Master of Arts in Teaching (MAT) degree program as well as two teacher professional development programs at BU: PROMYS for Teachers and the Focus on Mathematics partnership.

A unique feature of BU's Noyce program is the emphasis on graduate-level mathematics. Students enroll in four courses as part of their degree program including a 6-week immersion experience in Number Theory. Clinical experiences with master teachers trained by the Focus on Mathematics partnership are provided along with coursework and workshops specifically designed to support reflective teaching focused on student reasoning. Students also enroll in a course specifically designed to support the teaching of mathematics in high-needs districts. Follow-up activities during Noyce Scholars first year of teaching will include workshops and seminars that will keep them connected to a robust and on-going mathematical community of teachers, mathematics educators, and mathematicians. During the 2008-9 academic year, six Noyce Scholars enrolled in the MAT degree program. They will be entering the workforce in September.

7

Title: The Cal Poly Robert M. Noyce Program
 NSF Noyce Award Number: 0833353
 Principal Investigator: John Keller
 Institution: California Polytechnic State University
 Email: ehimelbl@calpoly.edu
 Co-PI(s): Seth Bush, Ed Himelblau
 Presenter(s): Edward Himelblau, Cal Poly, ehimelbl@calpoly.edu
 Discipline: Biology, Chemistry, Engineering, Physics
 URLs: http://www.cesame.calpoly.edu/programs-noyce.html

Abstract: The California Polytechnic State University (Cal Poly) in San Luis Obispo received a 5-year NSF Robert M Noyce award in September of 2008. Science and Engineering students are eligible for up to three years of support beginning in their Junior year and ending after their credentialing year. The amount of the scholarship award increases from \$10K to \$12K to \$14K each year. The initial cohort of ten Noyce Scholars was selected in April, 2009. This initial group will play a central role in defining a community for science education at Cal Poly and will enhance visibility and awareness of the Noyce Program on campus. The Noyce program at Cal Poly is supported by the Center for Excellence in Science and Mathematics

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Education (CESaME) which coordinates P-20 science education initiatives on campus, in the local community and throughout the state. Initiatives include P-20 collaborations, the Science Teacher and Researcher (STAR) program, the Learn By Doing Lab, and the California STEM Innovation Network project.

8

Title: A Community of Noyce Scholars at Cal Poly Pomona
NSF Noyce Award Number: 0434148
Principal Investigator: Jodye I. Selco
Institution: California State Polytechnic University, Pomona
Email: jjiselco@csupomona.edu
Co-PI(s): Christine L. Latulippe
Presenter(s): Jodye I. Selco, Cal Poly Pomona, jjiselco@csupomona.edu
Discipline: Mathematics and Science/undergraduate and graduate
URLs: <http://www.csupomona.edu/~noyce>

Abstract: California State Polytechnic University, Pomona (Cal Poly Pomona) has sponsored 20 future mathematics and 17 science teachers as Noyce Scholars as of June 2009. Thirteen Scholars have earned their preliminary credentials. During 2008-2009, 15 currently funded Noyce Scholars were post-baccalaureate credential candidates and 5 were undergraduates. 53% of all of the Cal Poly Pomona Noyce Scholars are from underrepresented groups.

Our scholars meet monthly for seminars to provide a sense of community as well as opportunities for networking, advising, and learning. This year's seminars included "Legal Issues in the Classroom," effective and innovative ways of engaging students, classroom management tricks, and 'Most Common Mistakes Made by New Teachers', and watching "A Class Divided." Many of our newest applicants cited wanting to be a part of the Noyce Scholars community as one of the reasons for applying.

Cal Poly Pomona and Cal State San Bernardino hosted a regional conference as a way to connect Noyce projects in the Western US. All of the Noyce projects in California, Arizona, Oregon, and Washington participated in the conference at Cal Poly Pomona. The Scholars and PIs were able to network with scholars and staff from the other projects.

We have an ongoing partnership with International-Polytechnic High School (I-Poly) that resides on the Cal Poly Pomona campus. Some of our Noyce Scholars visited I-Poly to observe and assist with mathematics and science instruction. This partnership will continue to provide for early field experiences for future Noyce Scholars.

Honor sashes have been created for and are presented to the Cal Poly Pomona Noyce Scholars. The Scholars will have a chance to wear the sashes at graduation ceremonies now and in the future as part of their academic regalia.

At the urging of our Scholars, we are instituting a mentoring program by pairing up Scholars that are currently teaching with those heading for a classroom.

9

Title: CSU, East Bay Noyce Scholarship Program
NSF Noyce Award Number: 0833348
Principal Investigator: Kathy Hann
Institution: California State University, East Bay
Email: david.stronck@csueastbay.edu
Co-PI(s): David Stronck
Presenter(s): David Stronck, California State University, East Bay, david.stronck@csueastbay.edu
Discipline: Mathematics and Science Teachers

Abstract: The CSUEB Noyce Scholarship Program is designed to increase the number of qualified math and science

teachers obtaining their credential at CSUEB and going on to serve at high-needs schools. Noyce Scholarships will be used to attract academically successful community college transfers, senior mathematics and science majors and STEM (Science, Technology, Engineering and Mathematics) professionals to become highly effective teachers in urban school districts. Each scholar will be supported for \$10,000 per year for one to two years and will be required to teach at a high-needs school two years for every year of support.

Our poster will include samples of the following materials:

- Description of Recruitment Pool
- Recruitment Flyer
- Application Forms
- Diversity Workshop Flyer
- Examples of Professional Development Opportunities
- Sample Statements from Scholars

10

Title: Teaching Excellence in Math and Science (TEMS)

NSF Noyce Award Number: 0733758

Principal Investigator: William Fisher

Institution: California State Universities, Chico & Sacramento

Email: wfisher@csuchico.edu

Co-PI(s): Deidre Sessoms, Deborah Summers, and Laurel Heffernan

Presenter(s): William Fisher; California State University, Chico; wfisher@csuchico.edu

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

Discipline: Mathematics and Science

URLs: www.csuchico.edu/edu and www.csus.edu/teach

Abstract: California State University, Chico and California State University, Sacramento have long been leaders in providing highly-qualified mathematics and science teachers for a service region larger than the size of Ohio that includes rural remote regions and urban areas with large populations of low-income, culturally and linguistically diverse students. In conjunction with other existing programs, the Noyce Scholars program is assisting Chico and Sacramento in doubling the number of mathematics and science teachers they produce, a statewide goal of the CSU system.

TEMS provides support to create and enhance programs for all math and science preservice teachers, not just Noyce scholars. Programs and activities that have been expanded include: Hands-On Lab science teaching experiences, Project M.A.T.H. (Mathematics And Teaching on the Horizon), new courses for STEM professionals allowing them to gain teaching credentials and meet NCLB highly qualified requirements, expanded teacher recruitment activities, expanded early field experiences, collaborative efforts with existing programs such as the Alliance for Minority Participation, the Mathematics and Science Teaching Initiative, California Postsecondary Education Commission grant programs for retaining new math and science teachers on both campuses, and the Beginning Teacher Support and Assessment induction programs. In addition, TEMS brings the scholars and faculty from two different campus and local environments together to learn from each other, thus increasing their capacity to effectively teach populations of students throughout California.

The emphases of this collaborative project vary across each of the campuses. Chico State, which serves primarily rural Northern California, is working with mathematics and science undergraduates to develop a pipeline of highly-qualified middle and secondary teachers for the Northstate. In 08-09, Chico had 7 scholars (2 post-baccalaureate credential students and 5 undergraduates). Sacramento State, centered in an urban area, is enticing career change professionals into math or science teaching. In 08-09, Sacramento had 6 Scholars (4 career changers, 1 undergraduate and 1 Master's). A total of 32 qualified applicants will result in 15 Scholars for 2009-10 across both campuses. A future innovative project is a

POSTER ABSTRACTS

student teaching exchange program that will allow scholars to experience the similarities and differences between teaching in rural versus urban settings.

11

Title: Program for Recruitment of Science and Mathematics Educators (PROMSE)

NSF Noyce Award Number: 0733849

Principal Investigator: David M. Andrews

Institution: California State University, Fresno

Email: davidan@csufresno.edu

Co-PI(s): David M. Andrews and Jaime Arvizu

Presenter(s): David M. Andrews and Jaime Arvizu, CSU-Fresno; and Sara Meadows and Frank Garcia (Scholars/Teachers)

Email: davidan@csufresno.edu

Discipline: Biology/ Science Education/ Environmental Science

URLs: www.csufresno.edu/smec

Abstract: The Fresno State University Noyce Phase II project entitled Program for Recruitment of Science and Mathematics Educators (PROMSE) builds upon the success and knowledge gained from our Noyce I project which ended July, 2007. PROMSE will increase the current Noyce Scholar population at California State University, Fresno by an additional 30 Scholars (20 stipends and 10 scholarships distributed equally) over the four year project. PROMSE builds upon successes from Noyce I recruitment and support. The PROMSE evaluation will monitor and measure level of project impact and success as well as individual Scholar achievement and classroom practice as student teachers and teachers. The evaluation will also include a comprehensive longitudinal tracking program to measure long-term impact of the project on Noyce Scholars as teachers in high-need schools. PROMSE will disseminate findings through traditional avenues, but will also incorporate the MERLOT (Multimedia Educational Resource for Learning and Online Teaching) digital library where evidence of Scholar products (online publications and contributions) and, in turn, those of their students will be accessible to others.

Intellectual Merit: The intellectual merit of this project is based upon the outstanding commitment and ability of partners to advance knowledge concerning recruitment, retention, preparation, more highly qualified science and mathematics teachers for high need science and mathematics classrooms. The Principal Investigator and project leaders and partners have a substantial track record of noteworthy initiatives and accomplishments in K-20 education and education reform.

Broader Impact: PROMSE is helping us to increase the number of highly-qualified teachers in high-need schools in the Central Valley of California where poverty and high-need schools are common. This project is increasing (over 20 since funded) the pool of excellent science and mathematics teachers in our high-need schools and increasing the number of under represented teachers in the classrooms. The project's evaluation plan is helping us to develop a comprehensive picture of the project's short term and long term impact on the university, school districts, schools, classrooms and finally on K-12 students.

12

Title: Improving Mathematics, Physics, and Chemistry Teaching (IMPACT) Project

NSF Noyce Award Number: 0630425

Principal Investigator: Margaret Kidd

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Co-PI(s): David Pagni and Richard Lodyga

Presenter(s): Adriana R. Valle, California State University, Fullerton, avalle05@gmail.com

Blanca McGuthrie, California State University, Fullerton, blankita15@csu.fullerton.edu

David Pagni, California State University, Fullerton, dpagni@fullerton.edu

Discipline: Mathematics, Chemistry, Physics

URLs: <http://math.fullerton.edu> and <http://nsm.fullerton.edu>

Abstract: The Improving Mathematics, Physics, and Chemistry Teaching (IMPACT) program is designed to support talented,

low-income, prospective secondary school mathematics, physics, and chemistry teachers during the year they work towards their teaching credential. Each year, the program awards stipends to students who have earned a Bachelor's degree in mathematics, physics, or chemistry and who have been admitted to the teacher education program, intent on earning a secondary school teaching credential.

During the four years of the grant, a total of 40 students will participate in the project. California State University, Fullerton (CSUF) houses the largest teacher-credentialing program in Orange County. IMPaCT operates within the current Secondary Credential program to actively recruit and fund minority candidates, especially Hispanics, to enter the fields of mathematics, physics, and chemistry teaching. In turn, these teachers will serve as role models to the large minority population in our public high schools and encourage more of these students to attend college and eventually enter the teaching field.

The IMPaCT program is coordinated with the school district partners within an ongoing NSF Mathematics and Science Partnership (MSP) program at CSU Fullerton, called TASEL-M (Teachers Assisting Students to Excel in Learning Mathematics) and a CPEC funded grant called CoAST (Continuum for the Advancement of Science Teaching). As a result, candidates who are awarded stipends are placed in schools where a strong working relationship exists between the CSUF mathematics, physics, and chemistry faculty members and their cohort teachers in the participating schools. Through existing professional development programs, the prospective teachers receive professional development in mathematics and physical science content and pedagogy alongside practicing teachers (seven days in the summer and five days during the academic year).

Progress of stipend awardees will be followed over the next five years to determine the effect of the program on new teachers and to assess their impact as role models in the schools where they are employed.

13

Title: Noyce Programs at CSULB

NSF Noyce Award Number: 0335772 & 0833349

Principal Investigator: Laura Henriques

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Co-PI(s): Xuhui Li and Steve Turley

Presenter(s): Laura Henriques (PI), CSULB, lhenriqu@csulb.edu, and Han Nguyen (Scholar), CSULB, teachscience4all@gmail.com

Discipline: Science & Math

URLs: <http://www.cnsm.csulb.edu/centers/sas/noyce.asp>

Abstract: The sun is setting on the California State University, Long Beach Noyce I project while the Noyce II program is in its infancy. A no-cost extension allowed us to finish out Noyce I with the last of our 37 scholars completing their participation during the Spring 2009 semester. The longitudinal study of Noyce I is underway as we begin our Noyce II program. Nine Noyce II Scholars will join us in the fall for service learning (tutoring in partner schools), on-campus professional development (bi-monthly seminars) and other Noyce sponsored events. They will do their service learning and student teaching in our partner school districts of Long Beach Unified and Whittier Union High School District, both of which are classified as high needs.

Lessons learned about recruitment resulted in new strategies being implemented for Noyce II. A greater emphasis was put on giving back to the community and program mentoring and support. The new strategies, along with a weakened economy, have resulted in our best candidate pools ever. We had 20 highly-qualified applicants for the first year of funding. The Noyce II program supports both undergraduate and post-baccalaureate students. The nine Scholars joining us have an average GPA of 3.25 (for the last 60 units), are mostly math and physics teachers-to-be. Almost all female, half the group is Latino and includes second career folks.

The longitudinal study associated with Noyce I is underway with Noyce I alumni, their department chairs and principals being interviewed and surveyed. Noyce project staff also provide their observations. The first year report promises to provide insights that will inform our Noyce II program.

POSTER ABSTRACTS

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Title: CSUN Robert Noyce Scholarship Program
NSF Noyce Award Number: 0630452
Principal Investigator: Gerry Simila
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Co-PI(s): Kellie Evans, Magnhild Lien, and Virginia Oberholzer-Vandergon
Presenter(s): Kellie Evans, CSUN, kellie.m.evans@csun.edu
Carolina Hernandez, CSUN, carolina.hernandez.2@csun.edu
Discipline: Math and Science
URLs: <http://www.csun.edu/math/noyce>

Abstract: The Noyce Scholarship Program at California State University, Northridge (CSUN) just completed its second year with four undergraduate and two fifth-year single subject credential mathematics scholars. The scholars participated in a year-long weekly seminar.

The fall seminar theme was California's plan to require Algebra I for all 8th graders. Scholars read articles and had discussions about the plan's merits and shortcomings. In October, a Sacramento County Superior Court judge ordered the state Board of Education to postpone the plan and scholars got a taste of the volatility of education policy. Scholars used Agile Mind, which is web-based software that includes customizable lesson plans that are aligned with state standards to create and present Algebra I lessons.

Fall highlights included a visit to the Algebra I class of a local teacher who won a 2005 Presidential Award for Excellence in Math and Science Teaching and attendance at the California Mathematics Council (CMC) South Conference in Palm Springs (funded by CSUN's Provost).

Spring discussions and activities were based on readings from selected chapters of *Knowing and Teaching Elementary Mathematics: Teachers' Understanding of Fundamental Mathematics in China and the United States*, by Liping Ma, 1999 and *Error Patterns in Computation: Using Error Patterns to Improve Instruction*, by Robert B. Ashlock, 2005. Guest speakers presented a variety of topics including the use of inquiry-based lessons and panels of high school teachers, both experienced and new, talked about all aspects of teaching math, including daily responsibilities, textbooks, classroom management, and useful assessments.

Spring highlights included the regional Noyce Conference in Ontario and the third annual UCLA Mathematics Department's Philip C. Curtis Jr. Center for Mathematics and Teaching Conference (funded by CSUN's Provost).

Recruitment efforts continue to develop, making use of such avenues as the Math Club's FACEBOOK page and the College of Education's outreach programs. The math program has been expanded to include 5th year Credential students because recruitment of undergraduates only was challenging. The biggest issue continues to be the requirement to work in a high-need district after graduation.

15

Title: Mentoring and Partnership: Our Keys to Success
NSF Noyce Award Number: 0630255
Principal Investigator: Davida Fischman
Institution: California State University San Bernardino
Email: fischman@csusb.edu
Co-PI(s): Joseph Jesunathadas, Carol Cronk, Stuart Sumida
Presenter(s): Davida Fischman, CSU San Bernardino, fischman@csusb.edu
Discipline: Mathematics, Biology, Chemistry, Physics, Geology
URLs: noyce.math.csusb.edu

Abstract: The major components of the CSU San Bernardino Noyce program are mentored weekly classroom experiences, monthly seminars for scholars and mentors, supervision of Noyce scholars' student teaching by subject-matter faculty, and academic advising by Natural Sciences as well as Education faculty. All of these are firmly grounded in a strong partnership between CSUSB and the San Bernardino City Unified School District.

At CSUSB, the Noyce scholars are primarily undergraduates who have had little or no experience in the classroom, so the ongoing mentored classroom experiences are of particular importance to these scholars. For this component of the program, 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. Each scholar spends 4 hours/week in the mentor teacher's classroom; 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. The program is laid out as a series of benchmark activities and skills to master, with ongoing documentation of progress through these benchmarks.

The Noyce seminars provide scholars with additional opportunities to learn from district experts. Topics of particular interest have been a series of sessions on classroom management, formative and summative assessment, and how do work successfully with all stakeholders.

Many scholars have said that without these mentored and structured classroom experiences, and the confidence they gain through them, they would not have made the decision to be a teacher. Others 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.

16

Title: CSUSM Math/Science Teacher Scholarships
 NSF Noyce Award Number: 0531878
 Principal Investigator: Patricia Stall
 Institution: California State University San Marcos and Rochester Inst.
 Email: pstall@csusm.edu
 Co-PI(s): Eileen Marron-Keating
 Presenter(s): Patricia Stall, pstall@csusm.edu
 Discipline: Education

Abstract: The partnership of this Project includes the following stakeholders: California State University San Marcos (CSUSM) Colleges of Science and Math, feeder community college bridging programs, CSUSM College of Education, North San Diego County Secondary Schools, Rochester Institute of Technology (RIT) and greater Rochester area middle and high schools.

Having just completed the third year of the project, our activities thus far include recruitment at RIT and CSUSM. We have created a pipeline for students at RIT to apply early, even one to two years prior to beginning the program, in an effort to immerse them in the field of teaching through tutoring opportunities and prerequisite education coursework.

We have 33 Noyce Scholars who have completed the program, and participated in the Salish I evaluation protocols. Our plans next year include expanded recruitment at RIT and CSUSM including contacts and partnerships with math and science faculty at CSUSM. In an effort to increase the pipeline, we are using a grant from the CSU Chancellor's office to entice math and science undergraduate majors into teaching via a "learning assistants" program modeled after a similar program in Colorado.

17

Title: Claremont Colleges Math/Science Ed Collaborative

NSF Noyce Award Number: 0532064

Principal Investigator: Dr. David Drew

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Co-PI(s): Dr. Darryl Yong

Presenter(s): Lisa S. Loop, Co-Director Teacher Education, lisa.loop@cgu.edu

Cory Edgmon, Noyce Fellow and Mathematics Teacher, Foothill High School, cory.edgmon@khsd.k12.ca.us

Discipline: Math and Science Education

Abstract: Through a combination of Noyce Fellowships and other state and federal financial aid opportunities, the Claremont Colleges has increased recruitment of high-quality math and science graduates into teaching by more than 300% over 3 years. Project data will be shared, including student recruitment, student performance and completion data, and teacher retention. Program highlights that support high teacher performance and retention will be shared.

18

Title: Robert Noyce Mathematics Scholars Program for Teachers

NSF Noyce Award Number: 0630339

Principal Investigator: Bettye Clark

Institution: Clark Atlanta University, Atlanta Public Schools

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Co-PI(s): John D. King, Clark Atlanta University, Co-PI

Alexander Fluellen, Clark Atlanta University, Co-PI

Presenter(s): Dr. Bettye M. Clark, PI, Clark Atlanta University, Professor, Department of Mathematical Sciences,

bclark@cau.edu; and Dr. John King, Assistant Professor, Co-PI, Clark Atlanta University, Department of Curriculum,

Mathematics Education, jking1@cau.edu

Discipline: Mathematics

URLs: www.robertnoycemspt.cau.edu

Abstract: The Clark Atlanta University NSF Robert Noyce Mathematics Scholars Program for Teachers (MSPT) awarded in January 2007 is a Phase I proposal in collaboration with Atlanta Public Schools and Fulton County Schools. The MSPT provides scholarships to Senior STEM majors (Track I) and STEM professionals (Track II) to complete the Master of Arts in Teaching (MAT) Degree Program for Secondary Teacher Certification in Mathematics. The MAT Degree will allow STEM majors to enter the teaching profession at a higher pay scale than the traditional BA or alternative teacher preparation programs.

This project will address the critical need to increase the number of “New Era” teachers, especially minority, with strong mathematics content knowledge and effective classroom management and pedagogical skills for diverse populations in high need schools. The integration of research and technology is a common theme of the MAT program. The MSPT will implement a follow-up strategy to provide assistance and support to beginning teachers in collaboration with the partnering schools. The project is guided by an advisory board charged to assist in the assessment of the effectiveness of the MAT program in recruiting and preparing teachers for high need school districts.

Since the MSPT is in its beginning stages, the poster presentation addresses the mission of the project, various aspects of the recruitment process (including the application, brochure, flyers, and “Meet and Greet” sessions), and the MAT program of study.

19

Title: Career Changers: A Palette of Experiences for Math and Science Classrooms
 Principal Investigator: Elaine Wiegert
 NSF Noyce Award Number: 0733711
 Institution: Clemson University
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 Co-PI(s): Lienne Medford and Barbara Speziale
 Presenter(s): Elaine Wiegert, Clemson University, ewieger@clemson.edu
 Penny Kirkpatrick, D. R. Hill Middle School, ricknpenny@bellsouth.net
 Discipline: Mathematics and Science

Abstract: The Clemson University Master of Arts in Teaching (MAT) middle grades program was awarded a Noyce Scholarship grant in the Fall of 2007. In May and August of this year, the first cohort of Noyce Scholars in the Clemson University MAT Noyce Scholarship Grant will be graduating. These scholars have undergraduate degrees in a variety of STEM disciplines - mathematics, engineering, biological sciences and veterinary sciences - to name a few.

This session explores how the content knowledge from the undergraduate studies as well as the professional experiences of these scholars is contextualized in middle grades mathematics and science classrooms. The session also explores how these Noyce Scholars plan to use their professional experiences to enrich their standards-based instruction in their classrooms. In June the second cohort of Noyce Scholars will begin their studies in the Clemson University MAT for middle grades program.

20

Title: Noyce Scholars at the College of William and Mary
 NSF Noyce Award Number: 0833330
 Principal Investigator: Paul D. Heideman
 Institution: College of William and Mary
 Email: pdheid@facstaff.wm.edu
 Co-PI(s): Virginia McLaughlin, Heather Macdonald, Margie Mason, and Juanita Jo Matkins
 Presenter(s): Paul D. Heideman, Department of Biology, College of William and Mary, pdheid@wm.edu

Abstract: The College of William and Mary (W&M) is beginning a Phase I Noyce Scholars Program to produce 39 new science and mathematics teachers. Issues faced by W&M include recruitment of prospective teachers, effective interactions of faculty in the science and mathematics department with faculty in the School of Education, adequate preparation of transfer students from community colleges, and efficient methods to prepare post-baccalaureate students for teaching. While W&M ranks well above national averages in percentage of students with STEM majors, few of these students in STEM disciplines have chosen to pursue high school teaching careers. Furthermore, most faculty in the science and mathematics departments have had little or no connections to our School of Education. Too few of these faculty understand and promote careers in high school STEM teaching to their advisees.

Our Noyce Program is addressing these issues by: (a) developing and deepening new collaborations among STEM departments and the School of Education; (b) developing more aggressive recruiting to attract strong students who have not been considering a teaching career; (c) providing Noyce stipends to cover tuition and fees; (d) expanding the current 4-year or 5th-year programs with a third pathway, a 5-year sequence for undergraduates to earn a masters degree; (e) forming special course offerings in science and mathematics and summer internship opportunities for research, curriculum, and professional development for Noyce scholars; (f) developing extensive follow-up mentoring and support for graduates, and (g) implementing a comprehensive evaluation schedule for our program.

The project includes pedagogical research in high school STEM teaching as a mechanism to develop critical thinking about pedagogy in Noyce Scholars. The project PIs and faculty in science, mathematics, and science and math education are active scholars in their fields, and use that experience to assist in developing summer internship projects for Noyce Scholars. Our new Noyce Scholars develop their summer internships in consultation with the Noyce management team.

POSTER ABSTRACTS

Our goal is to identify gaps in their experience, and develop internships that fill those gaps. For students with research experience but little teaching experience, for example, internships are designed to improve their knowledge and understanding of teaching, especially in high-needs schools, while those with little research experience are funded to gain experience in research. This new Noyce grant has increased awareness and interest in STEM teaching careers in both advisers and students.

21

Title: Mathematics And Science Teacher Education Renewal
NSF Noyce Award Number: 0833317
Principal Investigator: Gaoyin Qian
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Co-PI(s): Angela Kelly & Gaoyin Qian
Presenter(s): Angela Kelly & Gaoyin Qian
Discipline: Mathematics and Science Education

Abstract: The purpose of the program is to prepare a total of 24 New York State Initially Certified science and mathematics teachers for high-need inner-city middle schools (i.e., grades 5-9) within a four-year period (2009-2013). Two cohorts, each consisting of 12 students, will be selected from culturally and linguistically diverse undergraduate seniors majoring in science, technology, engineering, and mathematics (STEM). Cohort 1 will train 12 new teachers (Noyce Scholars) in years 2009-2012, and Cohort 2 will train additional 12 teachers in years 2010-2013.

In their first year in the MASTER Program, Noyce Scholars will join a teacher education program which requires them to complete an undergraduate STEM discipline, helps them to understand teaching and learning through rigorous and innovative coursework, provides comprehensive pre-service internships in high-need elementary and middle schools, and prepares them to earn a New York State Transitional B Certificate that leads to qualification to teach in public schools in New York State. Once on the job, Noyce Scholars will receive in-depth mentoring from Lehman College mentors over the two years during their graduate study. The comprehensive mentoring system will consist of several components: (a) continued mentoring and support from college mentors and expert teachers in school, (b) participation in an education seminar, and (c) support from peers. The MASTER Program will use Information Communication Technology (ICT) to develop Noyce scholars' ability to infuse education technology seamlessly and effectively in their middle school classrooms. At the end of their three years of study, Noyce scholars will earn an Initial Teaching Certificate (Grades 7-12) in science or mathematics education with an extension to Middle Childhood Education (grades 5-6).

The MASTER Program will be examined for the effect of its content and educational courses and continued mentoring in partnership with local schools on Noyce scholars' learning the content knowledge, beliefs about teaching and learning in science and mathematics, use of effective instructional practices, and their students' learning.

22

Title: Dowling College Robert Noyce Scholarship Program
NSF Noyce Award Number: 0335799
Principal Investigator: Lori Zaikowski
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Co-PI(s): Sandra Monteferrante and John Craven
Presenter(s): Lori Zaikowski, Dowling College, zaikowskium@gmail.com
Discipline: Natural Sciences and Mathematics
URLs: www.dowling.edu/noyce

Abstract: The NSF Robert Noyce Scholarship Program at Dowling College provided funding for 30 students to obtain mathematics and/or science teacher certifications and additional professional development. From 2003-08, 15 career

changers in the graduate education program and 15 undergraduate math and science majors were awarded Noyce scholarships in order to become teachers in high need districts across the region.

Every Noyce scholar was paired with a Principal Investigator as faculty mentor who directed academic and personal interventions and advised students in selecting professional development activities such as research, conferences, professional memberships, and internships. The mentoring relationship continued as a support mechanism after Noyce scholars graduate and began their teaching careers. Post-graduate activities include an annual four-session Noyce Seminar course, seminars, and workshops.

Continuing professional development is at the heart of the program, and a fund provides money for all scholars to engage in a variety of valuable experiences. The importance of integrating research and education is addressed by providing opportunities for scholars to gain research experience and serve as mentors to high school students conducting research. Supplemental funding enabled several scholars to participate in Brookhaven National Laboratory Programs: Pre-Service Teacher, Science Undergraduate Laboratory Internship, and Faculty and Student Teams. Through another supplemental award, two career changers are serving as Master Teaching Fellows. The high standards for Noyce scholars in content and pedagogy as well as continued professional development and support enables them to have a major impact on the quality of K-12 science and mathematics instruction.

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Title: Noyce Teachers in High Need Schools

NSF Noyce Award Number: 0434108

Principal Investigator: Sheila R. Vaidya, Ph.D.

Institution: Drexel University

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Co-PI(s): Donald McEachron, Ph.D. and Nira Herrmann, Ph.D.

Presenter(s): Sheila R. Vaidya, Ph.D., Drexel University, School of Education

Discipline: Mathematics and Science

Abstract: A total of 23 students have been recruited into the Robert Noyce Scholarship Program. Currently there is a Noyce teacher in twelve high need Philadelphia schools. Of these 23 students, thirteen are teaching and five additional students are in the pipeline to teach in the Fall.

We will discuss lessons learned, individual teacher cases and how our curriculum has been informed by the needs of teachers in high-need schools.

24

Title: DUETS: Developing STEM Urban Education Teachers

NSF Noyce Award Number: 0833286

Principal Investigator: James Knapp

Institution: Eastern Michigan University

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Co-PI(s): Deborah Harmon and Gary Hannan

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

Discipline: Science, Math

URLs: <http://www.emich.edu/honors/duetss/index.html>

Abstract: The DUETS Program, housed in the Honors College at Eastern Michigan University, was designed to prepare urban education teachers in science and math. The general outcomes of the Developing Urban Education Teachers in Science Program are to (1) increase the number of secondary education STEM majors graduated and placed in high-need and urban school districts, (2) increase the retention of new secondary STEM teachers in high-need and urban school districts and (3) increase secondary STEM teacher effectiveness in the classroom by pairing EMU's successful Minority Achievement, Retention, and Success (MARS) Program with its recently-established Creative Scientific Inquiry Experience (CSIE) program.

25

Title: Sparkling Results from GEMS: A Noyce Project in South Florida

NSF Noyce Award Number: 0833300

Principal Investigator: Julian Edward

Institution: Florida International University

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Co-PI(s): Eric Brewe, Palmer Graves, Laird Kramer, Florentin Murrasse, and Philippe Rukimbira

Presenter(s): Julian Edward, Florida International University, edwardj@fiu.edu

Laird Kramer, Florida International University, edwardj@fiu.edu

Discipline: Mathematics, Physics, Chemistry, Earth Sciences

URLs: <http://www.fiu.edu/~edwardj/> and <http://www.fiu.edu/~kramerl/>

Abstract: We will present results from the first year of the GEMS (Get Educators in Mathematics and Science) project at Florida International University (FIU), a public, research-intensive Hispanic-serving institution in Miami, Florida. GEMS recruits top students in Chemistry, Earth Sciences, Mathematics, and Physics courses and provides new pathways into science and mathematics teaching, initially through a Learning Assistant program. This leads to restructured teacher education programs that incorporate research-validated pedagogical skills and deep content knowledge. Graduates will receive a discipline-based degree with teaching certification, thus enabling them to pursue multiple career paths. Initial results will be provided, including program and curricular designs, as well as insights from the first group of Learning Assistants.

26

Title: The SMART Scholarship at Georgia Southern University

NSF Noyce Award Number: 0833265

Principal Investigator: James M. LoBue

Institution: Georgia Southern University

Email: JLoBue@GeorgiaSouthern.edu

Co-PI(s): Dr. Michelle Cawthorn, Dr. Joy W. Darley, Dr. Marlynn M. Griffin, and Dr. Brian P. Koehler

Presenter(s): James M. LoBue

Discipline: Science/Math

URLs: <http://cost.georgiasouthern.edu/smartscholarship/>

Abstract: Our scholarship program serves the rural southeast Georgia region in which a large portion of schools across districts qualify for Title I funding and in which a significant number of high school students do not graduate. Our applicant pool at Georgia Southern includes students from both rural and urban environments. In the first year of our program we have selected five SMART Scholars, three science and two math majors. This was a difficult process requiring considerable attention to individual communication.

The linchpin of our program is a prerequisite course taught in the College of Education, the Pre-Professional Block (PPB). This 3 semester hour academic course and 50 hour observational practicum has been difficult for our first cohort to fit into their academic schedules. This is especially problematic for science majors whose laboratory hours preclude off-campus visitation. All of our scholars have found their PPB experience to be highly insightful. As baseline data, we required each scholar to write an essay detailing insights from their PPB experience. From these data, we have identified a number of preconceptions about teaching and K-12 students that will be important to track as our scholars progress in their careers.

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Title: Robert Noyce: Urban Mathematics Educator Program Georgia State University

NSF Noyce Award Number: 0434094

Principal Investigator: Christine D. Thomas

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Co-PI(s): Pier A. Junor Clarke, Georgia State University, pjunor@gsu.edu
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 Janice Fournillier, Georgia State University, jfournillier@gsu.edu
 Ariel Smith, Maynard Holbrook Jackson High School, Atlanta, Georgia, axsmith@atlanta.k12.ga.us
 URLs: <http://education.gsu.edu/UMEP/index.html>

Abstract: The Robert Noyce: Urban Mathematics Educator Program (UMEP) at Georgia State University is currently in year five of the project. The goal of the UMEP is to increase the number of high-quality secondary mathematics teachers who seek jobs in urban school districts and are committed to remaining in urban school environments. Through the TEEMS program UMEP scholars complete initial certification requirements for secondary mathematics teaching with a master's degree. Each UMEP scholar receives a \$10,000 stipend as an incentive to pursue a teaching career in the Atlanta Public Schools or DeKalb County School System. The UMEP provides mentoring and support for the scholars through the first three years of teaching.

The Robert Noyce Urban Mathematics Educator Program is positioned to have placed 37 secondary mathematics teachers in high-need schools over the duration of the project. As a result, we will attain 92.5% of our goal for placing scholars in high-need schools. Currently, we have placed 19 students in secondary mathematics teaching in our partner school districts and have 18 students in the UMEP pipeline. Our first cohort of six scholars, who began in 2005, completed the program of study in July 2006 earning a Master's Degree with certification in secondary mathematics teaching.

In May 2009 the first cohort of six scholars will complete their third year of teaching in our partner schools. Our second cohort of seven scholars completed the degree program in July 2007 and will complete their second year of teaching in our partner school districts in May 2009. Of our third cohort of seven scholars, six will complete their first year of teaching in May 2009. Our fourth cohort of seven scholars will begin teaching in August 2009 and we have selected a fifth cohort of nine scholars to begin the program in June 2009.

We are now in the initial stages of using Second Life as a virtual learning environment for engaging in situated contexts designed to support best practices for teaching mathematics in high need schools. Within Second Life Noyce Scholar teachers convene as a community of scholars to examine a broad range of classroom situations. The purpose of the online learning community is to foster longevity of highly-qualified mathematics teacher in high-need schools, specifically our UMEP Scholars.

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Title: Science and Mathematics for All
 NSF Noyce Award Number: 0433819
 Principal Investigator: Marilyn M. Irving, Ed.D.
 Institution: Howard University
 Email: mirving@howard.edu
 Co-PI(s): Leon A. Dickson, Jr., Ph.D.
 Presenter(s): Marilyn M. Irving, Howard University, mirving@howard.edu
 Discipline: Science
 URLs: <http://www.howard.edu/schooleducation/Scholarships/index.html>

Abstract: Howard University's Science and Mathematics for All (SMA) program is designed to 1) increase the number of underrepresented minorities teaching mathematics and science in partnering school districts, 2) recruit graduating undergraduate students and graduate students majoring in science and/or mathematics who will be dedicated to teaching in high-poverty schools; and 3) provide extensive induction support for new teachers and 4) offer mentoring by the Howard University School of Education and the College of Arts and Sciences faculty.

POSTER ABSTRACTS

From September 2001 to June 2009, seventeen candidates have participated in the SMA program. Fourteen candidates have obtained full certification; three candidates are still working on being certified. Four new candidates have been accepted to the program for Summer Session II and Fall 2009.

While working in high-need schools the candidates have created an environment that provides middle and high schools students the opportunity to explore sound mathematics and science and deal with significant ideas and problems. They have also created an atmosphere of respect and value for students' ideas and ways of thinking.

29

Title: Field Education for STEM Disciplines

NSF Noyce Award Number: 0833134

Principal Investigator: Deborah S. Gardner

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Co-PI(s): Pamela Mills and William Sweeney

Presenter(s): Deborah S Gardner, Hunter College, deborah.gardner@hunter.cuny.edu

Discipline: interdisciplinary STEM

Abstract: The Teacher Academy at Hunter has incorporated field education into its program and has offered this at two sites: Black Rock Forest (BRF), a research site that is about 50 miles from New York City, and in New Orleans. We have taken Teacher Academy students to BRF each summer to introduce them to fieldwork and to help build community among the new cohort. We used a two-day program to introduce the forest, a natural setting that is completely unfamiliar to many urban students, and also to the concept of field research, something they have been unlikely to encounter in their high school science classes.

This trip has also proven effective at building community in the group, so they get to know one another quickly and can then help each other in simple field exercises and in their semester studies. This experience helps prepare them to introduce fieldwork to their students as aspiring teachers and then later as full-fledged professionals. There are several large parks in NYC that would be suitable for adapting the lessons of BRF to class excursions for public school students.

Teacher Academy students have also gone to New Orleans on service learning trips. The students on these trips helped in the rebuilding and learned about the science/engineering of the levees, the ecology of the region, and the demographics, social, and cultural aspects of New Orleans neighborhoods.

In April 2008, the Teacher Academy students spent one week rebuilding and a second week assisting in New Orleans schools. They spoke with teachers about the problems and challenges of teaching students, almost all of whom were minority, who had lived through traumatic events and were still living under extremely difficult conditions. They also interviewed teachers about the challenges of rebuilding the schools as learning centers. The students did preparatory reading before the trip, kept learning journals while they were there, and wrote and presented papers upon their return.

The work in the New Orleans public schools is a variation on the host school internship experience in NYC and gives the students a comparative perspective. In New Orleans they saw similar problems to NYC –homelessness, trauma, poverty, minorities, learning disabilities – but magnified ten-fold. And they got to observe, and work with, skilled teachers creating solutions to such challenging issues. This experience enhanced their classroom skills and also their understanding of how community circumstances influence student performance and achievement.

The New Orleans schools are trying many new approaches to learning because they are being rebuilt one by one by their teachers and principals, many of whom have come from all over the country to aid in the renewal of the city of New Orleans and its youthful residents. Our students gained inspiration as well as practical ideas from this trip.

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Title: Illinois State - Noyce Urban Ed in a Rural Setting
 NSF Noyce Award Number: 0833322
 Principal Investigator: William Hunter
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 Co-PI(s): Robert Lee, Elisa Palmer, and Nerida Ellerton
 Presenter(s): William Hunter, Illinois State University, whunter@ilstu.edu
 Discipline: Chemistry, Biology, and Mathematics
 URLs: <http://www.teachereducation.ilstu.edu/noycescholarship/index.shtml>

Abstract: Illinois State University (ISU) is a well-respected, premier teacher preparation institution. Chicago Public Schools (CPS) and the Little Village area have high-needs student populations. Through existing collaborative projects between ISU and CPS, the groundwork has been laid for a breakthrough in student academic achievement and career aspirations. With the help of the Robert Noyce Teacher Scholarship Program we can achieve that breakthrough and impact the lives of 25,000 students as a result of this project. Funding the ISU Robert Noyce Program will facilitate the achievement of Noyce goals and will assist in recruiting new highly-qualified STEM teachers into our nation's neediest classrooms. In this way, funding the ISU Robert Noyce Program will help improve the quality of teaching and learning of mathematics and science where it is needed most.

The Illinois State University Robert Noyce Teacher Scholarship Program activities will be a significant expansion of efforts recruiting non-traditional candidates from the Chicago Public Schools Little Village Area to teacher preparation programs in mathematics and science at Illinois State University. At ISU we have many years of experience in training science and math teachers who are recruited to teach all across the United States. In the past five years, we have moved purposefully into the Chicago Public Schools. ISU and CPS have realized that they need each other. Hard-to-staff school districts in urban areas need the attention of the largest teacher education institutions in the country. Last year, CPS hired nearly 100 ISU graduates – mostly in elementary education. We have begun a research program in which we are conducting a factor analysis of the pre-service experiences that lead to particular urban career patterns of retention, quality, student achievement, etc. (Lee & Radner, 2006). This research is of particular relevance for the ISU Robert Noyce Teacher Scholarship Program, and promises to provide specific evidence of the types of experiences which can lead to teacher retention, and student success in mathematics and science. Further, when comparisons are made with the greater ISU teacher education candidate population, the research may lead to programmatic changes and insights in urban mathematics and science teacher preparation.

The Illinois State University Robert Noyce Teacher Scholarship Program will support a total of 40 new STEM teacher candidates, with a primary impact on Chicago's high-needs schools, where these individuals are desperately needed. Applying ISU's 80% retention of those teachers for 5 years beyond their teaching commitment, we will have influenced nearly 25,000 students in the heart of a high-needs school district. By any measure, an impact of this scale would be impressive. More broadly, we will also conduct studies and develop models of the concerns and methods of professional preparation for STEM professionals who switch into the STEM teaching profession. As we disseminate these studies and models, we will broadly inform other colleges and universities specializing in teacher preparation, high-needs LEAs seeking to meet projected and current staffing shortages for STEM teachers, and candidates and potential candidates themselves about our strategies, successes and challenges.

To date we have made award offers to 14 students in the first year of our program. Our planned program for the fall of 2009 includes: Award Dinner, College of Education Chicago Urban Bus trip, having students join UNITE events, Hosting Chicago TEACH clubs at ISU, Noyce Program Chicago School Trip, Spring Noyce Scholarship Recruiting Meeting, Noyce Awardee-Driven Event, ISU High School & College Research Symposium, and the Truman College Pre-service Teacher Days.

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Title: Deepening the Pool
NSF Noyce Award Number: 0630424
Principal Investigator: Diana V. Lambdin
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Co-PI(s): Kent Orr
Presenter(s): Diana V. Lambdin, Indiana University, lambdin@indiana.edu
Discipline: Mathematics
URLs: <http://www.noyce.education.indiana.edu/>

Abstract: Deepening the Pool partners the Department of Mathematics and the School of Education to use Noyce stipends and scholarships to recruit mathematics majors into two IUB teacher certification programs:

1. Secondary Transition to Teaching Program (ST-to-T): A full-time graduate-level certification program. College graduates with an undergraduate math major (or equivalent) become mathematics teachers through 12 months of education study coupled with intense work in school classrooms. We target STEM professionals or recent mathematics graduates. Our goal was to recruit up to seven ST-to-T Noyce awardees in each of three years, and to develop mechanisms to maintain this recruitment level in the future. Our first two students, who began their funded study in June 2007, just completed their first year of teaching. A group of four students who began studies in June 2008 are currently seeking jobs. We have recruited a new cohort of three students to begin studies this June (2009).

2. Secondary Undergraduate Program: A four-year traditional program designed for undergraduates. With Noyce funding, students majoring in mathematics concurrently pursue teacher certification, with a culminating full-time student teaching semester. Our goal was to use Noyce to recruit up to six undergraduate mathematics majors annually, and to develop mechanisms to maintain this recruitment level in the future. Three students in our first group of undergraduate Noyce scholars began receiving funding in fall of 2007. One undergraduate student was recruited to start receiving Noyce funding in fall 2008. We have no new undergraduates recruited this year. Difficulties with recruiting undergraduates, likely due to unwieldy program requirements for dual math/education majors, have led to development of a new 5-year route to math BS plus teacher certification and education MS, which we hope may attract more undergraduate math majors into teaching.

Other project goals include:

3. To provide effective professional support for Deepening the Pool scholars during student teaching and into their first two years in the classroom, and

4. To implement a research-based strategy to evaluate the effectiveness of the recruitment program, to develop strategies for institutionalizing it, and to disseminate findings broadly.

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Title: IUPUI Robert Noyce Teach Science Scholarships
NSF Noyce Award Number: 0733788
Principal Investigator: Kathleen A. Marrs
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Presenter(s): Kathleen A. Marrs, IUPUI, kmarrs@iupui.edu, Kim Nguyen, IUPUI, knguyen@iupui.edu, and Dwight Schuster, IUPUI, daschust@iupui.edu
Discipline: Biology, Chemistry, Physics, Earth Science
URLs: <http://www.iupui.edu/ucase/scholarships/teachscience/>
<http://www.noyceconferenceindy.org/>

Abstract: The goal of the Robert Noyce: Advance Urban Learning: Teach Science proposal (NSF-DUE 0733788) is to graduate 30 discipline-based (Biology, Chemistry, Earth Science, and Physics) secondary science teachers over the course of the proposal. These IUPUI undergraduate students earn a B.S. or B.A. degree from the Purdue University School of Science and simultaneously fulfill the certification requirements for teaching secondary science through the Learning to Teach/Teaching to Learn Program at the Indiana University School of Education at IUPUI.

At IUPUI, the combination of courses and credits needed to combine a full major in a science discipline with the required courses and credits for teacher certification has proven to be a significant obstacle to students seeking a 4-year degree with teacher certification, even with the financial assistance of the Noyce Teach Science Scholarship. To address this challenge, we spent the past year working with the curriculum committees of the departments of Biology, Chemistry, Earth Sciences, and Physics, and well as the School of Education, to streamline the 4-year degree plans for Noyce Scholars. This poster will provide an overview of this streamlining process, including the final curriculum checklists for each degree plan now available at IUPUI. In all cases, it is now possible at IUPUI for students to earn a full B.A. or B.S. degree with secondary science certification within 4 years. Summer classes are typically required to complete these degrees within 4 years, but the financial assistance of the Noyce Teach Science Scholarship makes it possible for students to focus on degree completion and their goal of becoming a secondary science teacher.

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Title: The Roots of Challenges Faced by Noyce Scholars

NSF Noyce Award Number: 0531598

Principal Investigator: Signe E. Kastberg

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Co-PI(s): Kathleen Marrs and Kim S. Nguyen

Presenter(s): Signe E. Kastberg, Indiana University Purdue University Indianapolis, skastber@iupui.edu

Discipline: Science and Mathematics

Abstract: Evaluation of 2007-2008 Noyce Scholars revealed that while the graduates seemed to feel prepared to teach science and mathematics, they expressed concerns regarding the ability to impact "student achievement" while they felt that "had the skills to teach science/mathematics effectively."

Also of concern to program completers were their abilities to "work with parents" and "motivate students." To explore the complexity of these findings, we analyzed work samples collected during the course of study from three program completers.

In addition, we returned to the three program completers with questions designed to gather evidence of their own impressions of the lessons they taught. Specifically we sought to explore program completers' views of the lessons as examples of inquiry and any tensions they felt regarding support and preparation for inquiry in the program and in their individual school contexts. These analyses generated findings that encouraged faculty and the program chair to reexamine various program elements including the importance instructional experiences and communication between course instructors and field experience mentors. Findings and recommendations for program changes will be shared.

34

Title: Appalachian Rural Systemic Initiative Noyce Scholarship Program

NSF Noyce Award Number: 0086188

Principal Investigator: Wimberly Royster

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Presenter(s): Linda Griffin, KSTC, lgriffin@kstc.com

Discipline: mathematics, science

URLs: <http://www.arsi.org/noyce>

Abstract: The Appalachian Rural Systemic Initiative (ARSI) Noyce Scholarship Program is a multi-state partnership at four

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universities in the Appalachia region: Kentucky State University, Ohio University, University of Kentucky and University of Virginia's College at Wise. Its goal is to increase the supply of talented mathematics and science teachers pursuing teaching careers in Appalachian school districts. Targeted schools are those in the ARSI school districts, which reside in 66 economically disadvantaged counties in Appalachia.

To support the recipients during their first years of teaching, Noyce scholars have access to ARSI Teacher Partners where feasible. ARSI Teacher Partners were trained through a National Science Foundation grant. ARSI currently has twenty-three Scholars and former Scholars who joined the ARSI Teacher Partners to form a community of mathematics and science educators in Appalachia. The ARSI Noyce Scholars have received or are pursuing teaching certification in these areas (17 in science, 19 in mathematics): middle school science, biology, chemistry, physics, physical science, integrated science and secondary mathematics.

ARSI will continue to seek integration of Noyce Scholars into current and future math and science in-service programs that are supported with state and federal grant monies (e.g. state MSPs).

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Title: STEM-Plus

NSF Noyce Award Number: 0733825

Principal Investigator: Galen Turner

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Co-PIs : Jim Nelson, Connie LaBorde, and Kelly Crittenden

Presenter(s): Galen Turner

As the first year of our Noyce Scholarship program comes to a close, we discuss issues with recruiting STEM Professionals and undergraduate STEM majors to the program. We have successfully recruited STEM Professionals at the level we anticipated and have additional applications under review for the coming year.

While excitement about the program continues among first and second year college students looking forward to joining the program, we find ourselves still having difficulty recruiting for the undergraduate program at the level first anticipated. We welcome input from others who have faced similar challenges.

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Title: Open the Gate: Robert Noyce Teacher Scholars Program

NSF Noyce Award Number: 0833243

Principal Investigator: Ruth Cossey

Institution: Mills College

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Co-PI(s): Barbara LiSanti

Presenter(s): Ruth Cossey and Barbara LiSanti

Discipline: Mathematics, Chemistry, Biology and Physics

Abstract: The project reflects a partnership between the Departments of Mathematics, Computer Science, Chemistry, Physics and Biology and the Mid-Career Math and Science Program (MCMS) in the School of Education 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 while working towards an institutionalization of the program at Mills. The project includes a demonstration research project to study the Mills model of teacher education and the factors within it that support their teacher graduates' high retention rates in urban high-needs schools. Over the course of the project scholarships will be offered to female undergraduate senior STEM majors and to male and female graduate students in the

MCMS program, each with an undergraduate major in STEM.

Intellectual Merit: A key component of Open the Gate is engaging the scholarship students in the construction of a demonstration research project to study this teacher education model in order to determine how the skills and knowledge of STEM pre-service students develop over time, the experiences that lead to their progress in the pre- and in-service years, and their relationship to the graduates' longevity as teachers in high poverty schools. Thus, graduates from this project are advancing the scholarship of teaching within the fields of mathematics and science education through their skills as teacher-researchers who ask scholarly questions arising from complex curricular and pedagogical problems that require sustained, careful and systematic examination of their practice in an effort to improve it.

Broader Impact: Half of the credential students graduating from Mills come from racial, ethnic, and linguistic groups underrepresented in math and science. Increasing these percentages by recruiting and supporting students of color and first generation college students is an active goal of this project. Located at a women's college, Open the Gate is also well positioned to increase gender diversity in the pool of future math and science teachers. Information learned will be disseminated at state, national and international conferences and professional meetings with math and science, multicultural, and teacher educators. The project enhances existing partnerships between Mills College and ten surrounding high-needs urban school districts including Alameda County Office of Education and the unified districts of Alameda, Berkeley, Emery, Hayward, Oakland, San Francisco, San Leandro, San Lorenzo, and West Contra Costa County.

37

Title: Nazareth College Robert Noyce Scholar Program
 NSF Noyce Award Number: 0833264
 Principal Investigator: Lynn M. O'Brien
 Institution: Nazareth College
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 Co-PI(s): Kathleen M. DaBoll-Lavoie
 Presenter(s): Lynn M. O'Brien, Nazareth College, Rochester, NY, lobrien9@naz.edu
 Discipline: Chemistry, Biology, and Mathematics
 URLs: www.naz.edu/noyce

Abstract: Nazareth College is increasing the number of qualified and effective mathematics and science teachers committed to teaching in high-need K-12 schools. We will welcome our first cohort of Noyce Scholars in fall 2009. Our program supports undergraduate and graduate students in programs leading to certification in adolescence education Grades 7-12 in the areas of mathematics, biology, and chemistry and in childhood/middle childhood education Grades 1-6 (with majors in mathematics or the sciences).

The School of Education and the College of Arts and Sciences provide an integrated experience for teacher education students as they gain expertise in both content and pedagogy. Many of the courses in our programs are taught on-site in local education settings, thereby fostering pre-service students' ability to make connections between theory and practice, as well as enabling them to work directly with learners at the childhood level. We will discuss our recruitment efforts to date and highlight some of the programming that will be available for our incoming scholars.

38

Title: TECHS-NJ Activities to Promote Reflection on Mathematics
 NSF Noyce Award Number: 0630412
 Principal Investigator: Bruce Bukiet
 Institution: New Jersey Institute of Technology (NJIT), RU-Newark, NPS, Newark Museum
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 Co-PI(s): Arthur Powell, Ismael Calderon, Gayle Griffin
 Presenter(s): Joya Clark, Rutgers-Newark, joyacla@andromeda.rutgers.edu

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Discipline: Math and Science

URLs: techsnj.njit.edu

Abstract: During the 2008-2009 academic year, the TECHS-NJ project continued incorporating interesting aspects into the education of future excellent mathematics and science teachers. We describe two types of activities that we have undertaken to (1) focus teacher candidates on issues of discourse and identity in mathematics and science classrooms and (2) provide teacher candidates with opportunities to create and implement interdisciplinary presentations.

During the Fall 2008 semester, teacher candidates read articles selected from The Mathematics Teacher and from The Science Teacher on topics concerning communication in mathematics and science education. Five times during the semester, they were brought together for videotaped focus groups to discuss topics such as their perceptions of how their own cultural background as well as that of their students influences the discourse about science and mathematics that occurs while they are teaching, the difference between discourse in science and mathematics and other content areas, effective communication between teacher and student, barriers to student-teacher discourse, and various teachers' views on how mathematics or science should be emphasized in classroom discourse.

During the Spring 2009 semester, TECHS-NJ teacher candidates worked with students pursuing teacher certification in non-STEM disciplines to create interdisciplinary presentations involving mathematics or science and other content areas. These presentations covered the topics of Art and the Natural World, Mathematics of the Civil War, Earth Day, and Egypt and Fractions. These presentations were also videotaped. The videos taken of the focus groups, and the videos of the interdisciplinary presentations already mentioned, along with videos that have been and that will be made of teacher candidates during their student teaching and as teachers will be analyzed to track the development of TECHS-NJ teacher candidates' skills. Further detail concerning these activities, is presented in this poster.

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Title: The NYU Robert Noyce Scholarship Program

NSF Noyce Award Number: 0733805

Principal Investigator: David A Scicchitano

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Co-PI(s): Pamela Fraser-Abder, Karen King, Joseph McDonald, and Jalal Shatah

Presenter(s): David A Scicchitano, New York University, das2@nyu.edu, John Frisoli, New York University, frizzo78@gmail.com, Deborah A McLaughlin, New York University, dama414@nyu.edu, and Lee Frissell, New York University, lf1@nyu.edu

Discipline: Secondary Education

URLs: <http://steinhardt.nyu.edu/research/projects/noyce>

<http://steinhardt.nyu.edu/noyce>

Abstract: The New York University (NYU) Noyce Scholarship Program recruits NYU STEM-major undergraduates to interest them in careers in secondary education. The Program prepares them for careers as math and science teachers in high-needs schools by providing: (1) early familiarity with effective secondary school teaching; (2) a sense of secondary school teaching as a good career path for scientists and mathematicians; and (3) accelerated preparation for professional teacher certification. The Program will assist with job placement and support early career teachers. Thus far the Program has: (1) created an informational website; (2) expanded the eligible undergraduate pool to include NYU Polytechnic engineering students (resulting from the merger of NYU and Brooklyn Polytechnic University); (3) sent e-mails to NYU and NYU Poly STEM-major undergraduates inviting them to information sessions; (4) conducted more than a dozen such information sessions; (5) placed twenty prospective Noyce Scholars in required internships in science and math classrooms in public schools; and (6) directed some interested STEM-majors to other teacher preparation programs in math and science secondary education. These efforts have produced six Noyce Scholars beginning graduate studies this summer (as well as students preparing to teach through similar programs.)

Among the Noyce scholars are Jack Frisoli and Deborah McLaughlin. Jack is completing his required school-based internship at the Institute for Collaborative Education (ICE) (a public school) designing, implementing, and integrating new technologies

into existing courses to ensure that ICE students are proficient in the latest and most useful computer applications. Deborah, who did her public school internship at Williamsburg Charter School, is completing an externally funded research project in science, honing skills that will impact how she instructs science students and teaches the scientific method. These Noyce Scholars provide examples of how the Noyce can attract future teachers who will be among the leaders in secondary education.

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Title: Building a Community of Scholars

NSF Noyce Award Number: 0733794

Principal Investigator: Hollylynn Lee

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Co-PI(s): Karen Hollebrands, Pam Arroyo, and Irina Kogan

Presenter(s): Tyrone Washington, North Carolina State University, htwashin@ncsu.edu

Discipline: Mathematics Education

URLs: <http://ced.ncsu.edu/2/noyce>

Abstract: The Noyce Mathematics Education Teaching Scholars [Noyce METS] aims to increase the number of highly-qualified mathematics teachers prepared at NC State University with a major in a mathematical science and a major in mathematics education. These scholars will develop an understanding of mathematics needed for teaching, be well-prepared to be leaders in technological innovation to improve student understanding in mathematics classrooms, and be committed to working with students in high-needs school districts.

Our first cohort began in Fall 2008 and included three undergraduate level scholars and two graduate level scholars. Through focused recruitment, advertising, and word of mouth, we were able to increase the numbers in our second cohort that will join us Fall 2009. The second cohort includes four undergraduate-level scholars and four graduate-level scholars.

Preparing secondary mathematics teachers that are strong in both content and pedagogy and are committed to meeting the needs of students in high-needs schools is no small task. The dual major requirement of our program acknowledges the importance of content knowledge. In cultivating a scholarly program, Noyce METS at NCSU is creating a sense of community among faculty and scholars. Utilizing a variety of methods, we seek to enrich the scholars overall education. These methods include guest speakers, focus sessions, field experience, participation in professional conferences, and round table discussions.

Our Noyce program has a partnership with a local secondary high-needs school. The school needed assistance in their before and after school tutoring center. As part of the requirements of the program, our scholars serve as math tutors within the high school, and thus gain additional field experiences beyond their degree requirements.

Within our community of faculty and scholars, we have designed experiences to expose the scholars to avenues that ensure their continued professional growth. For example, the first cohort of scholars participated in several discussions this past year concerning how to engage all students in classroom discourse and they are doing some summer reading related to the topic. At the October 2009 annual meeting of the North Carolina Council of Teachers of Mathematics, the first cohort will apply what they have been learning and conduct a presentation addressing classroom communication for equity and engagement.

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Title: North Dakota Teacher Scholarship Program

NSF Noyce Award Number: 0833268

Principal Investigator: Lisa Montplaisir

Institution: North Dakota State University

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Co-PI(s): Erika Offerdahl, Donald Schwert, Canan Bilen Green, William Martin, Angela Hodge, Dogan Comez, and Gerald Ketterling

Presenter(s): Lisa Montplaisir, North Dakota State University, lisa.montplaisir@ndsu.edu

Discipline: Science and Mathematics

URLs: <http://www.ndsu.edu/csme/noyce/>

Abstract: The Noyce Scholars Program at NDSU is developed to address the recruitment plus mentored retention of talented STEM students into high needs, secondary schools within North Dakota and adjacent regions. The 88 high-needs, secondary schools of North Dakota are partnered into this project through commitment by the N.D. Education Standards & Practices Board.

The needs are compelling:

- The ESPB (2007) has declared all content areas of STEM as “critical shortage.”
- 65% of North Dakota schools are classified as Title I, requiring special resources to meet the needs of low-income and at-risk children.
- Nine districts in North Dakota started the 2007-08 academic year without either a science or mathematics teacher; for many of the state’s rural districts, one teacher represents an entire science or mathematics “department.”

The Noyce Scholarship Program at NDSU has two components:

1. Noyce Scholars Internships: paid summer internships to 1st and 2nd year NDSU students to encourage secondary teaching as a career. These interns will be placed into laboratory or classroom environments alongside exemplary high school juniors and seniors who are participating in the North Dakota Governor’s School program whenever possible. In year one, 8 interns have been placed.
2. Noyce STEM Scholars: scholarships covering nearly full educational costs to NDSU students who enroll in dual majors leading to certification and follow through on commitment to teaching two years in a high needs district for each year of Noyce scholarship support. Four Scholars are funded in 2009.

The project involves several research questions focusing its effectiveness in attracting, preparing, and retaining STEM individuals in teaching careers. These include analyses of the demographic backgrounds of the STEM Scholars, the successes/challenges of using the Noyce Internship program as a key recruitment tool for the Scholars program, the conditions impeding or enhancing Scholars’ completion of a second major in Education while pursuing a major in a STEM discipline, and the program’s success/challenges in the mentored retention of Scholars through their period of commitment to the high needs districts. Research results will be disseminated, and the successful elements of the program will drive development and implementation of future STEM teacher recruitment and retention for high needs, rural, and tribal districts.

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Title: SEOCEMS Noyce Scholars Program

NSF Award Number: 0833295

Principal Investigator: Ralph Martin

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Co-PI(s): Drs. Jeff Connor and Ralph Martin

Presenter(s): Dr. Ralph Martin, Dr. Jeff Connor, and Al Cote

Discipline: Mathematics and Science
 URL: www.seocems.org/

Abstract: The South East Ohio Center for Excellence is a partnership of three universities in Ohio's Appalachia region (Ohio University, Shawnee State University, University of Rio Grande) and the Coalition of Rural and Appalachian Schools.

The broad goals of the Center are to pursue improvements in the K-16 science and mathematics infrastructure. In particular:

- Professional development in mathematics and science for teachers
- Pupils' access to quality mathematics and science
- Teacher preparation programs
- Applied research and evaluation focused on mathematics and science in rural Appalachia
- Recruitment and retention of mathematics and science teachers and faculty dedicated to mathematics and science teacher education.

The Center's recruitment and retention goal stresses our mission of participating and supporting scholarship programs for future educators. SEOCEMS Noyce Program will increase the supply of mathematics and science teachers in southeastern Ohio. In addition to the Noyce scholarship program, the center is also involved with:

- Choose Appalachian Teaching (CAT) scholarship program is a partnership of 5 Colleges of Education in Southeast Ohio and is for undergraduates preparing to be AYA (Grade 7-12) mathematics and science teachers. We wish to recruit students into the program beginning Fall 2009.
- Proposal pending at the Woodrow Wilson Foundation to sponsor 40 teaching fellows through an innovative Masters' with Teaching Licensure in mathematics or science program.
- The Noyce program is strongly aligned with our mission, and we have a strong desire to see it succeed. Criteria for selecting scholarship recipients are:
 - Academic qualifications and standardized test scores and transcripts
 - Member of an underrepresented population
 - Commitment to Math and/or Science teaching in a rural school environment.

These three criteria should be balanced in selecting the candidates. SEOCEMS first round of Noyce Scholars will begin with the 2009-2010 academic year.

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Title: Robert Noyce Project Highlights
 NSF Noyce Award Number: 0531956
 Principal Investigator: Isabel Ball
 Institution: Our Lady of the Lake University
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 Co-PI(s): Peggy Carnahan
 Presenter(s): Isabel Ball, Our Lady of the Lake University, balli@lake.ollusa.edu
 Discipline: Science and Mathematics

Abstract: The Robert Noyce Project at Our Lady of the Lake University (OLLU) provides funding to non-teaching career graduate students who are seeking secondary teaching certificates in science and mathematics. These students are

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entering the teaching field after having served in other science, mathematics, and technology related careers. The certification program that serves them is OLLU's Master of Education Nontraditional Teacher Certification (MENTC) program. This program is a weekend program designed to be completed in two years. In addition, to courses in professional education, the program includes courses in the student's discipline and pedagogy in the discipline. In the second year students do their internship as employees of a school district. The poster display will provide specific information about the courses in the MENTC program in science and mathematics.

Students are pleased with the weekend format. It permits them to continue their career work until they begin their internship year. For the internship, the student is hired by the school district and is assigned a mentor teacher. A university professor also has scheduled visits with the student in the classroom and provides guidance. Noyce student data will be presented on the poster regarding applicants and their progress.

Throughout the program, as well as after completing it, the Noyce students are invited to participate in professional development workshops and presentations which are regularly offered for science and mathematics teachers in the San Antonio area. These activities not only provide classroom activities and strategies, but present updates on state policies, curriculum alignment, certification in laboratory safety, and demonstrations of new laboratory equipment and mathematics materials. The students also prize the networking these sessions provide; they give them opportunity to learn from and enjoy the enthusiasm of the more veteran teachers. The poster display will provide information about some of these workshops and presentations.

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Title: Collaborative for Excellence in Teacher Preparation Programs of the PASSHE

NSF Noyce Award Number: 0531960

Principal Investigator: Dr. N. Bharathan

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Co-PI(s): Peter Garland

Presenter(s): N.Bharathan, Pennsylvania State System of Higher Education (PASSHE), Indiana University of Pennsylvania (IUP), bharathn@iup.edu

URLs: <http://www.iup.edu/page.aspx?id=51923>

Abstract: Science and math teacher preparation programs of the Pennsylvania State System of Higher Education (PASSHE) have been undergoing systemic reform since August 2000 under the aegis of the NSF-supported Collaborative for Excellence in Teacher Preparation in Pennsylvania (CETP-PA). As CETP-PA pursues its original mission of science and math education reform and support to pre-service and in-service teachers, its progress thus far has it poised to reach out to science, technology, engineering and mathematics (STEM) students and professionals who desire to attain their education degree and/or teaching certification. CETP-PA works closely with the PASSHE System Office and the Pennsylvania State System of Higher Education Foundation Inc to provide scholarships and stipends to STEM majors and professionals who seek their teaching certification at a State System University.

The PASSHE is committed to addressing the critical shortage of science and math teachers, and the Robert Noyce scholarships and stipends are an extension of the services provided by and through the Math and Science Centers established in the CETP-PA project. These Centers have in fact become an institutional focus of the 12 CETP-PA universities. The State Foundation monitors the progress of the teachers in meeting their obligation to teach in a high-need school district.

The Foundation makes contact with both the awardee and the awardee's employer, distributing written surveys by electronic means that are completed, certified and returned to the Foundation. Project activities involve the Scholarship committee working to create the application forms, establish specific criteria and procedures for awards; to prepare term sheets, information releases and loan documents for awardees; and to prepare public information (brochures, webpage information).

Recruitment is done by distribution of program information, including scholarship/stipend applications, to University Math and Science Centers, faculty advisors, admission officers, distance learning administrators, and to CareerLink Centers. Since spring of 2006 the Robert Noyce Program in Pennsylvania has given over \$90,000 in scholarships (ten) and stipends (five). Evaluation and Monitoring phase will be completed 5- 6 years from project start, BUT could continue for at least 8 years for the last cohort of awardees.

45

Title: Preparing Rural High School STEM Teachers

NSF Noyce Award Number: 0833298

Principal Investigator: Eric M. Riggs

Institution: Purdue University

Email: jstaver@purdue.edu

Co-PI(s): Kamyar Haghighi, Mary Sadowski, Christie Sahley, and John Staver

Presenter(s): John Staver, Purdue University, jstaver@purdue.edu

Abstract: This project involves the Purdue University Colleges of Science, Education, Engineering and Technology in a partnership with Crawfordsville, Logansport, and Benton County schools, all small town and rural districts. Up to 33 science, technology, engineering or mathematics (STEM) majors are being helped by this Noyce project in their efforts to become high school science and mathematics teachers.

Support is provided through scholarships (some with one year of aid and others with two years of aid, reflecting their years remaining to degree when the scholarships were first awarded) and through a program designed for them in cooperation with other existing and emerging programs for STEM teacher workforce development at Purdue. The Purdue Center for Research and Engagement in Science and Mathematics Education (CRESME), a joint effort between the Colleges of Science and Education, is taking the lead in this effort. It is being aided by the strength of other educational research units on the Purdue campus, including the Colleges of Technology and Engineering, and the Discovery Learning Center. The overall intent of the program is to improve STEM education within small, rural school districts around Purdue and in so doing also provide generalizable insights that may be extended to similar rural settings around the nation.

Intellectual Merit: Educational research-oriented centers and departments on campus are working with teacher preparation and new teacher support programs and the Noyce project to recruit talented STEM undergraduates to teaching careers, working with them to explore the educational issues in their technical fields while at Purdue, especially in rural communities, and supporting them programmatically during their initial teaching years. The Noyce Scholars are being housed intellectually within CRESME, which is responsible for project infrastructure, curricula and course design, and for tracking of the scholars in order to determine project outcomes. As part of their teacher preparation program Noyce Scholars are participating in senior thesis projects (conducting research as assistants in existing STEM education research efforts in their disciplines) and a special Noyce seminar course. They are also being provided with a network of support and mentoring both while they are at Purdue and after they begin their teaching careers.

Broader Impacts: Through dissemination of lessons learned from this project, Purdue is improving its ability to provide STEM teachers, education services and direct outreach assistance to the increasingly diverse underserved rural and small town communities of Indiana and is providing models for use throughout Indiana and the nation.

46

Title: Building a Sustainable STEM Educator Pathway

NSF Noyce Award Number: 0833123

Principal Investigator: Karen Embry Jenlink

Institution: Saint Edward's University

Email: karenj@stedwards.edu

Co-PI(s): Steven Fletcher, Alice Session, and Dave Fonken

POSTER ABSTRACTS

Presenter(s): Dr. Karen Embry Jenlink, St. Edward's University, karenj@stedwards.edu

Discipline: 4-12 math and science educator preparation

URLs: <http://www.stedwards.edu/noyce>

Abstract: This session will provide the first-year findings in establishing an innovative Noyce teaching scholarship program within a multi-institutional partnership consisting of a Hispanic-serving university, a community college, and a large urban school district in the southwest. Participants will examine recruitment strategies, challenges, successes, and lessons learned. Highlights of an environmental science educator recruitment camp studying freshwater and marine habitats will be featured.

47

Title: Springboard to Success!

NSF Noyce Award Number: 0434150

Principal Investigator: Kathleen M. Fisher

Institution: San Diego State University

Email: mhoule@mail.sdsu.edu

Co-PI(s): Kathy S. Williams, Meredith E. Houle, Alexander W. Chizhik

Presenter(s): Meredith E. Houle, San Diego State University, mhoule@mail.sdsu.edu

Discipline: Science & Math

Abstract: Since 2004, San Diego State University Noyce grant has been working to recruit math and science students to teach in low-performing schools. To date, our program has honored 21 students with scholarships (13 in mathematics, 7 in science and one in math and science). Students may be supported during the last two years of their undergraduate degree and the post-baccalaureate credential year.

Our poster will highlight the work and experiences of three Noyce Scholars: Anthony Tosto, a middle school science teacher who received his credential in 2006 and has been teaching for 3 years; Maribel Flores, a high school math teacher who has been teaching bilingual geometry and algebra for two years; and Jeff Rapp who recently received his Bachelors degree in Biology and will be entering the credential program in the Fall.

48

Title: Supporting Noyce Scholars via Social Networking

NSF Noyce Award Number: 0630460

Principal Investigator: John Lindberg

Institution: Seattle Pacific University/SUNY Cortland

Email: gphelan@spu.edu

Co-PI(s): Elaine Woo, Frank Kline, Robbin O'Leary, and Gregory Phelan

Presenter(s): Gregory D. Phelan Seattle Pacific University and SUNY Cortland gphelan@spu.edu,

gregory.phelan@cortland.edu

Discipline: Chemistry and Education

URLs: <http://www.spu.edu/acad/robert-noyce/index.asp>

Abstract: At the Robert Noyce Scholarship Program Conference held in June 2008, a group of Noyce personnel from the states of California, Oregon, and Washington met to discuss current progress in the administration of their Noyce Scholarship Programs. One idea that came from these discussions was to create a resource to help current and future Noyce Personnel communicate in a more effective manner.

The idea of creating two resources was discussed. The first resource will provide a way for pre-service and in-service teachers to communicate with each other and with experienced teachers. Along these same lines an analogous resource will be created for Noyce Project Personnel to share ideas and resources. The second resource supported by this supplemental

proposal will be a wiki site to allow Noyce Project personnel to share information about their own programs as well as access information and valuable insight from other Noyce Project personnel around the nation.

Currently there are more than 100 members of the Robert Noyce Facebook groups sharing resources for induction period teachers. The Facebook group members have also expressed an interest in sharing information on successful job hunting strategies.

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Title: SEL Partnership

NSF Noyce Award Number: 0733802

Principal Investigator: Joseph Meyinsse

Institution: Southern University, Louisiana State University

Email: Joseph_Meyinsse@subr.edu

Co-PI(s): Luria Stubblefield (SUBR), James Madden (LSU), Annie Henderson (SUBR), and Brenda Nixon (LSU)

Presenter(s): Brittany Barber, Louisiana State University, erittanyshinyard@alumni.lsu.edu

Discipline: Biology

Abstract: This is a Phase I project, involving a partnership among Southern University Baton Rouge (SU-BR), the lead institution, the East Baton Rouge Parish School System (EBRPSS) and Louisiana State University (LSU) [SEL Partnership]. Other organizations that will contribute to the project include the Louisiana Resource Center for Educators and Teach Baton Rouge (non-profits that offer alternate teacher certification programs).

The overall goal is to recruit strong STEM majors who are in or beyond their third year of study into programs that lead to secondary-teacher certification. Most candidates will come from SU-BR, but the program will be open to minority students from LSU in cases where this will enhance the overall goals of the project. The LSU Geaux Teach program, itself developed with funding from NSF STEMTP and Noyce Scholars programs, will provide resources and infrastructure such as customized courses, field experiences, and mentoring.

EBRPSS will vigorously support graduates through teacher-induction, assistance, and support services. Because students who choose teaching late in their undergraduate programs may not be able to fit all certification requirements into the time remaining before graduation, alternative certification programs will step in where there is a need.

50

Title: The Stony Brook University CESAME Robert Noyce Program

NSF Noyce Award Number: 0531856

Principal Investigator: Keith Sheppard

Institution: SUNY at Stony Brook University

Email: keith.sheppard@stonybrook.edu

Co-PI(s): David Bynum and Lisa Berger

Presenter(s): Adriane McCoy, Stony Brook University, adriane@moriches-bay.com

Discipline: Science and Mathematics Education

URLs: <http://www.sunysb.edu/cesame/>

Abstract: The Robert Noyce Scholars Program at Stony Brook University is directed through the Center for Science and Mathematics Education (CESAME) at Stony Brook. CESAME recruits, selects, educates and mentors outstanding science and mathematics majors who wish to teach in high-needs schools in the region. Stony Brook's Noyce scholars are educated in content and a process rich curriculum. The focus of this summer's activities will include the integration of mathematics and science, using inquiry based laboratory work and the utilization of appropriate computer technologies into the science and mathematics classrooms.

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Noyce scholars will learn to utilize age appropriate practical activities to enhance student numeracy. Additionally newly appointed Noyce supplemental fellows, who are already working in high-needs schools will be involved in presenting workshops to the fellows. These workshops will include parent teacher communication, English language learner strategies and modifying classroom culture. This represents a new phase in the development of a cadre of professional, highly-qualified science and mathematics teachers committed to educating students in high-needs schools.

51

Title: Noyce Scholars at SUNY Buffalo State College

NSF Noyce Award Number: 0434103

Principal Investigator: Dan MacIsaac

Institution: SUNY College at Buffalo

Email: danmacisaac@mac.com

Co-PI(s): Joseph Zawicki (Former Principal Investigator), Susan McMillen (Co-Principal Investigator); David Henry (Co-Principal Investigator); David Wilson (Co-Principal Investigator); and Daniel MacIsaac (Former Co-Principal Investigator)

Presenter(s): Dan MacIsaac, SUNY Buffalo State College, macisadl@buffalostate.edu

Discipline: Physics Education & Mathematics Education

URLs: <http://www.buffalostate.edu/physics/noyce/>

Abstract: We will describe activities, overall statistics, short participant studies and qualitative lessons learned from the Buffalo State College NSF-Noyce WNY Partnership for New Science and Math Scholars.

52

Title: Robert Noyce Scholarship Program

NSF Noyce Award Number: 0532022

Principal Investigator: Joseph Straight

Institution: SUNY Fredonia

Email: joseph.straight@fredonia.edu

Co-PI(s): Michael Jabot, Holly Lawson, and Jamar Pickreign

Presenter(s): Joseph Straight, SUNY Fredonia, joseph.straight@fredonia.edu

Discipline: Biology, Chemistry, Earth Science, Math, Physics

URLs: www.fredonia.edu/org/noyce

Abstract: The goal of our program is to increase the number of students who enter and complete our rigorous programs leading to initial certification in Biology/Adolescence Education (grades 7-12), Chemistry/Adolescence Education, Earth Science/Adolescence Education, Physics/Adolescence Education, Mathematics/Adolescence Education, and Mathematics/Middle Childhood Education (grades 5-9), and who then teach in high-need schools. Specifically, we aim to support 14 scholarships annually, at \$7500 per scholarship, over the four-year period covering the 2006-2007 through 2009-2010 academic years. The overall objectives of the SUNY Fredonia Robert Noyce Scholarship Program include:

- Increase the number of students graduating with initial certification in STEM fields by 50%.
- Increase the number of STEM certification graduates who teach in high-need schools.
- Promote greater diversity among our STEM certification majors.
- Provide more systematic mentoring for our STEM certification majors.
- Provide better support and professional development for our STEM certification graduates during their induction period, i.e., during the critical first few years of their teaching careers.
- Use results from the program to advance knowledge of best practices for recruiting, developing, supporting, and retaining teachers for high-need schools.

Recently, SUNY Fredonia began a new Master of Arts in Teaching Science program, and four students in this program were supported as Noyce Scholars this past year. In addition, two Noyce Scholars graduated in Mathematics/Adolescence Education, and we hope one of them will attend the conference.

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Title: Noyce Scholars' Self-Determination

NSF Noyce Award Number: 0833326

Principal Investigator: Jerry Dwyer

Institution: Texas Tech University

Email: jerry.dwyer@ttu.edu

Co-PI(s): Dominick Casadonte, Lawrence Schovanec, Tara Stevens, and Monty Strauss

Presenter(s): Jerry Dwyer, Texas Tech University, jerry.dwyer@ttu.edu

Discipline: Mathematics, Chemistry

URLs: <http://www.webpages.ttu.edu/jedwyer/Noyce.htm>

Abstract: The Department of Mathematics & Statistics and the Department of Chemistry & Biochemistry at Texas Tech University (TTU), in collaboration with the Center for the Integration of Science Education and Research (CISER), have established the Texas Tech Noyce Scholars (TTNS) program to recruit upper-level undergraduate students with declared majors in Mathematics and Chemistry for a two-year K-12 program and facilitate the induction of lower-level undergraduates into K-12 secondary teaching careers in under resourced schools. The TTNS is organized and designed to meet the following requirements:

- Attract high-quality, diverse mathematics and science undergraduate majors to the teaching profession.
- Prepare self-determined teachers who possess a high degree of both content and pedagogical knowledge.
- Retain Noyce scholarship recipients as mathematics and science teachers.
- Demonstrate strategies needed for the effective recruitment, preparation, and retention of mathematics and science teachers.

The project partners will identify and recruit scholarship recipients based on mathematics GPA, evidence of teaching interest, and recommendation letters from STEM faculty members evaluated with a rubric based on the self-determination theoretical framework. Self-determination refers to the extent to which individuals perceive themselves as volitional (Deci & Ryan, 1985). According to Deci and Ryan (2000), a self-determined individual strives to experience and ensure competence, relatedness, and autonomy in the target domain. Individuals who meet these needs typically experience well-being and demonstrate positive academic outcomes. The TTNS mentoring process designed to develop participants' self-determination and the project effectiveness will be evaluated through surveys, student interviews, and the results will be widely disseminated.

Initial results of the TTNS application review using a self-determination scoring rubric revealed that applicants possessed strengths in relatedness and were considerably weaker in competency and autonomy. Although educators must possess a high degree of relatedness to successfully negotiate the demands of the classroom and broader school culture, the purpose of the TTNS project is to prepare educators who are specialists in mathematics and chemistry. Therefore, the initial findings suggest that recruitment strategies may need to focus on identifying educators first who can then meet the rigors of training in mathematics and chemistry rather than looking only for strong students in mathematics and chemistry who would be willing to work as teachers.

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Title: Analysis of Beginning Math and Science Teachers
NSF Noyce Award Number: 0630376
Principal Investigator: Michael Marder
Institution: The University of Texas at Austin
Email: l.abraham@mail.utexas.edu
Co-PI(s): Lawrence Abraham
Presenter(s): Lawrence Abraham, UTAustin, l.abraham@mail.utexas.edu
Discipline: Mathematics and Science
URLs: <http://www.uteach.utexas.edu>

Abstract: Since measures of student achievement cannot provide all the information needed to assess teaching quality, we have continued to gather additional data through observations of our graduates and their peers in secondary math and science classrooms in central Texas. Using the UTeach Observation Protocol (UTOP), which includes standardized classroom observation with structured follow-up interviews, we have collected longitudinal data on the instructional practices and beliefs of teachers in their first few years in the classroom. In this report we describe our findings of change over the first three years among UTeach graduates and a comparison group of beginning teachers from other programs.

Four main categories assessed in the UTOP are Classroom Environment, Lesson Structure, Implementation, and Mathematics/Science Content. In addition to scores for individual items within each category, ratings of all items in each category are synthesized to reflect a single rating of quality for each category. Our preliminary data reveal that while both UTeach graduates and the teachers in the comparison group were rated similarly in their initial year of teaching, over the first three years the UTeach graduates showed marked improvement, while the comparison group did not. This difference was particularly notable in the "Mathematics/Science Content" rating, in which the UTeach graduates showed their greatest improvement while the comparison group showed the greatest decline. In addition, the synthesis ratings for teachers in schools with the highest percentages of low SES students were higher for UTeach graduates than for the comparison group.

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Title: UT3 Noyce Program at The University of Toledo
NSF Noyce Award Number: 0202823
Principal Investigator: Charlene M. Czerniak
Institution: The University of Toledo
Email: JStrubl2@UTNet.UToledo.Edu
Co-PI(s): Ernest DuBrul
Presenter(s): Janet Struble, The University of Toledo, Janet.Struble@utoledo.edu
Discipline: Science and Mathematics
URLs: <http://www.teachut3.utoledo.edu/noyce>

Abstract: The UT3 Noyce Scholarship Program at The University of Toledo is a collaboration among the Judith Herb College of Education, College of Arts and Sciences and the Toledo Public Schools District. This four year program provides ten \$17,220 stipends per year (40 in total) to professionals with a minimum of a B.S. degree in engineering, mathematics, or the sciences. UT3 Noyce Scholars enroll in graduate level coursework that will make them eligible after two semesters for the Ohio Alternative Educator License, thereby expediting the number of highly qualified teachers entering the profession.

In the summer for three weeks, scholars participate in two courses: Best Practices of Teaching and Adolescent Psychology. In the fall semester, scholars continue by enrolling in Secondary Teaching Methods with a classroom field experience in Toledo Public High Schools. Our poster will showcase our first cohort of UT3 Noyce scholars.

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Title: Noyce Prospective STEM Teachers' Assumptions about High Need Students and their Families

NSF Noyce Award Number: 0532059

Principal Investigator: Debra Tomanek

Institution: University of Arizona

Email: dtomanek@u.arizona.edu

Presenter(s): Athena Ganchorre, University of Arizona, athenag@email.arizona.edu

Discipline: Science & Mathematics

ABSTRACT: This study investigated motivations among prospective teachers at a Southwest research one university who commit to teaching secondary level science or mathematics in under-resourced districts. An interpretive method uncovered assumptions prospective STEM teachers have about low-income or poor students and their families. These assumptions included (1) low-income or poor students' linguistic, cultural and socioeconomic backgrounds present challenges to learning that place them at an academic disadvantage, (2) to achieve academic success in high-needs schools takes the collective will and resources of the community, its families, students, teachers and administrators.

Despite an understanding of the challenges to learning opportunities high need students' face we believe there is strong evidence that prospective STEM teachers believe the reasons for poor academic performance lies primarily within low-income or poor students and families. Prospective STEM teachers believe (3) low-income or poor students are more likely to engage in activities counter-productive for learning and achievement than students from more affluent backgrounds and (4) low-income or poor families do not demonstrate values and behaviors that promote academic achievement. An implication of the study is the knowledge that it can contribute to efforts targeting the preparation of STEM teachers for under-resourced schools.

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Title: Robert Noyce Scholarship Program for Math, Science and Engineering K-12 Teachers

NSF Noyce Award Number: 0733841

Principal Investigator: Gay Stewart, Ph.D.

Institution: University of Arkansas, Fayetteville, Elkins Public

Email: wavering@uark.edu

Co-PI(s): Michael Wavering, Ph.D., Deborah Korth, Ed.D., Adam Huang, Ph.D., and Dennis Brewer, Ph.D.

Presenter(s): Michael J. Wavering, University of Arkansas, Fayetteville, wavering@uark.edu

Belinda Hendley, University of Arkansas, Fayetteville, bhendley@uark.edu

Discipline: Mathematics, Science, and Education

URLs: <http://physinfo.uark.edu/Noyce>

Abstract: The administrative team met numerous times and communicated regularly through e-mail to implement the first year activities, as well as plan for year two. During the 2008-2009 Academic Year, 16 University of Arkansas Robert Noyce Scholarship recipients completed their MAT Degree and requirements for teacher certification. Their intended teaching areas were: biological sciences - 4; environmental sciences - 1; mathematics - 6; physical sciences - 2; and physics - 3. In addition, two undergraduate Robert Noyce Scholarship recipients completed their baccalaureate degrees in physics.

First year students were surveyed at the beginning and end of the MAT program. Questions included (1 = strongly agree; 2 = agree; 3 = neutral; 4 = disagree; 5 = strongly disagree):

- The reason I am pursuing a teaching degree is the financial support for a graduate degree. 3.0
- If it were not for the Noyce program, I would not have enrolled in the MAT program. 3.25
- I will encourage other students to apply for the Noyce program. 1.75

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- I plan on teaching in a STEM field my entire working career. 1.92
- I think that a teacher in a STEM field is a critical profession for our country's future. 1.42

In spring 2009, 4 \$10,000 undergraduate Robert Noyce Scholars were identified to be awarded in the fall 2009. These will go to 2 physics majors, 1 mathematics major, and 1 life/earth science major. In summer 2009, 3 mathematics, 2 life/earth sciences and 5 physical/earth sciences majors will each receive \$14,500 Robert Noyce Scholarships to complete their MAT degree at the University of Arkansas.

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Title: Robert Noyce Scholars at Little Rock
NSF Noyce Award Number: 0434082
Principal Investigator: Dr. Sally A. Robison
Institution: University of Arkansas at Little Rock
Email: sarobison@ualr.edu
Co-PI(s): Dr. Alois Adams and Ms. Marion Douglas
Presenter(s): Dr. Sally A. Robison and Mrs. Carol Rigler
Discipline: Mathematics and Science
URLs: <http://www.ualr.edu/noyce>

Abstract: The University of Arkansas at Little Rock (UALR) received the Robert Noyce Scholarship grant entitled "Robert Noyce Scholars at UALR" in the summer of 2004 with the beginning date of January 1, 2005. The UALR grant is designed to encourage highly-qualified math and science majors into the field of secondary teaching within the state of Arkansas. The goal of the program is (1) to increase the number of science and mathematics graduates earning a license to teach at the secondary level (7-12), (2) to maintain a record of and increase the number of licensed science and mathematics graduates accepting positions in high-need schools as defined by the criteria in the Robert Noyce Scholarship Program solicitation, (3) to provide support for professionals with science and mathematics degrees to accomplish a career change into teaching, and (4) to sustain this program after the period of funding by NSF. Each goal will be addressed within this report.

Each grant year is designed to fund undergraduate scholarships and graduate stipends. Undergraduates receive \$7500 their first year (or typically their Junior year) and receive \$8500 in their second year (or Senior year) in the form of a scholarship. The scholarship pays the student's tuition each semester with the remainder partitioned out to the student's account for books, materials, or other educational expenses with half of the funds dispersed each semester. Graduate recipients receive \$10,000 for a single year disseminated in a similar manner over two semesters. For each year the candidate receives funding, they commit to two years of teaching in a state identified high-needs school district. Through the course of the grant, NSF funds will sponsor over of 32 undergraduates and 8 graduate students at UALR.

These UALR Noyce scholars will be recruited from currently enrolled STEM students at both UALR and local community colleges. This program provides a supportive infrastructure including a community of learners. The professional development will include an independent study in their respective content area, mentoring by experienced teachers and university professors, and various professional development opportunities as the new teachers begin teaching in "high-needs" school districts in Arkansas.

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Title: University of California-Irvine (UCI) Noyce STEM Teaching Scholarships Program
NSF Noyce Award Number: 0434153
Principal Investigator: Deborah Vandell
Institution: UC Irvine
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Co-PI(s): Sue Marshall

Presenter(s): Laurie Hansen, Project staff member and graduate student, UC Irvine Department of Education, hansenl@uci.edu

Discipline: Math and Science Teacher Education

URLs: www.gse.uci.edu/PS_FYE_NFG.php

Abstract: The Robert Noyce K-12 STEM Teaching Scholarship program at the University of California, Irvine (UCI) is one component of the UCI California Teach Science and Math Initiative (UCI Cal Teach), a comprehensive set of academic and support programs to attract and prepare STEM majors at a tier one research university for careers as math and science teachers.

Targeted at undergraduates, the core components of this initiative are: a) introductory teaching career seminars and early field experience in K-12 math and science classrooms in high-need school districts; b) specialized undergraduate degree programs that offer a B.S. in a STEM discipline and a concentration in secondary education, which provides an early start toward satisfying some requirements of the post-baccalaureate teacher credential program; c) scholarships, paid work opportunities in math and science education settings, and other financial incentives to support aspiring math and science teachers; and d) dedicated UCI Cal Teach counselors to help STEM majors successfully negotiate the pathway to completing their bachelor's degree and teacher certification.

Through this initiative, a greater number of aspiring math and science teachers have entered the UCI post-baccalaureate teacher credential program with solid preparation in their respective STEM disciplines and confidence in their career choice and in their commitment to serve the diverse student populations in California's high-need schools. UCI students who have participated in the UCI Cal Teach program are recruited to apply for the Noyce Scholarship program for up to two years: their senior year and the post-baccalaureate teacher credential program year. As pre-service teachers, Noyce Scholars further enhance their preparation for teaching high-need learners through student teaching assignments in local schools that serve ethnically diverse and low SES student populations.

As part of our Noyce Scholarships program evaluation efforts, we seek to understand how the availability of the scholarship influenced candidate's decision to apply and enroll to the UCI post-baccalaureate teacher education program, how receiving the scholarship benefited them (e.g., financially, professional support, receiving a job offer), and whether or not participating in the UCI teacher education program along with the Noyce scholarship prepared them for teaching in high-needs schools. To date, UCI has awarded 46 Noyce Scholarships.

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Title: Enabling More UCLA Science Teachers

NSF Noyce Award Number: 0335816

Principal Investigator: Arlene Russell

Institution: University of California – Los Angeles (UCLA)

Email: russell@chem.ucla.edu

Co-PI(s): Fred Freking

Presenter(s): Arlene A. Russell, UCLA, russell@chem.ucla.edu and Molly S. Hendrick, Lawndale HS, mollyhendrick@yahoo.com

Discipline: Science

Abstract: The UCLA Science Teacher Education Program (STEP) is committed to training and supporting secondary science teachers for urban schools. The two-year M.Ed program focuses on social justice and providing access to effective, engaging science instruction for students in urban schools. Students in the STEP program spend their first year taking courses in theory and methods, student teaching, and fulfilling requirements for earning a California single subject credential in science.

During the second year of the program, they complete their course work and carry out a classroom-research project leading to the M.Ed degree. Our Noyce grant, which ends August 2009, has supported a total of 44 students during its five-year lifetime.

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Title: UCSC Noyce Teacher Scholars: First Half, Year 1

NSF Noyce Award Number: 0833340

Principal Investigator: Stephen E. Thorsett

Institution: University of California - Santa Cruz

Email: gha@ucsc.edu

Co-PI(s): Sheldon Kamieniecki and Michael Isaacson

Presenter(s): Gretchen Andreasen, Cal Teach, University of California Santa Cruz, gha@ucsc.edu; Dena Sexton, Education Department, University of California Santa Cruz, dmsexton@ucsc.edu

Discipline: Teacher Education, Mathematics & Physical Sciences

URLs: <http://calteach.ucsc.edu>

Abstract: The University of California Santa Cruz (UCSC) Robert Noyce Teacher Scholars Program will prepare 32 highly qualified math and science teachers over four years to be hired into three partner school districts: Pajaro Valley Unified, Gonzales Unified, and Santa Cruz City Schools. Noyce Scholars will be recruited from the pool of UCSC undergraduate science, technology, engineering, and mathematics (STEM) majors who participate in paid middle or high school internships designed to help students assess, in a structured, low-risk environment, whether to pursue teaching. Noyce Scholars will complete UCSC's combined MA/credential program and begin their teaching careers in the partner districts. Their early career development will be supported with both district-specific induction and targeted Noyce Scholars induction support.

The Problem. Regional school districts around UCSC serve low-income, rural, agricultural communities with many English language learners. These districts struggle to recruit and retain qualified math and science teachers. Local institutions of higher education do not meet the need for math and science teachers regionally, in part due to few applications from subject-qualified candidates. For example, UCSC accepts every qualified applicant into its math credential program in 2006 that yielded only ten students.

Objectives. The objectives of the UCSC Robert Noyce Teacher Scholars Program are to: 1) increase to >24/year the number of UCSC STEM graduates in the math and science cohort of UCSC's MA/credential program (from a recent average of 16/year); 2) provide >70% of the math and science hiring needs for partner districts with well-prepared new teachers; and 3) retain >80% of Noyce Scholars in a partner district for four or more years, to support their retention in the field and continued professional growth.

Initial Effort. The first of four Noyce Scholars cohorts will start their MA/credential work in July 2009. University and district partners ranked ten applicants for the first cohort based on written applications and interviews; the districts considered them all strong. Of those ten, seven will attend UCSC's MA program (six as Noyce Scholars), and three will attend credential programs elsewhere. Incoming Noyce and non-Noyce students will be interviewed as the MA/credential program begins this summer to collect the first data in a study of emerging professional identity.

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Title: T-MAST Scholars

NSF Noyce Award Number: 0434103

Principal Investigator: Enrique Ortiz

Institution: University of Central Florida

Email: ortiz@mail.ucf.edu

Presenter(s): Enrique Ortiz, University of Central Florida, ortiz@mail.ucf.edu

Discipline: Mathematics and Science Education

URLs: <http://lockheedmartin.ucf.edu/T-MAST/>

Abstract: The Transition into Mathematics and Science Teaching (T-MAST) is a Master's degree and teacher's certification program in the area of middle school mathematics and science. It is an innovative, fast track, four semester graduate program for professionals who wish to transition into middle grade teaching that features: a master's degree with embedded certificate designed for completion in 4 semesters; accelerated, innovative classroom placement; cohort design

to promote the development of a professional community; one-year paid internship; active, multi-layered mentoring; and ongoing mentoring after graduation. The students in this program opt to pursue a degree and certification in mathematics or science. A portion of the students who participate in the Master of Arts in middle school mathematics or science program are also T-MAST Scholars.

The main roles of the T-MAST Scholars program are to offer a stipend to support students' financial needs during the program, and mentor them as they transition into the classroom and after graduation. These students would have a hard time completing the program without this financial assistance and mentoring. Only students who do not have any teaching experience and are part of one of the STEM areas qualify to receive this financial assistance.

The program supports mentoring and supervision efforts during the program through other sources. We have had 20 T-MAST Scholars since the summer 2005 semester. Sixteen of them are still working at high-need schools with 3 of them with 4 years of experience, 2 with 3 years, and 9 with 2 years. Teacher retention in the classroom at high-need schools has been very positive. Recruitment of new students has intensified and we are working on increasing students' enrollment in this program.

63

Title: Noyce Experiences in CU Applied Mathematics

NSF Noyce Award Number: 0833258

Principal Investigator: Valerie Otero

Institution: University of Colorado at Boulder

Email: eric.benzel@colorado.edu

Presenter(s): Eric Benzel, Undergrad Noyce Fellow, CU Boulder, eric.benzel@colorado.edu

Annie Venturo, Undergrad Noyce Fellow, CU Boulder, Annie.Venturo@colorado.edu

Discipline: Math Education

Abstract: Serving as a Noyce Fellow at the University of Colorado entails much more than simply receiving a stipend in the mail. Students are expected to contribute in significant ways to their Undergraduate department in order to further their own teaching abilities. Noyce fellows in the Department of Applied Mathematics have been working on various projects within and outside the department since 2004. This poster will feature an overview of the various projects with extended research results on the two most recent projects: oral exams in lower division calculus and high school algebra classes. Current and past Noyce Fellows' perspectives on the program are also included to give a sense of the impact of these projects in the preparation of future math teachers.

64

Title: Recruitment Strategies

NSF Noyce Award Number: 0833276

Principal Investigator: Denise S. Mewborn

Institution: University of Georgia

Email: dmewborn@uga.edu

Co-PI(s): J. Steve Oliver and Charles Kutal

Presenter(s): Denise S. Mewborn, University of Georgia, dmewborn@uga.edu

Discipline: Science Education and Mathematics Education

URLs: http://www.coe.uga.edu/mse/nsf_info.html

Abstract: We will provide an overview of the recruitment strategies we used to secure our first class of Noyce Fellows. These strategies include alliances with the Louis Stokes Peach State Alliance for Minority Participation (an NSF-funded coalition of six colleges and universities in Georgia designed to significantly increase the number of underrepresented minority students statewide who complete undergraduate degrees in STEM fields) and the Center for Latino Achievement and Success in Education (a research and development center designed to narrow the achievement gap of Latino students placed at risk due to poverty and language barriers and to improve the level of education of Latino students [PreK-16] statewide).

65

Title: University of Houston Noyce Scholarship Program

NSF Noyce Award Number: 0833342

Principal Investigator: Laveria F. Hutchison

Institution: University of Houston

Email: lhutchison@uh.edu

Co-PI(s): Jeffrey Morgan

Presenter(s): Laveria F. Hutchison, University of Houston, lhutchison@uh.edu

Sara Barber, University of Houston, artfulseas@gmail.com

Robert Houston, University of Houston, rhouston@uh.edu

Susan Williams, University of Houston, swilliams@uh.edu

Discipline: Mathematics and Science

URLs: URL for the teachHouston Project - <http://teachhouston.uh.edu>

URL for the Transition to Teaching Project - <http://transition.coe.uh.edu/>

Abstract: This poster presentation presents ideas that address ways to support teacher candidates as they prepare to become teachers in the STEM-related areas of science and mathematics. At the national level, schools districts in the United States will need approximately 283,000 additional science and mathematics teachers by the year 2015. According to Spencer (2005), the need for teachers in these subjects is particularly high in the Houston area and there is an increasing need to identify ways to provide scholarship support that will allow teacher candidates to complete the process of becoming certified teachers.

According to the Center for Research, Evaluation and Advancement of Teacher Education (2007), Houston is highly diverse with urban, suburban and rural communities and ranks fourth nationally for having the highest Hispanic and Latino population, fifth for the highest African-American population and eighth for the highest Asian population. In addition, the fifty-six Houston area school districts are highly diverse with 52.5% Hispanic and Latino students, 34.1% African-American students, 10.8% Asian students, 10.6% white students and 0.3% Native American students. The achievement gap among students enrolled in STEM-related subject areas is a concern with Hispanics and African-Americans averaging a four-year deficit in skill knowledge behind their White and Asian peers when they leave high school. Unless Houstonians are provided with a better education, income inequalities could expand and deepen with Houston already suffering from a 20.3% poverty rate, much higher than the Texas rate of 15.4%, and the national rate of 12.4%.

The University of Houston is uniquely qualified to address the preparation for effective STEM-qualified teachers. As one of the most diverse research institution in the country, UH educates some of the nation's most underserved and underrepresented student populations. The composition of the city and school districts will provide opportunities to design and evaluate instructional strategies for use in maintaining qualified teachers in STEM disciplines, conduct research on the effectiveness of these strategies, and disseminate research-based instructional products and findings to a national audience of educators, school administrators, service centers, business partners and political leaders.

The Noyce Scholars will participate in one of two STEM-specific teacher preparation programs at UH, depending on their level of education. Undergraduates will participate in the teachHOUSTON program with this program receiving six scholarships of \$10,000 each awarded every year for five years. The post-baccalaureate and graduate-level Noyce Scholars will be members of the U.S. Department of Education-funded Transition to Teaching program at UH receiving six scholarships of \$10,000 each awarded every year for five years.

This presentation will demonstrate scholarship selection criteria, instructional delivery systems, participant reflections and the evaluation system.

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Title: Topolo-what? Exposing Students to Graduate Math

Principal Investigator: David Leep

Institution: University of Kentucky (NSF GK-12 Project)

Email: cgregory@ms.uky.edu

Presenter(s): Casey Gregory and Pamela Callahan, University of Kentucky, Algebra Cubed (An NSF-GK-12 Project), cgregory@ms.uky.edu; Pam.Callahan@Powell.kyschools.us

Discipline: Secondary Mathematics

URLs: <http://www.ms.uky.edu/algebracubed/index.htm>

Abstract: Toplo-what? is a lesson plan designed for the secondary geometry classroom. This lesson is a great motivator for students because it explains high-level mathematics in an understandable, low-stress environment. This lesson acts simultaneously as a challenge to more accomplished students and as a creative outlet for those who struggle with the technicalities in mathematics.

Previous Knowledge Necessary:

None. While it would be beneficial to have a good understanding of set theory, three dimensional geometry and function behavior to master the topics in the lesson, that is not the point. The intent is to motivate students and expose them to new and advanced ideas.

Motivation: Mrs. Callahan's geometry classes were visited by University of Kentucky graduate student Casey Gregory twice a week during the 2008-2009 year. Ms. Gregory noticed that students were curious about the type of math studied at the graduate level. To answer these questions she developed Topolo-what?.

Presentation: Audience members will first participate as if they were geometry students, and then will learn about the reactions of Mrs. Callahan's students.

The lesson consists of a twenty-minute interactive Powerpoint presentation, and two projects. The Powerpoint outlines the birth of Topology, basic definitions of sets, functions, a topology, equivalence classes, homeomorphisms and quotient maps. Basic topological shapes are also introduced. The first project is a sample of preliminary exam problems at the graduate level. The second project involves using topological manipulatives to understand non-orientable surfaces.

More lesson plans can be found at <http://www.ms.uky.edu/algebracubed/index.htm>

67

Title: Using Online Social Networking in UK-NOYCE

NSF Noyce Award Number: 0733790

Principal Investigator: Margaret J. Mohr-Schroeder

Institution: University of Kentucky

Email: m.mohr@uky.edu

Co-PI(s): Jeffrey Osborn, Jana Bouwma-Gearhart, and Bruce Walcott

Presenter(s): Kayla Gifford, University of Kentucky, kay.giff@uky.edu; Garnett Coy, University of Kentucky, garnett.coy@uky.edu; Margaret J. Mohr-Schroeder, University of Kentucky, m.mohr@uky.edu; Jeffrey Osborn, University of Kentucky, jlosbo3@email.uky.edu; Jana Bouwma-Gearhart, University of Kentucky, jana.bouwma-gearhart@uky.edu; and Bruce Walcott, University of Kentucky, walcott@engr.uky.edu

URLs: <http://www.uky.edu/Education/EDC/Math/noyce>

Abstract: Teacher preparation programs, complimented by UK-NOYCE, provides fellows with unique experiences. One of the favorite experiences is student teaching. Student teaching is filled with day-to-day experience that only cooperating teachers get to share with their student teachers. The minimal interaction between student teachers and their program director/ university supervisor is often a barrier to effective instruction. Online social networking can be a venue for connecting university supervisors/program directors to student teachers' daily triumphs and challenges.

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Title: STEM Bridge Noyce Scholarship Program
NSF Noyce Award Number: 0434110
Principal Investigator: Allan Feldman
Institution: University of Massachusetts Amherst
Email: afeldman@educ.umass.edu
Co-PI(s): John Francisco, Farshid Hajir, and Morton Sternheim
Presenter(s): Allan Feldman, University of Massachusetts Amherst, afeldman@educ.umass.edu
URLs: <http://k12s.phast.umass.edu/bridge/>

Abstract: The STEM Bridge Noyce Scholarship Program is a joint effort of the University of Massachusetts Amherst (UMass) School of Education and the Science, Technology, Engineering, and Mathematics (STEM) Education Institute. Its goal is to award 52 Noyce Scholarships with an average value of \$8173.00 to 32 undergraduates and post-baccalaureate students preparing to become secondary science or mathematics teachers. A focus of the program is to recruit non-traditional candidates including community college transfer students and those completing their degrees through the University Without Walls.

The STEM Bridge Program builds upon past achievements at the STEM Ed Institute in the reform of undergraduate STEM teaching and the development of mechanisms for the support of new teachers, and of the UMass School of Education, which is one of the largest preparers of science and mathematics teachers in Massachusetts, and is a leader in pre-service and in-service teacher education as well as in educational research. STEM Bridge scholars are supported through an introductory course in math and science teaching, academic and social events, and mentors and advisors. New teacher support includes a New Teacher Support Group, Saturday Science and Engineering Seminars, STEM education seminars, and the opportunity to enroll in several innovative M.Ed. programs for math and science teachers.

The major challenge encountered has been the difficulty of attracting enough qualified applicants despite extensive recruiting efforts and the extension of the scholarship program to post-baccalaureate students. Data from the formative evaluation suggests that there is a stigma associated with the phrase “high-needs” that has a major impact on applications. We are preparing summative data that compares Noyce alumni’s teaching with their performance as student teachers.

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Title: Writing in the Mathematics Classroom
Institution: University of Michigan, Columbia Teachers College
Email: jrlong9@yahoo.com
Presenter(s): Robert LaColla, Lee Umphrey, & Jesseca Long
Discipline: Writing in Mathematics

Abstract: Robert LaColla is a 2008 Master Teacher of the NY-based Math for America (MfA) and teaches math and art at the Secondary School for Research in Brooklyn, NY. Formerly a 2005 NYC Teaching Fellow, Robert arrives in the classroom via an untraditional route after studying art during his undergraduate years. However, it is in the classroom that he loves to improve his technique; he has spent a significant portion of his energy this year improving literacy in the math classroom.

He presents this work with his 2008 MfA Master Teacher colleague Jesseca Long, currently serving at Bronx International HS. Formerly a Peace Corps Volunteer and Teaching Fellow, Jesseca brings a background in French, ESL, and Linguistics into her mathematics classroom.

Their session focuses on a variety of both high- & low-stakes, practical ways to engage students in writing in the mathematics classroom. Participants will explore the benefits of incorporating writing into mathematics, experience a sampling writing activities for themselves, review samples of student work, and have the opportunity to discuss potential struggles and concerns around classroom implementation.

70

Title: Evaluation of the Noyce Scholarship Program: Focus on Recruitment
 NSF Noyce Award Number: 0514884
 Principal Investigator: Frances Lawrenz
 Institution: University of Minnesota
 Email: lawrenz@umn.edu
 Presenter(s): Maureen Braam
 Discipline: Noyce Program Evaluation
 Website/URL: <http://education.umn.edu/EdPsych/NOYCE/default.html>

Abstract: This project is designed to evaluate the Robert Noyce Scholarship Program with the help of the Noyce projects nationwide. The evaluation is grounded in an extensive review and categorization of literature on STEM recruitment and retention. Additionally extensive help and support has been obtained from the Noyce projects in terms of identifying critical issues, in developing instruments, and in collecting and interpreting data. The project has two searchable data bases about STEM teacher preparation, recruitment and retention as well as copies of any presentations and videos of three virtual conferences held with the Noyce projects. The evaluation includes surveys of PIs, scholars and involved disciplinary faculty as well as interviews with scholars and school district representatives. We have also incorporated data from the ORC MACRO monitoring system. The poster presents results about how recruitment takes place, who is recruited and who should be recruited based on information from the different data sources and various analyses. The data reflects the wide diversity inherent in the Noyce projects and the motivations and outcomes of the scholars.

71

Title: MU Noyce Scholars Program- Science/Math Teachers
 NSF Noyce Award Number: 0832765
 Principal Investigator: Dr. Sandra Abell
 Institution: University of Missouri
 Email: souciema@missouri.edu
 Co-PI(s): Dr. Fran Arbaugh, Dr. Oscar Chavez, Dr. John Adams, Dr. Mark Volkmann, and Dr. Alan Whittington
 Presenter(s): Marilyn Soucie, University of Missouri, souciema@missouri.edu
 Discipline: Science and Mathematics
 URLs: <http://www.smar2t.missouri.edu/noyce.html>

Abstract: The goal of this Noyce-funded project is to recruit more highly qualified individuals into careers in mathematics and science teaching. In particular, we recruit individuals with undergraduate degrees (or higher) in mathematics or science who are planning to change career paths into the field of teaching. These students are prepared through SMAR2T: Science and Mathematics Academy for the Recruitment and Retention of Teachers, an alternate route to certification.

The Noyce program will provide 42 stipends of \$10,000 each to qualified STEM professionals who hold a baccalaureate, masters, or doctoral degree in mathematics, science, or a related field. These students are obligated to teach mathematics or science for two years in a high need school district (preferably in Missouri), within 6 years of program completion. We will also create an online social network for SMAR2T/Noyce students and graduates to provide continuing emotional and pedagogical support.

72

Title: UNCG Project Excellence in Science Education Learning
 NSF Noyce Award Number: 0833280
 Institution: University of North Carolina at Greensboro
 Principal Investigator: Terence A. Nile
 Email: tanile@uncg.edu
 Co-PI: Betty Epanchin, Catherine E. Matthews, Jerry L. Walsh

POSTER ABSTRACTS

Presenter(s): Jerry Walsh, jlwash@uncg.edu
URL: <http://www.uncg.edu/soe/ExSEL.html>

Abstract: The University of North Carolina at Greensboro is beginning the first year of Noyce scholarships with a program called Project ExSEL (Excellence in Science Education Learning). In a cooperative effort between the science departments in the College of Arts and Sciences and the science education specialists in the School of Education, our goal is to greatly increase the number of students who pursue science teaching licensure.

The goal has been reinforced by UNCG and by the university system's General Administration, who have put STEM teacher preparation as a high priority. Project ExSEL will recruit Noyce Scholars by providing teaching and educational experiences for freshmen and sophomores in the university science lab courses. Cohort activities will be organized to acquaint the potential Noyce scholars with the teaching profession and with current teachers.

These pre-Noyce scholars will also be provided with summer internships where they work with science and science education faculty in professional development programs for teachers. As students become interested in helping others learn, they will be lured toward a science teaching career. The Project ExSEL Scholars will continue cohort educational activities as well as experiences in teaching during their junior and senior years while they are supported on scholarship.

73

Title: The University of North Carolina at Pembroke (UNCP) Robert Noyce Scholarship Program
NSF Noyce Award Number: 0531994
Principal Investigator: Rachel A. McBroom
Institution: University of North Carolina at Pembroke
Email: rachel.mcbroom@uncp.edu
Co-PI(s): Velinda Worix, Mary Klinikowski
Presenter(s): Rachel A. McBroom, UNC Pembroke, rachel.mcbroom@uncp.edu

Abstract: The main goal of The University of North Carolina at Pembroke (UNCP) Robert Noyce Scholarship Program, funded by the National Science Foundation in fall 2005, is to increase the number of highly-qualified math and science teachers entering the profession. UNCP, a historically Native American institution and one of the most culturally diverse campuses in the southeastern United States, also seeks to increase the numbers of math and science teachers from underrepresented groups. UNCP plans to produce thirty math and science teachers that will hopefully remain in rural southeastern North Carolina to fulfill their teaching requirement in the region's high-needs schools. UNCP Noyce Scholars complete their teacher licensure requirements through either the undergraduate teacher education program (while completing a STEM major) or through the Masters of Arts in Teaching (MAT) program.

In addition to recruiting strong STEM majors into the education profession, the program provides support for Scholars as they complete their licensure requirements and into their initial years as classroom teachers. Recruitment, retention and support efforts, as well as, enrichment activities provided to the Noyce Scholars will be described. Twelve of the twenty-five UNCP Noyce Scholars have graduated and are employed by or seeking employment in high-needs schools in North Carolina. Approximately five new Noyce Scholars will be identified for the 2009-10 academic year.

74

Title: UNT Science & Mathematics Noyce Scholarships
NSF Noyce Award Number: 0532017
Principal Investigator: Pamela Esprivalo Harrell
Institution: University of North Texas
Email: pam.harrell@unt.edu
Co-PI(s): Kay Litler, Diana Mason, and Lee Hughes
Presenter(s): Pamela Esprivalo Harrell, University of North Texas

Discipline: Science and Mathematics
 URLs: <http://www.unt.edu/noyce/>

Abstract: UNT Science and Mathematics Robert Noyce Scholarship Program at the University of North Texas was initiated in 2005. This program is designed for undergraduates and graduates who teach mathematics or science in a high need school for at least two years. Undergraduates receive up to two years of funding and graduates are eligible for one year of funding (\$7750/year).

The first teacher cohort completed the two-year teaching commitment in May, 2008. Our program research investigates induction, classroom environment, teacher efficacy, and technology proficiency among program participants.

75

Title: University of Rochester Noyce Scholars Program
 NSF Noyce Award Number: 0733817
 Principal Investigator: Raffaella Borasi
 Institution: University of Rochester
 Email: csmith@warner.rochester.edu
 Co-PI(s): April Luehmann, Jeffrey Choppin, Michael Gage, and Jack Kampmeier
 Presenter(s): Constance Smith, Warner Graduate School of Education at University of Rochester, csmith@warner.rochester.edu
 Discipline: Education
 URLs: <http://www.rochester.edu/warner/index.php>

Abstract: Our first cohort of eleven STEM majors and professionals will be ready to teach in high-need schools as of Fall 2009. All of these Noyce Scholars have had experiences teaching in the Rochester City School District, an urban district with high poverty rates, low state test scores, and a shortage of qualified teachers in mathematics and science, and a key collaborator in this project.

Of the eleven scholars, 7 are enrolled in science programs and 4 in the mathematics program; they include 6 career changers. The science teacher candidates participated in the "Get Real! Science" teacher preparation program, designed by April Luehmann, and will be eligible for some additional post-graduation opportunities after their first year of teaching. The second cohort of another 11 STEM majors and professionals began their program in May 2009.

76

Title: Noyce Scholarship Program at Southern Mississippi
 NSF Noyce Award Number: 0630436
 Principal Investigator: Deborah Booth
 Institution: University of Southern Mississippi
 Email: Deborah.Booth@usm.edu
 Co-PI(s): Mary Peters, Chris Sirola, Sherry Herron
 Presenter(s): Deborah Booth, University of Southern Mississippi, deborah.booth@usm.edu
 Discipline: Chemistry, Biology, Math & Physics
 URLs: www.usm.edu/noyce

Abstract: The University of Southern Mississippi was founded in 1910 as a teachers college and continues this strong tradition in teacher preparation. In the spirit of this tradition, the Southern Miss College of Science and Technology is meeting the increasing demand for highly-qualified STEM teachers in the state of Mississippi with greater efforts to recruit students into science teacher preparation programs. Southern Miss has now adopted a new recruitment strategy with the (SM)2 program, Science and Math at Southern Miss.

POSTER ABSTRACTS

The Robert E. Noyce Scholarship Program at the University of Southern Mississippi is an integral part of this recruiting effort, building on the existing secondary level licensure programs in chemistry, physics, biology, and mathematics housed within their respective content departments in the College. These established programs are designed to produce highly-qualified STEM teachers with degrees in the content areas. Twenty-nine teacher candidates in these discipline areas will be funded and trained as Noyce Scholars. These candidates are recruited from currently enrolled STEM students at both Southern Miss and local community colleges. Scholarship recipients are also required to fulfill a community service learning project, such as volunteering as tutors in the school districts or as peer mentors/tutors on campus.

The heart of the Noyce Scholars experience is the Science and Math at Southern Miss and the New Teacher Induction Program. This program provides a supportive infrastructure including a community of learners, an on-line bulletin board, mentoring by experienced teachers, and professional development opportunities as the new teachers begin teaching in "high-needs" school districts which are primarily located in southern Mississippi. The professional development will include a special session in their respective content area, Noyce Scholar Reflections, at the annual state professional conferences.

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Title: NSF Robert Noyce Teacher Scholarship Program
NSF Noyce Award Number: 0632239
Principal Investigator: Robert Hilborn
Institution: University of Texas at Dallas
Email: mont@utdallas.edu
Co-PI(s): Homer Montgomery, Mary Urquhart, John Silbert
Presenter(s): Allison Pace, UTeach student, ajp065000@utdallas.edu
Discipline: Science and Mathematics Education
URLs: <http://www.utdallas.edu/scimathed/>

Abstract: The Noyce Teacher Scholarship Program is instrumental to the successful replication of the nationally-recognized UTeach program at the University of Texas at Dallas. The Noyce Program funds many of the scholarships and internships that are critical to our success in producing the next generation of outstanding science and mathematics teachers.

UTeach Dallas has just completed its first year of implementation. As such, UTeach students have now participated in the exploration courses to determine whether they have a true interest and aptitude to teach. Most students participating in the program are freshmen and sophomores but upperclassmen also participated. Juniors and seniors continuing in the program have been notified and encouraged to apply for the Noyce funds to cover tuition and fees beginning in fall of 2009. Based on student response, there is strong interest in Noyce scholarships. Evaluation of the initial Noyce recipients will be available after the start of classes in the fall. The number of eligible students will increase significantly in the spring of 2010. Additionally, Noyce funds have been put to effective use to support UTeach student internships that are essential components and expectations of UTeach replication sites.

UTeach Dallas students have received payment for time committed to various internship opportunities during the spring and continuing into summer 2009. Internships are an essential component of the UTeach program. Students are exposed to additional educational experiences in formal and informal science venues to hone their skills in preparation for a teaching career. At this time, approximately 18 students are involved. Additional opportunities will become available in the fall 2009. Internships include:

- Teaching environmental science lessons at the Richardson Independent School District (RISD) Environmental Studies Center.
- Teaching science lessons at local summer science camps.
- Teaching robotics lessons to 6th grade students in selected RISD campuses.
- Tutoring summer school students for RISD.
- Teaching engineering principles to middle age females at the UTD summer physics camp.

A typical UTeach Dallas intern is eligible for a minimum of 20 hours of work per week at a rate of \$12 per hour.

The Noyce Teacher Scholarship Program has made it possible for UTD to implement and to expand the UTeach program. The Noyce Program thus plays a direct and constructive role in producing outstanding mathematics and science teachers.

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Title: UTSA's Noyce Scholars Program

NSF Noyce Award Number: 0433667

Principal Investigator: Dr. Joseph Lazor (College of Sciences/UTeach Program)

Institution: University of Texas at San Antonio

Email: Stuart.Birnbaum@UTSA.edu

Co-PI(s): Dr. Richard Diem (College of Education and Human Development), Dr. Betty Travis (College of Sciences), Dr. Stuart Birnbaum (College of Sciences) and Dr. Amir Karimi (College of Engineering)

Presenter(s): Dr. Stuart Birnbaum, University of Texas San Antonio and April Tracy, Mathematics Teacher, Northeast School District, San Antonio, Texas

Discipline: Mathematics, Science and Education

URLs: <http://www.UTSA.edu/UTeach/Noyce.htm>

Abstract: The University of Texas at San Antonio's (UTSA) Noyce scholars Program supports undergraduate students in the UTeach Program as well as post-bac students in the Accelerated Teacher Education Program (A-TEP). Since the beginning of the Noyce awards at UTSA in October 2004, a total of 36 students have received scholarships or stipends. Of those 36, 25 are teaching.

There are three objectives for UTSA's Noyce Scholarship Program:

1. Provide scholarships for STEM Juniors and Seniors and stipends for STEM post-baccalaureates who are willing to teach science and/or mathematics in high-need school districts.
2. Provide a focused teacher certification program through collaboration among the College of Education and Human Development, the College of Sciences, the College of Engineering, and the Honors College.
3. Provide a support system for new teachers in the high-need school districts through a partnership between UTSA and collaborating high-need districts.

[Goal 1] During the 2008-09 academic year UTSA was awarded supplemental funds, allowing for an additional 8 stipends to support post-bac/career-changers seeking teacher certification. We anticipate that 6 of those 8 will be awarded by the beginning of the fall semester. [Goal 2] The College of Education and Human Development and the College of Sciences have been working together to streamline the teacher certification process.

The newly revised program to be implemented in fall 2009 will require no more than 21 credit hours of certification courses, compared to the 33 hours currently in place. [Goal 3] UTSA continues to collaborate with other universities in San Antonio that have received Noyce awards, along with other colleges and universities involved in teacher preparation.

For the past two years through business partnerships 6 awards have been given to math and science teachers each year. This coming year we intend to double those awards, and connect business partners with individual teachers to provide support at least during the first five years of teaching.

POSTER ABSTRACTS

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Title: UT Permian Basin Noyce Scholars
NSF Noyce Award Number: 0833283
Principal Investigator: Roy Hurst
Institution: The University of Texas - Permian Basin
Email: hurst_r@utpb.edu
Co-PI(s): Doug Hale
Presenter(s): Roy Hurst, The University of Texas - Permian Basin, hurst_r@utpb.edu
Discipline: Science and Math

Abstract: In response to the critical need for K-12 teachers of science and mathematics in southwest Texas, the University of Texas of the Permian Basin (UTPB) is recruiting highly qualified STEM majors and professionals to become effective teachers in high-need school districts. The first cohort of Noyce Scholars is being selected to begin their preparation in Fall 2009. UTPB serves a geographically remote area with a large Hispanic population, and females and Hispanics comprise more than 60% of the university's enrollment. By reducing the financial barriers and fostering a supportive infrastructure, the project will facilitate the success and retention of teachers of science and mathematics, especially those who are underrepresented in STEM fields.

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Title: Tools Systems to Support Early Career Teachers
NSF Noyce Award Number: 0833012
Principal Investigator: Mark Windschitl
Institution: University of Washington
Email: mwind@u.washington.edu
Co-PI(s): Mike Brown and Loyce Adams
Presenter(s): Mark Windschitl, University of Washington, mwind@u.washington.edu
Discipline: Science Education

Abstract: At the University of Washington we are midway through an eight-year effort to develop and study a system of tools for early career and pre-service secondary science teachers. This system is designed to support transitions from novice to expert-like pedagogical practice. To begin this effort we studied a cohort of novice science teachers for three years in order to determine challenges they face in taking up ambitious pedagogy. We followed this cohort through pre-service, student-teaching, and into a year-long induction program focused on the examination of student work to improve teaching practice.

We have documented that the tool-supported, collegial examinations of student work during the induction year advanced participants practice in about one-third of cases to expert-like levels. Also as a result of this initial study, we have been able to develop a broader suite of specialized pedagogical tools, targeted to the needs of beginning science teachers.

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Title: ACT!: Alternative Careers in Teaching
NSF Noyce Award Number: 0833324
Principal Investigator: Michael E. Beeth
Institution: University of Wisconsin Oshkosh
Email: beeth@uwosh.edu
Co-PI(s): Tammy J. Ladwig and Michael Lizotte
Presenter(s): Michael E. Beeth, University of Wisconsin Oshkosh, beeth@uwosh.edu
Tammy Ladwig, University of Wisconsin Fox Valley, tammy.ladwig@uwc.edu
Discipline: Science Education
URLs: www.uwfox.uwc.edu/academics/act2teach/

Abstract: This ACT! program provides stipends of \$10,000 for 10 individuals/year (50 stipends over 5 years) to talented professionals in science and mathematics related majors who are transitioning into careers as secondary mathematics or science teachers. This proposal responds to the critical need to attract, mentor and retain highly qualified science and mathematics teachers in Wisconsin schools with a high percentage of families with incomes below the poverty line, a high percentage of secondary teachers teaching out of field or a high teacher turn over rate. According to Stout (2007), Wisconsin schools with the highest percentage of poverty have roughly twice the percentage (26% compared to 13%) of “new teachers” and those teaching with less than three years of teaching experience. The region served by the ACT! program encompasses four (of twelve) Cooperative Education Service Areas (CESA's) serving 152 school districts in northeastern and southeastern Wisconsin.

CESA's serve educational needs in all areas of Wisconsin by serving as a link between school districts and between school districts and the state. Cooperative Educational Service Agencies may facilitate communication and cooperation among all public and private schools, agencies and organizations that provide services to pupils. The six school districts in CESA 1 include the large urban districts of: Milwaukee, West Allis-West Milwaukee, Racine and Kenosha. CESA 6 is the University of Wisconsin Oshkosh home region and includes the Oshkosh Area School District and 3 other large districts in close proximity. The Green Bay School District is the largest district in CESA 7 with 47.1 percent of students eligible for subsidized lunch. Finally, CESA 8 serves the largely rural, impoverished region in northeastern Wisconsin.

This proposal addresses the need to place highly-qualified mathematics and science teachers in these schools through the Alternative Careers in Teaching licensure program (ACT!). The ACT! program targets highly qualified individuals who possess a baccalaureate degree, extensive and relevant work experience in a field related to mathematics or science, and a desire to transition into a career as secondary science or mathematics teachers. The selection of Robert Noyce Teacher Stipend recipients support individuals who have exceptional knowledge and life experience in math or science related fields, and who have the desire to teach in the high-need schools in Wisconsin.

ACT! is the only alternative licensure program in the state of Wisconsin devoted exclusively to the preparation of secondary science and mathematics teachers. The program is a collaborative alternative teacher preparation program between the University of Wisconsin Oshkosh and five University of Wisconsin Colleges (two-year colleges). ACT! is approved as an alternative licensure program by the Wisconsin Department of Public Instruction.

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Title: Virginia Teach: Serving Math Students in Need

NSF Noyce Award Number: 0832992

Principal Investigator: Anderson Norton

Institution: Virginia Polytechnic Institute and Montgomery County Schools

Email: norton3@vt.edu

Co-PI(s): Jesse Wilkins, Vanessa Pitts Bannister, and Gwendolyn Lloyd

Presenter(s): Anderson Norton, Virginia Tech, norton3@vt.edu

Discipline: Secondary School Mathematics

URLs: <http://www.mathed.soe.vt.edu/virginiateach.html>

Abstract: The “Virginia Teach” Noyce scholarship program began with a year of great success. We have awarded 8 Noyce Scholarships to upper-graduate math majors who will complete Virginia Tech's 5-year licensure program (the fifth year is a graduate year that leads to an MEd) and will become secondary school math teachers. We also awarded and oversaw 5 internships for sophomores who spent their spring break working in a pair of high-need middle/high schools.

Applications for the internships and scholarships included more qualified students than we could accept. To provide some indication of this, we can report that the internships were filled by five sophomore math majors with a combined GPA of 3.88. These sophomores spent their spring break working in two local high-need schools in Appalachia: one middle school and one high school. All of them reported positive impacts of the experience on their desires to teach secondary school. Three of them also reported positive impacts on their desire to teach in high-need schools.

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The three scholarships for cohort A (a one-time offering for rising graduate students) and the five scholarships for cohort B (a typical cohort of rising seniors with funding for the senior year and graduate year) were filled by math majors with a combined GPA of 3.65. We just awarded scholarships to these cohorts in March, so we have no data from them. However, much of the feedback from the Noyce interns could apply to scholars as well.

Noyce interns valued the clustering of mentors and interns because they had more opportunity to see different teaching styles and communicate their experiences. When asked how we might improve the internship, several interns suggested we provide opportunities for them to observe and participate in even more classrooms, including classrooms across the two schools. They also suggested we provide even more opportunities for discussion, such as a chat room (we had provided a forum for daily reflections, but the forum was not especially conducive to scheduled chats). These suggestions indicate that our clustering approach to field placements and plans for community building will be valued by scholars, as well as interns.

Existing community-building plans include one “main event” each semester: a colloquium related to teaching math in high-need schools every fall, and a trip to the Virginia Council of Teachers of Mathematics (VCTM) conference each spring. They also include the creation of various forums for ongoing communication between past and present scholars. The VCTM conference provides a forum for professionals across the state to share ideas and support one another in their lifelong development as teachers. We strongly desire for our scholars to experience the value of such a forum and want to indoctrinate all scholars into the VCTM community, as well as the nation-wide (and affiliated) NCTM community.

Results of our recruiting and community-building support efforts are preliminary at this point, but we are encouraged by the level of interest and quality of feedback the project has received so far.

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Title: Underrepresented Engineers as Mathematics Teachers

NSF Noyce Award Number: 0630417

Principal Investigator: Robert G. Olsen

Institution: Washington State University

Email: bgolsen@wsu.edu

Co-PI(s): Robert G. Olsen and Tariq T. Akmal

Presenter(s): Robert G. Olsen, Washington State University, bgolsen@wsu.edu

Discipline: Engineering, Mathematics Education

URLs: www.math.wsu.edu/math_ed_activities/NSFNoyce09.pdf

www.eerc.wsu.edu/outreach-and-retention/noyce.shtml

Abstract: Washington State University (WSU) is offering Noyce scholarships to 1) engineering majors who agree to remain in school an additional year to earn a teaching certificate and 2) math education majors who agree to remain in school an additional year to complete a minor in engineering. The engineering background will provide examples they can use in class to provide motivation for the study of mathematics. Middle and/or High School students will benefit from more relevant education (because engineers use math on a daily basis and can provide a real context for lesson topics) and be exposed to professional opportunities that they may not have known about previously. The plan is that the WSU Noyce Scholars will return to their home communities as math teachers. These new teachers will be well qualified to teach math, will be mentored, will serve as role models and able to encourage more of their students to pursue professional careers in science and engineering.

Recruiting efforts are targeted on WSU students from several counties in south central Washington. The average inhabitant of these counties has a substantially smaller income and is much less likely to hold a BS degree than the average Washington State resident. Students who live there are much more likely to be of Hispanic ethnicity than those in other geographic areas of the state and to attend high need schools, the target for the Robert Noyce Scholarship Program. In 2008, the first students completed the program and began their teaching careers.

Two Noyce Scholars are now employed: one in the high need school in the district where she student taught, another is in a long-term substitute position teaching 9th and 10th grade math, and a third returned to college to add an additional endorsement. Four Noyce Scholars will complete their student teaching in high-need schools in fall of 2009.

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Title: Recruiting Teachers in West Virginia

NSF Noyce Award Number: 0833111

Principal Investigator: J. Kasi Jackson

Institution: West Virginia University

Email: kasi.jackson@mail.wvu.edu

Co-PI(s): Johnna Bolyard, Michelle Withers, David Miller, and Jeffrey Carver

Presenter(s): J. Kasi Jackson, Asst. Professor, Ctr for Women's Studies, Eberly College of Arts & Sciences, kasi.jackson@mail.wvu.edu; Johnna Bolyard, Asst. Professor, Curriculum & Instruction/Literacy Studies, College of Human Resources & Education, Johnna.Bolyard@mail.wvu.edu

Discipline: Women's Studies, Chemistry, Math, Biology

URLs: http://wmst.wvu.edu/financial_assistance_awards_scholarships/teach_wv

Abstract: Senator Jay Rockefeller visited West Virginia University on April 15th and met with students for an informal lunch discussion about the Robert Noyce Teacher Scholarship Program, which Rockefeller co-authored. WVU's Noyce program (TEACH-WV - Teaching Excellence for High Achievement in West Virginia) aims to recruit 20 students to complete the Benedum Collaborative 5 year teacher-training program. Scholars earn a STEM bachelor's degree, as well as a master's degree in education upon completing the program. In exchange for 3 years of support (\$10,000 per year), the students will teach for 6 years in high need West Virginia schools.

Participants included the Noyce project team of faculty from the Eberly College of Arts and Sciences and the College of Human Resources and Education, master's students who graduated from the 5 year teacher training program in 2009, the first 3 undergraduate recipients (all sophomores in math) of the WVU awards, along with undergraduate physics students who have contemplated teaching as a career.

The topics of the discussion included issues facing students and teachers at rural schools -- a crucial issue for W.V. where there are a high number of people living in rural communities. Common challenges for rural systems, such as salary inequity, multiple teaching assignments, and inadequate numbers of qualified teachers, are issues that are crucially important to children's education (Education Alliance, 2004).

In addition, attendees discussed the recruitment of highly qualified science students to K12 teaching careers; particularly in the high-need areas of chemistry and physics. Science students identified salary and opportunities for continuing scientific research as crucial incentives for recruitment.

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Title: Noyce Scholars at WPI and Clark University with Worcester Public Schools (2008-11)

NSF Noyce Award Number: 0201950

Principal Investigator: Robert Traver

Institution: WPI, Clark University, Worcester Public Schools

Email: rtraver@wpi.edu

Co-PI(s): Daniel Gibson, John Goulet, Stephen Jasperson, Kristen Wobbe, and Tom DelPrete (PI of subcontract)

Presenter(s): Robert Traver, WPI, rtraver@wpi.edu

Mark Brophy, Worcester Public Schools, brophym@worc.k12.ma.us

Discipline: STEM

URLs: www.wpi.edu

http://users.wpi.edu/~goulet/teacher_prep/teacher_prep.htm

<http://www.wpsweb.com/administration/hr/mentor.asp>

<http://www.clarku.edu/departments/education/>

Abstract: WPI, an engineering, mathematics and science university in Worcester, MA, and Clark University, a neighboring liberal arts university, together will increase the supply of high-quality STEM teachers at the middle and high school level for

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inner-city districts. With five Noyce undergraduate scholarships and graduate stipends per year, 25 high-quality STEM majors will be recruited to, prepared for, and employed in a high-need city school district--Worcester, MA (>50% free and reduced lunch.) The broad impact can be shown by the reasonable assumption that each of these 25 scholars, whether they stay in Worcester or complete their service elsewhere, will teach 110 students per year over the duration of the project. Thus, about 11,000 high-need middle and high school students will be taught.

At WPI, recruitment takes place among sophomore and junior classes, about 1600 students. All these students are enrolled in STEM majors that are designed for professional work in academic and industrial STEM careers (as distinct from education majors or subject-majors designed for prospective teachers). A diverse pool of scholars will be sought and the majority will likely be women, given the demographics of the WPI Teacher Preparation Program.

At Clark, recruitment takes place among the mathematics and science candidates for the MAT program. These scholars will have earned undergraduate degrees in mathematics or science and will also have earned a minimum GPA of 3.2. The Clark program will give priority to members of underrepresented student populations.

At WPI, pedagogical preparation takes place in its state-accredited teacher education program with its research-based psychology and teaching methods courses. Student-teaching practica will occur in the high-need Worcester public schools (WPS) and be supervised directly by the teacher preparation program director, a faculty member of the math department.

At Clark, the MAT program has been designed to take maximum advantage of its school partnerships, with an emphasis on intermixing theory and practice in a dynamic but controlled progression. Students have an 8 month internship which includes mentor teachers working in small teams, acting as reflective practice groups, with support from the faculty from both the University and partner schools. These internships take place in the same high-need district where the Scholars will later be employed.

The new teachers from both programs will be supported by Worcester Public Schools through its comprehensive Mentor/Induction Program. The Mentor/Induction Program provides 1) an in-depth orientation, 2) a trained mentor, and 3) a 16 week, 40 hour beginning teacher institute for both years one and two. Noyce scholars will provide two years of teaching in inner-city schools for each year that they receive a Noyce scholarship. The director of the WPS Mentor/Induction Program is a member of the governance team of the project and serves on the scholar selection committee for the WPI portion of the project.

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Title: Multiple Mathematical Intelligence

Presenter(s): David J. Miles

Current Noyce Scholar

Institution: Cal State San Marcos

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Discipline: Mathematics

Abstract: For several decades now, Howard Gardner's theory of Multiple Intelligences has had a significant impact on the educational world. In relation to mathematics, Gardner (2000) identifies a logical-mathematical intelligence. But just as Gardner questioned whether there is more than one way to be intelligent, the question of whether there is more than one way to be mathematically intelligent should also be considered. This project examines several published mathematical frameworks as well as research identifying different forms of mathematical knowledge.

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Title: Inquiry Based Learning in HS Physics
 Presenter(s): Andrew Corman
 Current Noyce Scholar
 Institution: California State University at San Marcos
 Email: cormanac@gmail.com
 Discipline: Inquiry Base Learning - Science - Physics

Abstract: Inquiry-based instruction and activities allow students to draw their own conclusions, develop relationship equations, and “create” the laws of science on their own. Using this method, students were able to produce extremely close results that directly related to the content they were currently trying to master. The method demonstrated used specific guided instruction and laboratory activities. These activities allowed students to grasp science content standards at a greater depth and breadth than non-inquiry based instruction. Student assessments were created to measure the depth and breadth of knowledge for each student using written responses and comparing their scores to more traditional assessment methods.

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Title: Noyce Program at CSUSB
 Presenter(s): Jimmy Urrutia and Adriana Martinez
 Current Noyce Scholar
 Institution: California State University San Bernardino
 Email: urrutiaj@csusb.edu
 Discipline: Program Overview

Abstract: The Noyce program at CSUSB works in partnership with San Bernardino City USD. The Noyce scholars are primarily undergraduates, and are assigned mentor teachers, who are expert teachers in the district. The scholar and the mentor teacher work together for two years. In those two years, the relationship that is developed between the scholars and the mentors is one that promotes the scholar’s learning about different pedagogical techniques.

The Noyce scholars spend 100 hours/year observing the mentor teachers. During the observations the scholars begin as simply observers; as the scholar begins to feel more comfortable with the students and with the class, the scholar begins to take on more responsibilities within the class and eventually progresses to teaching one of the classes. This scholar-mentor partnership provides many benefits. The relationship established is a very close one. The scholars and mentors work as colleagues and develop lesson plans and activities as a team; the scholars begin to learn the school culture; they begin to network at a school site and begin to feel comfortable in the school environment. Many of the scholars go above and beyond what is expected of them because of all the knowledge that they are gaining. There are many Noyce scholars who will have teaching positions in August and September, all of these scholars feel better prepared and feel more confident about their teaching than they were before they began to work with their mentor teacher.

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Title: Improving Mathematics, Physics, and Chemistry Teaching (IMPACT)
 Presenter(s): Blanca McGuthrie, Adriana Valle, and David Pagni
 Former Noyce Scholar
 Institution: California State University, Fullerton
 Email: avalue05@gmail.com

Abstract: The Improving Mathematics, Physics, and Chemistry Teaching (IMPACT) program is designed to support talented, low-income, prospective secondary school mathematics, physics, and chemistry teachers during the year they work towards their teaching credential. Each year, the program awards stipends to students who have earned a Bachelor’s degree in mathematics, physics, or chemistry and who have been admitted to the teacher education program, intent on earning a secondary school teaching credential. During the four years of the grant, a total of 40 students will participate in the project.

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California State University, Fullerton (CSUF) houses the largest teacher-credentialing program in Orange County. IMPaCT operates within the current Secondary Credential program to actively recruit and fund minority candidates, especially Hispanics, to enter the fields of mathematics, physics, and chemistry teaching. In turn, these teachers will serve as role models to the large minority population in our public high schools and encourage more of these students to attend college and eventually enter the teaching field.

The IMPaCT program is coordinated with the school district partners within an ongoing NSF Mathematics and Science Partnership (MSP) program at CSU Fullerton, called TASEL-M (Teachers Assisting Students to Excel in Learning Mathematics) and a CPEC funded grant called CoAST (Continuum for the Advancement of Science Teaching). As a result, candidates who are awarded stipends are placed in schools where a strong working relationship exists between the CSUF mathematics, physics, and chemistry faculty members and their cohort teachers in the participating schools. Through existing professional development programs, the prospective teachers receive professional development in mathematics and physical science content and pedagogy alongside practicing teachers (seven days in the summer and five days during the academic year).

Progress of stipend awardees will be followed over the next five years to determine the effect of the program on new teachers and to assess their impact as role models in the schools where they are employed.

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Title: Improving Critical Thinking Skills in Mathematics

Presenter(s): Fredericka Blackwell

Current Noyce Scholar

Institution: Clark Atlanta University

Email: Co_blackwell@yahoo.com

Discipline: Mathematics

Abstract: The research problem that was investigated was how the incorporation of word problems, career concerns, and creation improve critical thinking skills in secondary mathematics. This issue is important because students are now expected to not just regurgitate ideas that can solve problems, but they are expected to learn how to solve problems in the work place. Critical thinking is the simple method of using facts to plan, order, and work toward an end (Noddings, 2008). It has been shown that students who are able to create problem writings have a far more in-depth knowledge of their subject (Barlow & Drake, 2008).

To many students, math is not a personable subject. It is used for an aspect of life that they will never see, use, or know. However, research of various careers shows that problem solving and creativity with mathematics is a key part of their daily duties (Inoue, 2008). The construction of word models based on socio cultural ideologies are best for improving critical thinking (Ana Isabel & Llinares, 2008). As shown in Bellomo & Strapp's article, "A Survey of Advanced Mathematics Topics: A New High School Mathematics Class," students must be able to use their critical thinking skills in today's technology driven society (2008). It has also been shown that to improve or build cognition foundation, students must be able to exercise their knowledge in creative ways such as games or through investigation (Kamii & Rummelsburg, 2008). Student's must also feel "free" or have fewer constraints in their problem solving process (Inoue, 2008). This is the same for students who speak English as a first language and those who speak it as a second language (Wiest, 2008).

This leads me into the focus of my action research: What are the techniques and approaches that will foster critical thinking? What teaching strategies will help improve critical thinking skills in mathematics students? Will incorporating word problems increase critical thinking skills? How can word problems that focus on specific career fields in mathematics increase critical thinking skills?

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Title: Action Research in the Classroom Project
 Presenter(s): Naomi Uche Nwosu
 Current Noyce Scholar
 Institution: CUNY- HUNTER COLLEGE (City University of New York)
 Email: naomi.nwosu@hunter.cuny.edu
 Discipline: Math and Science Education

Abstract: The focus of the Hunter College project is action research in the classroom. Students in collaboration with host school math and science teachers used a systematic approach, with periodic assessments and data analysis to inform instruction. Collaborating teachers were paired with third year Teacher Academy students in a yearlong internship at Manhattan Hunter Science High School (MHSHS). The project participants used the Kaplan Achievement Planner to produce and manage data. Students created research questions based on classroom observations, reviewed the literature on their topic, completed statistical analyses of the collected data, and made recommendations for instruction based on their conclusions. In consultation with the teachers, they worked with students based on the analysis of on-going and periodic assessments and observations.

The Teacher Academy students tackled key questions that are central to formative assessment and instructional design: how can research inform instruction, how can research shape curriculum design, how do we develop research models, what is the evidence of learning, what is the best use of assessment data, what are the right questions to ask, what kind of evidence is useful, what can be learned from test data, and what can be learned from classroom observation?

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Title: How Many e- Can be Transferred to a Molecular Wire
 Presenter(s): Lori Zaikowski and Elicia Selvaggio
 Former Noyce Scholar
 Institution: Dowling College
 Email: zaikowskium@gmail.com
 Discipline: Chemistry

Abstract: Research on oligofluorene molecular wires was performed at Brookhaven National Laboratory in the Faculty and Student Teams program. Reduction reactions of oligofluorenes with one to ten monomer units (F1 to F10) addressed fundamental questions regarding electron capture capacity and delocalization of charge. This has applications to development of new materials for energy storage and transfer. Oligofluorenes were reacted with sodium metal in tetrahydrofuran under vacuum and with NaK under argon inert atmosphere. Ultraviolet-visible-near infrared spectroscopy measured the formation of anions, dianions, trianions, and other polyanions. F1 formed anion, F2 and F3 formed anions and dianions, and F4 to F10 formed higher polyanions. Titrations with p-dicyanobenzene, azulene, and anthracene were performed to verify the identifications of spectra corresponding to each anionic species. Absorption maxima, wavelengths of maximum absorbance, and extinction coefficients were determined for each species.

Results indicate that oligofluorenes capture and store multiple electrons upon reduction, that the negatively charged molecules are stable in the absence of air, and that electrons are not delocalized over the entire length of the conjugated molecule but occupy a given number of monomer units.

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Title: Dr. Seuss Meets Physics: Mnemonics
Presenter(s): Joji Thompson
Current Noyce Scholar
Institution: Drexel University
Email: joji.thompson@gmail.com
Discipline: Physics - In General
URLs: <http://masterycharter.org/>

Abstract: At Mastery Charter High School, I teach 12th grade Physics. Physics is a very difficult subject for low-performing students in Mathematics. Many students also find it boring.

To counter balance this, I try to make Physics as easy as possible by breaking every problem down into many steps. To keep it more interesting, I try to include student-friendly graphics and colorful mnemonics. My mnemonics are so nerdy that my kids love them. Every week they look forward to my Rhyming Wednesdays, which they happily participate in.

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Title: Doing Geology in Your City Park
Presenter(s): Tara K. Blalock
Current Noyce Scholar
Institution: Duke University
Email: Tara.Blalock@duke.edu
Discipline: High School Earth Science
URLs: <http://www.duke.edu/web/MAT/index.html>
<http://www.dpsnc.net/>
<http://www.duke.edu/~tkb4/index.html>

Abstract: Too few students experience field study as a part of the high school Earth Science curriculum, especially in high-needs school districts. This is the result of a number of factors, with limited budget for long-distance field trips typically ranking first. Despite increasing budget concerns due to the struggling economy, it remains essential that students learn geology hands-on, particularly within the field, and within a local context.

To improve geology instruction within a specific high-need school district, I propose a series of activities designed to supplement the Earth science curriculum in the Durham Public Schools of North Carolina based on the local geology exhibited within the Eno River State Park. The North Carolina Geologic Survey recently published a short guide to the rocks and geologic history of the park. The objectives of this project were to develop specific lessons and in-field exercises for a high school level curriculum based on this guide.

The Eno River State Park and its river encompass two significantly different geological terrains. For most of its course, the Eno River flows through Precambrian metamorphic rocks of primarily island arc volcanoclastic origin. Although metamorphosed, the rocks are readily recognizable as consisting of ash fall tuffs, lahars, feeder dikes, lava flows, and magma chamber granodiorites, as well as other pyroclastic rocks. The river terminates in Falls Lake Reservoir, located within the sedimentary rocks of the Triassic Durham Basin. The contrast in geologically controlled landforms between these two regions is one striking aspect of the Eno River geomorphology. Instruction will include small-group learning, field lessons and in-class labs based on the types of local rocks, their formational history, age and mineral content, and correlation to geologic and topographic maps of the region. Students will analyze the connection between rock type and landform evolution, specifically within a fluvial setting, and the further connections between landforms and the historical development of industry (mills, etc.) along the Eno River.

An important aspect of these newly designed lesson supplements is for students to develop an understanding of Earth

science as it is present in their everyday lives, and to establish a local sense of geologic, historical and geographic place within the context of their learning.

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Title: Historical Approaches to Teaching Physics
 Presenter(s): Don Eckford
 Current Noyce Scholar
 Institution: Eastern Michigan University
 Email: don.eckford@gmail.com
 Discipline: Physics/Astronomy

Abstract: This unit explores teaching the physics of astronomy from a historical perspective. It is unique in that it shows the many diverse cultures that have developed astronomical knowledge. Students are challenged to model their beliefs about the universe with known facts. Students will rationalize how different models of the universe have value in explaining our world. Students explore time-lapse photography and website creation and design. Students will realize that questions stand the test of time but models change as understanding is gained.

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Title: Noyce Scholarship Flow in My Life
 Presenter(s): Atikuzzaman Khan and Gregory Rushton
 Current Noyce Scholar
 Institution: Kennesaw State University
 Email: akhan3@gatech.edu

Abstract: The Robert Noyce Scholarship of NSF has helped me to choose teaching as a career. The scholarship gave me the opportunity to join in the MAT program at Kennesaw State University beginning in Summer '09.

This program introduced me to a good network of Scholars that support each other and work together to resolve common issues. Upon finishing my BA in December 2008, I had the opportunity to teach part-time in a high school for 4 months. From this hands-on classroom experience, I learned that a student's success depends on how much they are guided and supported. For example, instead of simply giving a reading assignment, a teacher could provide a set of study-guide questions, which will encourage students to read the course material carefully to find answers, thereby improving their reading comprehension.

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Title: LEGS (League of Extraordinary Girl Scientists)
 Presenter(s): Bethany Filipow
 Current Noyce Scholar
 Institution: Ohio University
 Email: bethanyfilipow@yahoo.com
 URLs: www.girlscientists.com

Abstract: Upon receiving my teaching certificate I journeyed into the exciting and challenging world of 7th grade science. Working in such an impoverished area opened my eyes into the immense amount of work that needs to be done to ensure that all children are given opportunities for a good education. At Philo Junior High there were no meaningful academic extracurricular activities. I also was very concerned with the fact that fewer females pursued STEM careers and believed that reaching middle school girls was critical in reversing this trend. Working with a local community member, Annie Warmke, LEGS, a girls-only science club, was created. During its first year, it has brought girls together with women scientists and mathematicians.

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LEGS met twice a month: once after school and for field trips on Saturdays. An end-of-the-year LEGS field trip was to Myrtle Beach to study science at the beach. During the year, members recorded field notes and reflected on their experiences in their science journals. A LEGS' community project, funded by Project Wild, was the creation of an all-seasons garden using Ohio native prairie plants. Though for educational use, it was selected as the winner of Philo's Community Beautification Contest.

If not for the Noyce scholarship I probably would not have chosen to work in Philo, Ohio, but I am thrilled that I am here and was able take part in starting this incredible program that is providing opportunities that encourage females to pursue careers in STEM fields.

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Title: My Method for Arming Super Heroes

Presenter(s): Belinda Hendley

Former Noyce Scholar

Institution: University of Arkansas

Email: bhendley@uark.edu

Discipline: science instruction

Abstract: Goal: to equip each student with a working knowledge of a subject as they develop their individual superpowers (talents).

Rationale and Objectives: The Noyce scholarship helped fund my career at the University of Arkansas. The MAT Programe aided in the development of my teaching style based on meeting two principal objectives: state frameworks and critical thinking skills.

Methods: Each unit is broken down into three areas: Introduction, study, and assessment. The topic is introduced by an assisted reading exercise which is supplemented by critical thinking questions designed to assess prior knowledge.

Lectures are composed of blocks lasting no more than twenty minutes, including frequent demonstrations. Labs give students experience with the principles taught in class. States recommend twenty percent of instructional time should be spent in activities; for every four lecture blocks, there is one lab block.

Painless quizzes are used to assess what students have learned from the previous lesson and monitor student progress. Students are awarded daily participation points for taking the quizzes. Painless quizzes factor into the next lesson and follow the same multiple choice and open response format as tests; this gives students a preview of the test that they can use to form a study guide as they progress through the unit.

Results: I developed this teaching style during my internships. It proved effective in the pilot study and the forthcoming data are promising. I plan to further study this method during future teaching opportunities.

Conclusion: This method obtained demonstrative results in my brief internships. A program of reading, lectures, and labs with painless quizzes allowed for student-driven classroom instruction by responding in real time to students' learning patterns.

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Title: Proposal for Applied Mathematics/Physics/Robotics

Presenter(s): Joshua B. Copen

Former Noyce Scholar

Institution: University of Massachusetts

Email: copenj@sps.springfield.ma.us

Discipline: Applied Mathematics, Physics, Robotics

URLs: <http://sps.springfield.ma.us/>

<http://www.sps.springfield.ma.us/schoolsites/putnam/>
<http://www.sciencedaily.com/releases/1998/08/980825075401>.http://nces.ed.gov/timss/pdf/Comparing_TIMSS_NAEP_%20PISA.pdf

Abstract: Student performance in science and mathematics in the United States has suffered under recent times. This decrease in aptitude of Science and Mathematics needs to be resolved. I have found that student involvement with these areas declines because they are uninvolved with how these subjects interact with their community to benefit their surroundings. Robotics links the two subjects of technology and engineering in a manner that increases student involvement. When assembly of a final product is reached, the student links the disciplines of math and science to ingenuity. By creating something that is both beneficial to others and inspirational, student learning is enhanced.

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Title: Sponge Activities
 Presenter(s): Rustin Reys
 Former Noyce Scholar
 Institution: University of Missouri - Columbia - (Park Hill High School)
 Email: reysr@parkhill.k12.mo.us
 Discipline: High School Mathematics

Abstract: Many teachers struggle with ways to engage students during the last 5-10 minutes of class. Meaningful learning is often missing from this portion of the day when students are more apt to pack up their things, talk to friends or line up at the door. The “sponge” activities that I will share are specific to the mathematics classroom and are designed to “soak up” the last few minutes of the period. A variety of math-based games, logic puzzles and riddles, and summarization techniques will be shared. The games include NIM, sprouts, Skunk, sticks, and Factor 36. Critical thinking activities include lateral thinking questions, Wuzzles, riddles and word problems. In addition, a list of the Top 5 things that should be said at the end of the class will be shared. These activities are not uniquely mine as I have gathered them from books, conferences, professors and even students.

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Title: Innovative Assessment in Chemistry and Earth Science
 Presenter(s): Christopher Young
 Current Noyce Scholar
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Abstract: All students have different strengths and intelligences, and a good teacher makes use of a variety of instructional methods and assessments in order to help students understand concepts, monitor their own learning, and inform future instruction. This presentation describes a number of custom-developed instructional activities and assessments created and used during the student teaching placements of a pre-service chemistry and earth science teacher, which are available for use and/or modification by others. Techniques and methods used include student modeling of chemical concepts, engaging students in authentic scientific practices via problem-based learning, and intentional, visible scaffolding of inquiry-based lab activities. Examples include dramatic depictions of electron behavior, modeling of periodic table trends, student-generated lab procedures for calculating density trends, creation of a class periodic table, and problem-based learning involving a mysterious meteorite.

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