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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
2019 Noyce Summit

The Role of Teacher Preparation in STEM Teacher Retention in High-Need School Districts

July 10-12, 2019
Hyatt Regency on Capitol Hill

Co-hosted by
American Association for the Advancement of Science (AAAS)
STEM Education Program
and
National Science Foundation (NSF) Division of Undergraduate Education (DUE)
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* This icon indicates sessions that may be of particular interest to Noyce Scholars/Fellows.
The Role of Teacher Preparation in STEM Teacher Retention in High-Need School Districts

Objectives:

The 2019 Noyce Summit seeks to explore and advance the role of teacher preparation in retention of STEM teachers in the workforce, particularly in high-need1 school districts. More specifically, the objectives are to identify:

(a) Evidence-based strategies (i.e., practices, policies, and programmatic components) of STEM teacher preparation that may have contributed to increased and/or above average STEM teacher retention in the workforce; and

(b) Strategies that help STEM teacher faculty and administrators in STEM teacher preparation to strengthen their partnerships with schools, districts, state education agencies, and policy agencies to increase retention of STEM teachers in the workforce.

While there are many factors influencing teachers’ decisions to stay in positions for which they were prepared, this meeting focuses attention on those factors which are directly in the control of teacher preparation programs or which may be meaningfully influenced by them. Retention begins with recruitment and continues through program preparation and completion, entry into a position for which one is prepared, as well as being retained in such a position through initial teaching and/or Robert Noyce Scholarship commitment term and beyond.

Questions to be addressed during the Summit include:

• What are the key evidence-based STEM teacher preparation policies and practices of Noyce and other preparation programs that are associated with teacher retention in the workforce?

• How can faculty and administrators ensure that these evidence-based practices are shared and utilized widely at their own institutions? How can teachers and teacher candidates take advantage of these practices?

• What knowledge, skills, and supports are needed to help Noyce student alumni and other STEM teachers better navigate and thrive in the school workplace culture in high-need schools?

• What strategies can STEM teacher preparation faculty and administrators use when working with local schools and districts to increase STEM teacher retention in high-need schools and districts - including strategies related to principals and other school administrators, district-level administrators, department chairs, and teachers?

• What strategies can teachers, teacher candidates, faculty, and administrators use when working with state and policy organizations to increase STEM teacher retention in high-need schools and districts in their state?

1 A high-need school district is defined as one that serves a large percentage of individuals with families with incomes below the poverty line; has a significant number of secondary school teachers not teaching in the content area in which they were trained; and/or has high teacher turnover.
National Science Foundation (NSF) Robert Noyce Teacher Scholarship Program

The Robert Noyce Teacher Scholarship Program seeks to encourage talented science, technology, engineering, and mathematics (STEM) majors and professionals to become K-12 STEM teachers. This program responds to the critical need for highly effective K-12 STEM teachers by recruiting and preparing talented undergraduate STEM majors and STEM professionals to pursue teaching careers in elementary and secondary schools in high-need local educational agencies. The program seeks to encourage institutions of higher education to develop and sustain a culture where undergraduate STEM majors, especially those of the highest achievement and ability, are encouraged and supported when they express a desire to pursue K-12 STEM teaching careers.

The program was first authorized under the National Science Foundation Authorization Act of 2002 (P.L. 107-368). It was reauthorized in 2007 under the America COMPETES Act (P.L. 110-69) and the America COMPETES Reauthorization Act of 2010 (P.L. 111-358), and amended by the STEM Education Act of 2015 (P.L. 114-59). The Noyce program addresses the goal established by the President's Council of Advisors on Science and Technology, "of ensuring over the next decade the recruitment, preparation, and induction support of at least 100,000 new STEM middle and high school teachers who have strong majors in STEM fields and strong content-specific pedagogical preparation, by providing vigorous support for programs designed to produce such teachers." (PCAST, 2010).

By supporting the recruitment and preparation of strong STEM teachers who will teach in high-need local educational agencies, serving diverse student populations, the program supports the strategic objective (G1/O2) in the NSF Strategic Plan for 2014-2018: "Integrate education and research to support development of a diverse STEM workforce with cutting-edge capabilities." The Noyce Program supports the role of NSF as central to discovering, studying, and promoting pathways for STEM teacher education through research and development.

The Robert Noyce Teacher Scholarship Program consists of four tracks: Track 1 - The Robert Noyce Teacher Scholarships and Stipends Track (S&S); Track 2 - The NSF Teaching Fellowships Track (TF); Track 3 - The NSF Master Teaching Fellowships Track (MTF); and Track 4 - Noyce Research Track. In addition, funds for Capacity Building awards, which may lead to the development of full proposals in Track 1: S&S, Track 2: TF, or Track 3: MTF, are also supported. Partnerships between four-year institutions and two-year institutions, providing pathways leading to STEM teacher certification, are particularly encouraged.

American Association for the Advancement of Science (AAAS)

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

AAAS was founded in 1848, and includes some 264 affiliated societies and academies of science, serving 10 million individuals. Science has the largest paid circulation of any peer-reviewed general science journal in the world, with an estimated total readership of one million. The non-profit AAAS is open to all and fulfills its mission to "advance science and serve society" through initiatives in science policy; international programs; science education; and more. For the latest research news, log onto EurekAlert!, http://www.eurekalert.org/, the premier science-news website, a service of AAAS.

Membership and Programs

Open to all, AAAS membership includes a subscription to Science. AAAS fulfills its mission to advance science and serve society through initiatives in science policy, diplomacy, education, career support, public engagement with science, and more.

AAAS Mission

AAAS seeks to "advance science, engineering, and innovation throughout the world for the benefit of all people." To fulfill this mission, the AAAS Board has set these broad goals:

- Enhance communication among scientists, engineers, and the public;
- Promote and defend the integrity of science and its use;
- Strengthen support for the science and technology enterprise;
- Provide a voice for science on societal issues;
- Promote the responsible use of science in public policy;
- Strengthen and diversify the science and technology workforce;
- Foster education in science and technology for everyone;
- Increase public engagement with science and technology; and
- Advance international cooperation in science.

Visit the AAAS website at https://www.aaas.org/

More information on AAAS’ Noyce-related work:
https://www.nsfnoyce.org
https://aaas-arise.org
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Seattle, WA | February 13–16, 2020

Join us for the 2020 AAAS Annual Meeting in Seattle, WA!
REGISTRATION OPENS IN AUGUST

aaas.org/meetings

The scientific endeavor has been at the forefront in developing innovations which have improved life on Earth in immeasurable ways. Now, life on this planet is facing new challenges from both nature and the built world, and scientific application is our best tool with which to react. By drawing on our current understanding of the world, and bravely experimenting with forward-thinking visions, the scientific community needs to respond with discoveries and developments to help solve many pressing problems.
Wednesday, July 10, 2019

2:00 pm - 9:00 pm  
Registration  
(Regency Foyer Wall)

2:00 pm - 4:20 pm  
New Awardee Session with NSF Staff  
(Regency B)

Led by NSF Noyce Program Directors

3:30 pm - 5:30 pm  
Current and Former Scholars/Fellows Orientation | Speed STEMming Resources  
(Capitol Room A,B)

Facilitator: Cammie Newmyer, 2018-2019 Albert Einstein Distinguished Educator Fellow, NSF Noyce

Speaker: Peggy Brookins, President and CEO, National Board of Professional Teaching Standards

Speed STEMming Resource Organizations  
See page 50.

3:45 pm - 4:45 pm  
Current Grantee Town Hall Meeting  
(Regency C,D)

Led by NSF Noyce Program Directors

4:45 pm - 5:30 pm  
New Awardee and Current Grantee Mixer  
(Regency C,D)

5:30 pm - 6:00 pm  
Poster Setup for Session 1  
(Regency Foyer/Columbia Foyer/ Columbia A,B)  
See handout for poster number and poster session.  
See handout for titles and lead presenters of posters.

6:00 pm - 7:30 pm  
Plenary Session 1  
(Regency A,B,C)

Moderator: Jennifer E. Carinci, Program Director, STEM Education Research, STEM Education, AAAS

Thursday, July 11, 2019

7:45 am - 6:00 pm  
Registration  
(Regency Foyer Wall)

7:45 am - 2:45 pm  
Poster Setup for Session 2  
(Regency Foyer/Columbia Foyer/ Columbia A,B)  
See handout for poster number and poster session.  
See handout for titles and lead presenters of posters.

7:45 am - 8:45 am  
Continental Breakfast, Topical Roundtables, and Networking Session 1  
(Regency A,B,C)

Roundtable Topics  
See page 15.

8:45 am - 10:00 am  
Plenary Session 2  
(Regency A,B,C)

Moderator: Andrea L. Nixon, Program Director, DUE, NSF Noyce

Welcome:  
Rush D. Holt, Chief Executive Officer, AAAS and Executive Publisher, Science Family of Journals
AGENDA

Noyce Track 4 STEM Teacher Retention Research Panelists:
Grant No. DUE–1660597:
Meltem Alemdar, Associate Director and Senior Research Scientist, Georgia Institute of Technology’s Center for Education Integrating Science, Mathematics and Computing

Grant No. DUE–1557273:
Catherine Horn, Moores Professor of Educational Leadership and Policy Studies and Executive Director of the Institute for Educational Policy Research and Evaluation, University of Houston

Grant No. DUE–1758282:
Douglas Larkin, Associate Professor, Montclair State University

Announcements

10:00 am - 10:15 am  Break
10:15 am - 10:45 am  Concurrent Workshops Session 1*
  See page 17-20 for workshop abstracts and presenters. See handout for workshop room assignment.

10:45 am - 10:55 am  Transition to Workshops
10:55 am - 11:25 am  Concurrent Workshops Session 2*
  See page 20-24 for workshop abstracts and presenters. See handout for workshop room assignment.

11:25 am - 11:40 am  Break
11:40 am - 12:40 pm  Plenary Session 3
  (Regency A,B,C)
  Moderator: Cammie Newmyer, 2018-2019 Albert Einstein Distinguished Educator Fellow, NSF Noyce

Voices from the Field Panelists:
Maisha Abu-Mallouh, Physics and Biology Teacher, Joliet Central High School, IL (Lewis University)

Brandon Begay, Algebra I and II, Geometry, AP Calculus, and Financial Literacy Teacher, Shiprock High School, NM (Arizona State University and San Juan College)

Maria Crouse, Integrated Mathematics II & III and Financial Algebra Teacher, Dr. Martin Luther King Jr. Early College, CO (Metropolitan State University of Denver)

Keedon M. Hopkins, Biology, Earth Science, Physics and Chemistry Teacher, Innovation Early College High School at ECU, NC (East Carolina University)

Jonathan Isozaki, Common Core Integrated Mathematics I and II Teacher, Hawthorne High School, CA (Loyola Marymount University)

Jamie MacDonald, STEM Teacher for Second through Fifth Grades, Hayden McFadden Elementary School, MA (Bridgewater State University)

12:40 pm - 1:00 pm  Break
1:00 pm - 2:30 pm  Plenary Session 4 and Working Lunch
  (Regency A,B,C)
  Moderator: Lee Zia, Deputy Division Director, DUE, NSF

STEM Teacher Retention Policy Panelists:
Alberto M. Carvalho, Superintendent, Miami-Dade County Public Schools

Della Cronin, Principal, Bose Public Affairs Group

Erin White, Senior Director, Product Development and Research at STEMconnector

2:30 pm - 2:45 pm  Break
2:45 pm - 4:15 pm  Discussion Sessions: Exploring the 2019 Summit Theme
  Questions to Address/Room Assignments
  See page 14.

*Seating in workshop rooms is limited and available on a first-come basis.
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
</table>
| 4:30pm - 5:45 pm | **Poster Session 2**  
(Regency Foyer/Columbia Foyer/  
Columbia A,B)  
See handout for poster number and  
poster session.  
See handout for titles and lead  
presenters of posters. |
| 5:45 pm - 6:00 pm | **Remove Posters**                                                     |
| 6:00 pm       | **Dinner on Your Own**                                                |
|               | **Optional: Current and Former  
Scholars/Fellows Networking Offsite**                                  |
|               | **Optional: New Awardee and Current  
Grantee Dialogue Continuation**                                         |
| Friday, July 12, 2019 |                                                                 |
| 7:45 am - 8:45 am | **Continental Breakfast, Research  
Roundtables, and Networking Session 2**  
(Regency A,B,C) |
|               | **Roundtable Topics**  
See page 15.                                                               |
| 9:00 am - 9:30 am | **Concurrent Workshops Session 3**  
See page 24-29 for workshop abstracts  
and presenters. See handout for  
workshop room assignment. |
| 9:30 am - 9:40 am | **Transition to Workshops**                                            |
| 9:40 am - 10:25 am | **Concurrent Workshops Session 4**  
See page 29-34 for workshop abstracts  
and presenters. See handout for  
workshop room assignment. |
| 10:25 am - 10:35 am | **Transition to Workshops**                                            |
| 10:35 am - 11:05 am | **Concurrent Workshops Session 5**  
See page 34-38 for workshop abstracts  
and presenters. See handout for  
workshop room assignment. |
| 11:05 am - 11:15 am | **Break**                                                             |
| 11:15 am - 12:30 pm | **Plenary Session 5**  
(Regency A,B,C)  
**Moderator: Jennifer E. Carinci**, Program  
Director, STEM Education Research,  
STEM Education, AAAS  
**Synthesis from Discussion Groups and  
Plenary Sessions Discussants:**  
**Shirley M. Malcom, Senior Advisor,** and  
**Director of SEA Change, AAAS**  
**Kathleen B. Bergin, Program Director,**  
Co-Lead Robert Noyce Teacher  
Scholarship Program, NSF  
**Museum Tours for Scholars and  
Fellows**  
(Meet Tour Guides at the  
Regency Foyer Wall)  
See page 51. |

*Workshops moderated by the following NSF Staff:  
Karen Keene, Tamara Floyd-Smith, Kathleen Bergin, Sandra Richardson, R. Steven Turley, Jennifer Lewis, Andrea Nixon,  
Talitha Washington, Nathan Williams, Daphne Marshall,  
Cammie Newmyer, John Butler, and Glenda Valdez.
About the 2019 Noyce Summit Discussion Sessions

The 2019 Noyce Summit small group discussion sessions will provide additional information for the AAAS Guide to Innovation in Science and Mathematics Preservice Teacher Education and Leadership Development. To this end discussions will begin to explore the summit theme, The Role of Teacher Preparation in STEM Teacher Retention in High-Need School Districts including:

1. What are the key evidence-based STEM teacher preparation policies and practices of Noyce and other preparation programs that are associated with teacher retention in the workforce?

2. How can faculty and administrators ensure that these evidence-based practices are shared and utilized widely at their own institutions? How can teachers and teacher candidates take advantage of these practices?

3. What knowledge, skills, and supports are needed to help Noyce student alumni and other STEM teachers better navigate and thrive in the school workplace culture in high-need schools?

4. What strategies can STEM teacher preparation faculty and administrators use when working with local schools and districts to increase STEM teacher retention in high-need schools and districts - including strategies related to principals and other school administrators, district-level administrators, department chairs, and teachers?

5. What strategies can teachers, teacher candidates, faculty, and administrators use when working with state and policy organizations to increase STEM teacher retention in high-need schools and districts in their state?

Room Locations

- Group 1 – Glacier
- Group 2 – Grand Teton
- Group 3 – Columbia C
- Group 4 – Regency D
- Group 5 – Concord
- Group 6 – Lexington
- Group 7 – Bunker Hill
- Group 8 – Capitol Room A
- Group 9 – Capitol Room B
- Group 10 – Congressional B
- Group 11 – Congressional C
- Group 12 – Congressional D
- Group 13 – Yellowstone
- Group 14 – Everglades

Discussion and Roundtable Leaders

- Maisa Abu-Mallouh, Joliet Central High School
- Brandon Begay, Shiprock High School
- Jose Blackorby, CAST, Inc.
- Corrie Canaday, Western Governors University
- Ann Cavallo, University of Texas at Arlington
- Regina Ciprih, University of South Carolina
- Valerie Martin Conley, University of Colorado, Colorado Springs
- Maria Crouse, Dr. Martin Luther King Jr. Early College
- Scott Jackson Dantley, Howard University
- Edwin Dickey, University of South Carolina
- Bridget Druken, California State University, Fullerton
- Joni Falk, TERC
- Ed Fuller, Penn State University
- Lisa Gonsalves, University of Massachusetts Boston
- Keeden Hopkins, Innovation Early College at East Carolina University
- Jennifer Horak, National Science Teachers Association
- Jane Horwitz, University of Pennsylvania
- Valorie Hutson, Educational Consultant
- Jonathan Isozaki, Hawthorne High School
- Giti Javidi, University of South Florida Sarasota-Manatee
- Antoinette Linton, California State University, Fullerton
- Ramon Lopez, University of Texas at Arlington
- Julie Luft, University of Georgia
- Heather Macdonald, College of William & Mary
- Jamie MacDonald, Hayden McFadden Elementary School
- James Matthews, Siena College
- Camille McKayle, University of the Virgin Islands
- Patricia McMorris, Rice University
- Ruthmae Sears, University of South Florida
- Wendy Smith, University of Nebraska-Lincoln
- Gay Stewart, West Virginia University
- Marilyn E. Strutchens, Auburn University
- Ashli Wright, Florida International University
Topical, Practice-Focused Roundtables

July 11, 2019  |  7:45am – 8:45am  
(Regency A,B,C)

Goal: Share evidence-based practices and resources, as well as crowd-source problem-solving, related to the topic at your chosen table.

1. Computer Science Teacher Preparation
2. Convergent Skills Development Across STEM Disciplines.
3. Culturally Relevant Pedagogy (engaging with P-12 students)
4. Culturally Relevant Pedagogy (engaging with teacher candidates)
5. Engineering – Teaching the “E” in STEM
6. Math – Teaching the “M” in STEM
7. Mutually Beneficial Partnerships with High-Need Schools and Districts
8. Noyce Project Management and Sustainability
9. Preparing Teachers for High-Need School Districts
10. Student Engagement Strategies
11. Supporting New Teachers
12. Supporting Each and Every Student
13. Teacher Leadership
14. Recruiting Effective and Diverse Teacher Candidates
15. Technology – Teaching the “T” in STEM

Research-Focused Roundtables

July 12, 2019  |  7:45am – 8:45am  
(Regency A,B,C)

Goal: Share results of research/evaluation/data collection (formal or informal investigation) efforts, research design and questions of interest, relevant resources, and any ideas for collaborations around the following topics.

1. Assessing Impact on P-12 Students
2. Assessing Effectiveness of Program Graduates
3. Assessment of P-12 Students
4. Assessment of Teacher Candidates
5. Instructional Improvement - Faculty and Teacher
6. Strategies for Tracking Program Graduates
7. Networked Improvement Communities
8. Noyce Program Evaluation
9. Program Improvement
10. Retention of STEM Teacher Candidates During Preparation
11. Retention of STEM Teachers in High-Need School Districts
12. Recruiting Practices that are Effective and Facilitate Retention
13. Teacher Action Research
14. Teacher Research Experiences

Liberal Arts Colleges Gathering

July 12, 2019  |  7:45am – 8:45am  
(Concord)
Session 1: Thursday, July 11, 2019  
10:15am - 10:45am

1.1 Culturally Relevant Teaching in the STEM Classrooms: Lessons from Research and Practice

Session Length: 30 minutes

Michelle Rosen, Associate Professor of Education and Noyce Co-PI, New Jersey City University; Earline Bresil, Noyce Scholar and Student, New Jersey City University

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

Topic: Culturally Relevant Pedagogy  
Discipline: Biological Sciences

This session will provide participants with a brief overview of a multi-dimensional teacher residency program where Noyce Scholars work as interns in authentic classroom settings. The overview will include how the program works and the Noyce Scholars’ experiences working and learning alongside experienced STEM teachers in an apprentice-type model. Benefits and challenges will be shared. More specifically, the session will share research findings from a study where Noyce Scholars focused on creating Culturally Relevant Teaching strategies to use in their internship experiences. Presenters will explain the process that began in a professional development series at the university and culminated in authentic STEM lessons in underrepresented schools where the Scholars work. Results will highlight the impact of the experience for the Noyce Scholars, cooperating teachers, and students involved in the process. Recommendations will focus on how this study can be used to improve teacher preparation programs and provide an added value to the Noyce Scholar Program. Participants will be able to learn how to create a similar teacher residency program with their Noyce Scholars.

1.2 Integrating STEM, Culture, and Student Identity to Enhance Engagement Community Connections

Session Length: 30 minutes

Wren Walker Robbins, Department Chair, Secondary Education, Salish Kootenai College; Jedd Tougas, Noyce Scholar

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

Topic: STEM Content Area and/or Convergent Discipline Skills Development  
Discipline(s): Math, Other: Broadfield Science

In this workshop, participants will build skills to use culturally sustaining pedagogies that integrate STEM, culture, indigenous language, and students’ identities. These methods utilize a third space approach developed working with students of color, which asserts that students’ perspectives are funds of knowledge that are inherently valuable. Participants will explore how this approach helps build community connections in underserved communities and explore a framework for documenting the impact of integrative practices. Participants will also examine specific examples of how this approach has been applied to elementary and secondary education curricula, a K-12 classroom, and an outreach program in a reservation community.

1.3 The Keys to Recruiting, Retaining, and Supporting African-American Noyce Scholars

Session Length: 30 minutes

David Sparks, Assistant Professor of Curriculum and Instruction, University of Texas at Arlington; Leah McAlister-Shields, teachHOUSTON, University of Houston; Paige Evans, teachHOUSTON, University of Houston

Target Audience: Evaluators/Research Researchers, Higher Education Institution Administrators, Noyce Master Teachers, Noyce Teaching Fellows, Project PIs, Co-Pis, Other Faculty/Staff

Topic: Supporting Each and Every Student  
Discipline: Other: Science Education

Recruiting, retaining, and supporting African-American mathematics and science teachers is of great importance but is an even more vital consideration when preparing teachers who will be working with diverse populations in their classrooms. Research has shown that students thrive under diverse teachers who match their specific demographics (Gershenson, Holt, & Papageorge, 2016). Studies have also considered the importance of African American male teachers (Milner, 2016), the identity development of African American female pre-service teachers (Sparks, 2018), and the formation of identity in African American STEM students (Sparks, Pole, & DenHartog, In Press). Emphasis must not only be placed on increasing the numbers of African American mathematics and science teachers but also a concerted focus on the characteristics and qualities these students bring to the classroom (Mensah, 2009). A panel of professors from the University of Texas at Arlington and the University of Houston, representing successful Robert Noyce Scholarship Program collaborations, will discuss the needs of preservice African American mathematics and science teachers as well as how to support them as they transition into the
classroom. After a brief introduction of the panel, each panelist will lead a brainstorming group focused on three areas: recruitment, retention, and support. The panelists will then share each group’s ideas and make recommendations for future research, ongoing discussions, and the formation of collaborative research groups devoted to recruiting, retaining, and supporting African-American Noyce scholars. Representatives from mathematics and science teacher preparation programs are encouraged to attend and share additional research and best practices.

1.4 Noyce Scholars and Fellows as Change Agents in STEM Teaching: Research Report from the 2019 WRNC-AZ

*Session Length: 30 minutes*

Cynthia Anhalt, PI, The University of Arizona; Elliott D. Beck, Noyce Scholar, The University of Arizona

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

Topic: Research, Assessment, and/or Evaluation

Discipline(s): Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics

Research findings from a free response narrative survey administered at the 2019 Western Regional Noyce Conference - Arizona will be presented. The survey captured 104 Scholars’ and Fellows’ reflections about how they see themselves as change agents for under-represented students in STEM education. Of the total surveys, 61 were from prospective teachers and 43 from practicing teachers in the Noyce program. Themes that cut across narrative descriptions will be presented on (1) teaching that makes a difference for under-represented students, (2) identifying and overcoming challenges that students may face, and (3) implementing changes to increase access in STEM education for under-represented students. Common themes across responses converged to (1) being responsive to student needs, (2) learning about student personal lives to gain perspectives into academic lives, (3) building on student strengths, (4) advocating for student development of positive identities in STEM, and (5) using engaging content and delivery to ignite student passion for STEM. Theoretical perspectives reflecting these emergent themes from the survey responses will be underscored for initiating discussion.

1.5 Noyce Scholars Learning about Teaching in the Classrooms of Employed Noyce Teachers

*Session Length: 30 minutes*

Paul Bischoff, PI, Noyce Scholars Program, SUNY-Oneonta; Paul French, Co-PI, SUNY-Oneonta

Target Audience: Project Pls, Co-Pls, Other Faculty/Staff, Undergraduate and/or Graduate Noyce Scholars

Topic: Preparing Teachers for High-Need School Districts

Discipline(s): Biological Sciences, Chemistry, Geosciences, Math, Physics

In this session participants will review and discuss journal entries kept by undergraduate Noyce Scholars pertaining to a week-long clinical placement in a high-needs NYC classroom where the host teacher is a recent Noyce graduate. Essays reviewed and discussed include pre-trip anticipatory essays, daily journal entries and end-of-experience reflections. The goal is to analyze the data in an effort to evaluate the strengths and weaknesses of the concept.

1.6 Partnerships and Their Benefits to All Involved Parties

*Session Length: 30 minutes*

Bonnie Maur, STEM Director, Sacred Heart University
Kristin Rainville, Professor and PI, Isabelle Farrington College of Education, Sacred Heart University; Andrew Lazowski, Professor and co-PI, College of Arts and Sciences, Sacred Heart University; Nicholas Montimurro, Noyce Scholar, Sacred Heart University

Target Audience: Evaluators/Education Researchers, Noyce Master Teachers, Project Pls, Co-Pls, Other Faculty/Staff, School and District Administrators

Topic: Mutually Beneficial Partnerships with High-Need Schools and Districts

Discipline(s): Biological Sciences, Math

Information will be shared regarding partnerships that have been formed, including but not limited to, summer service learning, outreach and recruitment, scholarships, enhanced curriculum, mentoring supports, induction support, and professional identity development. Specific ideas for forging relationships will be discussed. Methods in which relationships continue to grow and ways in which they evolve will be examined. Participants in this workshop will leave with ideas for growing their community relationships to provide for further opportunities for their Noyce Scholars. Participants will share their partnership ideas in group settings in order to further grow ideas and additionally grow partnerships between programs.
1.7 Reaching and Recognizing Our English Language Learners in Math Class

Session Length: 30 minutes

Kayla Scheitlin, High School Math teacher and Noyce Master Teaching Fellow, Malden High School and Tufts University

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

Topic: Supporting Each and Every Student

Discipline: Math

As our math classrooms become increasingly linguistically and culturally diverse, teachers must consider the best practices for teaching students who are learning English. Additionally, our English language learners (ELL) are capable of contributing powerful mathematical ideas to our classroom community. How can we create opportunities for our ELLs to be recognized and contribute as mathematical authorities in our classrooms? What type of community do we need to build in our classrooms to support this mathematical agency of our English language learners? How can we explicitly teach the language of mathematics while also covering all of our math curriculum? How can this work benefit ALL students? When I began teaching a Sheltered Algebra I course three years ago, I struggled to address these questions in my practice. The general ELL strategies I had learned were not easily adaptable to the math content I needed to teach, and I struggled to build meaning for my students. What was missing was a sense of community among my students and an understanding that everyone had mathematical power in my classroom. Drawing on my experience teaching math in a linguistically diverse high school, current research, and the support of my case study group in my Noyce program, I will share my successes and challenges in learning to reach and honor my ELLs. Workshop participants will learn practical strategies for building community among different language peers, implementing language worthy tasks, and efficiently teaching vocabulary.

1.9 STEM Teacher Preparation for Long-Term Retention and Success in High-Need Schools

Session Length: 30 minutes

Kevin Carr, Professor of Science Education, Pacific University Woodburn Campus

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff

Topic: Preparing Teachers for High-Need School Districts

Discipline(s): Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics

Pacific STEM Teacher Pathways includes several components of teacher preparation specifically designed to promote the long-term success of Scholars in high-need schools. These elements include targeted recruiting and admissions, strategic program delivery location, embedded clinical partnership with a high-need school district, service learning in high need settings, teacher action research, and year-long coursework dedicated to cultural responsiveness. In this session we will present details of these components and share how these have impacted the retention of our Scholars in high-need schools.

1.10 Successfully Preparing STEM Teacher Candidates for the edTPA

Session Length: 30 minutes

Jennifer Ellis, Noyce PI, Associate Professor and Director of STEM Education, UTC-STEM Education; Kendra Duncan, edTPA Coordinator and Clinical Faculty for UTC’s School of Education

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

Topic: Research, Assessment, and/or Evaluation

Discipline(s): Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics
STEM Teacher candidates often find it difficult to conceptualize what each edTPA language demand looks and sounds like in a classroom setting. Resources and best practices will be shared to support STEM teacher candidates to further develop students’ language use. This session will assist participants in developing a deeper understanding of the edTPA Academic Language demands: language function, vocabulary, discourse, and syntax. Participants will learn how to effectively integrate edTPA best practices into the UTeach curriculum to provide students with a solid foundation to perform well on the edTPA and to translate these best practices into their own STEM classroom. Participants will use the associated language rubrics and commentary prompts to analyze exemplars. Participants will examine the edTPA resources that are available for use with STEM teacher candidates to strengthen competency of the language demands. The presenters will share lessons learned from their successful implementation of edTPA into a UTeach/STEM Education curriculum. Participants are invited to share successes and challenges of their institution’s edTPA implementation of STEM Teacher Candidates.

1.11 Teaching and Learning of English Language Learners: Inroads Made by Noyce STEMELL Scholars

Session Length: 30 minutes

Serigne Gningue, PI, Lehman College, CUNY; Gillian Bayne, Co-PI, Lehman College, CUNY; Sunyata Smith, Co-PI, Lehman College, CUNY; Nicolette Georgiades, Noyce Teacher, New World High School; Hillary Lantigua, Noyce Teacher, New World High School

Target Audience: Evaluators/Education Researchers, Higher Education Institution Administrators, Noyce Master Teachers, Noyce Teaching Fellows, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators

Topic: Effectiveness of Program Graduates

Discipline(s): Biological Sciences, Chemistry, Geosciences, Math

According to observations using the Sheltered Instruction Observation Protocol (SIOP) evaluation tool, Noyce Scholars are performing best in delivering effective pedagogy to ELLs [the program’s most important goal] as well as using inquiry-based instructional activities and effective time management. Additionally, Scholars have reported being highly confident in their ability to meet the needs of ELLs in science and mathematics, and in so doing, address many of their students’ English proficiency needs. Our research has shown that STEMELL scholars strongly outpace other math and science education department students at the College in their completion of course credits across similar time periods. We have found that Scholars have risen to the level of competence in their pedagogical enactments to the level of teachers who have worked productively in the field for up to four years. Consequently, through their participation in STEMELL, Noyce Scholars have completed the program with a clear advantage over traditional math and science teachers who are going into the field directly after being immersed in traditional education programs. Scholars have reported that the internship and fieldwork experiences embedded within the STEMELL program continue to provide them with the most knowledge and high quality capacity building in working with ELLs in urban high-need middle and high school mainstream science and mathematics classrooms.

Session 1 & 2: Thursday, July 11, 2019
10:15am - 11:25am

1.12 Voices from the Field Master Teacher Panel

Session Length: 60 minutes

Cammie Newmyer, Einstein Fellow at NSF Noyce; Dawn Kahler, Kalamazoo Public Schools; Julie Wittenborn-Sikorski, Murphysboro Middle School; Lisa Thompson, P.S. 78; Patricia McMorris, Milby High School; Stephanie Harry, Einstein Fellow at NSF PAEMST; Pascale Creek-Pinner, Einstein Fellow at Department of Energy

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

Topic: Resources for Teachers

Discipline: Other: Science Education

Session 2: Thursday, July 11, 2019
10:55am - 11:25am

2.1 Building a K-12 to STEM Careers Pipeline through Collaborative Partnerships

Session Length: 30 minutes

Valerie Hutson, Educational Consultant

Target Audience: Higher Education Institution Administrators, Non-Profit Organization Personnel, School and District Administrators, Undergraduate and/or Graduate Noyce Scholars

Topic: Mutually Beneficial Partnerships with High-Need Schools and Districts

Discipline: Other: Education
It is vital that K-12 public schools provide high quality instruction, expanded learning opportunities, family engagement and support, and behavioral health services to meet the holistic needs of students and families. Many students in high-need school districts face severe challenges that include persistent poverty, low academic performance, high truancy, and exposure to urban crime and violence. Hence, a call out for the mobilization, coordination, and refocusing of district resources to support student success is critical. This is true and urgent. However, many public school districts suffer from annual budget cuts. To ensure students are prepared for college and careers, coordinated and integrated efforts by schools, families, organizations, and the larger community can transform a school culture and climate to counter inequitable outcomes for students, specifically the underrepresented population.

Collaborative partnerships are the catalyst to strengthening the school-to-career pipeline. Moreover, it is the critical response to the barriers that prevent underrepresented students from reaching their educational and career goals. This workshop will introduce participants to a collaborative partnership framework to advance K-12 to STEM education and career success. You will walk away with concrete strategies for developing effective internal and external relationships within your school community and the larger community as well as tools to help you create a STEM pipeline model of your own.

### 2.2 Case Study of a Full-Year Clinically-Rich Varied Student Teaching Placement Model

**Session Length: 30 minutes**

Stephen Farenga, PI, Queens College, CUNY; Salvatore Garofalo, Co-PI, Queens College, CUNY; Gopal Subramaniam, Co-PI, Queens College, CUNY

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

**Topic:** Mutually Beneficial Partnerships with High-Need Schools and Districts

**Discipline(s):** Biological Sciences, Geosciences

This presentation will examine the benefits and disadvantages of a year-long clinically-rich residency program with varied options for field placement. While all candidates in the Queens College Science Education Program participate in a full year of student teaching (two semesters), the case study being presented involved two female student teacher candidates where one teacher candidate selected to remain with one mentor teacher throughout the residency, and the other candidate selected to switch to another mentor teacher at the halfway point for greater exposure during the residency program. The field placement site is considered a Title I, high-need school. The field supervisors for both candidates were two full-time faculty members in the Science Education Program. Both field supervisors observed each of the candidates 16 times for a total of 32 observations throughout the year. The field supervisors’ practices were also monitored once each semester by the program’s director and the grant’s outside evaluator. This preliminary investigation provided descriptive data and suggested hypotheses that may later be tested experimentally. The comparison of the candidates was based on the cooperating teacher. Candidate 1 remained with her cooperating teacher in the second semester of student teaching with the same class. Candidate 2 switched to a different cooperating teacher and different classes in the second semester. Each of the candidates taught within her field of licensure.

### 2.3 Early Field Experience Influence on Participant Perceptions of Pursuing a STEM Teaching Career

**Session Length: 30 minutes**

Chrissy Cross, Assistant Professor, Co-PI Noyce, Stephen F. Austin State University; Keith Hubbard; Dennis Gravatt; Jonathan Mitchell; Lesa Beverly; Ray Darville

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

**Topic:** Recruiting with Retention in Mind

**Discipline:** Other: Education

Recruiting of STEM teachers is a focus in the rural area of East Texas where teachers are often difficult to recruit and retain and rarely stay in STEM teaching for more than 5 years. To help address the statewide and nationwide teacher shortage (Taie & Goldring, 2017) in STEM, the objective of this research was to investigate the impact of an early intensive field experience on the perceptions of potential STEM teachers. The research question framing this study was, “How does the Master Teacher Job Shadow (MTJS) as an early intensive field experience influence participant perception and desire to pursue a career in a STEM teaching field?” A qualitative research study based upon 4 years of data from an early intensive field experience included: pre-experience survey, pre-experience focus group, during experience prompted journals, post-experience survey, and post-experience focus group. Independent data analysis by 3 researchers yielded themes and results that could potentially be transferable to other university recruitment programs. The MTJS functioning as an early intense field experience and recruiting mechanism for future STEM teachers was very successful based on our findings that 94% (56/59) of participants stated explicitly that the MTJS impacted their desire or lack of desire to teach, and they were able to form a more realistic view of a STEM teaching career.
2.4 How We Built This: Collaborative Track 4 Pre-Service Teacher Research Experience Longitudinal Study

Session Length: 30 minutes

Jon Keller, Co-PI, University of Colorado; Sanlyn Buxner, PI, University of Arizona; Larry Horvath, PI, San Francisco State University; Deidre Sessions, PI, Sacramento State University; Dermot Donnelly, PI, Fresno State University

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

Topic: Research, Assessment, and/or Evaluation

Discipline: Other: Teacher Research Experiences

Through a collaborative Noyce Track 4 award, the STEM Teacher and Researcher (STAR) Program is conducting a longitudinal study on the impact of providing summer research experience as a component of teacher preparation (DUE-1660839, 1660810, 1660777, 1660715, 1660658). Project partners involve Noyce programs at four California State University campuses along with two independent research organizations (American Institutes for Research and researchers at the University of Arizona). The project has administered teacher surveys and K-12 student surveys, conducted phone interviews of teachers and teacher supervisors, and is currently working with seven partner school districts and state agencies to collect student achievement data and teacher employment data. The design of our research study and preliminary results will be discussed, but the emphasis of the workshop will be on lessons learned from building our collaborative partnership. Workshop participants will a) gain perspective on how one collaborative Track 4 project is structured, and b) have the opportunity to conceptually other prospective Track 4 projects.

2.5 Increasing Recruitment and Retention of STEM Majors to Teach in High-Need School Districts

Session Length: 30 minutes

Paige Evans, PI and Clinical Professor, University of Houston; Leah McAllister-Shields, Academic Program Manager, University of Houston; Donna W. Stokes, Co-PI, University of Houston

Target Audience: Project PIs, Co-Pis, Other Faculty/Staff

Topic: Recruiting with Retention in Mind

Discipline(s): Biological Sciences, Chemistry, Computer Science, Geosciences, Math, Physics

teachHOUSTON at the University of Houston is a university-based secondary STEM (Science, Technology, Engineering, and Math) teacher preparation program that addresses the critical need for highly qualified STEM teachers in Texas and across the country to teach in high-need school districts. It is a collaboration between the colleges of Natural Sciences and Mathematics and Education and local school districts. teachHOUSTON provides compact and flexible degree plans that fully integrate grade 7-12 teacher certification for those obtaining a major in Natural Sciences and Mathematics without adding time or cost to four-year degrees. STEM teachers are prepared through early and on-going field-experiences, and rigorous research-based instruction that integrates content and pedagogy provided by faculty members that have extensive teaching experience in public schools. teachHOUSTON produces diverse teachers with solid content knowledge for enhancing student learning, which will ultimately increase the number of students from predominantly underrepresented groups entering into STEM-related majors and professions. The teachHOUSTON program has had two successive Noyce Track 1 grants. Since 2012, the project leadership team has worked diligently to improve the recruitment and retention of Noyce Scholars. This session highlights successes and challenges of recruiting STEM majors into the preservice teaching program. The following strategies will be discussed: Faculty Ambassadors, Student Ambassadors, Classroom Visits, Noyce Internship, Monitors, Registration Parties, Student Orientations, Flyers, and Social Media. Additionally, retention statistics will be shared.

2.6 Keeping it Real: Teacher-Led PLCs for Noyce Scholars

Session Length: 30 minutes

Patrick McGuire, PI, University of Colorado, Colorado Springs

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

Topic: Mutually Beneficial Partnerships with High-Need Schools and Districts

Discipline(s): Biological Sciences, Chemistry, Math, Physics

What better way to expose your Noyce scholars to the realities (both positive and negative) of teaching in high-need learning environments than to involve experienced in-service teachers in the process? In this interactive workshop we will provide an overview of an innovative Professional Learning Community (PLC) model led by in-service teachers from our partner LEAs. Over the first two years of our Noyce program, we have worked closely with three experienced in-service STEM teachers from three high-need partner districts to co-design and deliver PLCs to our Noyce scholars based on real time topics. Sample PLCs topics, selected by Noyce scholars in conjunction with mentor teachers, include: classroom management, parent interactions, stress management, Teaching Students with Poverty in Mind (book study), and long-term lesson planning. Monthly PLCs are held at the university and at high-need partner school districts.
on a rotating basis. This rotation provides Noyce scholars an opportunity to experience a variety of local contexts and engage with in-service STEM teachers, staff, and administrators. In addition to providing an overview of the PLC model, we will discuss the benefits of working together in tandem with in-service STEM teachers from our partner LEAs. We will share and model a sample PLC activity and provide all attendees with a link to the Google Drive infrastructure that includes all of the PLC content from our Noyce program. To conclude, we will discuss the advantages of this mutually beneficial PLC framework, associated challenges and limitations, and recommendations for other Noyce programs.

2.7 Noyce Scholar Use of Student Performance Data to Inform Instruction

Session Length: 30 minutes

Regina Toolin, PI, University of Vermont; Ghana Rimal, Noyce Scholar, University of Vermont

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

Topic: Effectiveness of Program Graduates

Discipline(s): Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics

The research described in this workshop focuses on the assessment practices of Noyce scholars enrolled in the MAT in Secondary Education program at the University of Vermont. In this workshop we will introduce the Analysis of Learning framework that scholars utilized to design, implement, and reflect on a long-term assessment plan that summarizes student performance and growth over the 4-week solo student teaching period. During the workshop, participants will examine Analysis of Learning examples designed and implemented by Noyce scholars who recently completed the MAT Program. Participants will discuss how the Analysis of Learning framework and other assessment strategies may inform their teaching and assessment practices.

2.8 Promising Practices in Rural Field Experiences for Pre-Service Teachers

Session Length: 30 minutes

Paul Adams, Dean, College of Education, and Professor of Physics, Fort Hays State University; Janet K. Stramel, Associate Professor, Fort Hays State University

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

Topic: Preparing Teachers for High-Need School Districts

Discipline(s): Biological Sciences, Chemistry, Geosciences, Math, Physics

Fort Hays State University has focused its efforts on increasing the recruitment and retention of science and mathematics teachers for underserved rural communities. The challenge we face is two-fold: preservice teachers were not aware of what it means to live and work in rural schools, or those who come from rural communities had not looked at rural schools through the eyes of an educator. The premise for adding a week-long intensive and community-based rural field experience, coupled with on-campus seminars about rural schools, was to assist with recruiting Noyce Scholars to rural communities and subsequently retaining them in these communities. Based on interviews and anecdotal records, we have found that the experience is a high point of our program and still retains impact even three years after the experience. We will share our successes and lessons learned, how we developed partnerships with the schools involved, and the greater impact it is having on our institution. Time will be allotted for a general discussion with other grantees to share their stories of the use of field experiences as a critical element of their programs.

2.9 Puzzles and Pictures

Session Length: 30 minutes

Thomas Manning, PI and Professor of Chemistry, Valdosta State University

Target Audience: Non-Profit Organization Personnel, Noyce Teaching Fellows, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Undergraduate and/or Graduate Noyce Scholars

Topic: Culturally Relevant Pedagogy

Discipline: Other: General Science

This workshop will be broken into two components: The first is using a novel series of puzzles (Word Strings, Famous Quotes, Box) in middle and high school level courses. They familiarize students with new words or concepts and build strategic skills. The second component will focus on the use of art in math and science. Students take pictures of obscure marine creatures then use them to draw the general public into STEM activities. Along the way, students found themselves spending many hours on their project, learning about different topics from photography to federal regulations that impact the ocean. The students are currently lobbying the local city government to install a marine invertebrate mural they created.
2.10 STEM INSPIRES (Infusing Social Programs in Residential Education Scholars)

Session Length: 30 minutes

Robin Johnson, Assistant Professor and Co-PI, Texas A&M University - Corpus Christi

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

Topic: Preparing Teachers for High-Need School Districts

Discipline: Other: STEM

There is a recognized need for research-informed instructional approaches and strategies for increased STEM engagement to promote self-efficacy among teachers of grades 6-12 students, according to research on educator preparation programs. This workshop will present a capacity building proposal that will result in a teacher preparation model that engages the community and can be adopted and replicated through regionwide resources, shared expertise, and challenge projects for grades 6-12 science and mathematics students. Data collected and shared will help the STEM INSPIRES team address these issues through its operational goals and objectives by using community mentors and resources, culturally relevant pedagogy, and STEM needs assessment data from our partnering school district. There will be time for questions from participants and a discussion about next steps in the future.

2.11 Using Backward Design for Diverse Classrooms

Session Length: 30 minutes

Melissa George, Cal Teach Science and Math Initiative Internship Coordinator, University of California, Santa Cruz

Target Audience: Noyce Master Teachers, Noyce Teaching Fellows

Topic: Supporting Each and Every Student

Discipline: Other: STEM Education

The Next Generation Science Standards (NGSS) supports K-12 education that addresses human impacts on Earth’s systems while encouraging citizen scientists to become active in their own communities (Achieve, 2013). As a teacher-researcher, I embraced this challenge by developing a high school zoology course using backward design (Wiggins & McTighe, 2005) for a diverse set of learners. Implementing the technique’s three stages, I structured NGSS-focused learning goals, planned assessment to meet these goals, and centered instruction on student interests. My course, Zoology Brüöt, adopts the term art brüöt coined by French artist Jean Dubuffet referring to work created outside the boundaries of the official culture. The course uses this same philosophy, inspiring students to express their ideas in non-traditional ways: (a) organism study of structure and function through multiple representations (art), (b) ecosystem modeling and monitoring using student designs (architecture), and (c) evaluating the culturally embedded culinary use of animals (appetite). My unit will serve as a backdrop for workshop participants to explore the use of backward design to create creative units. This will also involve the practice of multiple strategies to tailor courses to differentiate for diverse learners.

Session 3: Friday, July 12, 2019
9:00am - 9:30am

3.1 A Phenomenon-Based Lesson Demonstrates Scaffolding for Science Knowledge All Learners Can Access

Session Length: 30 minutes

Virginia Vandergron, PI, California State University, Northridge

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

Topic: Supporting Each and Every Student

Discipline(s): Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics

The focus of this session will be on how to use scaffolding techniques to get all students to develop their own Claim Evidence Reasoning (CER) model around a global climate change related issue. The participants will take part in a hands-on lesson that starts with a phenomenon that students can wonder about and ask questions. Then, the participants will, as adult learners, explore the phenomenon by doing a demonstration that helps all students have the same experience related to the phenomenon. Participants will then develop an individual claim of what they observed in the demo using CER. At this point they will have an opportunity to draw out a model of their understanding of their claim. Further explanations will then be scaffolded with some reading and maps after which participants will re-visit their models. Working with a small group they will share their CER models with each other and then collaborate to form a consensus model for their group. If time allows, they will do a gallery walk to see what other models participants drew, giving peer feedback. Intentional time will be set aside at the end to debrief teacher moves and student moves. Transparency in how to guide students in sense making by using CER will be discussed as well as strategies for reading and consensus building in a science classroom.
3.2 Apprenticeships and Collaborative Professional Development

Session Length: 30 minutes

Jill Cochran, PI, Berry College; Melissa Demetrikopoulos, Institute for Biomedical Philosophy

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

Topic: Mutually Beneficial Partnerships with High-Need Schools and Districts

Discipline(s): Biological Sciences, Chemistry, Math, Physics

STEMTeach at Berry College supports Noyce Scholars and potential Noyce Scholars through apprenticeships with master STEM high school teachers as mentors. Apprentices spend four hours per month in their mentor teacher’s classroom starting as early as their first semester of college. The mentors and apprentices gather twice each semester for collaborative professional development. This professional development is focused on STEM rather than one individual discipline and includes community partners, classroom-centered activities and reflective practice. These days of collaboration have helped develop mentor-apprentice relationships, cohesiveness and support among the students, and school-endorsed professional development for the teachers.

3.3 Creating Spaces for Mentor-Mentee Conversations About Teaching

Session Length: 30 minutes

Helen Meyer, Associate Professor, Secondary Science Education, University of Cincinnati

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

Topic: Preparing Teachers for High-Need School Districts

Discipline: Other: Education

In this session, I will present materials that the UC MTF program (Expert Clinically-Based Teacher Educators- ECBTES) has been developing as part of our Noyce grant. The ECBTES are all highly experienced urban STEM teachers who regularly work with preservice STEM teachers or induction teachers in the urban school district. A major activity of the grant is to create materials to prepare new STEM mentor teachers to work with pre-service and induction year teachers. We have modified a brief survey (based on the work of Battelle) which helps mentors and mentees understand their teaching priorities. The survey provides the mentor/mentee pairs with common language to discuss teaching and leadership priorities. This can be used to support mentors to understand what drives the decisions of their mentees and to provide a framework for expanding both individuals practices. We will also share brief classroom scenarios narrated from the mentor and mentee perspectives. We have used the scenarios to develop mentors’ priorities for providing feedback and guidance and to understand mentees’ support expectations. We see these dual narrative scenarios as a way to bridge expectations of mentors and mentees.

3.4 Cultural Competency: Preparing Scholars for Future Classrooms

Session Length: 30 minutes

Jill Choate, Assistant Professor in Teacher Education, Fort Lewis College

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

Topic: Preparing Teachers for High-Need School Districts

Discipline: Other: Teacher Education

When preparing to become a teacher, one must understand the community you will be serving. In an effort to help prepare scholars for their future communities, cultural competency trainings were provided for two predominant cultures found in the Four Corners Region (Colorado, Utah, Arizona, New Mexico): Latinx and Native Americans. Local experts on these two cultures each provided a two-hour professional development session for Noyce faculty and scholars with active discussions, hands-on and interactive activities to become familiar with learning styles, cultural norms, and classroom strategies for effective community building within the classroom. This workshop will present information on guidelines used to create trainings, along with how to structure sessions to ensure understanding, application, and implementation of strategies learned into Noyce scholars’ future classrooms.

3.5 Developing Teacher Leaders Through Online Course Instruction

Session Length: 30 minutes

Amanda Gončzi, Assistant Research Scientist, Michigan Technological University; Jacqueline Huntoon, PI; Michigan Technological University; Shari Stockero, Co-PI, Michigan Technological University; Redmon Hungwe, Co-PI, Michigan Technological University

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff

Topic: Teacher Leadership
WORKSHOP ABSTRACTS

Discipline(s): Biological Sciences, Chemistry, Engineering, Physics, Other: Integrated science

This session is designed to provide an overview of a semester-long remote online course designed to support teacher engagement in leadership opportunities. Prepost survey results and interview data suggest online course instruction can effectively support teacher leadership skills in particular, action research, peer professional development, and facilitation of learning communities when instruction purposefully integrates planning for leadership, implementation, and subsequent reflection. This research uniquely demonstrates the potential for remote instruction to support teacher leadership as well as its limitations.

3.6 Developing Teacher Leaders Through Professional Learning Facilitation

*Session Length: 30 minutes*

Michael Occhino, Project Coordinator - Leadership Team, University of Rochester; Marie Rice, Master Teaching Fellow, Rochester City School District

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

Topic: Teacher Leadership

Discipline(s): Biological Sciences, Chemistry, Math

A major goal of the University of Rochester Noyce MTF Phase II (Track 3) project is developing agents of change by promoting identity development as teacher leaders. Fellows develop greater competency and confidence as leaders in this current Year Four by engaging in the development, implementation, and evaluation of professional learning (PL) in their local contexts. This builds upon the foundations in Year Three, where fellows provided content-focused coaching to peers in their school districts while developing effective communication practices as leaders. One of our fellows will describe the affordances of the scaffolds that were put in place for them to develop their PL over the course of the last year-and-a-half. This will be supported by a member of the leadership team co-presenting rationale, resources, and lessons learned from implementing these scaffolds. Two main areas will be considered in more depth with interactive components so participants can apply our experiences to their own MTF programs. We will explore: (1) the credit bearing course “Designing and Evaluating Professional Development” and (2) the practicum experience, “Implementing High Quality Professional Learning.” The outcome of this session should be that participants can begin developing a well thought out set of experiences in professional learning tailored to the Master Teaching Fellows in their own program.

3.7 Dissemination of Regional Noyce Conference Planning

*Session Length: 30 minutes*

William Hunter, PI, Noyce Midwest Conference, Illinois State University; Greg Phelan, SUNY Cortland; Lawrence Horvath, San Francisco State University; Jessica Krin, Southern Illinois University Edwardsville; Olesya Courier, Illinois State; Andre Green, University of Southern Alabama

Target Audience: Project PIs, Co-Pis, Other Faculty/Staff

Topic: Supporting New Teachers

Discipline: N/A

This is an opportunity for conference PIs, support staff, and interested participants to share current and future plans and to seek advice on those plans. In 2018, we had a very valuable discussion which shaped the 2019 proposals and current conference plans. We hope to continue to network with each other.

3.8 Learning Assistants Become Teachers: A Model for Recruitment and Retention

*Session Length: 30 minutes*

David Erickson, PI, University of Montana; Annie Gustafson, Noyce Scholar and Teacher, Kalispell Middle School; Brooke Gruntowicz, Noyce Scholar and Teacher

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

Topic: Recruiting with Retention in Mind

Discipline(s): Biological Sciences, Math

The development of future STEM teachers is a long process that when begun in the K-12 classroom and continued in the college classrooms could result in the systematic growth of learners who love facilitating K-12 student learning and choose a career in teaching STEM. Our model, launched in 2012, is a work-in-progress that we will share and then listen to your questions and suggestions to improve this model.

3.9 Persistence, Effectiveness, and Retention Studies in STEM Teaching: Synthesis & Future Opportunities

*Session Length: 30 minutes*

Wendy Smith, Associate Director, Center for Science, Mathematics & Computer Education, University of Nebraska;
3.10 Recruiting Science Majors to Teaching: A Workshop to Design Recruiting Plans and Materials

Session Length: 30 minutes

Juliet Baxter, PI, ESPRIT Noyce Grant and Associate Professor, University of Oregon

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff
Topic: Recruiting with Retention in Mind
Discipline(s): Biological Sciences, Chemistry, Physics

This workshop is designed to support recipients of newly-awarded Noyce projects in developing a plan for recruiting science majors to teach. We will briefly present the recruitment strategies that we have designed during the first two years of our Noyce project with critiques from colleagues (e.g., University of Oregon School of Journalism and Development/fund raising). We will present “before and after” versions of recruiting flyers for science majors, project summaries for undergraduate advisors, PowerPoint presentations and a 3-minute video to be shown in large, undergraduate science courses. Each of these recruiting materials has been revised (and will continue to be revised) based on feedback from students and design experts. We will allow time and provide templates for attendees to draft/revise their recruitment plans and materials.

3.11 Recruitment and Retention of Underrepresented Noyce Scholars

Session Length: 30 minutes

Jacqueline Leonard, PI, University of Wyoming

Target Audience: Evaluators/Education Researchers, Project PIs, Co-PIs, Other Faculty/Staff, Undergraduate and/or Graduate Noyce Scholars
Topic: Culturally Relevant Pedagogy
Discipline: Other: Elementary

Preserve teachers with disaffection for mathematics or science are less likely to enter the field of education (Darling, Hammond, 2000), and if they do become teachers, they are more likely to avoid teaching these subjects (Leonard, Barnes-Johnson, Dantley & Kimber, 2011). To address the need for highly qualified teachers in elementary classrooms, we conducted a study to examine the recruitment and retention of undergraduate dual STEM and elementary education majors. The primary goal of our five-year study was to increase the number and quality of teachers of mathematics and science who are committed to serving high-need students in elementary schools. Tangible benefits in the Wyoming Interns to Teacher Scholars (WITS) study included: (a) full tuition, housing, textbooks, and digital tablets; (b) mentoring by faculty and graduate students; (c) professional development; and (d) social activities. However, the Principal Investigator, as a member of an underrepresented group, believes intangible resources are also needed to successfully complete programs like WITS. Culturally relevant pedagogy, in the form of developing cultural competencies for advising, course-taking, and problem solving, are needed to work with and understand the needs of scholars of color. This
3.12 Robert Noyce Teacher Scholarship Program: Developing Effective Mathematical Sciences Teachers

Session Length: 30 minutes

Masood Poorandi, PI, Bethune-Cookman University; Hector N. Torres, Co-PI, Associate Professor, Bethune-Cookman

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

Topic: Preparing Teachers for High-Need School Districts

Discipline(s): Biological Sciences, Chemistry, Math, Physics

The Noyce Teacher Scholarship Program at Bethune-Cookman University (B-CU) aims to serve the national need of increasing the number of high-quality mathematics teachers. The overall goal of the 5-year project is to encourage STEM undergraduate students to pursue mathematical sciences teaching careers in elementary and secondary schools especially in high-need educational agencies. The overall strategy for developing highly effective mathematical sciences teachers is to support scholars in the attainment of dual degrees in a STEM discipline and in Mathematics Education. The project will award a two-year scholarship to 20-25 STEM students who demonstrate commitment to become teachers of mathematics. To stimulate early interest of first- and second-year STEM students in K-12 teaching careers, 40 internships will be awarded to B-CU STEM students during the program. Partnering with Volusia and Flagler County School Districts and the Boys & Girls Club of Volusia County, the project will direct a 14-week internship curriculum as a preparatory academy for the Noyce Teacher Scholarships Component of the program.

The academy has two main goals: (1) instructional experience in informal learning settings and (2) developing knowledge of competencies/skills required for highly qualified teachers. In addition, the project will provide mentoring support to ensure scholars follow the teacher certification pathway that best aligns with their background and educator preparation routes. The project will improve the quality, quantity, and diversity of mathematics teachers of Volusia County and Flagler County School Districts, and build new sustainable models for the recruitment, preparation, and retention of mathematics teachers to address the teacher shortage.

3.13 Routines for Reasoning

Session Length: 30 minutes

Stephanie Sheehan, Teacher, College of Staten Island

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

Topic: Resources for Teachers

Discipline(s): Biological Sciences, Chemistry, Math, Physics

During this workshop, participants will learn about instructional routines and how they offer repeatable designs for learning that support both students and teachers. Participants will hear about two routines in reasoning: Contemplate then Calculate and Decide and Defend. Contemplate then Calculate is an instructional routine that provides students and teachers with an opportunity to shift instructional focus from calculation to necessary structural interpretations of mathematics. This routine fosters structural thinking—math practice 7. Decide and Defend is an instructional routine that helps students make sense of another students' reasoning, decide if they agree or disagree with that reasoning, and then construct an argument defending their decision. The routine fosters mathematical practice 3—construct viable arguments and critique the reasoning of others. Participants will engage in the practices as if they were students and explore how to implement them in their classrooms.

3.14 Swimming Upstream: Overcoming Challenges of Noyce Programs at Smaller Institutions

Session Length: 30 minutes

Julie Dahlstrom, PI and Associate Professor of Physics and Astronomy, Carthage College; Christine Blaine, Co-PI and Professor of Chemistry, Carthage College; Karin Sconzert, Co-PI and Associate Professor of Education, Carthage College; Aaron Trautwein, Co-PI and Professor of Mathematics, Carthage College

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

Topic: Noyce Project Management and/or Sustainability

Discipline(s): Biological Sciences, Chemistry, Math, Physics

Noyce programs at large public universities outnumber those at smaller primarily undergraduate institutions (PUIs) by a substantial margin. Reasons for the wide gap in participation among institution types include larger numbers of target STEM students at higher enrollment institutions and a better developed sponsored programs infrastructure at larger universities. These factors compound each other to make a
strong case that more STEM teachers can be produced with greater economies of scale at larger universities. In contrast, PUIs tend to have lower student enrollments, heavier faculty teaching loads, less grant experience, and fewer resources to execute institutional grants. These challenges can become insurmountable to development beyond the Noyce capacity building stage. This session will use the lessons learned while designing and implementing the Carthage College Noyce program as a case study of one way that a Track 1 program grew from a capacity building grant. The overall goal of this workshop is to offer investigators, faculty, and administrators from PUIs a forum to discuss the challenges they face, previously known or unforeseen, and to share what they have learned in their Noyce efforts. Think-pair-share exercises will be used with participants to identify, discuss, and (hopefully) leverage the advantages that PUIs have in recruiting, preparing, and supporting their students in STEM teaching. This workshop will be especially helpful to PUI's with capacity building grants.

Session 4: Friday, July 12, 2019
9:40am - 10:25am

4.1 Correlation Between Professional Noticing and Specialized Content Knowledge

Session Length: 45 minutes

Behailu Mammo, PI, Hofstra University; Raymond LaRochelle, Research Collaborator, University of Delaware

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

Topic: Supporting New Teachers

Discipline(s): Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics

Professional noticing of students’ mathematical thinking is an important but challenging expertise for teachers to develop. One way we can understand the development of this expertise is by understanding what cognitive resources teachers utilize in order to effectively “professionally notice” a student’s work. Theoretically, cognitive resources such as mathematical knowledge for teaching (MKT) and beliefs that motivate teachers to be responsive to their students would support sophisticated professional noticing skills. However, empirical investigations into connections between such cognitive resources and professional noticing have uncovered mixed evidence; some studies find evidence of such connections, while others do not. In this workshop, we share results from a study in which we uncovered a connection between teachers’ MKT and professional noticing expertise. In particular, we found evidence that a strong specialized content knowledge, as measured by the number of different solution strategies teachers used to solve one task, may correlate with a more sophisticated ability to decide how to respond to a student based on the student’s mathematical understandings. This finding implies that knowledge of multiple solution strategies may support teachers’ deciding how to respond skills. Samples of students’ work will be used to give opportunities for the audience to practice the three components of professional noticing of student mathematical thinking.

4.2 Culturally Relevant Pedagogy and STEM Teacher Preparation: Student and Professor Perspectives

Session Length: 45 minutes

Janelle Johnson, PI and Assistant Professor of STEM Education, Metropolitan State University of Denver; Matthew Davis, Current Scholar, Metropolitan State University of Denver

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

Topic: Culturally Relevant Pedagogy

Discipline: Other: STEM

Participants in this session will learn about the culturally relevant component of teacher preparation offered at one urban commuter HSI. Some of the literature and learning activities described include: Curriculum as Window and Mirror; a local Call to Action to address educational inequities; and differentiation of content area lesson plans. Participants will engage in discussion about challenges and successes of engaging preservice STEM teachers in culturally relevant pedagogy from the perspectives of both students and instructors.

4.3 Culturally Responsive Science Education in New York City: Collaboration of a Community of Teachers

Session Length: 45 minutes

Arthur Funk, Noyce Scholar, American Museum of Natural History; Sean Krepski, Noyce Scholar, American Museum of Natural History; Maya Pincus, Noyce Scholar, American Museum of Natural History; Susan Sylvester, Noyce Scholar, American Museum of Natural History; Kin Tsoi, Noyce Scholar, American Museum of Natural History; Caity Tully, Noyce Scholar, American Museum of Natural History

Target Audience: Noyce Master Teachers, Noyce Teaching Fellows, Project Pls, Co-Pls, Other Faculty/Staff, School and District Administrators, Undergraduate
Resources pertaining to culturally responsive education in the science classroom are virtually non-existent. In this workshop, we will share and model readily adaptable culturally responsive activities that we have used in our own science classrooms. First, participants will consider their own cultural perspectives using the metaphor of a culture tree. They will then share ideas through a research-based classroom discussion strategy that supports students in thinking critically and speaking openly, maximizing learning while minimizing threats (Zaretta-Hammond, 2015; Aguilar, 2018). Next, participants will engage in an idea exchange protocol to support sharing, comparing, and building their thinking on culturally responsive education. Workshop leaders will describe how they modified this protocol for use in their classrooms, and what they learned from their collaborative analysis through the lens of culturally responsive education. The workshop leaders will then introduce terms and definitions commonly used in the literature around culturally responsive education. Workshop leaders will offer their own definitions, including what they consider to be the most important components for their own science teaching. Finally, participants will be introduced to a tool (modified from Bryan-Goode, Hester, & Peoples, 2019) for evaluating the cultural responsiveness of a science curriculum. Participants will consider ways in which they can modify their own curricula to be more culturally responsive and network with other participants to share and refine their newly developed strategies. To model supporting metacognition in the culturally responsive classroom, participants will engage in reflection on the ways in which the activities they participated in were culturally responsive.

4.4 Developing a Model for Community College and University Collaboration Around Math Teacher Preparation

Session Length: 45 minutes

David Pagni, PI, California State University, Fullerton; Patrice Waller, Co-PI, California State University, Fullerton; Christa Solheid, Co-PI, Santa Ana College; Martin Romero, Management Team Member, Santa Ana College

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

Topic: Noyce Project Management and/or Sustainability

Discipline: Math

Transitioning Math Majors into Teaching (TMMT) is a Noyce Track 1 project that is attempting to develop a model for seamless transition of math majors from a community college to the state university; ultimately culminating in secondary school mathematics teaching credentials. The project builds on research on the role that institutional agents play in support of Latino and other underrepresented students to achieve transfer success. Part of this research stems from the doctoral dissertation of one of the project’s community college partners. Sharing the process of building the partnership and early experiences with implementing shared experiences for the freshmen/sophomore Noyce TMMT Associates may help other institutions attempting to nurture students in the transfer process who plan to become secondary school mathematics teachers. Participants will also gain knowledge about the early work of this project to select Noyce TMMT Associates and Scholars in the first semester of funding. The presenters will have time for an open discussion on building these types of partnerships, and hope to gain knowledge from the participants as well.

4.5 Evaluation as a Partner in Project Design and Implementation

Session Length: 45 minutes

Nathan Magee, PI, TCNJ Noyce grant and Professor of Physics, The College of New Jersey; Susan Eriksson, Project External Evaluator, Eriksson Associates

Target Audience: Evaluator/Education Researchers, Project PIs, Co-Pis, Other Faculty/Staff

Topic: Research, Assessment, and/or Evaluation

Discipline: Physics

Workshop presenters will model how the two roles (PI and Project Evaluator) work together in the physics program at The College of New Jersey with participants applying these principles to their own projects. The following information includes the activity/subject, estimated time, presenter and interactive participant activity. (1) Introduction to workshop: Magee: PI perspective and Eriksson: external evaluator perspective; participant introductions (depending on number of people), NSF Program Officer on “why evaluation.” (2) Aligning project goals with outcomes: Magee: Project goals, Eriksson, outcomes. Participants will align their own goals with outcomes in a Logic Model. (3) Aligning project management with evaluation/monitoring: Magee: setting up project management. Participants will list major benchmarks. (4) End game: what works and why – purpose of evaluation. Eriksson: purpose of evaluation. Participants address utility of their own evaluation. (5) Resources: Eriksson: resource overview, Magee: working with other projects and what projects need from NSF. (6) Printed resource list and participant questions. (7) Plans for next steps, Magee: participants write out an action item.
4.6 How to Support Productive Mentoring: Tools and Practices for Productive Partnerships Between Mentors

Session Length: 45 minutes

Karin Lohwasser, PI, University of California, Santa Barbara; Caroline Hadley, Research Assistant, University of Washington; Soo-Yeon Shim, Research Assistant, University of Washington

Target Audience: Evaluators/Education Researchers, Higher Education Institution Administrators, Noyce Master Teachers, Noyce Teaching Fellows, Project PIs, Co-PIs, Other Faculty/Staff

Topic: Effectiveness of Program Graduates

Discipline(s): Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics, Other: Teacher Education

What makes mentoring effective for preservice teachers who are just learning to teach? In this workshop, we introduce a system of supports (practice, tools, and resources) that can promote productive partnerships between preservice teachers and mentor teachers during field placements. In the first part of this workshop, we will introduce six effective mentoring practices for supporting preservice teachers: 1) making thinking explicit; 2) modeling the work of teaching; 3) pre-briefing and debriefing; 4) co-planning; 5) co-teaching; and 6) analyzing student work together. Participants will share their experiences of mentoring and/or supporting mentoring and discuss the six practices based on their experiences. In the second part, we will share tools and resources that we have developed for supporting productive collaboration between preservice teachers and mentors. These include a website with mentoring resources (http://mentoredteachers.org/), short video guides and protocols for mentoring practices, trajectories for preservice teachers’ learning opportunities, and feedback tools that mentors and candidates can use together in classrooms. Participants will be invited to try out these tools and resources. In the third part, we will invite participants to think about how they can use these supports in their own contexts and will discuss potential strengths and limitations of the materials. For the last part, we will open up discussions to talk about broader implications for supporting the collaboration between preservice teachers and mentor teachers and possible tensions that might arise.

4.7 Lessons Learned: Integration of CRP Across a STEM Teacher Preparation Program

Session Length: 45 minutes

Leah McAlister-Shields, Senior Personnel, University of Houston; Paige Evans, PI and Clinical Professor, University of Houston; Donna Stokes, Associate Professor, University of Houston; Cheryl Craig, Professor, Texas A&M University

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

Topic: Culturally Relevant Pedagogy

Discipline(s): Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics

Research confirms that Culturally Responsive Pedagogy (CRP) is a vehicle for increasing teacher success in high-need classrooms. As such, this Noyce funded program has integrated elements of CRP across courses offered. This session highlights CRP activities implemented in each of these courses and discusses the lessons learned this past year. Additionally, next steps will also be discussed.

4.8 Model-Based Reasoning and Recall Using Sketching to Learn and Eyes-Closed Exercises

Session Length: 45 minutes

Paul Heideman, Professor of Biology, College of William & Mary

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

Topic: STEM Content Area and/or Convergent Discipline Skills Development

Discipline(s): Biological Sciences, Chemistry, Geosciences, Math, Physics

Students struggle to replace learning methods that have low effectiveness, such as rereading or reviewing, with effective active learning methods that help build recall and build problem-solving skills. This workshop will explore ways to apply two methods that can help students understand, recall, and reason in science (and perhaps in mathematics). Drawing, sketching, and visualization have extensive evidence from the research literature for effectiveness as a tool for understanding and reasoning but are known to be challenging for students to learn and adopt for learning and problem solving. For both of these, guided instruction and practice can help students apply these tools effectively for reasoning. The workshop will begin with a brief introduction and rationale from the research literature on drawing to learn and visualization. The workshop will take participants through examples that apply drawing as brief, minimalist sketches that require no artistic expertise, and also through a visualization approach, eyes-closed exercises, both of which help students focus on essentials. Both methods also provide ways for teachers to gain feedback from students. The workshop will include opportunities for small-group and full-group applications followed by Q&A on potential problems. Participants will also work in small groups to practice a method to build student skills for model-based reasoning and problem solving: so-called “Change-one-thing – What-would-be-
**WORKSHOP ABSTRACTS**

different? problems that are based on sketched or visualized models. Both methods can be taught to students as a mechanism to understand hypotheses and make predictions.

**4.9 Personalities, Perceptions, and Placements: Lessons Learned from Noyce Scholar Rural Placement**

*Session Length: 45 minutes*

Laurie Cavey, Professor, Department of Mathematics, Boise State University; Maddison Chinnock, Scholar and recent graduate of Boise State

Target Audience: Project PIs, Co-Pis, Other Faculty/Staff

Topic: Mutually Beneficial Partnerships with High-Need Schools and Districts

Discipline: Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics

In this session, we plan to actively engage participants in considering challenges associated with recruitment efforts that have a primary focus on recruiting STEM majors from rural school districts to return to their home communities to teach.

The proposed session outline is as follows:

1. Engaging participants in a short activity in which they reflect on how they were in middle and high school versus their current professional selves. Participants will be asked to think about how they are different, and what administrators or their teachers might have said about the younger versions of themselves.

2. Provide a brief background on the motivation of our program to focus on working with rural communities to 'grow their own' secondary STEM teachers.

3. Tell the story of one of our recent graduates who was placed in her hometown rural community for her student teaching placement. She will share some of the obstacles she faced by teaching in a school where she was a student that appear to be tied to significant changes in her personality since she was a middle/high school student.

4. We will then shift back to the university and program's perspective and share some of our initial ideas about how to collaboratively work with rural district administrators and teachers to advocate for scholars being placed in their hometown rural schools.

The session will close with a group discussion, providing participants the opportunity to share their own lessons learned with rural placements.

**4.10 Students Were Not Made To Be Managed: Effective Practices to Build Community and Promote Inclusivity**

*Session Length: 45 minutes*

Natalie King, Co-PI, Developing STEM Professionals as Educators and Teacher Leaders, Georgia State University; Christine Thomas, PI, Developing STEM Professionals as Educators and Teacher Leaders, Georgia State University

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

Topic: Preparing Teachers for High-Need School Districts

Discipline(s): Biological Sciences, Chemistry, Computer Science, Engineering, Geosciences, Math, Physics

The relatively homogeneous and static demographics of the teaching workforce do not adequately reflect the dynamism and racial and ethnic diversity of U.S. students (Darling-Hammond & Bransford, 2007; US Department of Education, 2016). Notably, research suggests that many teachers often underestimate the potential of students of color to excel in the STEM disciplines (Brickhouse, Lowery, & Schultz, 2000). These negative perceptions tend to discourage students from realizing their true potentials and perceiving themselves as STEM talent.

Furthermore, Black/Latinx students in urban settings often experience cultural and historical mistrust in educational settings and are disconnected from the science curriculum that ignores their funds of knowledge (Kane, 2012; Moll, Amanti, Neff, & Gonzalez, 1992; NSF, 2017). Although researchers have analyzed various challenges and strategies to decrease the impact of these resisting factors, increasing teachers’ capacity to create equitable STEM learning spaces within urban settings continues to remain a challenge (Coffey and Farinde-Wu, 2006; Fraser-Abder, Atwater, and Lee, 2006; Kokka, 2016). The aforementioned realities reify the need for STEM teacher educators to explore innovative ways to prepare and develop culturally competent STEM teachers who can thrive even in the most challenging working conditions. In this workshop, we will engage attendees in effective strategies and best practices for STEM teachers to create and maintain positive classroom communities. Through role-playing and interactive activities, attendees will learn how to engage the local community in their quest to create spaces that are conducive for learning.

**4.11 The ABCs of Multi-Institutional Partnership: Year 1**

*Session Length: 45 minutes*

Tetyana Berezovski, PI, Saint Joseph's University; Greer Richardson, Co-PI, LaSalle University; Victor Donnay, Co-PI, Bryn Mawr College
Target Audience: Evaluators/Education Researchers, Higher Education Institution Administrators, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators
Topic: Noyce Project Management and/or Sustainability
Discipline(s): Biological Sciences, Chemistry, Engineering, Math, Physics

This workshop will focus on the collaborative processes used to implement a scholarship program across and within multi-institutional partnerships that evolved from the Philadelphia Regional Noyce Partnership (PRNP) organization. Six area colleges and universities became equal partners; some had previous Noyce funding, others did not. During the first year of funding the partnership focused on developing a functional collaboration predicated on shared values and beliefs. The working relationships between the PRNP and its partners were established prior to Noyce funding primarily in the areas of representational interests. During the first year of funding, three major areas of institutional interactions and collaborations were established and intensified across the board. These include individual, academic, and administrative groups. The workshop will focus on processes of establishing and maintaining a distributed leadership model at each partner school as a workable model of the PRNP. The workshop will offer a critical analysis of the challenges and opportunities that the partners experienced as they conducted collaborative work across diverse institutions.

4.12 The Noyce Mentor: A Model for Supporting Pre-service STEM Teachers

Session Length: 45 minutes

Doris Kimbrough, Professor of Chemistry and PI, Noyce Project, University of Colorado Denver

Target Audience: Higher Education Institution Administrators, Noyce Teaching Fellows, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Undergraduate and/or Graduate Noyce Scholars
Topic: Preparing Teachers for High-Need School Districts
Discipline(s): Biological Sciences, Chemistry, Math, Physics

The Noyce mentor role was conceived as part of CU Denver’s first Noyce science project (Promoting Undergraduate Licensure in Science Education, PULSE, NSF #1136122), implemented in the Noyce mathematics project (Noyce Math Scholars, NSF #0934945), and is currently in place in our third Noyce project (CU Denver Noyce Track 1, NSF #1660770), which supports preservice teachers in both mathematics and science. We have worked with three Noyce mentors through the course of the above projects. In each case she was/is an experienced STEM teacher in the K-12 arena, possesses considerable leadership experience, and is retired from teaching. Her role has been one of both professional coaching and emotional support to our Noyce participants at three levels of their path to becoming effective teachers: 1) before they enter the licensure program; 2) during the post-baccalaureate licensure experience; and 3) during the first and sometimes second year of teaching in a high-need school district (induction period). A STEM-specific mentor who operates outside of our School of Education and Human Development/partner school administrative system provides a unique and extremely effective model towards supporting pre-service and beginning teachers. Workshop participants will be divided into groups, and each will analyze and present a case study of a teacher at a different point in her/his path to becoming STEM teachers in high-need districts. We will then discuss how the Noyce mentor helped support and coach each teacher in his or her journey to becoming an effective STEM teacher.

4.13 Undergraduate Students’ Perceptions of Service-Learning Experiences

Session Length: 45 minutes

Sherri Martinie, Associate Professor, Kansas State University; Elise Meyer, Noyce Scholar, Kansas State University; Kaylee Gunzelman, Noyce Scholar, Kansas State University

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Undergraduate and/or Graduate Noyce Scholars
Topic: Mutually Beneficial Partnerships with High-Need Schools and Districts
Discipline: Math

Research was conducted into how undergraduate students at one institution perceive the service learning experiences they engage in throughout their teacher preparation program. A total of 159 participants from one university completed a survey that asked them about their definition of service learning and their feelings about their service learning experience. The survey consisted of both Likert-scale items and open-ended questions. The results of the survey will be shared. This research was conducted by a Noyce project PI and a Noyce scholar. In addition to sharing the results of the survey, the case of one service learning experience led by Noyce scholars, Family STEAM nights, will be described. Since 1989, the College of Education at Kansas State University has entered into projects with Kansas school districts to establish mutually beneficial partnerships. Service learning projects with these districts often are vehicles for establishing and building these partnerships. Research implications and recommendations will be shared.
WORKSHOP ABSTRACTS

4.14 Using Visual Network Scales and Social Network Analysis in Teacher Professional Development

Session Length: 45 minutes

Justin Polizzi, Assistant Professor, Tennessee STEM Education Center, Middle Tennessee State University; Gregory Rushton, Professor of Chemistry and Director, Tennessee STEM Education Center, Middle Tennessee State University

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

Topic: Research, Assessment, and/or Evaluation

Discipline(s): Chemistry, Physics

The focus of our workshop is using Social Network Analysis (SNA) as both a professional development activity and a research tool. We demonstrate an interactive SNA activity previously used with early career or experienced teachers to facilitate discussions of the teaching profession and their professional opportunities. In particular, we focus on Visual Network Scales (VNS) as a pedagogical tool for describing and contrasting images from SNA and discussing what they mean. In the process of demonstrating the activity, we cover basic concepts in network thinking that demystify SNA. We also solicit participant feedback related to networks, provide sample responses from previous teacher participants, and discuss implications for using SNA and VNS in education research. BYO Device and internet access are encouraged for activity. The relevance of the workshop is related to growing interest in SNA and teacher leadership within the teacher education community. The workshop provides a general overview of network theory and how network data are collected, processed, and interpreted through an activity for teachers. The activity was originally designed for use in an NSF Noyce project to develop teacher leaders and was found to facilitate discourse on the profession and leadership rather than personal classroom issues. The SNA activity may be particularly relevant to STEM teacher education due to that population’s familiarity with measuring, quantifying and modeling systems. VNS provides an opportunity for teachers to model and explain interactions and outcomes.

Session 5: Friday, July 12, 2019

10:35am - 11:05am

5.1 Can You List Five Good Reasons for Teaching Mathematics? Science? What Are the Big Five?

Session Length: 30 minutes

Jim Matthews, Professor, Siena College

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

Topic: Supporting New Teachers

Discipline(s): Chemistry, Computer Science, Physics

During a long school year, it’s not unusual to lose sight of the big picture of why we teach what we teach. It’s easy to become consumed with the immediate needs of students, lesson plans, classroom management, and everything associated with assessments. This loss of vision can also occur while participating in a teacher preparation program. In this very interactive session, participants will discuss the reasons for teaching mathematics and science. We will share examples that connect to the Big Five and discuss ways to keep us focused on what really counts.

5.2 Detroit by the Numbers: Math You Can Care About

Session Length: 30 minutes

Jennifer Lewis, Associate Professor, Wayne State University

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

Topic: STEM Content Area and/or Convergent Discipline Skills Development

Discipline: Math

In 2012, Andrew Hacker wrote a scathing takedown of high school and college algebra. Hacker argued that "making mathematics mandatory prevents us from discovering and developing young talent." Around that time, Wayne State abruptly cancelled the general education mathematics requirement. Students could get a degree without taking mathematics. In the past two years, the Noyce faculty developed a new course, Detroit by the Numbers, to satisfy the newly reinstated general education requirement and mindful of the critiques leveled by Hacker and our own students. This course extends current thinking about mathematics education from the P-12 system into a college mathematics course. It is place-based and uses mathematics to tell the story of social issues and agencies in Detroit that are especially relevant to the lives of our undergraduate students. Students visit agencies and institutions around the city, and each unit takes on a social issue of concern to the local community, for example, differential car insurance rates or the quality of the drinking water in school buildings. The mathematical content retains the rigor of traditional mathematics courses at the undergraduate level but is anchored in issues that are relevant and meaningful to college students. The development of Detroit by the Numbers was influenced by
Rico Gutstein and other P-12 mathematics educators. In this session, participants will see examples of units and examine the data showing student growth in mathematical knowledge, self-efficacy, and interest in mathematics.

5.3 Induction: A Five-Year Model

Session Length: 30 minutes

Ruth Cossey, PI, Mills College; Steven Luntz, OUTR Project Coach, Mills College; Stephanie Hironaka, Oakland Unified School District; Sterling He, Oakland Unified School District; Mike King, Oakland School of the Arts; Steven Yan, Oakland Unified School District

Target Audience: Noyce Master Teachers, Noyce Teaching Fellows, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators
Topic: Supporting New Teachers
Discipline(s): Biological Sciences, Chemistry, Math, Physics

Join in an interactive presentation of coaching models from early teacher preparation through four years of full-time teaching. The team will share both successes and missteps. Although we will not provide a guide to full induction, we will have you peek through windows of five years of professional learning support from initial student teaching, Lesson Study, personal cognitive coaching, and district sponsored site-based coaching.

5.4 Intervention Strategies for Struggling Learners in Mathematics

Session Length: 30 minutes

Irina Lyublinskaya, PI (Track 3 Noyce), Co-PI (Track 1 Noyce), and Professor of STEM Education, College of Staten Island

Target Audience: Noyce Master Teachers, Noyce Teaching Fellows, Undergraduate and/or Graduate Noyce Scholars
Topic: Supporting Each and Every Student
Discipline(s): Biological Sciences, Chemistry, Math, Other: Elementary Science

Students struggling with mathematics need interventions that mitigate and prevent mathematics difficulties. In this workshop, we will discuss evidence-based recommendations that address the challenges of teaching mathematics to students in grades 6 through 12. Participants will learn about specific recommendations to address the needs of these students through focused interventions; discuss how to carry out each recommendation and overcome potential roadblocks to implementing the recommendations; review examples illustrating specific intervention strategies for different recommendations; and develop strategies based on these recommendations for teaching specific topics of middle school mathematics.

5.5 K-12 Diversity Pathway Programs in the E-STEM Fields: Summary of Perceived Unmet Need

Session Length: 30 minutes

Alexis Caldwell, Science Teacher at Durham School of the Arts (AP Environmental Science and Biology), Duke University and Durham School of the Arts

Target Audience: Non-Profit Organization Personnel, Undergraduate and/or Graduate Noyce Scholars
Topic: Mutually Beneficial Partnerships with High-Need Schools and Districts
Discipline: Other: E-STEM

The pathway through the education system and into E-STEM professions has been described as a “pipeline,” where the barriers to attracting and maintaining individuals in E-STEM are characterized as “leaks” in the pipeline. A number of pathway/pipeline programs have been established with the goal of attracting and retaining individuals from underrepresented groups in various professions (e.g., STEM summer camps for students). The purpose of this session is to provide an overview of research into the range of existing K-12 pipeline programs, to assess gaps in the goals of existing programs, and to investigate implications of these findings for stakeholders.

5.6 Managing a Successful Track 1 Undergraduate Noyce Program: Lessons Learned from 5 (+1) years

Session Length: 30 minutes

Douglas Larkin, PI, Noyce Teacher Scholarship Program and Associate Professor, Montclair State University; Sandra Adams, PI and Noyce Teacher Scholarship Program Professor, Montclair State University

Target Audience: Evaluators/Education Researchers, Higher Education Institution Administrators, Project PIs, Co-Pis, Other Faculty/Staff
Topic: Noyce Project Management and/or Sustainability
Discipline(s): Biological Sciences, Chemistry, Geosciences, Physics

In this conversational workshop, Dr. Sandra Adams and Dr. Doug Larkin will discuss lessons learned over the past six years in managing a Noyce Track 1 program focused on recruiting, preparing, and retaining undergraduates as teachers. To date, the Montclair State University (MSU) Noyce program has admitted 29 of our proposed 30 scholarship recipients to the
program. The workshop will highlight some of the more everyday aspects of running a Noyce program. We will raise some critical issues that we have encountered along the way and share what we have learned in our attempts to address them. Participants will be able to apply the lessons learned from our MSU Noyce program to their own efforts in the following areas: recruitment and admission; partnerships with community colleges; partnerships across colleges within the university; running monthly meetings for Noyce scholars; scheduling and advisement for Noyce scholars; performance measures (observations of teaching, portfolios, edTPA); job placement, and retention and mentoring. This session will be highly interactive, and there will be an opportunity for other Noyce PIs to discuss their own contexts and challenges.

5.7 Preparing Pre-Service Science Teachers to Teach Science in Linguistically Diverse Classrooms

Session Length: 30 minutes

Alexis Rutt, Project Personnel, Doctoral Student, and Co-instructor, University of Virginia; Frackson Mumba, PI and Co-Instructor, University of Virginia

Target Audience: Evaluators/Education Researchers, Project PIs, Co-PIs, Other Faculty/Staff
Topic: Preparing Teachers for High-Need School Districts
Discipline(s): Biological Sciences, Chemistry, Engineering, Physics, Other: Earth Science

Science classrooms are becoming increasingly linguistically diverse (i.e., inclusive of students who are still learning English, commonly called English Learners or ELs), requiring that pre-service teachers be prepared to teach science in a way that integrates language and literacy into the content, especially at the secondary level. During this workshop, we will describe how we worked with our graduate Noyce scholars during their science methods courses to prepare them to teach linguistically diverse students using a research-informed language and literacy integrated science instructional framework. In particular, we will discuss how we incorporated this instructional framework into our traditional methods instruction to ensure that the integration of language and literacy was grounded in effective, rigorous science instruction. We will also detail some preliminary findings related to our 2018-2019 Noyce cohort’s understanding and perceptions of and planning abilities for language and literacy integrated science instruction following their participation in our re-designed methods courses.

5.8 Promoting Student Agency through Self-Assessment and Rubrics

Session Length: 30 minutes

Ryan Kile, Master Teacher Fellow, High School Math Teacher, California State University, Fullerton and Anaheim Union High School District; Jennifer Fuentes, Master Teacher Fellow, High School Math Teacher, California State University, Fullerton and Anaheim Union High School District; Mark Ellis, PI, ATMALA Project and Professor of Secondary Education, California State University, Fullerton

Target Audience: Noyce Master Teachers, Noyce Teaching Fellows, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Undergraduate and/or Graduate Noyce Scholars
Topic: Supporting Each and Every Student
Discipline: Math

Learn from the experiences of two teachers of mathematics who have worked to shift their classrooms to be more culturally responsive and student-centered. One key component of student-centered learning is the productive use of assessment. When students are active participants in the assessment process, they feel more in control of their learning. Hear about the research and engagement in practical examples including analyzing samples of student work demonstrating the formative self-assessment process. Self-assessment and the use of rubrics guide students from where they are to where they need to be, helping students appreciate the brilliance of mathematics.

5.9 Recruitment and Placement of Four Corners Noyce Scholars and Participants

Session Length: 30 minutes

Alicia O’Brien, PI, San Juan College; Jill Choate, Assistant Professor of Education, Fort Lewis College

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, Undergraduate and/or Graduate Noyce Scholars
Topic: Recruiting with Retention in Mind
Discipline(s): Biological Sciences, Chemistry, Engineering, Math

This session will explain first-year recruitment and placement methods for Levels I and II participants and Noyce Scholars within the Four Corners Noyce Program. The Four Corners Noyce Program is a shared institutional endeavor that encompasses a variety of recruitment methods and processes for mentoring and bridging students from a two-year college to a four-year institution. The Four Corners area is a unique combination of cultures. For this reason, diversity is emphasized at both 2-year
and 4-year institutions and presents exceptional opportunities for participants in a variety of K-12 settings. A variety of recruitment and placement activities will be discussed including the use of a county-wide math consortium as a placement tool, Julia Robinson Math Festivals, math mindset professional development, STEM classroom recruitment, and a middle school STEM Expo. Lessons learned and implications for future processes moving forward will be discussed.

5.10 Retention of Noyce Scholars - State of the Field

Session Length: 30 minutes

Jessica Gottlieb, Assistant Professor, Texas Tech University; Jerry Dwyer, PI, Professor and Director of CISER, Texas Tech University

Target Audience: Evaluators/Education Researchers
Topic: Research, Assessment, and/or Evaluation
Discipline: Math

This workshop will present participants with a systematic review of research conducted with Noyce fellows and scholars, with a particular focus on factors related to teacher retention during and after the Noyce scholarship, as well as how this research is reflected or challenged in the broader teacher education research community. We will present results from our ongoing research on Noyce teacher retention and offer workshop participants the opportunity to consider how their research can contribute to the identified gaps in the literature. Research will include all peer-reviewed research that included participants who are affiliated in some way with the Noyce program. Given the largely qualitative nature of this research, a systematic review approach will be used rather than a meta-analysis.

5.11 Supporting Beginning STEM Teachers in Urban Schools

Session Length: 30 minutes

Anne Seitsinger, PI and Associate Dean, University of Rhode Island

Target Audience: School and District Administrators
Topic: Supporting New Teachers
Discipline(s): Biological Sciences, Chemistry, Computer Science, Geosciences, Math, Physics

A continued need exists for highly qualified teachers, especially in mathematics and science in high-need schools (HNS). Nationally-sponsored efforts such as NSF’s Robert Noyce Teacher Scholarship Program support institutions of higher education trying to attract and support STEM teacher candidates to work in HNS. This mixed-methods study uses a survey and candidate interviews to understand the experiences and needs of first-year teachers/inductees who successfully completed a Noyce-supported teacher preparation program and are now teaching full time in a HNS. Inductees indicate aspects of teaching to be considered as we continue to support these candidates.

Concerns include access to mentoring, the challenging nature of addressing students’ needs, and access to high quality curriculum and technology.

5.12 Supporting Noyce Scholars’ Development of Sociocultural Awareness

Session Length: 30 minutes

Lisa McDonald, Doctoral Research Assistant, Barnard College; Romi Messer, Noyce Scholar, Barnard College

Target Audience: Evaluators/Education Researchers, Noyce Teaching Fellows, Project Pls, Co-Pls, Other Faculty/Staff, Undergraduate and/or Graduate Noyce Scholars
Topic: Preparing Teachers for High-Need School Districts
Discipline: N/A

The support of scholars in the Barnard Noyce Teacher Scholars Program has been shown to be beneficial in facilitating the scholars’ growth inside and outside of the classroom. In our elementary cohort, new teachers have expressed the importance of forming relationships with the students they teach to build a sense of classroom community and effective practices. Teacher preparation experiences and mentorship from their professors and peers allow scholars to examine and expand their sociocultural awareness within their teacher identity, a process that scholars identify as significant to their development. This workshop will provide findings from an in-depth case study regarding a scholar’s experience as a preservice teacher to classroom teacher within the Barnard Noyce program. The findings from this case study illustrate strategies and supports for scholars that prepare them for success in high-need schools.

5.13 Supporting Noyce Scholars Through the Use of Open Portfolios: A Model from UTeach Maker

Session Length: 30 minutes

Shelly Rodriguez, Associate Professor of Practice, University of Texas; Susan McLain, Noyce Scholar, Manor New Tech High School

Target Audience: Evaluators/Education Researchers, Higher Education Institution Administrators, Noyce Teaching Fellows, Project Pls, Co-Pls, Other Faculty/Staff, School and District Administrators, Undergraduate and/or Graduate Noyce Scholars
WORKSHOP ABSTRACTS

Topic: Supporting New Teachers
Discipline: Other: STEM

Participants will be introduced to “making”, the UTeach Maker program, and the open portfolio process used for micro-credentialing. Participants will have the opportunity to explore the portfolios of current and former Noyce scholars and will have time to survey the rubrics provided for national reviewers. The session will include a Q & A with a current scholar from the program and give participants the chance to consider how an open portfolio might be useful in their own program’s context.

5.14 The Importance of Field Supervisor Expertise in the Development of Highly Qualified Science Educators

Session Length: 30 minutes

Salvatore Garofalo, Co-PI, Queens College, CUNY; Stephen Farenga, PI, Queens College; Gopal Subramaniam, Co-PI, Queens College; David Laurenson, Project Director, Queens College

Target Audience: Higher Education Institution Administrators, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators
Topic: Preparing Teachers for High-Need School Districts
Discipline: Other: Science Education

The presentation will elucidate observations from the field by full-time, discipline-specific team field science educators. Teachers are increasingly being evaluated by parents and administrators for tenure, merit pay, and promotion. The process of gathering external, unbiased observer feedback in regard to one’s instructional performance is therefore an invaluable experience for successful entry and retention within science education. Based on the number of teachers who leave the field within the first three years, it is evident that the usual pattern of teacher preparation and mentoring may not be efficient. We analyze whether receiving constructive criticism from multiple discipline-specific field supervisors/mentors increases the resiliency of science teacher candidates. This study also seeks to explore the benefit of team field supervision for formative assessment of pedagogical and science-specific content knowledge and scaffolding of instructional and assessment strategies. The development of teacher effectiveness requires comprehensive efforts of individuals who must understand teaching as a whole. Teaching and the evaluation of good teaching are probably some of the most complex human endeavors. Teacher preparatory programs aim to provide the beginning teacher with a repertoire of behaviors that extend beyond the basic area of teaching and learning in order to meet the variety of challenges present in the modern classroom. However, science education programs in particular must also provide meaningful discipline-specific pedagogical content knowledge covering a minimum of four distinct science subjects. Therefore, the science-specific background of the field supervisor is imperative to assess content complexity and appropriate content-specific pedagogical methodology.
NSF Noyce Program Officers

Sandra Richardson, Program Lead
Sandra Richardson is the Program Lead for the Noyce Program. Prior to her permanent assignment at the National Science Foundation, she served as an Associate Professor of Mathematics and Mathematics Education at Virginia State University. Her research is in developing pedagogical content knowledge for preservice teachers and effective means of diversifying the STEM teacher pipeline. She brings her expertise in teacher professional development and broadening participation efforts to the Noyce Program.

Kathleen B. Bergin, Program Co-Lead
Kathleen B. Bergin is the Program Co-Lead for the Robert Noyce Teacher Scholarship Program. She came to her permanent assignment at the National Science Foundation after she retired from Georgia Institute of Technology in Atlanta, GA. In addition to passions for equity and diversity in STEM education, Bergin has focused on the importance of changing how teachers/instructors and learners engage in the process of questioning. She brings her expertise as a biologist by training and educator by passion to the Noyce team and is a strong advocate for STEM majors becoming teachers.

Tamara Floyd-Smith, Program Director
Tamara Floyd-Smith is a Program Director from Tuskegee University, Tuskegee, AL, where she is a Professor and Associate Provost. She brings an active engagement in K-12 outreach to the Noyce team. Floyd-Smith’s broadening participation research agenda has resulted in several peer reviewed journal publications which highlight evidence-based practices for engaging K12 students with a goal of increasing STEM knowledge and stimulating interest in STEM disciplines.

Karen A. Keene, Program Director
Karen A. Keene is a Program Director from North Carolina State University, Raleigh, NC, where she is an Associate Professor of Mathematics Education. Her research areas are in the teaching and learning of differential equations through Inquiry-Oriented Differential Equations (IODE) and supporting mathematics instructor change at the undergraduate level. Keene was a high school teacher for 15 years. She brings this teaching experience and her years preparing mathematics teacher at North Carolina State to the Noyce Program.

Jennifer Lewis, Program Director
Jennifer Lewis is a Program Director from the University of South Florida, Tampa, FL, where she is a Professor and Graduate Director. She also serves as the Director of the Center for the Improvement of Teaching and Research in Undergraduate STEM Education (CITRUS). Lewis’s research includes discipline-based educational research in the field of chemistry. She brings her expertise as an experienced project evaluator to the Noyce Program.

Andrea L. Nixon, Program Director
Andrea L. Nixon is a Program Director from Carleton College, Northfield, MN, where she is the Director of Educational Research. Her research includes studies in undergraduate help seeking behaviors, as well as, educational technologies and curricular and research support for undergraduate students. Nixon brings her extensive research experience in qualitative and mixed methods as they relate to longitudinal and meta-analysis to the Noyce Program.

R. Steven Turley, Program Director
Steve Turley is a Program Director from Brigham Young University, Provo, UT, where he is a professor of physics. His research is in the areas of extreme ultraviolet optics, physics education, and institutional change. Turley brings his experience as a former Department Chair and the Associate Dean for First Year Experience – transition to college and retention to the Noyce team.

Talitha M. Washington, Program Director
Talitha M. Washington is a Program Director from Howard University, Washington, DC, where she is an Associate Professor of Mathematics. Her research is in dynamical systems and differential and difference equations. Washington brings her experience conducting teacher training workshops from Pre-K through college level, as well as, her experience with Hispanic Serving Institutions to the Noyce team.
BIOGRAPHIES

AAAS Noyce Lead Staff

Betty Calinger, Senior Project Director, STEM Education, AAAS

Betty Calinger is a Senior Project Director at AAAS where she directs projects that build science literacy for all children in formal and informal settings through partnerships with STEM professionals, schools, community-based organizations, and businesses. Calinger oversees the AAAS STEM Volunteer Program that places STEM professionals in classrooms in 10 school districts in the DC metro area to assist teachers. She administers a summer science program for elementary-school students through partnerships with libraries, Boys & Girls Clubs, and other community-based organizations. This program, funded by a global pharmaceutical company, has served almost 10,000 children in the DC area since 2012.

Calinger has served as the co-principal investigator for grants supporting the Graduate STEM Fellows in K-12 Education program, funded by NSF, and managed several grants providing professional development to middle school teachers in the mid-Atlantic region. She was the managing editor of the This Year in School Science book series.

Jennifer E. Carinci, Program Director, STEM Education Research, STEM Education, AAAS

Jennifer E. Carinci is a Program Director for STEM Education at AAAS where she serves as Principal Investigator on an NSF-funded project around stimulating research in STEM teacher education. She also manages the L’Oréal USA Fellowships for Women in Science program - a national awards program that annually recognizes five U.S.-based women researchers at the beginning of their scientific careers – and works on the AAAS IF/THEN Ambassadors program – that furthers women in STEM by empowering current innovators and inspiring the next generation of pioneers.

Carinci most recently served as the inaugural Director of Research, Innovation, and Data Strategy at the Council for the Accreditation of Educator Preparation (CAEP). Given the newness of both the position and the organization, Jennifer’s role involved shaping and implementing an ambitious agenda to advance educator preparation. Previously Jennifer served as an Institute of Education Sciences Pre-Doctoral Training Fellow with a background as a middle and high school art teacher in Baltimore City.

Jennifer has evaluated students, interns, programs, and prospective and current teachers through various research studies at Johns Hopkins, selecting for the Baltimore City Teaching Residency, and as an evaluator for the National Summer Learning Association and the Center for Research and Reform in Education. Through the Graduate Education Internship at Maryland Institute College of Art (MICA) and Young Audiences of Maryland’s Teaching Artist Institute, Jennifer has mentored aspiring Baltimore City teachers.

Distinctions earned include Maryland Art Education Association’s New Middle School Art Teacher of the Year, Fulbright Teacher Scholar in Greece, Program Chair of the Academic Audit Research in Teacher Education SIG, and past member of the AERA Council. Jennifer holds a B.F.A. in General Fine Arts from Maryland Institute College of Art (MICA), as well as a Master’s of Science in Education and a Doctorate in Teacher Development and Leadership from Johns Hopkins University.

Shirley M. Malcom, Senior Advisor, and Director of SEA Change, AAAS

Shirley M. Malcom, Senior Advisor, and Director of SEA Change at AAAS, has served as a program officer in the NSF Science Education Directorate; an assistant professor of biology, University of North Carolina, Wilmington; and a high school science teacher. Malcom received her PhD in Ecology from the Pennsylvania State University; Master’s in Zoology from the University of California, Los Angeles; and Bachelor’s with distinction in Zoology from the University of Washington. In addition, she holds 17 honorary degrees.

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

Maisa Abu-Mallouh, Science Teacher, Joliet Central High School

Maisa Abu-Mallouh, a Voices from the Field panelist, teaches physics and biology at Joliet Central High School in Joliet, IL. She graduated from Lewis University with a B.S. in biology and MEd in Secondary Education. Maisa believes that students everywhere should have the same access to passionate science teachers who instill a sense of wonder and excitement into everything they ask students to do. With a strong love and awe for science, she understands the struggles students in high-need schools face and seeks to be a positive example by showing her students they can follow their passions, no matter what the situation may be.

Meltem Alemdar, Associate Director and Senior Research Scientist, Georgia Institute of Technology’s Center for Education Integrating Science, Mathematics and Computing (CEISMC)

Meltem Alemdar is Associate Director and Senior Research Scientist at Georgia Institute of Technology’s Center for Education Integrating Science, Mathematics and Computing (CEISMC). Alemdar earned her PhD in Education Policy, with a concentration in Research, Measurement, and Statistics, at Georgia State University in 2009. Her research focuses on improving K-12 STEM education through research on curriculum development, teacher education, and student learning in integrated STEM environments.

Alemdar has led as PI and co-PI numerous NSF-funded research projects focusing on project-based learning, STEM integration, engineering education, and social network analysis. Additionally, she has been an external evaluator for various NSF projects over the past decade. As part of an NSF-funded project, she directs a longitudinal study that focuses on measuring an engineering curriculum’s impact on student learning and 21st century skills. She has also directed a large multi-year, multi-institutional social network analysis study measuring changing collaboration patterns among program investigators as a part of an NIH-funded grant. Her expertise includes program evaluation, social network analysis and quantitative methods such as Hierarchical Linear Modeling and Structural Equation Modeling.

Her current NSF Noyce-funded project focuses on examining factors influencing the retention of early career teachers in high-need schools. Drawing on a sample of Noyce Teacher Fellows, the study investigates the role of teachers’ personal networks and self-efficacy on teacher retention.

Brandon Begay, Science Teacher, Shiprock High School

Brandon Begay, a Voices from the Field panelist, has been teaching Algebra I & II, Geometry, AP Calculus, and Financial Literacy at Shiprock High School, in Shiprock, NM. He attended San Juan College and Arizona State University and graduated with a B.S. in biochemistry. Brandon become a math educator so that he can help empower young Navajo students in his community with math and science content knowledge. He is not only an educator, but also a mentor and role model for his students. He shows them that if they stay focused in their education and demonstrate resilience in life they can achieve anything.

Kathleen B. Bergin, Program Director, Division of Undergraduate Education, Directorate for Education and Human Resources, NSF

Kathleen B. Bergin is a Program Director in the Division of Undergraduate Education in the Directorate for Education and Human Resources at the National Science Foundation. She is a biologist by training, but an educator by passion. Bergin currently serves as the Co-Lead Program Officer in the Robert Noyce Teacher Scholarship program and the Lead Program Officer in the Math and Science Partnerships/STEM-C: MSP Partnerships legacy program. She also serves as a Program Officer in the Improving Undergraduate STEM Education (IUSE: EHR) program, primarily related to teacher preparation and interdisciplinary studies.

Bergin manages a portfolio of awards in the programs listed above, as well as in the EHR Core Research (ECR) program, and in the Transforming Undergraduate Education in STEM (TUES) and the Laboratory Improvement (CCLI) programs, the latter two related to undergraduate biology, as well as the Innovation through Institutional Integration legacy program. She believes that all can learn mathematics and science at deep meaningful levels, and that it is the adults that need to work to discover the strategies that will engage, motivate, and provide access to the creativity and wonder that are inherent in these disciplines.

Bergin holds degrees from Georgia College at Milledgeville and Georgia State University. She was a classroom teacher of chemistry, physics, and biology for twelve years. She was a
BIOGRAPHIES

Peggy Brookins, President and CEO, National Board of Professional Teaching Standards

Peggy Brookins, NBCT, joined the National Board for Professional Teaching Standards (NBPTS) as Executive Vice President in December 2014, and was named President & CEO in November 2015. Her long career as an educator includes many national leadership positions and accolades. In July 2014, President Barack Obama named Brookins as a member of the President’s Advisory Commission on Educational Excellence for African Americans. She joined the National Board from the Engineering and Manufacturing Institute of Technology at Forest High School in Ocala, Florida, which she co-founded in 1994 and where she served as director and as a mathematics instructor.

On the NBPTS Board from 2007 to 2011, Brookins served as audit committee chair and on the CEO Search Committee. In addition, she has served on the board of inBloom, The Conference Board of Mathematical Sciences Ad Hoc Committee on Teachers as Professionals, the Content Technical Working Group for the Partnership for Assessment of Readiness for College and Careers and a commissioner on the Council for the Accreditation of Educator Preparation (CAEP). She was a national trainer for AFT (Thinking Mathematics K-2, 3-6, 6-8 Common Core) and a member of the PARCC assessment team. She serves on the Advisory Board of Digital Promise, SREP Teacher Prep Commission, P21 Executive Board, and the Executive Board of the Trump Foundation of Israel.

Brookins achieved her certification in Adult and Young Adolescent Mathematics in 2003 and renewed in 2013. She has been inducted into the University of Florida Hall of Fame in 2009, is a Florida Education Association “Everyday Hero,” and received the association’s Excellence in Teaching Award. In 2013, Brookins was named an Aspen Ideas Festival Scholar. She received a Bachelor of Science degree from the University of Florida.

Alberto M. Carvalho, Superintendent, Miami-Dade County Public Schools

Alberto M. Carvalho has served as Superintendent of Miami-Dade County Public Schools (M-DCPS), the nation’s fourth largest school system, since September 2008. He is a nationally recognized expert on education transformation, finance, and leadership development. During his tenure, M-DCPS has become one of the nation’s highest-performing urban school systems receiving systemwide accreditation from AdvancEd. The District was recognized with the 2012 Broad Prize for Urban Education, 2014 College Board Advanced Placement Equity and Excellence District of the Year, and 2019 Cambridge District of the Year. As a staunch believer in school choice, he has expanded choice options in Miami-Dade to include over 1,000 offerings including programs in fine and performing arts, biotechnology, engineering, robotics, aviation, forensic sciences, and many others.

An instructional leader at heart, Carvalho is also the proud founder of the award-winning iPrep Academy, a model of robust 21st century learning in the age of innovation and technology. Recognized by his peers as a leader, he has been named Florida’s 2014 Superintendent of the Year, 2016 winner of the Harold W. McGraw Prize in Education, 2018 Urban Superintendent of the Year, 2019 NABE Superintendent of the Year, and AASA’s 2014 National Superintendent of the Year; and one of Scholastic Administrator’s “The Fantastic Five” educators making a difference in America.

He serves on the National Assessment Governing Board, is a member of The National Board of Directors for Common Threads, as well as on the Posse Foundation Board of Directors.

Carvalho holds a Bachelor of Science in Biology/Biomedical Sciences from Barry University, a Master of Educational Leadership from Nova Southeastern University, and has been awarded many honorary degrees including a Doctor of Public Service by Florida International University; Doctor of Humane Letters by both Barry University and Florida Memorial University; and a Doctor of Pedagogy, Honoris Causa from Nova Southeastern University. He has been honored by the President
of Portugal with the “Ordem de Mérito Civil” and by Mexico with the “Othli Award”.

Della Cronin, Principal, Bose Public Affairs Group

Della Cronin is a principal of the Bose Public Affairs Group in Washington, D.C. office. She brings over 20 years of experience in education and research policy, legislative and regulatory processes, fundraising and public affairs to the firm, having worked for a broad array of education companies and interests.

Cronin has managed corporate and national partnerships, communications for a corporate foundation, as well as outreach and public awareness efforts, and worked with the Department of Education to inform college campus officials about policy changes resulting from reauthorization of the Higher Education Act. She organizes Capitol Hill briefings and Congressional advocacy days, and has encouraged groups she works with to integrate social media elements into those events. She is also a frequent speaker on the topics of federal education and research policy, as well as the ins and outs of policymaking in Washington, D.C.

In recent years, Cronin has been involved in efforts to elevate the profile of computer science education in K-12 schools and federal and state policies. That work drew from her expertise in K-12, higher education, research and STEM education policies and programs and resulted in changes to federal education and research statutes. Cronin also works with clients who have interests in specific academic disciplines and the related policy issues and concerns, such as teacher preparation and professional development programs. Cronin holds a bachelor’s degree in economics and a minor in political science from Virginia Tech University.

Maria Crouse, Mathematics Teacher, Dr. Martin Luther King Jr. Early College

Maria Crouse, a Voices from the Field panelist, teaches Integrated Mathematics and Financial Algebra at Dr. Martin Luther King Jr. Early College in Denver. She earned her B.A. in Mathematics and a Minor in Secondary Education from Metropolitan State University. Maria is a career changer who developed a great sense of urgency to become a teacher and serve in a high-need school when she witnessed the struggle of her own children when they entered their middle-school years. She says that kids deserve teachers who will help them unlock their true, full potential in STEM fields and beyond. Math shouldn’t be a barrier, it should be the foundational understanding that dreams are built upon.

Keeden M. Hopkins, Science Teacher, Innovation Early College High School

Keeden Hopkins, a Voices from the Field panelist, teaches biology, earth science, physics, and chemistry at Innovation Early College High School, located on the campus of East Carolina University in Greenville, NC. He received his B.S. in Biology and MAT in Secondary Science from East Carolina University. Keeden’s passion as a teacher is to help students realize their potential and ensure that their ambitions aren’t left as dreams. He teaches mainly first-generation college students from Pitt County, NC. The students receive a high school diploma but also have hours that can transfer to college. Keeden believes STEM is

Rush D. Holt, Chief Executive Officer, AAAS and Executive Publisher, Science Family of Journals

Rush D. Holt, PhD, became the chief executive officer of the American Association for the Advancement of Science (AAAS) and executive publisher of the Science family of journals in February 2015. In this role Holt leads the world’s largest multi-disciplinary scientific and engineering society.

Over his career Holt has held positions as teacher, scientist, administrator, and policymaker. From 1987 to 1998 Holt was assistant director of one of the U.S.’s largest alternative energy research facilities, Princeton University’s Plasma Physics Laboratory (PPPL), a Department of Energy national lab. Holt also served as an arms control expert at the U.S. State Department, where he monitored the nuclear programs of countries including Iraq, Iran, North Korea, and the former Soviet Union.

Before joining AAAS Holt served for sixteen years as a member of the U.S. House of Representatives, representing New Jersey’s twelfth Congressional District.

Holt is a Phi Beta Kappa graduate of Carleton College and holds MA and PhD degrees in physics from New York University. He was a Director’s Visitor at the Institute for Advanced Study in Princeton, is a member of Sigma Xi, and an elected fellow of both AAAS and the American Physical Society. Holt is a past recipient of two of AAAS’ highest honors: the William D. Carey Lectureship Award (2005) and the Philip Hauge Abelson Award (2010).
the future, but more importantly the hearts and minds behind it are the future. He advocates for teachers to instill a yearning and desire for exploration in their students by relating everything that they do in the classroom to real world issues.

Catherine Horn, Moores Professor of Educational Leadership and Policy Studies and Executive Director, Institute for Educational Policy Research and Evaluation, University of Houston

Catherine Horn is also the Director for the Center for Research and Advancement of Teacher Education and for the University of Houston Education Research Center. Horn, who received her PhD from Boston College, focuses on the systemic influences of secondary and postsecondary assessment and related policies on the learning trajectories of students, particularly those traditionally underserved by the education and social sectors. Prior to joining the University of Houston, she was a Research Associate for The Civil Rights Project at Harvard University; Senior Research Associate for the Center for the Study of Testing, Evaluation and Educational Policy’s National Board on Educational Testing and Public Policy at Boston College; and a teacher at Jefferson Davis High School in the Houston Independent School District. Horn has been honored with numerous awards including a Fulbright Fellowship to Chile, a University Teaching Excellence Award, and appointment as an inaugural Faculty in Residence at the University of Houston.

Jonathan Isozaki, Mathematics Teacher, Hawthorne High School

Jonathan Isozaki, a Voices from the Field panelist, has been teaching Common Core Integrated Mathematics I and II at Hawthorne High School in Los Angeles for two years. He earned a BA in Mathematics and Secondary Education from Loyola Marymount University. First, as a student who had significant developmental challenges, and now, as a math educator, Jonathan never thought he would be learning so much about the challenges his students face and how much their lives outside of the classroom affect what happens inside. He feels very fortunate to have the chance to improve people’s lives and loves helping students with their challenges. Jonathan emphasizes how important it is to have a supportive environment with motivated teachers, administrators, and parents.

Douglas B. Larkin, Associate Professor, Teaching and Learning Department, Montclair State University

Douglas Larkin is an Associate Professor in the Department of Teaching and Learning at Montclair State. He was a high school physics and chemistry teacher for ten years—most recently in Trenton, NJ—and also served in the Peace Corps teaching physics and mathematics in Kenya and Papua, New Guinea. He received his Ph.D. in 2010 from the University of Wisconsin-Madison. His main research concerns the preparation of science teachers for culturally diverse classrooms and issues of equity and justice in teacher preparation. His most recent book, Teaching Science in Diverse Classrooms: Real Science for Real Students, will be published by Routledge in October 2019. Larkin is a section editor for the journal, Science Education, and currently serves as PI for an NSF Noyce Track 4 research grant, and co-PI on an NSF Noyce Track 1 undergraduate scholarship grant with Dr. Sandra Adams at Montclair State University.

Jamie MacDonald, STEM Teacher, Hayden McFadden Elementary School

Jamie MacDonald, a Voices from the Field panelist, is a STEM teacher for second through fifth graders at Hayden McFadden Elementary School in New Bedford, MA. She attended Bridgewater State University, where she earned a BA in geology and elementary education. Most of Jamie’s students do not speak English as their first language and come from economically disadvantaged homes. She believes that her students can succeed regardless of their background. It brings Jamie joy and professional satisfaction to show her “kids” a bigger world outside of their neighborhood through science. She loves to help them see greater possibilities and dream bigger dreams.

Tonikiaa Orange, Director for the Institute for Cultural Sustainability and Educational Equity, UCLA

Tonikiaa Orange is the Director for the Institute for Cultural Sustainability and Educational Equity (ICSEE) and the Assistant Director for the Principal Leadership Institute at UCLA Center X. Her work focuses on providing professional learning opportunities to educators on culturally responsive and sustaining pedagogy and an equity centered coaching framework called reciprocal learning partnerships for equity. Orange teaches Curriculum and Instruction in the Principal Leadership Institute, and Social Foundations and
Cultural Diversity and Educational Psychology in the Teacher Education Program, both programs housed at UCLA Center X. She is a former math and science teacher and principal of a K-8 school in Los Angeles that was specifically designed to serve Standard English Learners (SEL) and English Language Learners (ELL) through Culturally Linguistic and Responsive Pedagogy.

Her commitment to education spans over 20 years. She served as Program Manager for Chicago Public Schools in the department of Curriculum and Instruction and as a Senior Consultant for Education Resources Group, where she conducted evaluations on urban school reform initiatives. In addition, she was a Senior Program Officer for the Los Angeles California Children and Families First Commission, where she focused on co-developing initiatives and grant giving priorities for school readiness, child abuse, and strategic planning. Orange received her Ed.D. and B.A. from the University of Pittsburgh and a M.A. from Teachers College, Columbia University and UCLA.

Sandra Richardson, Program Director and Program Lead. Robert Noyce Teacher Scholarship Program, DUE, NSF

Sandra Richardson is a Program Director at the National Science Foundation (NSF) in the Division of Undergraduate Education, Directorate for Education and Human Resources and the Program Lead for the NSF Robert Noyce Teacher Scholarship Program. She earned a MS and PhD in Mathematics Education from Purdue University and a BS in Mathematics from Dillard University. Her research publications and scholarly interests have been motivated by the intersection of her personal, professional, and scholarly experiences as a student, teacher, research professor, and academic. Her scholarly and research interests include developing effective tools for mathematics curricula, advancing pedagogical content knowledge of mathematics teachers, studying minority and underrepresented students’ mathematical thinking at all levels of school mathematics, and mathematics teacher education. She has been the principal investigator and co-principal investigator on numerous public, private, and federal grants, including funding efforts to study secondary mathematics teachers’ mathematical knowledge for teaching, impacts of mathematics enrichment programs on students’ STEM success, and effective means of preparing prospective and in-service mathematics teachers to teach English Language Learners. In addition to Richardson’s research interests, she also has a passion for inspiring underrepresented students to pursue advanced degrees in STEM disciplines.

Richardson has served on numerous district, state, and national committees and advisory boards focusing on mathematics teacher education and increasing the representation of underrepresented students in STEM fields. She is a Mathematical Association of America Project NExT Fellow and an active member of the Association of Mathematics Teacher Educators and Mathematical Association of America, among other professional societies. She has received numerous honors and awards, including a University Excellence in Teaching and Research Merit Award and the Texas State Teachers Association Advisor of the Year Award for her mentoring and outreach efforts and spent a summer preparing mathematics teachers in Cape Coast, Ghana.

In addition to managing a portfolio of awards in the Noyce program, Richardson also manages a portfolio of awards in the Improving Undergraduate STEM Education (IUSE), Transforming Undergraduate Education in STEM (TUES), and Laboratory Improvement (CCLI) programs.

Erin White, Senior Director, Product Development and Research, STEMconnector

Erin White is Senior Director, Product Development & Research at STEMconnector, where she leads efforts to produce actionable insights for members and the field through research and analysis. Erin brings a breadth of experience working in the social sector, with an emphasis on translating ideas to action and creating innovative partnerships between business, government, nonprofits, and foundations to tackle complex social problems.

Prior to joining STEMconnector, she served as Senior Director at America’s Promise Alliance, the nation’s largest network of organizations dedicated to improving the lives of children and youth. While there, she was lead researcher and author of Our Work: A Framework for Accelerating Progress for Young People in America, which outlines the practices and policies that will help create the conditions for young people to succeed and contribute in education, the workforce, and their communities.

Erin also previously led projects at FSG, a mission-driven consulting firm. She worked alongside communities to plan, implement, and evaluate their cross-sector, “collective impact” initiatives focusing on education, health, and community development. Erin’s first role in public service was as Senior Advisor to the Secretary of the U.S. Department of Agriculture, where she led the Faith-Based and Community Initiative. She developed policy to expand and enhance partnerships with nonprofit organizations across $19B in domestic food and nutrition assistance, international food aid, and rural development programs.

Erin has authored numerous pieces on community collaboration, policy, and other topics, and has been published in the Stanford Social Innovation Review and Collective Impact Forum (a partnership with the Aspen Institute). Passionate about teaching and learning alongside community leaders, Erin is a faculty member at the University of Pennsylvania.
Lee Zia, Deputy Division Director, DUE, NSF

Lee Zia served as the Lead Program Director for the NSF National Science, Mathematics, Engineering, and Technology Education Digital Library (NSDL) Program from its inception in FY 2000 to its sunsetting in FY 2010. He served as a "rotator" in the NSF Division of Undergraduate Education during calendar years 1995 and 1996 while on leave from the Department of Mathematics at the University of New Hampshire. Zia rejoined the NSF as a permanent staff member in the fall of 1999. From November 2008 to December 2009, he served as a Commerce Science and Technology Fellow in the Office of Senator John D. Rockefeller IV. Most recently he served as the Lead Program Director for the STEM Talent Expansion Program (STEP). Zia holds degrees in mathematics from the University of North Carolina (B.S.) and the University of Michigan (M.S.), and applied mathematics from Brown University (Ph.D.).

member for the Rider-Pool Foundation Collective Impact Fellowship. She holds a B.A. in Government from Harvard University and an M.Sc. in Public Policy and Administration, with honors, from the London School of Economics.
Stephanie Harry, Albert Einstein Fellow, Department of Energy, Office of Science

For 22 years, Stephanie has been a dedicated and passionate high school chemistry teacher. She is currently teaching at Kecoughtan High School in Hampton, VA. She has also served as a chemistry adjunct professor at Thomas Nelson Community College and Norfolk State University in Hampton and Norfolk VA, respectively. In the last four years Stephanie has created over 35 YouTube videos on chemistry-related lessons. In addition to teaching, she has served as a chemistry curriculum writer for her school district, a U.S. Army eCybermission Virtual judge, an assessment reviewer for the National Board for Professional Teaching Standards, and an assessment reviewer for the Virginia Standards of Learning.

Stephanie earned a B.S. in Chemistry and a Master of Arts in Teaching from Norfolk State University. She was awarded a grant to support her goals to combine experiments with tattoo ink and chemistry. She is a regular presenter at state and national STEM education conferences, a National Board Certified Teacher in Chemistry, and currently the Chemistry Content Chair for the Virginia Association of Science Teachers.

Kate McCann, Albert Einstein Fellow, U.S. Department of Energy, Office of Science

Kate McCann teaches geometry and AP statistics to high school students at U-32 Middle & High School. She has presented professional development workshops at the local, state, and regional levels and is past-president of the Vermont Council of Teachers of Mathematics, where she initiated and continues to direct the Statewide Math Fair. McCann is National Board Certified in Adolescence and Young Adulthood Mathematics, has a B.S. in mathematics and an M.Ed. in curriculum and instruction from the University of Vermont. She was named 2017 Vermont State Teacher of the year and was awarded the Presidential Award for Excellence in Math and Science Teaching in 2015.

Cammie Newmyer, Albert Einstein Fellow, NSF Directorate for Education and Human Resources

Cammie Newmyer comes to her Fellowship appointment as a high school mathematics and computer science teacher from the Byron Syring DELTA Center and the Monte Vista Online Academy. Newmyer has 18 years of teaching experience in highly impacted school districts in the San Luis Valley in Southern Colorado, teaching math and computer science to diverse populations, including at-risk high school students. As a direct result of her efforts to individualize math instruction by both remediating and accelerating math learning, Cammie has written four books on strategies for increasing math content understanding - the “Math That Makes Sense” series. She has developed multiple online courses in both computer science and mathematics and was awarded the San Luis Valley Teacher of Year award for mentoring students in engineering projects for the International Science and Engineering Fair.

As an education member of the Civil Air Patrol, Cammie brought technology and hands-on learning to alternative high school students. She has continued to work outside the K-12 system as an adjunct professor in developmental mathematics at Adams State University and college level mathematics for Colorado Community Colleges Online. She has worked with migrant youth through the Summer Migrant Education Program and first generation college bound students through Upward Bound. Cammie has presented strategies for teachers to assist, recruit and retain students attending high-need schools in STEM courses at the Space Exploration Educator’s Conference at Space Center Houston, TX and the Computer Science & Information Symposium at Google Headquarters in Mountain View, CA.

After earning a B.A. in mathematics with a minor in history and an emphasis in secondary education from Adams State, she was invited to present an original work in mathematics on group theory at Colorado State University through the Mathematical Association of America. Later, Cammie earned an M.A. in mathematics from the University of Houston. Cammie has worked with the Colorado State Board of Education, setting standards for teacher certification in mathematics for the State of Colorado. She is an AP Calculus and AP Computer Science certified instructor.
Pascale Creek Pinner, Albert Einstein Fellow, Department of Energy, Office of Science

Pascale Creek Pinner is serving her Fellowship in the Office of Workforce Development for Teachers and Scientists in the Department of Energy’s Office of Science. Over the last 30 years, Pinner has taught Earth and Space science to 8th grade Hilo Intermediate School students on the Big Island of Hawaii. Pascale has also taught math, writing in the content areas, health, and directed the school’s Gifted and Talented program. As a science methods lecturer for four years at the University of Hawaii at Hilo, Pascale was also able to share her passion for teaching with pre-service educators.

Pinner has received numerous grants, including a Math/Science Partnership (MSP) Title IIb grant where her services as the Curriculum Coordinator/Co-Principal Investigator impacted over 1500 students. Pascale developed the Teacher-to-Teacher (T2T) professional development model in science while working with 43 teachers in grades K-6. The schools and teachers continue to implement the science curriculum to this day!

Pascale began her career by earning a B.A. in Biology and a Secondary Teaching Certificate from University of Hawaii at Hilo. A Professional Certificate in Secondary Education and National Board Certification in Early Adolescent Science followed these degrees. She completed her PhD in Educational/Teacher Leadership from Concordia University, Chicago in 2012.

Pinner currently serves on the Hawaii State STEM Content Panel, and the Hawaii Science and Technology Executive Board. She has received many awards including the Presidential Award for Excellence in Math & Science Teaching and the Hawaii State Teacher of the Year (HI-STOY 2008). Pascale has published and presented at a number of regional and national conferences, where she continues to share her enthusiasm for all things STEM.

Bryan Silver, Albert Einstein Fellow, NSF Directorate for Engineering

Bryan Silver is a Science and Career Technical Education teacher from Kalani High School. He is serving his Fellowship with the National Science Foundation (NSF) Directorate for Engineering (ENG), Division of Engineering Education and Centers (EEC), Research Experiences for Teachers in Engineering and Computer Science Program (RET). He has 20 years of teaching experience in the Honolulu School District and is certified to teach History, Special Education, Science and Career Technical Education grades 9-12.

In Honolulu, Bryan teaches four levels of engineering classes, STEM Capstone, and runs four successful after-school robotic programs in FIRST Robotics, FIRST Tech Challenge, VEX and Drones. Free time is spent SCUBA diving and racing sailboats from dinghies to forty footers. He strives to get students involved--from designing 50-foot bridges out of 2x4s and twine in the Da Vinci Bridge project to acting as project managers hosting robotic events and leading seminars for the Honolulu leadership symposium. Making the mundane magical and the ordinary extraordinary, Bryan has developed a robust after-school robotics program, secured over $280,000 in grant support, and developed three student-run businesses that continue generating funds to keep the robotics programs solvent. He is currently working on a Mobile Makery Center designed out of a 40-foot container with the help of ImagineWorks, a nonprofit organization created by his alumni. They plan to take the center around the island of Oahu to bring tech to every community.

Bryan holds degrees from University of California, Santa Barbara (B.A. in Archaeology and Religious Studies); University of Hawaii, Manoa (post-bac in History and Special Education). He is an Eagle Scout (1989), the recipient of 2016 Presidential Award for Excellence in Mathematics and Science Teaching, National Center for Women in Technologies Teacher of the Year 2013 and 2018, and the 2015 Woodie Flower’s Excellence for Mentor’s Award in Robotics.

Rachel Stagner, Albert Einstein Fellow, NASA

Rachel Stagner is a high school science teacher at Madison High School. She is serving her fellowship at the National Aeronautics and Space Administration (NASA) in the Aeronautics Research Mission Directorate (ARMD). Rachel has taught a variety of subjects at Madison High School—most recently chemistry and forensic science. In addition, she has been the co-department head, a mentor to students hoping to attend college, and an advisor for the school’s Math Engineering Science Achievement (MESA) and Outdoor clubs. She is a teacher-leader in her district and has served on multiple committees examining fair grading practices, equity, and science curriculum sequencing and development.

Outside of the district, she is an Oregon Science Teachers Association board member, has presented at several conferences, and is a current Murdock Trust “Partners in Science” participant who recently finished two summers of neuroscience research at Oregon Health & Science University. Stagner earned dual Masters Degrees in Science Teaching and Education from Portland State University where she was a Noyce Scholar. She earned her Bachelor of Science degree in Fisheries
& Wildlife Management with a minor in Environmental Studies from Michigan State University.

Rachel is passionate about encouraging students to think critically and finding ways to connect science to their everyday lives. She is committed to increasing the number of underrepresented students who pursue science as a career choice and using science education to address issues of social and environmental justice.

Kellie Taylor, Albert Einstein Fellow, Library of Congress

Kellie Taylor has been the kindergarten through fifth grade engineering teacher at Galileo STEM Academy in Eagle, ID since 2012. She is serving her Fellowship at the Library of Congress. She began her teaching career in 2004 and earned her master’s and doctorate in Educational Technology from Boise State University while teaching fulltime. Kellie has shared her work in the classroom at various conferences beginning with the 2013 Radical Innovation Summit in Washington D.C. and then as a strand provider for robotics and 3D printing at the 2013, 2014, 2015, 2017, and 2018 i-STEM Summer Institutes. In addition, Kellie presented her work with robotics and 3D printing at the 2014, 2015, 2017 NCCE Conferences. She also presented on robotics programmed with C++ at the 2018 SEEC and 2018 IETA.

Kellie has been recognized as a 2014 and 2018 State Finalist for the Presidential Award for Excellence in Mathematics and Science Teaching and attended the Mickelson ExxonMobil Teachers Academy in Pittsburgh, PA in July 2015. She also received the 2016 K-6 Industry’s Excellent Educators Dedicated to STEM award for her work integrating industry into the classroom and providing real world science experiences. Kellie has been Teacher of the Year at her school in 2007, 2012, and 2017.

She maintains a curious attitude that promotes innovation in the classroom and school culture; however, curiosity is only the beginning. Kellie follows her curiosity and passion for education by striving to grow professionally through attending conferences and educator institutes, and participating in various opportunities such as Maven Elementary Educator Summit, NASA Microgravity University for Educators, and the United States Patent and Trademark Office 4th Annual National Summer Teacher Institute on Innovation, STEM, and Intellectual Property. She also attended Picademy during August 2017 and became a Raspberry Pi Certified Educator. Kellie is a new member of Space Exploration Educator Crew through Space Center Houston. With all the various professional development, she continues to advance students’ engagement in STEM with classroom instruction, additional opportunities in after-school groups and competitive teams, and organizing school-wide events such as STEM Night and Sumbots. Kellie works to build upon students’ existing skills in 3D printing, robotics, engineering, and collaboration, through problem-based challenges. Furthermore, while developing her professional abilities and the abilities of her students, she works to conduct action research on best practices for STEM implementation in the elementary classroom.
Speed STEMming Resource Organizations

- 114th Partnership Program Spark 101
- Albert Einstein Distinguished Educator Fellowship
- ASCD STEM by Choice and Teach to Lead
- Knowles Teaching Fellows Program
- Library of Congress Education
- NASA Education: HQ and Goddard
- National Academy of Sciences LabX
- National Board for Professional Teaching Standards
- National Geographic Education
- National Museum of African American History and Culture
- National Museum of Natural History Education
- National Science Bowl
- Smithsonian Center for Learning and Digital Access
- Society for Science and the Public
- Space Center Houston, SEEC
- STEM Teacher Leadership Network
- The International Spy Museum
- The Presidential Awards for Excellence in Mathematics and Science Teaching
- The Space Foundation Teacher Liaisons and Alan Shepard Technology in Education Award
- United States Patent and Trademark Office Education