NSEC Network of STEM Education Centers

Association of Public & Land-Grant Universities

2019 NSEC NATIONAL CONFERENCE

Location: Hilton Omaha in Omaha, Nebraska

Friday, May 31, 2019 Quick Glance Schedule

8:00 AM - 9:00 AM	Breakfast in Blackstone B
9:00 AM - 12:00 PM	Workshop on Inclusive Teaching in St. Nicholas Donald Gillian-Daniel, Collaborative for Advancing Learning & Teaching, University of Wisconsin-Madison
12:00 PM - 1:00 PM	Lunch in Blackstone B
1:00 PM - 1:45 PM	Workshop Wrap up in St. Nicholas
1:45 PM - 2:15 PM	Networking Break
2:15 PM - 3:15 PM	Welcome and community building in St. Nicholas
3:15 PM - 3:45 PM	Roundtable I in St. Nicholas
3:45 PM - 3:55 PM	Break
3:55 PM - 4:25 PM	Roundtable II in St. Nicholas
4:30 PM - 6:00 PM	Poster + Reception in St. Nicholas

Saturday, June 1, 2019

7:30 AM - 8:45 AM	Breakfast in Blackstone B
8:45 AM - 9:15 AM	Day 2 Reflections in Blackstone A
9:15 AM - 10:10 AM	Concurrent Session I
10:10 AM - 10:40 AM	Networking Break
10:40 AM - 11:35 AM	Concurrent Session II
11:45 AM - 1:00 PM	Lunch in Blackstone B
1:00 PM - 2:15 PM	Keynote Address in Blackstone A Mathew Ouellett, executive director of the Center for Teaching Innovation, Cornell University
2:15 PM - 2:30 PM	Break
2:30 PM - 3:25 PM	Concurrent Session III
3:25 PM - 3:45 PM	Break
3:45 PM - 4:40 PM	Concurrent Session IV
4:45 PM - 5:45 PM	NSEC planning discussion (all are welcome)

Sunday, June 2, 2019

7:00 AM - 8:30 AM	Breakfast in Blackstone B
8:30 AM - 9:00 AM	Day 3 Reflections in Blackstone A
9:10 AM - 9:40 AM	Roundtable III
9:40 AM - 10:00 AM	Break
10:00 AM - 11:00 AM	Planning a Center's Budget in Blackstone A
11:00 AM	Adjourn

NSEC 2019 National Conference

Friday, May 31, 2019 Detailed Schedule

8:00 AM - 9:00 AM	Breakfast in Blackstone B
9:00 AM - 12:00 PM	Workshop on Inclusive Teaching in St. Nicholas Donald Gillian-Daniel, Collaborative for Advancing Learning & Teaching, University of Wisconsin-Madison
12:00 PM - 1:00 PM	Lunch in Blackstone B
1:00 PM - 1:45 PM	Workshop Wrap up in St. Nicholas
1:45 PM - 2:15 PM	Networking Break
2:15 PM - 3:15 PM	Welcome and community building in St. Nicholas

3:15 PM - 3:45 PM	**Roundtables I**
Table 1	Gateways-ND: Building the Institutional Infrastructure for Improving STEM Undergraduate Education - Anna Semanko, North Dakota State University
Table 2	The DBER Scholars Program: A Method of Engaging Undergraduate Students within a STEM Institute - Anthony Chase, IUPUI
Table 3	Never-the-less She Persisted: High Impact Practices for Recruiting and Retaining Women and, in particular, Minority Women in STEM - Ellen Lieberman and Allison Antwi, Rutgers University
Table 4	Development of a Multi-disciplinary Journal Club on Teaching and Learning - Colleen Craig, University of Washington
Table 5	Increasing the Number of African American Advanced STEM Professionals: Lessons from Two Southern Predominantly White Institutions. - Shawn Moore, East Carolina University
Table 7	Engaging First-Semester Freshman in STEM Education - Derrick Nero, University of Nebraska at Omaha
Table 8	Advancement in STEM Education for All Through Accommodations for Underprepared Minority and/or Post-Traditional Students - Charles H. Roberts and Zipangani M. Vokhiwa, Mercer University
Table 9	Exploring the Interconnections between Discipline-Based Education Research (DBER) and STEM Education Centers - Marilyne Stains, University of Nebraska-Lincoln
Table 10	Mind the Gap: Working with Faculty to Use Data to Decrease Equity Gaps in their Courses - Donna Llewellyn, Boise State University

3:45 PM - 3:55 PM	Break

3:55 PM - 4:25 PM	**Roundtables II**
Table 1	Fundraising 101 - Laura Frost, Director, Florida Gulf Coast University
Table 2	Internships for STEM undergraduates: Structural Models for Student Success - Jacqueline Broida and Emily Gaines, University of Utah
Table 3	Supporting STEM Lab Teaching Assistants Enactment of an Effective Operational Curriculum via a Year-Long Professional Development Initiative - Ruthmae Sears, University of South Florida
Table 4	Digital Badges for Recognition of Student STEM Community Engagement - Sharon Locke, Southern Illinois University Edwardsville
Table 5	Building a Model of Public-Private Partnerships to Develop STEM Career Pathways - Julie Sigmon, Omaha STEM Ecosystem; Tracie Reding, University of NE Omaha; Elizabeth Mulkerrin, Omaha Henrry Doorly Zoo and Aquarium; Chris Schaben, Omaha Public Schools
Table 6	UREs, CUREs, and TREs - Literature Review Findings - John Keller, University of Colorado Boulder
Table 7	The STEM Educators Guide to Understanding Millennials - John Rand, University of Hawaii
Table 8	Women in Engineering-Changing the Culture to Recruit and Retain - Melinda Davis, University of Idaho
Table 9	How a Learning Assistant Program Helped a Campus Transform All Gateway STEM Series (to varying degrees) - Shanna Shaked, UCLA

4:30 PM - 6:00 PM	Poster + Reception in St. Nicholas
Poster 1	Utilizing Effective Features of Professional Development to Support STEM Lab Teaching Assistants to Exhibit Good Teaching Practices - Ruthmae Sears, University of South Florida
Poster 2	Never-the-less She Persisted: High Impact Practices for Recruiting and Retaining Women and, in particular, Minority Women in STEM - Ellen Lieberman and Allison Antwi, Rutgers University
Poster 3	UNO STEM activities - Patrick X. Rault, University of Nebraska at Omaha
Poster 4	Imagine Your STEM Future: Informal STEM Practices in the Classroom - Michelle Higgins, University of Arizona
Poster 5	Teaching STEM for All @ Your Local Planetarium - Krista Testin, University of Nebraska Omaha

Poster 6	Scientist-STEM Center-School Partnerships Support Cross-Curricular Contextual Learning - Bryan Rebar, University of Oregon
Poster 7	Faculty Strategies for Implementing and Assessing Flipped Teaching - Sharon Locke, Southern Illinois University Edwardsville
Poster 8	Use of AR & VR Technologies to Engage Students with Scientific Phenomena - Soon Lee, Wichita State University
Poster 9	Peer Mentoring: Automated Formatting of Data for Presentation - Dabney Dixon, Georgia State University
Poster 10	Aspire: The National Alliance for Inclusive & Diverse STEM Faculty - Julia Savoy, University of Wisconsin-Madison
Poster 11	Inclusive Learning and Teaching in Undergraduate STEM Instruction – Lucas Hill, University of Wisconsin-Madison
Poster 12	Organizational Change Networks, Drivers of Change in Undergraduate STEM Education - Sohyeon Bae, Michigan State University
Poster 13	A collaborative, systems thinking framework for faculty to explore student retention in STEM - Amy Chan-Hilton, University of Southern Indiana
Poster 14	Collaborative Around Research Experiences for Teachers (CARET): Assessing Impacts Across Programs - John Keller, University of Colorado Boulder

Saturday, June 1, 2019

7:30 AM - 8:45 AM	Breakfast in Blackstone B
8:45 AM - 9:15 AM	Day 2 Reflections in Blackstone A

9:15 AM - 10:10 AM	Concurrent Sessions I
Hill	Catalyzing Change in Mathematics Education at a Hispanic Serving Institution - Laird Kramer, Edgar Fuller, Roneet Merkin, Charity Watson, and Jeremiah Hower, Florida International University
Paxton	Social Network Analysis and Connecting Community Partners - Kristin VanWyngaarden and Tracie Reding, University of Nebraska at Omaha
Herndon	Streamlining the Ed Research IRB at Your Institution - Adrienne Williams, UC Irvine
Washington City	Supporting student equity by supporting faculty and the instructional system - Marco Molinaro, UC Davis
Blackstone A	WORKSHOP - Building Evaluation Capacity in STEM Education Centers: An Approach to Better "See" Your Programs - Lucas Hill, University of Wisconsin-Madison

10:10 AM - 10:40 AM	Networking Break

10:40 AM - 11:35 AM	Concurrent Sessions II
Blackstone A	WORKSHOP Continued - Building Evaluation Capacity in STEM Education Centers: An Approach to Better "See" Your Programs - Lucas Hill, University of Wisconsin-Madison
Hill	The Emergence of a STEM Center: Lessons Learned and Still to Learn - Neal Grandgenett, University of Nebraska at Omaha
Washington City	Developing a Collaborative by Extending a Research Project - Katerina Thompson, University of Maryland
Herndon	Practicing Into Inclusion: Utilizing a Learning Assistant Pedagogy Course to Explore and Address Impacts of Structural Oppression on Learning - Jessica Cleeves, University of Utah
Paxton	Moving Change Forward: The Disruptive and Stabilizing Roles of Centers in Undergraduate STEM Education - Deborah Carlisle, UMass Amherst

11:45 AM - 1:00 PM	Lunch in Blackstone B
1:00 PM - 2:15 PM	Keynote Address in Blackstone A Mathew Ouellett, executive director of the Center for Teaching Innovation, Cornell University
2:15 PM - 2:30 PM	Break

2:30 PM - 3:25 PM	Concurrent Sessions III
Herndon	WORKSHOP - Broadening Participation: Strategies for Developing and Maintaining a Positive Workplace Climate- Blair Schneider, University of Kansas
Washington City	Strengths, Challenges, and Opportunities: Enhancing STEM Education Centers through Self-Assessment - Julia Savoy, University of Wisconsin-Madison
Blackstone A	Enriching, Coordinating, and Promoting Faculty and Student Engagement to Better Serve the K-12 STEM Community - Kerry Cresawn, James Madison University
Paxton	Quickly Moving the Needle for Multi-section Courses: the "Hackathon" Approach - Kevin Yee, University of South Florida
Hill	A Customized Evaluation Data Interface to Optimize Inclusive STEM Faculty Development - Jonathan K Waterhouse and Meghan Bathgate, Yale Univeristy

3:25 PM - 3:45 PM	Break

3:45 PM - 4:40 PM	Concurrent Sessions IV
Herndon	WORKSHOP Continued - Broadening Participation: Strategies for Developing and Maintaining a Positive Workplace Climate- Blair Schneider, University of Kansas
Paxton	Research-Practice Partnerships to Improve STEM Education: Empowering Educators to Change Institutions for K-16+ Education - Laura Millay, University of Maine
Hill	What Students Tell Us: Engaging Faculty with Data from Student Surveys - Tekla Nicholas and Leanne M. Wells, Florida International University
Washington City	Partnering with Peer Leaders to Create Inclusive Academic Support Environments - Kelly McDonald, California State University, Sacramento

4:45 PM - 5:45 PM	NSEC planning discussion (all are welcome)
Herndon	Financial Models and Funding for Expansion of NSEC: Pitches for Funders for NSEC 2020 - Facilitators: John Rand, Noah Finkelstein, and Shanna Shaked
Paxton	Programmatic Activities for NSEC members: Finding Ways to Leverage Our Community's Expertise - Facilitators: Laura Frost, Donna Llewellyn, and Gwen Shusterman
Hill	Needs Assessment Survey: Developing a survey of the community about what centers are doing, where we plan to grow, and what we need - Facilitators: Ruthmae Sears, Cindy Ghent, and Debbie Carlisle
Washington City	Leadership from Within and Partnerships from Without for NSEC: Management/Governance of NSEC and NSEC 2020 with POD - Facilitators: Ken Griffith, Kacy Redd, and Zipangani Vokhiwa

Sunday, June 2, 2019

7:00 AM - 8:30 AM	Breakfast in Blackstone B
8:30 AM - 9:00 AM	Day 3 Reflections in Blackstone A

9:10 AM - 9:40 AM	Roundtables III
Table 1	Aspire Alliance: a National Alliance for Diverse and Inclusive Faculty - Kacy Redd, APLU
Table 2	Transforming the Evaluation of Teaching: Taking a Scholarly Approach to Evaluation to Support Student Outcomes - Noah Finkelstein, University of Colorado
Table 3	Challenging the Culture and Teaching Practices of Academic STEM - Audra Baleisis, University of Michigan
Table 4	But is it Working? Evaluation of Peer-mentoring Efforts - Dabney Dixon, Georgia State University
Table 5	Significant Interest Group on Research Experiences for Teachers - John Keller, Director, University of Colorado Boulder
Table 6	Coming to Consensus: Investigating the Longitudinal Impacts of a Large-scale Deliberation Intervention - Gwen Shusterman, Portland State University
Table 7	The National Diversity in STEM Conference - John Rand, University of Hawaii

9:40 AM - 10:00 AM	Break
10:00 AM - 11:00 AM	Planning a Center's Budget in Blackstone A
11:00 AM	Adjourn

Sharing Presentations: You can post your presentations, handouts, posters here: https://drive.google.com/drive/folders/19ThGR_HuKRO9f6t-9aMQakM7mD1OMka8?usp=sharing

Are you a user of social media? Tweet us #NSEC2019.

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Thank You!

The NSEC 2019 National Conference could not happen without the leadership of the conference planning committee. We thank them for their invaluable help. We also thank the NSEC Steering Committee, Advisory Board, and our evaluator, Nancy Shapiro, for their guidance.

NSEC 2019 National Conference Planners

- Adrienne Bentz, Texas A&M University
- Cynthia Ghent, Towson University
- Theresa Hopkins, University of Tennessee
- Laird Kramer, Florida International University
- Donna Llewellyn, Boise State University
- Timothy Scott, Texas A&M University
- Gwen Shusterman, Portland State University
- Alice Steimle, The University of Mississippi
- Zipangani Vokhiwa, Mercer University
- Kacy Redd, Association of Public and Land-grant Universities
- Noah Finkelstein, University of Colorado at Boulder

NSEC Steering Committee

- Steven Case, University of Kansas
- Laura Frost, Florida Gulf Coast University
- Cynthia Ghent, Towson University
- Ken Griffith, Texas Tech University
- Cailin Huyck Orr, Science Education Resource Center at Carleton College
- Donna Llewellyn, Boise State University
- Sharon Locke, Southern Illinois University Edwardsville
- Ruthmae Sears, University of South Florida
- Shanna Shaked, UCLA
- Gwen Shusterman, Portland State University
- John Rand, University of Hawai'i System
- Charles Roberts, Penfield College of Mercer University
- Timothy Scott, Texas A&M University

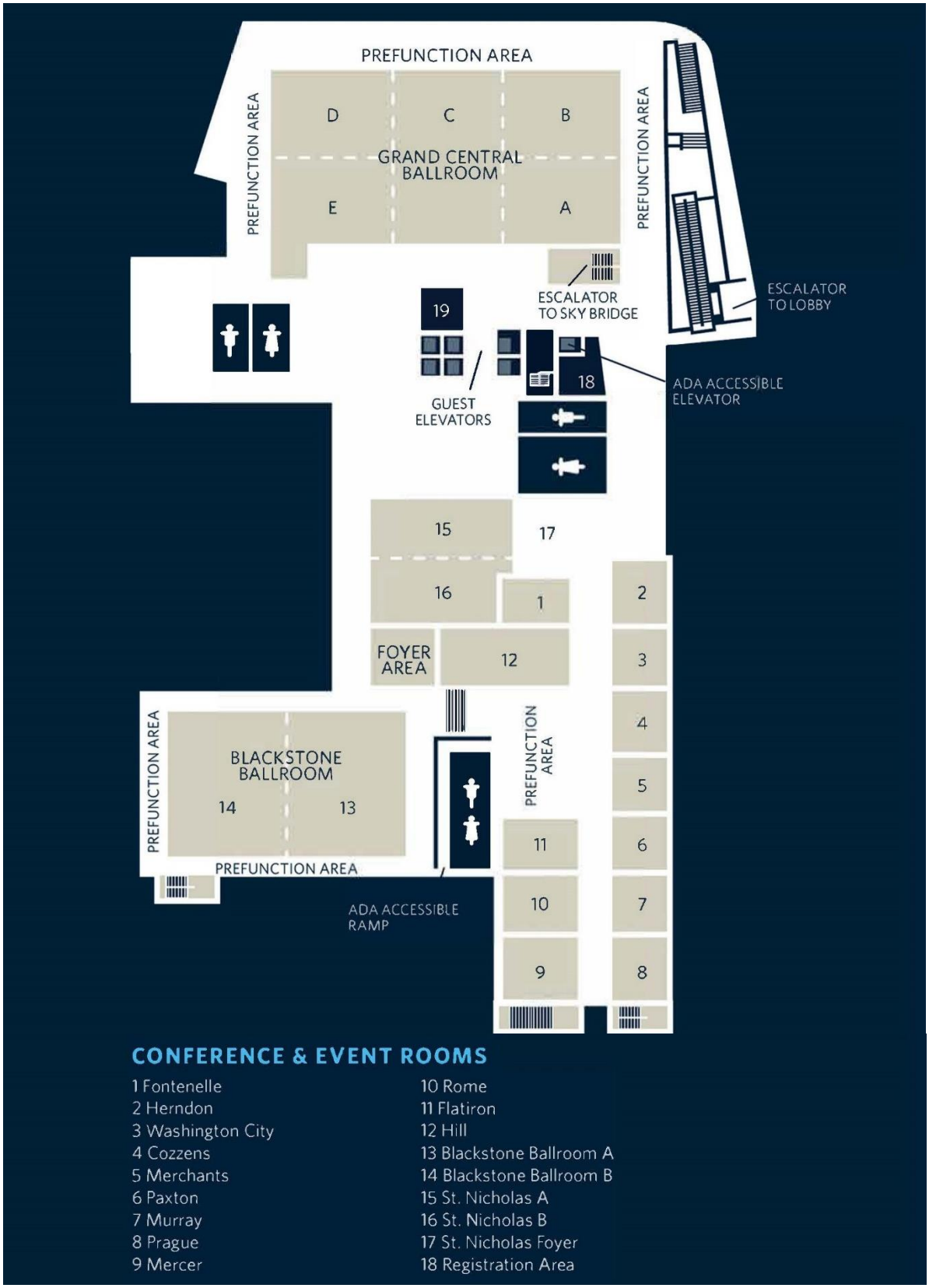
NSEC Advisory Board

- Kenneth G. Furton, Florida International University
- Charles Henderson, Western Michigan University
- Cathy Manduca, Director, SERC, Carleton College
- Emily Miller, Association of American Universities (AAU)
- Mathew Ouellett, Cornell University
- Susan Renoe, University of Missouri, Columbia
- Linda Slakey, AACU, AAU and APLU
- Pratibha Varma-Nelson, Indiana University-Purdue University Indianapolis

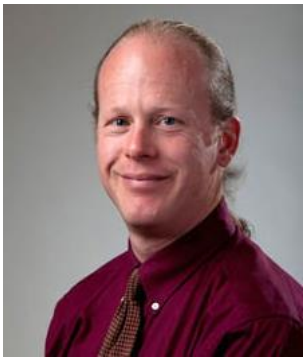
Evaluator

Nancy Shapiro, Associate Vice-Chancellor for Academic Affairs & Special Assistant to Chancellor, University System of Maryland

Omaha Hilton Hotel Map



NSEC Speaker Bios



Dr. Don Gillian-Daniel engages faculty and staff in exploring how to teach more inclusively. Instead of just discussing *what* to do, he uses an applied improvisational approach to challenge participants to practice, in real time, *how* they will respond. For over a decade he has developed and taught face-to-face and synchronous online graduate courses about effective and inclusive teaching. In addition, he has led sessions about inclusive teaching at Nazarbayev University in Kazakhstan, addressed implicit bias in the college classroom for National Science Foundation-funded initiatives, and consulted with national non-profits like the Aldo Leopold Foundation. Don was an Associate Director of the Delta Program in Research, Teaching and Learning, and Institutional Administrative Leader for the Center for the Integration of Research, Teaching and Learning (CIRTL) Network. He now works through the Collaborative for Advancing Learning & Teaching at the University of Wisconsin-Madison.

Dr. Mathew Ouellett is the founding executive director of the Cornell University Center for Teaching Innovation. Matt joined the Cornell community in 2017 from Wayne State University where he served as associate provost and director of the Office for Teaching and Learning. Prior to that, he held progressively responsible positions in higher education administration at the University of Massachusetts Amherst. In addition to teaching regularly, his most recent publication is Friendship in Educational Development: Reflections on Intersectional Identities and Inclusive Professional Practices (New Directions for Teaching and Learning, no. 158, Summer 2019). In 2012, Matt was honored with the Bob Pierleoni Spirit of POD Award for outstanding lifetime achievement and leadership in the enhancement of teaching, learning, and faculty development.

Workshop for NSEC 2019 National Conference (included in registration)

Facilitator: Don Gillian-Daniel, Collaborative for Advancing Learning & Teaching, University of Wisconsin-Madison

Faculty and instructional staff strive to create diverse, equitable and inclusive learning environments because of the positive impacts on students' learning. Often, they do this without any training in how to effectively do so, beyond recreating what they experienced as students. Faculty grapple with questions like: As student demographics and backgrounds become more diverse, how do you make your content, activities, language you use, and classroom logistics inclusive for all students? And, as students interact with each-other more often with active learning, how do you respond to "hot moments" or "difficult discussions" in the classroom?

Incidents of race and racism, privilege and power regularly impact undergraduates on our campuses. Without training, knowing how to address these inequities effectively can be uncomfortable and challenging. This workshop is designed to build educator confidence in using inclusive teaching strategies. Participants will consider how workshop elements could be translated to their own campus programming.

Learning Outcomes:

As a result of attending this session, participants will:
1) explore the perspectives of underrepresented and minoritized students on our campuses,
2) analyze their own and student identity and the impact that identity has on the learning environment,
3) discuss a framework for addressing hot moments and difficult discussions in the classroom,
4) practice what to say during hot moments or difficult discussions,
5) examine a range of inclusive teaching approaches to use in the classroom and beyond, and
6) Plan ways to use workshop elements on their campuses, in their work with faculty.

This session will place an emphasis on practice as a transferable tool -- "saying the words", deconstructing conversations and receiving feedback.

This workshop is supported, in part, by the National Science Foundation's INCLUDES program as part of the Aspire Alliance.

WORKSHOP - Building Evaluation Capacity in STEM Education Centers: An Approach to Better "See" Your Programs

Session: Concurrent Session I and Concurrent Session II - Workshop **Location:** Blackstone A

Speakers: Lucas Hill, Associate Researcher, University of Wisconsin-Madison

Additional Authors: Lucas B. Hill, Associate Researcher, University of Wisconsin-Madison; Mark Graham, Research Scientist & Director, STEM Program Evaluation & Research Lab (STEM-PERL), Department of Ecology & Evolutionary Biology, Yale University; Melanie Bauer, Assistant Director of STEM-PERL, Yale University; and Julia N. Savoy, Assistant Researcher, University of Wisconsin-Madison

Strands: Assessment; Managing a Center

Abstract: As STEM Education Centers proliferate across the US, the need to demonstrate impact to campus and national stakeholders grows in importance. Prior program evaluation methods have typically focused on short-term outcomes, largely ignoring long-term program effectiveness. At present, there is a need to expand evaluation capacity to help improve the success and impact of STEM Education Centers. To accomplish this, practitioners need expanded resources and tools to better "see" program complexity and identify the key data collection points to assess short-, medium-, and long-term outcomes. Workshop participants will explore the major components of the systems evaluation protocol, a specific tool and process designed to build evaluation capacity and help individuals better visualize the flow of their program. Participants, focusing on their local programs, will (1) map some of their programmatic activities and outcomes, (2) articulate key evaluation questions, and (3) strategize an evaluation plan, including ideas for future implementation.

Catalyzing Change in Mathematics Education at a Hispanic Serving Institution

Session: Concurrent Session I **Location:** Hill

Speakers: Laird Kramer, Founding Director and Professor, Florida International University; Edgar Fuller, Distinguished Professor and Associate Director, Florida International University; Roneet Merkin, Instructor & Program Director for Mastery Math Lab, Florida International University; Charity Watson, Visiting Assistant Professor, Florida International University; Jeremiah Hower, Senior Instructor and Program Director for Mastery Math Lab, Florida International University

Strands: Retention and Success; Improving the Quality of Education; Institutional change

Abstract: Establishing a culture of evidence-based and inclusive mathematics instruction is necessary for the success of diverse populations of students. This panel will share promising practices in lower division mathematics courses and in the Calculus sequences that aim to increase the success and retention of students from all backgrounds. Panelists will discuss and share data from successful initiatives launched at a Hispanic Serving Institution. The panel will focus on the lessons learned from projects such as the Mastery Math Lab program, the Pathways Pre-Calculus reform, a Catalyzing Change in Calculus project,

and the establishment of the Center for the Transformation of Teaching Mathematics to promote and sustain the institutional expansion of these initiatives.

Social Network Analysis and Connecting Community Partners

Session: Concurrent Session I **Location:** Paxton

Speakers: Kristin VanWyngaarden, BODYMOELS Graduate Assistant, University of Nebraska at Omaha; Tracie Reding, STEM Outreach Coordinator, University of Nebraska at Omaha

Additional Authors: Tracie Reding and Kristin VanWyngaarden, University of Nebraska at Omaha

Strands: Broadening participation; Research; Partnerships Beyond the University

Abstract: STEM Centers within academic institutions serve to improve collaboration between departments aimed to further educational programming within STEM fields. While inter-organizational relationships are paramount for leveraging the goals of an organization, outside support has proven an effective tool. Fostering relationships outside of STEM Centers may result in improved inclusivity, and thus organizational and student outcomes. Social Network Analysis (SNA) serves as a beneficial tool to assess the effectiveness and ability to leverage relationships and also select meaningful projects and grants. The purpose of this workshop is to discuss use of SNA within your organization, utilize data analysis programs to improve efficiency within your program, interpretation of results when utilizing SNA programs, and tools to support data visualization. This interactive workshop will provide you with the opportunity to utilize a variety of platforms to support your STEM Center with the support of professionals who utilize these programs regularly for research purposes.

Streamlining the Ed Research IRB at Your Institution

Session: Concurrent Session I **Location:** Herndon

Speakers: Adrienne Williams, Director, UC Irvine

Additional Authors: Michael Dennin, Vice Provost of Teaching and Learning and Professor of Physics and Astronomy, UC Irvine

Strands: Assessment; Research; Engaging Faculty

Abstract: STEM Education Centers often work with faculty to assess and improve teaching effectiveness in their classrooms. Publishing these results requires the submission of an IRB, a process that many find to be opaque and full of roadblocks on campuses with little experience in this area. In this presentation, a campus that has successfully rolled out a "Blanket IRB" for its STEM Education researchers will facilitate a discussion about making progress towards a streamlined and supportive relationship with your IRB staff. STEM Education Center staff and faculty who have struggled with IRB approval will benefit. Those who have improved their own IRB process are also invited to share their experiences.

Supporting student equity by supporting faculty and the instructional system

Session: Concurrent Session I **Location:** Washington City

Speakers: Marco Molinaro, Asst. Vice Provost fo Educational Effectiveness, UC Davis

Additional Authors: Marc Facciotti, Associate Professor of biomedical engineering, UC Davis; Matt Steinwachs, Lead Programmer, Center for Educational Effectiveness, UC Davis

Strands: Inclusive Education; Improving the Quality of Education; Engaging Faculty

Abstract: At UC Davis we are focused on supporting systemic change to improve undergraduate student outcomes. We are using a locally generated Cycle of Progress for sustainable change that consist of 4 cyclical phases - Awareness, Understanding, Action, Reflection, and repeat. Realizing there have many efforts focused on students but far fewer focused on helping faculty, we saw a need to help faculty better understand who their students are. In our efforts, we developed an approach to communicating student outcomes that looked at the intersectionality of first generation, low income and underrepresented minority variables on student short and long term outcomes globally at our university. We are now extending the approach to individual faculty in their classrooms. Our Know Your Students prototype tool helps us work collaboratively with faculty while enhancing the use of existing resources to improve learning opportunities, equity and inclusivity for our students.

The Emergence of a STEM Center: Lessons Learned and Still to Learn

Session: Concurrent Session II **Location:** Hill

Speakers: Neal Grandgenett, Haddix Community Chair of STEM Education, University of Nebraska at Omaha

Additional Authors: Christine Cutucache, Haddix Community Chair of Science, University of Nebraska at Omaha; Brian Dorn, Union Pacific Chair of Computer Science, University of Nebraska at Omaha; Chris Moore, Haddix Community Chair of Physical Science, University of Nebraska at Omaha; Patrick Rault, Haddix Community Chair of Mathematics, University of Nebraska at Omaha

Strands: Retention and Success; Improving the Quality of Education; Institutional change

Abstract: This presentation will describe the collaborative journey of the University of Nebraska at Omaha, toward a new STEM Center administrative unit, that has been the result of a series of highly collaborative efforts, as led by five faculty "community chairs" and a team of 54 faculty colleagues. This journey has been a campus priority, and has had significant impacts on STEM student inclusion, engagement and retention, as well as significant successes for external funding for STEM student support ($35 million over 10 years). Program growth has led to the need for a new campus-wide STEM Center infrastructure, currently under consideration by the Board of Regents, which has been strategically planned to build upon organizational strengths and to address ongoing challenges. Lessons learned will be discussed by the presenters, as well discussion with the session audience, for their advice and suggestions for this and other newly emerging STEM Centers.

Developing a collaborative by extending a research project

Session: Concurrent Session II **Location:** Washington City

Speakers: Katerina Thompson, Assistant Dean, University of Maryland

Additional Authors: Cindy Ghent, Associate Professor and Director, Towson University; Gili Marbach-Ad, Research Professor and Director, University of Maryland; Jackie Bortiatynski, Director, Penn State University; Lindsay Wheeler, Assistant Professor and Assistant Director, University of Virginia

Strands: Research; Partnerships Beyond the University; Engaging Faculty

Abstract: RECCUSE (Regional Collaborative for Change in Undergraduate STEM Education) is a team of four STEM Education Centers that are partnering to extend current research on students' views and beliefs about cross-disciplinary skills. We have administered the STEP-U survey, initially developed at the University of Maryland, to graduating STEM students at the four partner campuses. We seek to compare student views and beliefs across STEM disciplines and institutions. Additionally, we will incorporate results into professional development activities that challenge STEM faculty to consider how their own beliefs influence their teaching. Concurrently, we are documenting the process of creating this cross-institutional collaborative, so that others can learn how to develop and sustain these partnerships that are meaningful for both local and national STEM education. Participants will engage directly with

the STEP-U survey instrument, discuss how to form sustainable cross-institutional collaborations, and consider how they can translate this approach to their own context.

Practicing Into Inclusion: Utilizing a Learning Assistant Pedagogy Course to Explore and Address Impacts of Structural Oppression on Learning

Session: Concurrent Session II **Location:** Herndon

Speakers: Jessica Cleeves, Academic Program Manager, University of Utah

Additional Authors: Jordan Gerton, University of Utah CSME

Strands: Inclusive Education; Improving the Quality of Education; Broadening participation

Abstract: The University of Utah's Learning Assistant pedagogy course connects evidence-based best practice for small group facilitation and the individual, institutional, and cultural barriers which motivate the opportunity gap. Through this approach, students engage in self-reflection around race, class, gender, ableism, heteronormativity, similar to traditional 'diversity' classes. Doing so from their Learning Assistant mentorship role, while learning actionable pedagogical strategies, however, seems to move students from backgrounds of privilege through feelings of anger, guilt, and shame differently than courses whose sole goal is to explore inequity without offering actionable next steps. Students who identify with marginalized positionalities are relieved from tokenization and into advocacy for their students, with whom their identities may/not align. Situating conversations about access and power within a context of enacting inclusive pedagogical practices allows Learning Assistants to co-create solutions concurrent with understand the historical depth, cultural complexity, and structural resistance to making education equitable and inclusive.

Moving Change Forward: The Disruptive and Stabilizing Roles of Centers in Undergraduate STEM Education

Session: Concurrent Session II **Location:** Paxton

Speakers: Deborah Carlisle, Post doctoral Research Associate, UMass Amherst

Additional Authors: Gabriela Weaver, Special Assistant to the Provost, Professor of Chemistry, UMass Amherst

Strands: Improving the Quality of Education; Research

Abstract: This research presents some of the highlights from our national survey of Centers. The survey was focused on the important roles Centers play in undergraduate STEM education. We will explore what was learned about their priorities, resources, and strategies, and discuss the implications these may have for their future work. This survey was constructed around four hypotheses, which were informed by a cross-case analysis of data collected during site visits to a purposive national sample of Centers. Through interactive discussion using visual graphics and prompts, we will explore the four

hypotheses and highlight the key findings from our survey. During this session we seek to answer the following questions: 1) How important are the hypotheses areas to a Center's mission? 2) What do the data from the four hypotheses tell us about Centers? 3) How do these results inform the ways in which centers may complement one another? We will actively engage participants in considering the roles of their centers, and the ways in which they overlap with the national landscape based on these results.

WORKSHOP - Broadening participation: Strategies for developing and maintaining a positive workplace climate

Session: Concurrent Session III and Concurrent Session IV - Workshop **Location:** Herndon

Speakers: Blair Schneider, Program Manager, University of Kansas

Additional Authors: Steven Case, Director, University of Kansas Center for STEM Learning; Meredith Hastings, Associate Professor, Brown University; Erika Marin-Spiotta, Professor, University Wisconsin-Madison

Strands: Inclusive Education; Broadening participation; Engaging Faculty

Abstract: Harassment, bullying, and other exclusionary behaviors have wide-ranging detrimental effects on mental and physical wellbeing and contribute to the continued marginalization of historically underrepresented groups in many academic disciplines. However, most academics do not receive mentoring or training in how to address, respond to, and prevent these types of behaviors at the personal and community level. Without this training, our academic institutions will continue to confront barriers in their efforts to create inclusive environments for all. This interactive workshop provides training in strategies to protect and support targets of harassment through real world scenarios. After this session, participants will be able to identify: (1) Different ways in which harassment can manifest in research environments; (2) Strategies for bystander intervention, and (3) Resources for support to promote cultural change. This workshop was developed by ADVANCEGeo with a U.S. National Science Foundation ADVANCE Partnership award to empower geoscientists to transform workplace climate.

Strengths, Challenges, and Opportunities: Enhancing STEM Education Centers through Self-Assessment

Session: Concurrent Session III **Location:** Washington City

Speakers: Julia Savoy, Assistant Researcher, University of Wisconsin-Madison

Additional Authors: Lucas B. Hill, Associate Researcher, University of Wisconsin-Madison; Ann E. Austin, Professor of Higher, Adult, and Lifelong Education; Associate Dean for Research in the College of Education; Assistant Provost for Faculty Development--Career Paths, Michigan State University; Bipana Bantawa, Post-doctoral Research Assistant, University of Wisconsin-Madison

Strands: Research; Managing a Center; Institutional change

Abstract: Gaining a clear picture of strengths, challenges, and opportunities can help STEM Education Centers make strategic choices about their programming, resource allocation, and critical partnership development on their campuses. In this interactive workshop, participants will become familiar with an instrument designed for use in self-assessment of STEM Education Centers. Rooted in research on the CIRTL Network, the instrument is designed to examine the dynamics of an institutional STEM Education Center and the nature of its connections with other campus entities. After using the instrument for self-assessment of their STEM Centers, participants will (1) select two strategic areas for focus during the

workshop (e.g., developing partnerships), (2) engage in reflective self-assessment and peer interaction to examine these areas, and (3) draft an action plan for improvements. Materials provided will be useful to participants for future self-assessment of STEM Center functioning. Participation with a campus team will be especially useful.

Enriching, coordinating, and promoting faculty and student engagement to better serve the K-12 STEM community

Session: Concurrent Session III **Location:** Blackstone A

Speakers: Kerry Cresawn, STEM Center director, James Madison University

Strands: Managing a Center

Abstract: The James Madison University STEM Center is dually dedicated to K-12 STEM outreach and to providing meaningful opportunities for undergraduates and faculty to serve and engage the K-12 community. The center underwent a significant change in structure in July 2018 with a new organizational model, a full-time director, and a re-evaluation of how to best balance and synergize these two goals. From this evaluation, we learned that the Center's lack of visibility and lack of coordination of STEM outreach opportunities and student engagement were the primary barriers to student and faculty engagement. This lack of engagement was, in turn, a significant barrier to serving the K-12 community with equitable and impactful practices. We will present the steps and outcomes of a 12-month plan to increase visibility on campus and to better coordinate STEM outreach efforts including more effective faculty and student engagement and increased capacity for K-12 outreach.

Quickly Moving the Needle for Multi-section Courses: the "Hackathon" Approach

Session: Concurrent Session III **Location:** Paxton

Speakers: Kevin Yee, Assistant Dean, University of South Florida

Additional Authors: Amanda Helip-Wooley, Teaching and Learning Facilitator, University of South Florida

Strands: Improving the Quality of Education; Engaging Faculty; Institutional change

Abstract: While culture change is famously difficult to advance at a departmental level, we have found success in encouraging, guiding, and implementing change at a course level in STEM classes, particularly when the course has many sections taught by multiple instructors, such as the first semester of biology or college algebra. Engaging the faculty course coordinator and all full-time faculty who teach those courses brings the necessary players to the table to enable redesign for enhanced student success. Rather than the usual multi-session course redesign process that stretches over a semester (or longer), we have devised a condensed format that occurs in a single two-day period. Modeled after the "hackathons" pioneered by software coders, these events have advantages such as simplified

scheduling, an action bias and work ethos, a renewed sense of progress and pride, and rapid implementation.

A Customized Evaluation Data Interface to Optimize Inclusive STEM Faculty Development

Session: Concurrent Session III **Location:** Hill

Speakers: Jonathan K Waterhouse, Project Manager of STEM Evaluation and Technology, Poorvu Center for Teaching and Learning, Yale University; Meghan Bathgate, Postdoctoral Research Associate, Poorvu Center for Teaching and Learning, Yale University

Additional Authors: Jonathan K Waterhouse, Project Manager of STEM Evaluation and Technology, Poorvu Center for Teaching and Learning, Yale University; Meghan Bathgate, Postdoctoral Research Associate, Poorvu Center for Teaching and Learning, Yale University; Jennifer Frederick, Executive Director, Poorvu Center for Teaching and Learning, Yale University

Strands: Inclusive Education; Assessment; Engaging Faculty

Abstract: STEM learning centers and initiatives face a common challenge of demonstrating the efficacy of their efforts over time and communicating outcomes to stakeholders. Our STEM evaluation team developed an Evaluation Data Interface (EDI) to automate this process through visual displays that allow individual customization. The EDI has been implemented to evaluate the Summer Institutes, a national STEM faculty development training on evidence-based practices. We will describe how this tool facilitated a data-driven approach to improve our inclusive teaching curriculum. Participants will learn about our innovative evaluation methods through a demonstration of the EDI platform that automates creation of cross-year and cross-assessment data reports. We will show how the interactive interface connects disparate program evaluation elements in one location (evaluation pathway model, literature, evaluation questions, and data). This technology enabled targeted improvement of the diversity and inclusivity component of our curriculum and has potential for collaborative pilots with NSEC community members.

Research-Practice Partnerships to Improve STEM Education: Empowering Educators to Change Institutions for K-16+ Education

Session: Concurrent Session IV **Location:** Paxton

Speakers: Laura Millay, Research and Evaluation Coordinator, University of Maine

Additional Authors: Mitchell Bruce, Professor of Chemistry, Maine Center for Research in STEM Education, University of Maine; Susan McKay, Professor of Physics and Director of the Maine Center for Research in STEM Education, University of Maine; Franziska Peterson, Assistant Professor of Mathematics Education, Maine Center for Research in STEM Education, University of Maine; Marina Van der Eb, Maine STEM Partnership Coordinator, Maine Center for Research in STEM Education, University of Maine; Erin Vinson, Campus Programs Coordinator, Maine Center for Research in STEM Education, University of Maine; Michael Wittmann, Professor of Physics, Maine Center for Research in STEM Education, University of Maine

Strands: Retention and Success; Partnerships Beyond the University; Institutional change

Abstract: The Maine Center for Research in STEM Education at the University of Maine engages in research-practice partnerships to improve STEM education and enact institutional change in K-16+ settings. Our goal in this presentation is to share from our successes and challenges in implementing research-practice partnerships, measuring student outcomes, sustaining our work beyond grant funding, and gaining support from institutional leaders. We also hope to start discussion with others who are involved in similar efforts. Key successes include evidence of positive outcomes for students (increased retention, improved grades and test scores, improved attitudes), building a professional community and fostering professional growth for educators, and bringing about long-term institutional change. Key challenges include maintaining connections between research and practice and between researchers and educators over time, and developing meaningful assessments of student outcomes.

What Students Tell Us: Engaging faculty with data from student surveys

Session: Concurrent Session IV **Location:** Hill

Speakers: Tekla Nicholas, Senior Statistical Researcher, Florida International University; Leanne M. Wells Director, Center for the Advancement of Teaching, Florida International University

Strands: Improving the Quality of Education; Broadening participation; Engaging Faculty

Abstract: Since Spring 2016, more than 20,000 students at Florida International University have responded to Student Perceptions & Behaviors surveys in their gateway classes in STEM disciplines and beyond. Nearly one third of students report that competing obligations keep them from class. It is essential that faculty understand obstacles such as these and can adopt strategies to support students' success. This presentation will discuss the development and use of surveys as part of our efforts to improve student learning, increase success among students from underrepresented groups, and engage a broader circle of faculty in evidence-based course reform. The surveys are grounded in qualitative

research developed using themes emerging from student stories. We present strategies for disseminating findings in ways that create opportunities for reticent faculty to engage and developing faculty to share successful interventions and instructional designs.

Partnering with peer leaders to create inclusive academic support environments

Session: Concurrent Session IV **Location:** Washington City

Speakers: Kelly McDonald, Director, Center for Science and Math Success, California State University, Sacramento

Additional Authors: Kelly McDonald, Associate Professor of Biological Sciences and Director, Center for Science and Math Success; Jennifer Lundmark, Professor of Biological Sciences and PAL Program Director; Enid Gonzalez-Orta, Associate Professor of Biological Sciences and SEE Program Director; Jeffrey Paradis, Professor of Chemistry and C2S Program Director, California State University, Sacramento

Strands: Inclusive Education; Retention and Success; Broadening participation

Abstract: The Science and Math Success Center (CSMS) at Sacramento State emphasizes peer support programs that enhance student academic performance, retention, leadership development and overall well-being. Three of the CSMS programs, Peer-Assisted Learning (PAL), Science Educational Equity (SEE) and Commit to Study (C2S), employ over 120 undergraduates who work to improve the success of their peers. Peer leaders participate in ongoing professional development related to creating inclusive learning environments, promoting students' self-efficacy and sense of belonging, employing a growth mindset and refining intercultural competency. The ethnic and socioeconomic diversity of the peer leaders reflects the diversity of the students enrolled in STEM courses, at over 60% URM and more than 50% Pell-eligible. In this session, participants will learn about the creation, evolution, ongoing support of and challenges related to the CSMS programs, examine program outcome data and engage in discussion related to best practices and sustainability of student success programs.

Gateways-ND: Building the Institutional Infrastructure for Improving STEM Undergraduate Education

Session: Roundtable I **Location:** Table 1

Speakers: Anna Semanko, North Dakota State University

Strands: Engaging Faculty

Abstract: Gateways-ND is a five-year (2015-2020) National Science Foundation (NSF)-funded instructional faculty and staff development program that is designed to offer relevant, collaborative, and sustained support to science, technology, engineering, and math (STEM) postsecondary educators North Dakota State University. The instruction of the program is based on current evidence-based pedagogy and course design to help faculty and staff learn to create and/or reinvent STEM courses to be learner-focused and engaging. Since the program began in 2015, Gateways-ND has made substantial changes in teaching and learning practices, and beliefs, among NDSU faculty, staff, and administration. The path to these changes has highlighted a clear path for other institutions can follow to support STEM instructional change across an institution. To date, over 140 faculty and instructional staff have been a part of four cohorts.

The DBER Scholars Program: A Method of Engaging Undergraduate Students within a STEM Institute

Session: Roundtable I **Location:** Table 2

Speakers: Anthony Chase, Evaluation and Research Specialist, IUPUI

Additional Authors: Anthony Chase, IUPUI

Strands: Improving the Quality of Education

Abstract: STEM Centers and Institutes often focus on engagement of faculty and larger institutional goals. The engagement of undergraduate students often is left to training them to engage with faculty in pedagogical practices and rarely partners with them to do educational research in STEM. The DBER Scholars program at IUPUI offers a six module program that trains students to engage alongside STEM faculty in qualitative, quantitative, and mixed-methods research. This program is housed within IUPUI's STEM Education Innovation and Research Institute (SEIRI). A detailed outline of the program and first year outcomes will be presented here.

Never-the-less She Persisted: High Impact Practices for recruiting and retaining women and, in particular, minority women in STEM

Session: Roundtable I **Location:** Table 3

Speakers: Ellen Lieberman, Associate Dean, Undergraduate Student Programs, Rutgers University; and Allison Antwi, Associate Dean, Douglass Residential College, Rutgers University

Strands: Inclusive Education; Retention and Success; Broadening participation; Engaging Faculty; Institutional change

Abstract: Living-learning communities (LLCs), a high impact practice, create inclusive spaces that lead to engagement and persistence in college. LLCs are effective in recruiting and retaining women in majors where they are traditionally under-represented (Brower & Inkelas, 2010; Lieberman, 2018). Douglass Residential College (the women's college within Rutgers University) created women-only STEM LLCs to address under-representation in target areas: engineering, computer science, and minority women retention in biology. The presentation offers details on the components of model LLCs for women in STEM, particularly within a co-ed university. Research methods will be shared and data demonstrating the impact (increased enrollment and retention of women in the target STEM majors) after the formation of the LLC. This includes comparisons with men and with women not in the LLC. The specific combination of resources that created a trajectory of success for undergraduate women in STEM will be discussed.

Development of a Multi-disciplinary Journal Club on Teaching and Learning

Session: Roundtable I **Location:** Table 4

Speakers: Colleen Craig, Senior Lecturer / Teaching Fellow, University of Washington

Strands: Engaging Faculty

Abstract: At the University of Washington, we recently piloted a multi-disciplinary journal club focusing on literature from the scholarship of teaching and learning (SoTL) and discipline-based education research (DBER). Although single-discipline education journal clubs already existed at UW, we explicitly invited faculty from different disciplinary backgrounds, since many of the issues we face as teachers are the same regardless of what we teach. Modeled on best practices for journal clubs in the health sciences, the goals of this club are to introduce faculty to emerging trends in SoTL and DBER, and to critique and translate findings to guide instructional practice. The pilot cohort included seven faculty: Arabic, Biology, Chemistry, Comparative Literature, Education, Law, and Philosophy. This diversity offered the benefit of wide-ranging expertise, but also presented challenges due to our differing research traditions. At this roundtable, we will discuss what's working well in the journal club, and opportunities for improvement.

Increasing the Number of African American Advanced STEM Professionals: Lessons from two southern Predominantly White Institutions

Session: Roundtable I **Location:** Table 5

Speakers: Shawn Moore, Director, Center for STEM Education, East Carolina University

Strands: Broadening participation; Research; Institutional change

Abstract: This study explored how two select predominantly white institutions (PWIs) have learned to be successful in advancing undergraduate African-American students to advanced degrees in the life sciences. This study explored how interventions that influence African-American students to doctoral degrees in Life Sciences shaped these institutions as learning organizations; and in what ways and to

what extent do departments exhibit the characteristics of a learning organization that influences their STEM environment to allow African-American students to advance to doctoral programs. This study has implications for theory and practice inferred from the findings that include a new model for how certain higher education institutions operate as learning organizations and the processes and systems by which PWIs might evolve their campuses to be among the most successful in advancing African-American students to completing doctoral degrees in life science areas.

Engaging First-Semester Freshman in STEM Education

Session: Roundtable I **Location:** Table 7

Speakers: Derrick Nero, Assistant Professor of Engineering Education, University of Nebraska at Omaha

Additional Authors: Derrick A. Nero, Assistant Professor of Engineering Education, University of Nebraska at Omaha

Strands: Improving the Quality of Education

Abstract: STEM Centers often need to help the campus move toward innovative undergraduate student coursework that is both interesting and interdisciplinary. This project discusses one such course and several findings and lessons learned from its initial offerings, in the context of a discipline-based education research study. This phenomenological study describes the findings of a new general science course which utilizes near space experiments on a high-altitude balloon platform to teach science methods and engineering design. The course was populated with pre-Education majors. The presentation reports on the format for the course, its key activities, and the effects of course experiences on students' scores on the Science Teaching Efficacy Belief Instrument (STEBI-B) and university-based student course evaluations.

Advancement in STEM Education for All Through Accommodations for Underprepared Minority and/or Post-Traditional Students

Session: Roundtable I **Location:** Table 8

Speakers: Charles H. Roberts, Associate Professor, Mercer University; Zipangani M. Vokhiwa, Associate Professor of Science, Mercer University

Strands: Retention and Success; Improving the Quality of Education; Broadening participation

Abstract: Due to the many and serious challenges faced by under-prepared minority and/or post-traditional students when studying within the STEM disciplines, it is often necessary to simultaneously consider factors that demand aggressive attention and remediation before these students are able to make significant strides in their academic and career development. Consequently, measures that involve cross-discipline collaboration are needed. One such effort has led to the successful implementation of a strategy to significantly enhance students' critical thinking, problem solving, and communication skills within a non-STEM course. Other courses within the curriculum have been identified to hold the

potential for a similar consideration of certain crucial factors. The presenters will explore some possibilities that exist for the successful integration into certain STEM and non-STEM courses, strategies that are essential for the successful advancement of minority and/or post-traditional students. At minimum they have been deemed growth inducing for all others.

Exploring the interconnections between Discipline-Based Education Research (DBER) and STEM Education Centers

Session: Roundtable I **Location:** Table 9

Speakers: Marilyne Stains, Associate Professor, University of Nebraska-Lincoln

Strands: Improving the Quality of Education; Research; Engaging Faculty

Abstract: This roundtable will discuss how STEM Education Centers can promote/increase how DBER scholars influence their own institutions on STEM education issues. In particular, the roundtable will briefly discuss the history behind the development of a DBER community at the University of Nebraska-Lincoln, the role that the Center for Science, Mathematics and Computer Education played in creating a campus conversation around STEM education. The roundtable will also showcase the research produced by DBER scholars at the University of Nebraska-Lincoln and how this research has impacted undergraduate STEM education at UNL.

Mind the Gap: Working with Faculty to Use Data to Decrease Equity Gaps in their Courses

Session: Roundtable I **Location:** Table 10

Speakers: Donna Llewellyn, Executive Director, Boise State University

Strands: Retention and Success; Broadening participation; Assessment

Abstract: Boise State University has engaged in extensive efforts to improve undergraduate education with an emphasis on STEM disciplines. Much of this effort has been on increasing the use of evidence based instructional practices among STEM faculty. The Institute for STEM and Diversity Initiatives and the Center for Teaching and Learning have collaborated to support faculty in using data to assess changes they have made in their teaching. Recently, our focus has shifted to a deeper look into equity gaps in student success and how to move the use of data from the back end (assessment of changes) to the front end (identification of gaps) and supporting faculty to reduce the gaps. The current issue we would like to address during this round table is effective strategies for immersing faculty in their student success data with identifiable equity gaps and getting them to intentionally address those by modifying their teaching practices.

Fundraising 101

Session: Roundtable II **Location:** Table 1

Speakers: Laura Frost, Director, Florida Gulf Coast University

Strands: Partnerships Beyond the University; Managing a Center

Abstract: Is your STEM Center categorized as self-sustaining? If you answered yes, then fundraising is important for you. Many STEM Centers seek funding through federal grants, but what about other forms of fundraising? Have you ever considered working with your University Advancement, throwing a fundraiser, or partnering with local community organizations? The presenter will lead off the discussion with her own success in acquiring a $1.2M, multi-year donation through University Advancement, failure in throwing a fundraiser, and partnerships with community groups all of which have provided insight into fundraising outside the realm of federal grants. Please join this roundtable to share your experiences.

Internships for STEM undergraduates: structural models for student success

Session: Roundtable II **Location:** Table 2

Speakers: Jacqueline Broida, Internship Coordinator, University of Utah; Emily Gaines, Director of Engagement, University of Utah

Strands: Retention and Success; Broadening participation; Partnerships Beyond the University

Abstract: Internships provide an important opportunity for students to develop important skills, explore career paths, and build an employment history. These high-impact experiences are important to the success of any student, but particularly so for underrepresented student groups and STEM students who do not pursue careers in academia. In 2015, the University of Utah's Center for Science and Mathematics Education (CSME) created an internship program to serve 50 undergraduate students/year. The program has completed 7 cohort-based intakes, but has not met its initial enrollment goals. Structural changes and new collaborations are being explored to enhance the program, expand participation, increase diversity of students and employers, reduce barriers to participation, and track student success. This roundtable will explore the CSME internship model's successes and shortcomings and encourage broader group discussion surrounding the features of successful high-impact experiential learning programs.

Supporting STEM Lab Teaching Assistants Enactment of an Effective Operational Curriculum via a Year-Long Professional Development Initiative

Session: Roundtable II **Location:** Table 3

Speakers: Ruthmae Sears, Associate Professor, University of South Florida

Additional Authors: Robert Potter, University of South Florida

Strands: Improving the Quality of Education; Research; Institutional change

Abstract: This presentation describes the structure of a year-long professional development initiative to support STEM laboratory teaching assistants attend to the operational curriculum, which embodies teacher-intended curriculum, enacted curriculum, and student outcomes (Remillard,& Heck, 2014). Our professional development training sought to build community, reflect on means to implement effective evidence-based research instructional practices, identify and utilize strategies that can motivate students, address challenges and complexities that may arise in a laboratory setting, and strengthen relationships with laboratory coordinators. Therefore, our presentation will provide an overview of our professional development structure, describe activities and strategies utilized, and summarize feedback garnered thus far from participants. The presentation has implication on efforts to support teaching assistants who are at the intersection of being responsible for instruction, as well as students seeking to obtain a graduate education.

Digital Badges for Recognition of Student STEM Community Engagement

Session: Roundtable II **Location:** Table 4

Speakers: Sharon Locke, Director and Associate Professor, Southern Illinois University Edwardsville

Additional Authors: Colin Wilson, Outreach Instructor, Southern Illinois University Edwardsville

Strands: Retention and Success; Broadening participation; Partnerships Beyond the University

Abstract: Digital badges in higher education are a means to provide students with a "micro-credential" in recognition of competencies and skills developed in or out of a formal course. We developed a "Community Engagement in STEM" digital badge series that serves to recognize community engagement activities by STEM students, encourage students' sustained participation in outreach, and motivate students to have ongoing interactions with STEM faculty and staff. In its pilot year the badge program achieved a greater than 70% acceptance rate and positive comments from students, who perceived the badges as a way to extend their resume for job applications. Many student success initiatives integrate community service as a way to help at-risk students make connections between their STEM academic program and its relevance and value to society. Digital badges could be integrated into these outreach experiences as a way to further motivate students and provide tangible evidence of their accomplishments.

Building a Model of Public-Private Partnerships to Develop STEM Career Pathways

Session: Roundtable II **Location:** Table 5

Speakers: Julie Sigmon, Director, Omaha STEM Ecosystem; Tracie Reding, STEM Outreach Coordinator, University of NE Omaha; Elizabeth Mulkerrin, VP of Education, Omaha Henrry Doorly Zoo and Aquarium; Chris Schaben, Science Supervisor, Omaha Public Schools

Strands: Partnerships Beyond the University

Abstract: This roundtable focuses on building a model of public-private collaboration. By its general nature, Omaha STEM Ecosystem comprises of a diverse mix of community or state-wide partnerships. Leveraging those partnerships is key in developing a seamless pathway for students to career and beyond, as life-long learners. The Omaha STEM Ecosystem believes that the strength of our Ecosystem directly relates to the diverse and fully engaged community of over 700 stakeholders. Building upon the strengths of our post-secondary partners, the Nebraska University system/ UNO, the twelve-school districts/Omaha Public Schools, science centers/Omaha's Henry Doorly Zoo and Aquarium and business partners, we created an innovative model for STEM education pathways. This collaboration focused on shared grants, professional development for educators, and network events to share best practices, are a few of the tools utilized in this innovative model. The greatest impact came, not from just developing the partnerships, but more importantly building and connecting STEM pathways for students that lead to careers. This model is transforming Omaha into a robust STEM community to grow our talent pipeline. In this session, we will share what we learned, our challenges and evidence of our success and provide opportunities for discussion around these issues: Challenges:

UREs, CUREs, and TREs - Literature Review Findings

Session: Roundtable II **Location:** Table 6

Speakers: John Keller, Director, University of Colorado Boulder

Strands: Research

Abstract: The Collaborative Around Research Experiences for Teacher (CARET) has conducted a review of the literature around Undergraduate Research Experiences (UREs), Course-based Undergraduate Research Experiences (CUREs), and Teacher Research Experiences (TREs). We will share our findings and next steps into investigating the impacts of providing research experiences for in-service and aspiring teachers.

The STEM Educators Guide to Understanding Millennials

Session: Roundtable II **Location:** Table 7

Speakers: John Rand, Director of STEM Education, University of Hawaii

Additional Authors:

Strands: Retention and Success;

Abstract: In this Roundtable Discussion the audience will be encouraged to consider the changing ways that the younger generation (Millennials) are approaching their education and their life choices. The unprecedented proliferation of advanced technologies and access to information has altered their values and attitudes toward collaboration, community and education. The mantra has shifted from "live to work" to "work to live" and it is essential that STEM educators consider these changes so that they can

work more effectively with this younger generation. Adjusting how we as educators view the Millennial's perspective will allow us to adapt to the changing needs of these students. The discussion group will be prompted to consider tools and strategies (Guide) to use with Millennials that will inspire, motivate and ignite passion in these students.

Women in Engineering-Changing the Culture to Recruit and Retain

Session: Roundtable II **Location:** Table 8

Speakers: Melinda Davis, Director, STEM Education, University of Idaho

Strands: Inclusive Education;

Abstract: University of Idaho struggles, like so many universities, with recruiting and retaining women in the College of Engineering. In 2015, the Deans of 256 engineering schools in the U.S. committed to development of diversity plans, and Dr. Larry Stauffer, UI Dean of College of Engineering (COE) personally committed to this effort. A COE Diversity Task Force was formed in 2017 to develop a plan for a Diversity and Inclusion Initiative. The need to increase women in the college both as faculty and as students became immediately clear. Evidence based programs were investigated and are now being implemented to recruit and retain female students and faculty. These programs include; establishing a professional mentorship network, enhancing student services, offering summer transition programs, and raising awareness with outreach programs. Enrollment, retention and graduation rates are some of the indicators of success and progress to date of these programs will be discussed.

How a Learning Assistant program helped a campus transform all gateway STEM series (to varying degrees)

Session: Roundtable II **Location:** Table 9

Speakers: Shanna Shaked, Senior Associate Director, UCLA

Additional Authors: Nadia Sellami, Associate Director, Academic Support Program, Keck School of Medicine of the University of Southern California; Erin Sanders O'Leary, Director of CEILS, UCLA

Strands: Broadening participation; Engaging Faculty; Institutional change

Abstract: We founded an undergraduate Learning Assistant (LA) program in January 2016, and in the 3 years since then, it has expanded to become more than 20 times as large. Over the past three years, LAs have been in more than 100 different lecture sections and worked with more than 25,000 enrolled students! Almost half of the discussion and lab sections were transformed DUE to the presence of LAs, and would otherwise have remained more traditional. This expansion was only possible through taking advantage of existing and emerging synergies and program innovation to address the challenges the expansion brought. We first provide an overview of the program history components and assessment. We then describe in detail the key challenges and how we leveraged synergies and innovation to further expansion and institutionalization of the program.

Aspire Alliance: a National Alliance for Diverse and Inclusive Faculty

Session: Roundtable III **Location:** Table 1

Speakers: Kacy Redd, Associate Vice President, Research and STEM Education, APLU

Strands: Inclusive Education; Broadening participation; Partnerships Beyond the University; Engaging Faculty; Institutional change

Abstract: I will share the goals and strategies of the Aspire Alliance, one of five new NSF INCLUDES Alliances. During the roundtable, we will explore the opportunities for STEM education centers to leverage the work of the Aspire Alliance. For context, the Aspire Alliance seeks to increase the learning, persistence, and completion of underrepresented students in STEM by aligning professional development, recruitment, and retention practices of diverse and inclusive faculty. The Alliance is anchored by APLU, CIRTL, over 55 universities, three regional collaboratives (Southern CA, IA, TX), and more than 35 cross-sector partners, including NSEC. We are pursuing three mutually reinforcing strategic goals: - Deepen the preparation of all STEM faculty to be inclusive and effective in their undergraduate teaching, research mentoring, and advising; - Diversify the faculty through effective recruitment, hiring, and retention of URG STEM faculty via institutional transformation in practices, policies, and resources; - Foster institutional cultures that recognize and value inclusivity and diversity broadly, and in the context of STEM faculty work specifically.

Transforming the Evaluation of Teaching: taking a scholarly approach to evaluation to support student outcomes

Session: Roundtable III **Location:** Table 2

Speakers: Noah Finkelstein, Professor and Co-Director, University of Colorado Boulder

Additional Authors: Ann Austin, Michigan State University; Mark Graham, Yale University; Andrea Greenhoot, University of Kansas; and Gabriela Weaver, University of Massachusetts

Strands: Inclusive Education; Retention and Success; Broadening Participation; Assessment; Research; Engaging Faculty; Institutional Change

Abstract: In support of the growing interest in new approaches to teaching evaluation, this roundtable will introduce the NSF-funded TEval project (TEval.net) and frame a discussion around: (1) key guiding elements and processes in an evidence-based framework and rubric for taking a more scholarly approach to teaching evaluation- one with attention to the multiple dimensions of teaching, the use of multiple sources of data, and the relevance of both formative and evaluation outcomes; (2) provides case studies from multiple research-extensive institutions engaged in transformative change in teaching evaluation, using this framework; (3) key aspects of systems approaches to institutional change to introduce and implement a more comprehensive approach to teaching evaluation; and (4) questions about new approaches to teaching evaluation and strategies to bring these to fruition in wide-spread fashion.

Challenging the culture and teaching practices of academic STEM

Session: Roundtable III **Location:** Table 3

Speakers: Audra Baleisis, , University of Michigan

Additional Authors:

Strands: Retention and Success; Improving the Quality of Education; Engaging Faculty

Abstract: Challenging the culture and teaching practices of academic STEM. In this group we will discuss how to successfully advocate for: (1) greater transparency (in response to faculty fears about "spoon-feeding"), (2) growth mindset (in response to the "genius worship" that propagates fixed-mindset behaviors and conditions), and (3) a conscious push back against impostor syndrome feelings among students and faculty.

But is it Working? Evaluation of Peer-mentoring Efforts

Session: Roundtable III **Location:** Table 4

Speakers: Dabney Dixon, Professor, Georgia State University

Strands: Retention and Success; Improving the Quality of Education; Assessment

Abstract: Peer mentoring increases social and academic confidence and helps the students make friends. A sense of belonging in STEM is critical, especially for first-generation students. We will present an example survey to assess academic confidence after tutoring sessions. Tools to help the faculty evaluate the success of peer mentoring are important. We will provide participants with an Excel spreadsheet that allows rapid production of data tables and graphs for evaluation of the utility of the peer mentoring effort, and presentation of this data to the administration. Participants: to practice the use of this resource, please bring your laptop and your data set to the roundtable in Excel in the format below (all one line in Excel, any column entries can be omitted, but the tables using that data will not be created): Center, Student ID, Date, Time In, Time Out, Course, Section, Subject, Student Name, Tutor Name, Course Grade.

Significant Interest Group on research experiences for teachers

Session: Roundtable III **Location:** Table 5

Speakers: John Keller, Director, University of Colorado Boulder

Strands: Research

Abstract: The Collaborative Around Research Experiences for Teachers (CARET) is interested in connecting with other APLU NSEC partners interested in research into the impact of providing research experiences for teachers on classroom practice and teacher retention.

Coming to Consensus: Investigating the Longitudinal Impacts of a Large-scale Deliberation Intervention

Session: Roundtable III **Location:** Table 6

Speakers: Gwen Shusterman, Professor, Portland State University

Strands: Inclusive Education; Retention and Success; Improving the Quality of Education

Abstract: We have developed and implemented an active learning (AL) pedagogy, Deliberative Democracy (DD) as a strategy to decrease attrition rates in STEM. DD follows a pedagogical framework which places real science issues within a social context to increase student engagement. DD provides a platform for students to use their knowledge from course material, primary research literature, and sources from the media as they work in groups to reach consensus on how to approach real-world problems. Although there is much data supporting the benefits of AL, little is known about how students perceive AL interventions, and if they are impacted by them in the long-term. Using both surveys and semi-structured interviews we have explored the questions: 1) What are student perceptions of DD? 2) Is DD achieving its intended outcomes? Our data suggests that DD is generally perceived positively by students, and can yield desired outcomes in introductory biology courses

The National Diversity in STEM Conference

Session: Roundtable III **Location:** Table 7

Speakers: John Rand, Director of STEM Education, University of Hawaii

Additional Authors:

Strands: Retention and Success;

Abstract: The 2019 Society for the Advancement of Chicanos/Hispanics and Native Americans (SACNAS) will be held in Honolulu, Hi on October 31-November 2. This 3-day conference is the largest multidisciplinary and multicultural STEM diversity event in the country! Join us for cutting-edge scientific research and professional development sessions, motivational keynote speakers, graduate school & career expo, multicultural celebrations and a welcoming community of peers, mentors, and role models. If you are associated with a STEM center and are concerned with diversity and inclusion this conference is a must for both your faculty and your students. Additional information about the conference and the many activities and programs planned will be shared with the NSEC community.

Poster 1: Utilizing Effective Features of Professional Development to Support STEM Lab Teaching Assistants to Exhibit Good Teaching Practices

Speakers: Ruthmae Sears, Associate Professor, University of South Florida;

Additional Authors: Ruthmae Sears and Robert Potter, University of South Florida

Strands: Improving the Quality of Education; Research; Institutional change

Abstract: We will describe how we sought to use professional development to assist STEM teaching assistants to exhibit effective teaching practices in undergraduate laboratory settings. Particularly, we will highlight how we utilize Darling-Hammond, Hyler, and Gardner (2017) features of effective professional development to guide our efforts. The features of effective professional development include: content focused, active learning, encourages collaboration, models desired practice, includes expert support, embeds feedback, and is sustained over time.

Poster 2: Never-the-less She Persisted: High Impact Practices for recruiting and retaining women and, in particular, minority women in STEM

Speakers: Ellen Lieberman, Associate Dean, Undergraduate Student Programs, Rutgers University; and Allison Antwi, Associate Dean, Douglass Residential College, Rutgers University

Additional Authors:

Strands: Inclusive Education; Retention and Success; Broadening participation; Engaging Faculty; Institutional change

Abstract: Living-learning communities (LLCs), a high impact practice, create inclusive spaces that lead to engagement and persistence in college. LLCs are effective in recruiting and retaining women in majors where they are traditionally under-represented (Brower & Inkelas, 2010; Lieberman, 2018). Douglass Residential College (the women's college within Rutgers University) created women-only STEM LLCs to address under-representation in target areas: engineering, computer science, and minority women retention in biology. The presentation offers details on the components of model LLCs for women in STEM, particularly within a co-ed university. Research methods will be shared and data demonstrating the impact (increased enrollment and retention of women in the target STEM majors) after the formation of the LLC. This includes comparisons with men and with women not in the LLC. The specific combination of resources that created a trajectory of success for undergraduate women in STEM will be discussed.

Poster 3: UNO STEM activities

Speakers: Patrick X. Rault, Dr. George Haddix Community Chair of Mathematics, University of Nebraska at Omaha

Additional Authors: Christine E. Cutucache, the Dr. George Haddix Community Chair of Science, University of Nebraska Omaha; Brian Dorn, the Union Pacific Community Chair of Computer Science Education, University of Nebraska Omaha; Neal Grandgenett, the Dr. George and Sally Haddix Community Chair of STEM Education, University of Nebraska Omaha; Christopher Moore, the Dr. George

Haddix Community Chair of Physical Science, University of Nebraska Omaha; Rachel Pugh, Noyce Math Student Scholar, University of Nebraska Omaha, University of Nebraska Omaha; Amanda Shultz, Noyce Science Student Intern, University of Nebraska Omaha;

Strands: Broadening participation; Assessment; Partnerships Beyond the University

Abstract: We will present the broad range of outreach and extracurricular activities that University of Nebraska Omaha (UNO) students and faculty are engaged with. Challenges and successes will be discussed, as well as what is seen as the most effective support models. The UNO STEM Teaching, Research, and Inquiry-Learning (TRAIL) Center is currently undergoing its final approval before a grand opening. A major goal of the center is to involve K-16 and life-long learners in engaging STEM opportunities. This creation of a center will standardize and formalize our support for these types of activities.

Poster 4: Imagine Your STEM Future: Informal STEM Practices in the Classroom

Speakers: Michelle Higgins, Associate Director, University of Arizona

Additional Authors: Sara Kobilka, Program Coordinator, University of Arizona STEM Learning Center; Kimberly Sierra-Cajas, Director, University of Arizona STEM Learning Center

Strands: Inclusive Education; Broadening participation; Partnerships Beyond the University

Abstract: High school girls with interest and potential to pursue a STEM career often self-select out of mathematics and science courses required to enter a post-secondary STEM degree. Imagine Your STEM Future: A STEM mentoring program for high school girls is positioned to support girls' interest in STEM, promote a positive self-concept in STEM, and broaden the girls' perspectives of STEM's role in today's world. We strive to meet the goals through the following strategies: long-term mentoring by women scientists and engineers; small group, hands-on activities that broaden the girls' perspectives of STEM's role in today's world; and opportunities for girls to reflect on the development of their leadership skills, including collaboration skills, advocacy and communication skills, and their own potential to make a difference in their world. This program currently serves more than 140 girls through two freshmen classes, one sophomore class, a junior class, and a senior class.

Poster 5: Teaching STEM for All @ your Local Planetarium

Speakers: Krista Testin, Planetarium Operator, University of Nebraska Omaha

Strands: Inclusive Education; Improving the Quality of Education; Partnerships Beyond the University

Abstract: Many people remember their first field trip to a planetarium. For decades it has been a destination for STEM education, offering an immersive educational experience for all. Planetariums have come a long way since the star projectors of the 70s and 80s. As advancements are made in planetariums, they are going beyond looking up at the stars in night sky. With ever-advancing computer data visualization, planetariums can not only show you the stars but fly you to planets and beyond our own star. They can take you on an underwater adventure exploring the depths of the ocean, a walk-through tropical rainforest studying its ecosystems, or travel inside the human body. A planetarium visit

will not only spark interest but also reinforce content knowledge and go places most average people may never see in person; it will be a trip that is remembered for the rest of your life.

Poster 6: Scientist-STEM Center-School Partnerships Support Cross-Curricular Contextual Learning

Speakers: Bryan Rebar, Associate Director, University of Oregon

Additional Authors: Brice Kuhl, Associate Professor, Psychology Department; Ulrich Mayr, Professor, Psychology Department; Kristin Schild, Postdoctoral Scholar, Earth Sciences Department; Barbara Siemens, Language Arts Teacher, Arts & Technology Academy; Courtney Stitt, Math Teacher, Arts & Technology Academy; David Sutherland, Associate Professor, Earth Sciences Department, University of Oregon

Strands: Partnerships Beyond the University

Abstract: Building on an existing partnership between University of Oregon's STEM center, STEM CORE, and a local STEM middle school, the Arts and Technology Academy, independently funded research projects led by Psychology and Earth Sciences faculty aim to engage students of diverse backgrounds in their respective research topics. In each project, the model for the partnership involves scientists and teachers co-planning and, in some cases, co-leading lessons that engage students in authentic investigations related to the scientists' research and expertise. Appropriate aspects of each topic are introduced in each subject area course, and activities are coordinated such that each class contributes to a final product. For example, students design a psychology experiment in science, create learning materials (content) for the experiment in social studies, analyze gathered data in math, and compose a summary article in English/language arts. Teacher professional development and logistical, pedagogical, and evaluation support are provided by STEM CORE.

Poster 7: Faculty Strategies for Implementing and Assessing Flipped Teaching

Speakers: Sharon Locke, Director and Associate Professor, Southern Illinois University Edwardsville

Additional Authors: Chaya Gopalan, Lynn Bartels, Georgia Bracey, Julie Fickas, Hannah Ruholl, Southern Illinois University Edwardsville

Strands: Improving the Quality of Education; Research; Engaging Faculty

Abstract: Despite growing evidence that active learning in flipped classrooms can increase student learning and motivation, some faculty members have voiced resistance due to lack of confidence, lack of knowledge of how to flip a course, not knowing where to start, and/or concerns about having sufficient time to prepare effective course materials. To address these barriers to change, we are studying cohorts of STEM faculty members as they learn about and implement flipped teaching. In the first project year, twelve faculty members participated in fall semester workshops and then implemented flipped courses in the spring semester. Faculty members' prepared course materials and plans indicate substantial variation in faculty choices on which courses to flip, the format for flipping, and student learning assessment. By examining commonalities and differences in implementation across academic discipline,

level of teaching experience, course size, and institutional type, the project team aims to identify the instructional supports that will optimize faculty motivation to adopt flipped teaching.

Poster 8: Use of AR & VR Technologies to Engage Students with Scientific Phenomena

Speakers: Soon Lee, Assistant Professor of STEM Education, Wichita State University

Strands: Improving the Quality of Education

Abstract: Augmented Reality (AR) and Virtual Reality (VR) technologies allow STEM educators to engage their students in various scientific phenomena. This provides students with exciting and insightful first-hand experiences which otherwise they would not have in the classrooms together or individually. The poster will also share various STEM educational/instructional VR and AR apps such as Google Expeditions, SolAR, Hologo, Cospaces, etc. and how they can be used to engage students with scientific phenomena with or without VR viewers in the K-16 science classrooms. The AR & VR apps introduced on this poster have been used in an Elementary Science Methods course and a Physical Science Content course to enhance the pre-service elementary teachers' interest in teaching science since 2015 in the School of Education at Wichita State University.

Poster 9: Peer Mentoring: Automated Formatting of Data for Presentation

Speakers: Dabney Dixon, Professor of Chemistry, Georgia State University

Additional Authors: Dabney Dixon, Professor of Chemistry, Georgia State University; Alan Craig, Mathematics Instructor, Georgia State University; Susan Carver, Director, Operation STEM, Cleveland State University; Kelli Wellborn, Manager, Peer Tutoring, University of Texas at Dallas; and Justin Boone, Assistant Director, Tutoring & Peer Learning Programs, Georgia Institute of Technology

Strands: Managing a Center

Abstract: Peer mentoring is a key aspect of undergraduate education. The mentees improve in technical proficiency, receive encouragement, increase their social and academic confidence, develop study and communication skills, and make new friends. The mentors reinforce their knowledge of the subject, improve in leaderships skills, increase in confidence, and enlarge their circle of academic friends. Peer mentoring has many variations in STEM: Learning Assistants (LA), Peer-led Team Learning (PLTL), Supplemental Instruction (SI), and Tutoring. The amount of money spent on peer mentoring can be very large. Often, the efforts are overseen by separate offices at an institution, making it difficult to be sure which approach is best under given circumstances. Tools to help the faculty and administration evaluate the various approaches would be very welcome. We have created Excel spreadsheets that allow rapid production of data tables and graphs for evaluation of the utility of the peer mentoring effort, and presentation of this data to the administration. Outputs include numbers of students, time, day and week of visit, unique student visitors by course and section of course, comparison of grades and DFW rates for those who attended and did not attend tutoring.

Poster 10: Aspire: The National Alliance for Inclusive & Diverse STEM Faculty

Speakers: Julia Savoy, Assistant Researcher, Wisconsin Center for Education Research, University of Wisconsin-Madison

Additional Authors: Eugene Anderson, Association of Public and Land-grant Universities; Lorenzo Baber, Iowa State University; Suzanne Barbour, University of Georgia; Kitch Barnicle, University of Wisconsin-Madison; Heather Conley, Kirkwood Community College; Mary Darrow, Iowa State University; Benjamin Flores, University of Texas at El Paso; Don Gillian-Daniel, University of Wisconsin-Madison; Howard Gobstein, Association of Public and Land-grant Universities; Bennett Goldberg, Northwestern University; Leslie Gonzales, Michigan State University; Jess Gregg, University of California, Los Angeles; Kimberly Griffin, University of Maryland College Park; James Grover, University of Texas at Arlington; Kayon Hall, Michigan State University; Lucas Hill, University of Wisconsin-Madison; Robert Mathieu, University of Wisconsin-Madison; Judy Milton, University of Georgia; Craig Ogilvie, Iowa State University; Kacy Redd, Association of Public and Land-grant Universities; Erin Sanders, University of California, Los Angeles; Rochelle Sapp, University of Georgia; Heidi Taboada, University of Texas at El Paso; Travis York, Association of Public and Land-grant Universities; Christine Pribbenow, the LEAD Center.

Strands: Inclusive Education; Research; Institutional Change

Abstract: The vision of the NSF Aspire Alliance is to increase the learning, persistence, and completion of students from underrepresented groups (URG) in STEM. The Alliance hypothesizes that increased faculty use of inclusive practices combined with an increase in the diversity of our nation's STEM faculty will change institutional and disciplinary cultures, further attracting, retaining, and advancing URG students and faculty to careers in STEM. These cycles can powerfully sustain broad systemic change across STEM. Anchored by the Association of Public and Land-grant Universities (APLU) and the Center for the Integration of Research, Teaching and Learning (CIRTL), over 55 universities, four regional collaboratives (Southern CA, IA, West TX, North/East TX), and more than 35 cross-sector partners have committed to collectively achieving this vision. The poster will provide an overview of the Aspire Alliance and its components parts.

Poster 11: Inclusive Learning and Teaching in Undergraduate STEM Instruction

Speakers: Lucas Hill, Associate Researcher, University of Wisconsin-Madison

Additional Authors: Bennett Goldberg, Northwestern University; Sara Armstrong, University of Michigan; Susanna Calkins, Northwestern University; Anna Conway, Des Moines Area Community College; Tazin Daniels, University of Michigan; Regina Frey, Washington University in St. Louis; Don Gillian-Daniel, University of Wisconsin-Madison; Noah Green, University of Wisconsin-Madison; Robin Greenler, University of Wisconsin-Madison; Lucas Hill, University of Wisconsin-Madison; Sarah Chobot Hokanson, Boston University; Omari Keeles, Northwestern University; Judy Milton, University of Georgia; Tershia Pinder-Grover, University of Michigan; Julia Savoy, University of Wisconsin-Madison; Nicole Tuttle, University of Michigan; Sally Wilson, Marshalltown Community College; Veronica Womack, Northwestern University; and Alessandra York, Washington University in St. Louis

Strands: Inclusive Education; Engaging Faculty; Improving the Quality of Education

Abstract: This multimodal program will engage current and future STEM faculty in creating inclusive learning environments, advancing the learning experiences of undergraduate students nationally. Our goals are to: (1) provide content that improves the awareness, confidence, and ability of participants to create inclusive STEM learning environments; (2) build a diverse national partnership network; (3) infuse knowledge, embed research, and implement continuous assessment and evaluation throughout the project; and (4) develop, improve, and sustain ourselves as an equity-based collaborative. Our program will apply embodied case studies and improvisational dramatization to help participants develop awareness and understanding of social identity, power, and positionality. We feature a MOOC, asynchronous and synchronous learning, and in-person learning communities. We will disseminate through partnerships, train-the-trainer workshops, and open educational resources. We will advance scholarship, determine the best practices our learners adopt, report on models of facilitator and instructor learning communities, and explore the sustainability of such initiatives.

Poster 12: Organizational Change Networks, Drivers of Change in Undergraduate STEM Education

Speakers: Sohyeon Bae, Graduate Research Assistant, Michigan State University

Additional Authors: Ann Austin, Associate Dean of Research, Michigan State University; Susan Singer, Provost, Rollins College; Vicki Baker, Professor, Albion College; Adam Grimm, Graduate Research Assistant, Michigan State University; Matt Ring, Undergraduate Research Assistant, Michigan State University; Levi Shanks, Graduate Research Assistant, Michigan State University; Staci Starck, Project Manager, Michigan State University; Amelia Storer, Graduate Research Assistant, Rollins College

Strands: Research; Partnerships Beyond the University; Institutional Change

Abstract: This project aims to analyze six Organizational Change Networks (OCNs), which were established to improve undergraduate STEM education in the U.S. Since their founding, the networks have evolved. The primary purposes of OCNs is connecting organizations or institutional leaders to bring about transformative change in STEM education on member campuses, to distinguish them from networks of individuals. The six networks include the ATE, BVA, CIRTL, PULSE, NSEC, and RC. Our team is investigating how these networks are designed and operating, stages of development, and the associated outcomes achieved based on our team's multifaceted approach. The poster will include the primary findings about the six OCNs with brief case summaries of each network and corresponding themes that have evolved from our research to date. Relying on initial findings, we also explore the emerging lessons which can serve to guide and inform the development and efforts of other STEM reform initiatives.

Poster 13: A collaborative, systems thinking framework for faculty to explore student retention in STEM

Speakers: Amy Chan-Hilton, Director, Center for Excellence in Teaching & Learning, University of Southern Indiana

Strands: Retention and Success; Engaging Faculty; Institutional Change

Abstract: This poster describes the implementation and pilot results of a framework for engaging STEM faculty members in exploring student retention issues. Recent implementation of institution-wide strategies has contributed to increased retention and graduation rates. Opportunities to intentionally develop improvements in STEM curriculum and instruction leverage this retention focus. The goals of the framework are to 1) increase faculty participants' knowledge of evidence-based student retention and instructional practices, 2) support their inquiry into STEM student success and retention; and 3) apply a collaborative, systems approach to engage and support faculty. The framework integrates a faculty learning community (Cox 2001) with a learning organization model (Senge 2006) and uses expectancy value theory of motivation (Wigfield & Eccles 2000) to sustain faculty engagement. The research question, "How does a systematic framework impact faculty members' understanding and attitudes on student retention in STEM?" is addressed with semi-structured interviews and content analysis.

Poster 14: Collaborative Around Research Experiences for Teachers (CARET): Assessing Impacts Across Programs

Speakers: John Keller, Director, Fiske Planetarium, University of Colorado Boulder

Additional Authors: Kelly Barry, Southern Illinois University Edwardsville; Wilella Burgess, Purdue University; Sanlyn Buxner, University of Arizona; Jessica Cleeves, University of Utah; Laleh Cote, University of California Berkeley; Larry Horvath, San Francisco State University; SoonChun Lee, Wichita State University; Sharon Locke, Southern Illinois University Edwardsville; Bryan Rebar, University of Oregon; Elisa Stone, University of California Berkeley; Stamatis Vokos, Cal Poly San Luis Obispo

Strands: Research; Assessment

Abstract: Research programs for teachers are popular but there is scant research investigating their overall impact. Evaluations consistently show positive outcomes for participants but little work has been done across the field to compare outcomes across programs. We present ongoing efforts of the Collaborative around Research Experiences for Teachers (CARET). CARET was initiated by a group of Network of STEM Education Centers (NSEC) who were engaged in providing research and industry experiences for preservice and inservice teachers. Through a growing effort and network of institutions, we have created a shared assessment for programs and conducted a review of the literature of relevant undergraduate research programs, classroom research programs, and teacher research and industry programs. We present the shared assessment along with findings from the field testing across six different programs and findings related to the review of the literature. Our findings have implications for program designers and leaders and researchers.

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