Transforming STEM Higher Education Conference

Teaching STEM. Leading Change. Holding on to Our Humanity.

November 2-4, 2023
Hyatt Regency Crystal City Hotel, Arlington, VA

aacu.org/event/2023-stem
Dear Friends,

Welcome to the 2023 AAC&U Transforming STEM Higher Education Conference. I’m so, so glad you are here!

I’m also thrilled that you have decided to choose us as your professional development destination. This year’s conference is promising to be one of our best conferences ever. And we owe that, in large part, to your work and your support.

Each year, the urgency to ensure that we are inspired and fully empowered to improve undergraduate STEM teaching continually increases. And the complexity by which we must do so increases even more. Today’s STEM faculty are called upon to teach core scientific material under conditions that are, at times, unconscionable. Who would have thought we would find ourselves here? At such a time as this?

At AAC&U, we know all too well how important the cycle of sacrifice and renewal is to STEM faculty and administrators alike. Because you continue to make the sacrifice for our future generations of scientists and engineers, my colleagues and I are here this week to focus on your renewal.

In addition to hosting several of higher education’s most amazing plenary speakers, we’ve incorporated mindfulness sessions throughout our agenda, as well as a meditation room, a devotional wall, and dozens of opportunities for you to fully connect with your colleagues and friends, and meet new ones. Like you, we need this! Indeed, when all is said and done, we are in this together – connected one to another through the work we are so passionate about and committed to.

Again, welcome to the Conference. I am so honored to be able to share this space with you. If there is anything that my colleagues and I can do to make your experience a better one, please, don’t hesitate to let us know.

Enjoy!

Vice President for Undergraduate STEM Education; and Executive Director, Project Kaleidoscope
# Schedule at a Glance

## Thursday, November 2, 2023

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:30 am – 7:00 pm</td>
<td>Conference Registration and Membership Information</td>
<td>Independence Foyer, Independence Level</td>
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<tr>
<td>1:30 pm – 2:30 pm</td>
<td>Concurrent Sessions 1</td>
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<td>2:45 pm – 3:45 pm</td>
<td>Concurrent Sessions 2</td>
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<tr>
<td>3:00 pm – 5:00 pm</td>
<td>Featured Session 1 [Pre-Registration Required]</td>
<td>Washington A, Ballroom Level</td>
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<tr>
<td>4:00 pm – 5:00 pm</td>
<td>Concurrent Sessions 3</td>
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</tbody>
</table>
| 5:30 pm – 7:00 pm  | **Opening Keynote Address**  
**Conversations with the Soul of STEM Reform**  
*David Hall—University of the Virgin Islands* | Regency Ballroom A-D, Ballroom Level          |
| 7:00 pm – 8:30 pm  | Welcome Reception                                                                        | Regency A-D Foyer, Ballroom Level              |

## Friday, November 3, 2023

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<tr>
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<tr>
<td>7:00 am – 6:00 pm</td>
<td>Conference Registration and Membership Information</td>
<td>Independence Foyer, Independence Level</td>
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<tr>
<td>6:30 am – 8:00 am</td>
<td>Continental Breakfast</td>
<td>Regency A-D Foyer, Ballroom Level</td>
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<tr>
<td>7:30 am – 8:15 am</td>
<td>Featured Session 2 [Pre-Registration Required]</td>
<td>Regency Ballroom E, Ballroom Level</td>
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<td>8:15 am – 9:15 am</td>
<td>Concurrent Sessions 4</td>
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<td>8:15 am – 9:45 am</td>
<td>Workshops 1</td>
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<tr>
<td>9:30 am – 10:30 am</td>
<td>Featured Session 3 [Pre-Registration Required]</td>
<td>Tidewater II, 2nd Floor</td>
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<td>9:30 am – 10:30 am</td>
<td>Concurrent Sessions 5</td>
<td>Regency A-D Foyer, Ballroom Level</td>
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<tr>
<td>10:30 am – 11:00 am</td>
<td>Refreshment Break</td>
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<tr>
<td>11:00 am – 12:00 pm</td>
<td>Featured Session 4 [Pre-Registration Required]</td>
<td>Regency Ballroom E, Ballroom Level</td>
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<td>Concurrent Sessions 6</td>
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<td>11:00 am – 12:30 pm</td>
<td>Workshops 2</td>
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<tr>
<td>12:30 pm – 2:00 pm</td>
<td>Featured Session 5 [Pre-Registration Required]</td>
<td>Potomac III, Ballroom Level</td>
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<tr>
<td>12:30 pm – 2:00 pm</td>
<td>Featured Session 6 [Pre-Registration Required]</td>
<td>Potomac IV, Ballroom Level</td>
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<tr>
<td>12:30 pm – 2:00 pm</td>
<td>Lunch on your own</td>
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</tbody>
</table>
| 2:00 pm – 3:30 pm  | **Keynote Address**  
**Reimagining STEM: From Artificial Intelligence to Collective Wisdom**  
*Ruha Benjamin—Princeton University* | Regency Ballroom A-D, Ballroom Level          |
<p>| 3:30 pm – 4:00 pm  | Book Signing and Refreshment Break                                                       | Regency Ballroom Foyer, Ballroom Level         |</p>
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<td>Poster Session</td>
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**SATURDAY, NOVEMBER 4, 2023**

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<td>Continental Breakfast</td>
<td>Regency A-D Foyer, Ballroom Level</td>
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<tr>
<td>8:00 am – 9:00 am</td>
<td>Featured Session 7 [Pre-Registration Required]</td>
<td>Conference Theater, Ballroom Level</td>
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<td>8:00 am – 10:00 am</td>
<td>Featured Session 8 [Pre-Registration Required]</td>
<td>Tidewater II, 2nd Floor</td>
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<td>8:00 am – 9:00 am</td>
<td>Concurrent Sessions 8</td>
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<td>Workshops 4</td>
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<tr>
<td>9:15 am – 10:15 am</td>
<td>Featured Session 9 [Pre-Registration Required]</td>
<td>Conference Theater, Ballroom Level</td>
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<td>9:15 am – 10:15 am</td>
<td>Featured Session 10 [Pre-Registration Required]</td>
<td>Virginia Room</td>
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<td>9:15 am – 10:15 am</td>
<td>Concurrent Sessions 9</td>
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<tr>
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<td>Refreshment Break</td>
<td>Regency Foyer</td>
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<tr>
<td>10:30 am – 12:00 pm</td>
<td>Closing Keynote Address</td>
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**From Books to Bots?...The Role of AI and ChatGPT in Undergraduate STEM Teaching**  
*James Lang—Assumption University [retired]*
AAC&U is grateful for the generous support of our 2023 Transforming STEM Higher Education Conference sponsors:

**MAPLESOFT**

At Maplesoft, our mission is to provide powerful technology to explore, solve, and disseminate mathematical problems and their applications, and to make math easier to learn, understand, and use. Our mathematics-based software solutions help students, educators, scientists, engineers, and researchers take advantage of the power of math to enrich the world we live in.

**CHRONICLE OF HIGHER EDUCATION**

The Chronicle of Higher Education is the only privately owned, independent media organization dedicated to U.S. colleges and universities. As the unrivaled leader in higher education journalism, it provides more than 1.7 million professionals award-winning news, analysis, events, and opportunities for professional growth to succeed in a rapidly changing world.
CONFERENCE PARTNERS

AAC&U values the rich collaborations it shares with Conference Partners. We thank them for their commitment to supporting AAC&U in advancing undergraduate STEM reform.

Bloosky is a cloud-based, scholarly writing platform that uses artificial intelligence to cut your research time down from months to a matter of weeks.

The Faculty Online Learning Community-Equity is an NSF-funded initiative that advances knowledge about organizational and cultural factors that influence intersectional gender equity and equity reform in higher education STEM departments.

The National Science Foundation is an independent federal agency that supports science and engineering by promoting the progress the science; advancing the national health, prosperity, and welfare of the nation; and securing the national defense.

PRISSEM Academic Services provides research development, evaluation, and critical consulting services to those in higher education working to rebuild STEM into an enterprise that values the contributions of all.

Thorn Run Partners builds the capacity of institutions of higher education to navigate the grant development, writing, and submission processes to maximize their chances for success.
KEYSTROKE WRITING PROGRAM

This program is exclusively designed for HBCU STEM faculty, program directors, and administrators who wish to build their capacity to publish and promote the outstanding broadening participation outcomes of their HBCUs to all audiences.

WHAT MAKES US DIFFERENT?

We match participants with expert writing coaches to provide mentorship and a nurturing environment for scholarly productivity.

We provide mindfulness meditation practices to ground our bodies before each weekly dedicated writing session.

We provide support for publishing our participants’ work in CASL’s Journal of STEM Leadership and Broadening Participation.

WHAT PARTICIPANTS CAN EXPECT:

Developing important shifts in their mindsets about writing, while also gaining skills in identifying their unique voices and the value that lies within them.

Building endurance in the practice of writing with regular reflection and community support.

Realizing the credibility of their ideas and position within the academy.

Using writing to raise a national consciousness that values the contributions of HBCU leader-scholars within the U.S. STEM enterprise.

For more information, please contact casl@aacu.org

The Center for the Advancement of STEM Leadership Keystroke Writing Program is generously funded by the National Science Foundation HBCU–Undergraduate Program.
PROJECT KALEIDOSCOPE 
REGIONAL NETWORKS

Providing powerful, just-in-time, affordable professional development opportunities that meet the needs of today’s STEM faculty.

Register Soon...and be a part of the national conversation on undergraduate stem reform.

2024 REGIONAL NETWORK MEETING SCHEDULE

- **01 DECEMBER**  
  **In-Person**  
  **PUERTO RICO 2023**

- **10 JANUARY**  
  **Virtual**  
  **MASSACHUSETTS**

- **15 MARCH**  
  **Virtual**  
  **CAPITAL PKAL**

- **06 APRIL**  
  **In-Person**  
  **OHIO PKAL**

- **12 APRIL**  
  **Virtual**  
  **NORTH CAROLINA**

- **10 JUNE**  
  **Hybrid**  
  **MASSACHUSETTS**

@WeArePKAL  
pkal-networks@aacu.org

We Are PKAL
ABOUT THE PROGRAM

The program of events that follows lists all conference sessions. Updates and announcements will be posted at the conference registration desk and through the eventScribe mobile app. Information about the app is available at the registration desk. This app can be used to access the program of events, see maps of the hotel, and connect with other attendees.

WIFI

Network: Hyatt_Meetings
Passcode: STEM2023

SESSION TYPES

I: Individual Classroom- or Project-Level Interventions
II: Institution-Level Interventions
III: National-Level Interventions
IV: STEM Education Research

SESSION FORMATS

Poster Sessions are visual displays of findings from research and/or implementation of undergraduate STEM reform interventions. Presenters are available during the poster session to discuss the work shared on their posters.

Innovation/Ideation Sessions feature “untested” strategies, emerging research, and new theories or concepts that show promise for advancing our national STEM higher education reform agenda. Each session consists of two presentations of equal length, with time for questions and feedback. The presentations run back-to-back.

Regular/Lightning Sessions provide an opportunity for presenters to disseminate findings and/or outcomes from their most recent undergraduate STEM reform initiatives in less than 30 minutes and will have time for attendee questions and feedback.

Workshops provide an interactive environment for conference attendees to deeply examine, explore, and/or experience relevant theories and implementation strategies.

Facilitated Discussions/Seminars allow time for colleagues to examine new ways of thinking about STEM higher education reform and the specific strategies that are needed for moving forward.

OPPORTUNITIES TO CONNECT

Here are a few ways for you to connect with colleagues during the conference:

- Use the eventScribe mobile app to find our links to our social media platforms and connect with other attendees.
- Join the conversation on Twitter by following us @WearePKAL and using the hashtag #AACUSTEM.
AAC&U’S PROJECT KALEIDOSCOPE
PRESENTS
THE STEM LEADERSHIP INSTITUTE

July 16 - 24, 2024

Institute Features

✓ Experiential Learning
✓ Academic Executive Coaching
✓ Self-Reflection and Mindfulness
✓ My Tenure Trek (MTT) Live Diversity Simulation

The AAC&U’s Project Kaleidoscope STEM Leadership Institute is a seven-star leadership development experience designed especially for STEM faculty and administrators who wish to

LEAD. Differently.

www.tinyurl.com/SLI2024

Location
The Claggett Center
Adamstown, MD
THURSDAY, NOVEMBER 2ND 5:30 PM

David Hall, President, University of the Virgin Islands

Conversations with the Soul of STEM Reform

Born in Savannah, Georgia, David Hall holds a bachelor’s degree from Kansas State University, where he was named an “All American” for his athletic and scholarly accomplishments. After graduating from Kansas State, he played professional basketball in Italy. He received his Doctor of Jurisprudence from the University of Oklahoma, where he also earned a master’s degree in human relations. He holds both an LL.M. degree and a Doctor of Juridical Science from Harvard Law School. David Hall is also a published author. His publications include works on civil rights, the U.S. Constitution and race, legal education, and social justice. He has authored a book on the intersection of law and spirituality, entitled The Spiritual Revitalization of the Legal Profession: A Search for Sacred Rivers, and lectures nationally on topics of social justice, leadership, diversity, and spiritual values in professional life.

FRIDAY, NOVEMBER 3RD 2:00 PM

Ruha Benjamin, Associate Professor of African American Studies, Princeton University

Reimagining STEM: From Artificial Intelligence to Collective Wisdom

Ruha Benjamin is the Alexander Stewart 1886 Professor of African American Studies at Princeton University, founding director of the Ida B. Wells Just Data Lab, and author of the award-winning book Race After Technology: Abolitionist Tools for the New Jim Code, among many other publications. Her work investigates the social dimensions of science, medicine, and technology with a focus on the relationship between innovation and inequity, health and justice, knowledge, and power. She is the recipient of numerous awards and honors, including the Marguerite Casey Foundation Freedom Scholar Award and the President’s Award for Distinguished Teaching at Princeton. Her most recent book, Viral Justice: How We Grow the World We Want, winner of the 2023 Stowe Prize, was born out of the twin plagues of COVID-19 and police violence and offers a practical and principled approach to transforming our communities and helping us build a more just and joyful world.

SATURDAY, NOVEMBER 4TH 10:30 AM

James Lang, Assumption University [retired]

From Books to Bots?...The Role of AI and ChatGPT in Undergraduate STEM Teaching

James M. Lang is the founding Director of the D’Amour Center for Teaching Excellence and a former Professor of English at Assumption University in Worcester, MA. He is the author of six books, the most recent of which are Distracted: Why Students Can’t Focus and What You Can Do About It, Small Teaching: Everyday Lessons from the Science of Learning, and Cheating Lessons: Learning from Academic Dishonesty. A sought-after speaker, Jim has given talks and workshops on teaching and navigating Artificial Intelligence and ChatGPT at more than two hundred colleges and universities in the U.S. and abroad. He has also consulted for the United Nations on the development of teaching materials in ethics and integrity for college faculty. Lang also writes a monthly column on teaching and learning for The Chronicle of Higher Education; his work has appeared in the Chronicle since 1999. His book reviews and public scholarship on higher education have appeared in a wide variety of newspapers and magazines, including Time, Boston Globe, Chicago Tribune, and The Conversation. In September of 2016, Lang received a Fulbright Specialist grant to work with three universities in Colombia on the creation of a MOOC focused on teaching and learning in undergraduate STEM education. He has a BA in English and Philosophy from the University of Notre Dame, an MA in English from St. Louis University, and a Ph.D. in English from Northwestern University.
FEATURED SESSIONS

PRE-REGISTRATION REQUIRED

**Session 1: Uncovering Joy in these Hot Mess Times: Mindfulness Practice for the STEM Leader**

*Thursday, November 2nd 3:00 PM – 5:00 PM*  
Washington A

This session/workshop will provide STEM faculty/administrators with the skills necessary to decompress from travel, the stressors of the academy, and life/world challenges, and discover ways to enter into the conference space and any other space, with a restorative, joyful mindset.

*Stephanie Briggs, Owner—Be.Still.Move.*

**Session 2: Sunrise Salutations**

*Friday, November 3rd 7:30 AM – 8:15 AM*  
Regency Ballroom E

As the sun rises and casts its gentle glow, Stephanie will guide you on a journey of inner awakening and mindfulness. This early morning workshop offers a unique opportunity to begin your day centered, calm, and ready to embrace the day’s challenges with a sense of inner peace and vitality that will carry you through your daily endeavors. Stephanie’s expertise in mindfulness and her calming presence make “Sunrise Salutations” the perfect start to your day, helping you navigate life with a clear mind and a peaceful heart. Don’t miss this opportunity to greet the sunrise with mindfulness and serenity.

*Stephanie Briggs, Owner—Be.Still.Move.*

**Session 3: An Opportunity for Input on the New Consensus Study About Equitable and Effective Undergraduate STEM Teaching from the National Academies of Sciences, Engineering, and Medicine**

*Friday, November 3rd 9:30 AM – 10:30 AM*  
Tidewater II

In this session participants will learn about the motivation, scope, and plans for a consensus study that the National Academies of Sciences, Engineering, and Medicine began this year. The study focuses on preparing a Framework for Equitable and Effective Undergraduate STEM Teaching. The final report, to be released in 2024, will lay out recommendations for educators, departments, institutions, and disciplines. Participants will have an opportunity to share their own views on equitable and effective undergraduate STEM teaching and that input will inform the committee’s revision of the draft Framework that is being released this month.

*Kerry Brenner, Senior Program Officer—National Academies of Sciences, Engineering, and Medicine*  
*Archie Holmes, Executive Vice Chancellor for Academic Affairs—The University of Texas System*

**Session 4: Mind Full? Mindful Moment**

*Friday, November 3rd 11:00 AM – 12:00 PM*  
Regency Ballroom E

In the midst of your busy day, “Mind Full? Mindful Moment” offers a soothing pause to recenter and recharge. This midmorning session provides an invaluable opportunity to pause, breathe, and refresh, creating a space of calm that will resonate throughout your day offering renewed focus and serenity. Stephanie’s expertise in mindfulness and her calming presence helps you to remain mindful and present as you engage in all your daily endeavors. Join Stephanie for a “Mind Full? Mindful Moment” and embrace this opportunity to replenish your mental and emotional well-being.

*Stephanie Briggs, Owner—Be.Still.Move.*

**Session 5: Faculty Online Learning Communities for Gender Equity**

*Friday, November 3rd 12:30 PM – 2:00 PM*  
Potomac III

*Faculty Online Learning Communities for Gender Equity* (FOLC-E) is a community of practice for departmental teams to receive support (from the project team and each other) as they address intersectional gender equity in their home departments. During this luncheon, we will demonstrate a facilitated meeting, with current FOLC-E participants discussing the challenges and successes of engaging in equity work. Following
the demonstration, you will have the opportunity to ask the participants about their experiences, which includes: two years of support, personalized administrative mentors, and expert speakers. Please join us to learn how participants have navigated their equity work, and how you can apply for our next cohort.

Apriel Hodari, Principal Investigator—Eureka Scientific, Inc.
Donte McGuire, Director of Research and Evaluation—Higher Ed Insight
Samantha Elliott, Director of Center for Inclusive Teaching and Learning—St. Mary’s College of Maryland
Michael Baumgardner, Assistant Dean of Public Engagement and Enrollment—University of Albany
Daniel Vrinceanu, Professor of Physics—Texas Southern University
Stacey Jones-Willy, Chemistry Professor—Pima Community College

Session 6: Friend or Foe: ChatGPT for Next Tier Academic Writing
Friday, November 3rd 12:30 PM – 2:00 PM
Potomac IV

In an era where artificial intelligence is revolutionizing the way we approach academia, ChatGPT emerges as both a trusted companion and a potential adversary in the world of academic writing and research grant development. Blooksy, is a pioneering content-sharing platform that offers a unique interface for writers and researchers to collaborate with AI, harnessing the power of ChatGPT. With the capacity to assist in crafting research papers, grant proposals, and even entire books, ChatGPT offers an efficient and adaptable tool for academic content creation. Join us for an insightful session that delves into the dynamic realm of AI-driven academic writing, featuring a focus on ChatGPT and its implications for scholarly endeavors.

Anthony Joiner, CEO—Blooksy
JW Jones II, Blooksy

Session 7: Cultivating Project Ideas for the NSF Innovation in Two-Year College STEM Education (ITYC) Program
Saturday, November 4th 8:00 AM – 9:00 AM
Conference Theater

The National Science Foundation recently launched the Innovations in Two Year College STEM Education program. Its goals are to (1) center students in the effort to advance innovation, promote equitable outcomes and broaden participation for all students in STEM education at two-year colleges, and (2) enhance the capacity of two-year colleges to harness the talent and potential of their diverse student and faculty populations through innovative disciplinary, multi-department, and college-wide efforts. In this seminar, program directors will work with attendees to cultivate project ideas that may result in proposal submissions. Program directors will highlight strategies for building successful inter- and intra-institutional partnerships and using disaggregated institutional data to provide context for the project. Attendees will learn more about the submission and review process and will be encouraged to engage program directors in a conversation with a brief summary of their potential project.

Kalyn Owens, Program Director—National Science Foundation
Michael Davis, Academic Dean—Northern Virginia Community College

Session 8: GrantWise: An Introduction to NSF S-STEM Grant Writing Success
Saturday November 4th 8:00 AM – 10:00 AM
Tidewater II

For many faculty members, especially those without formal grant writing training or those at institutions with limited grant support, the process of “getting a grant” can seem daunting. As part of the STEM Higher Education Conference, the 2-hour GrantWise Workshop is designed for participants who are interested in securing extramural funding to bolster STEM education but don’t know where to start. We aim to demystify the grant-seeking process, emphasizing: (1) Knowledge of sponsor priorities and expectations; (2) Targeted communication skills; (3) Building and nurturing critical relationships and networks; (4) Streamlined proposal management; and (5) crafting competitive grant proposals.

In the first segment of GrantWise, we’ll delve into the broad Federal funding ecosystem, spotlighting the National Science Foundation’s Scholarships in Science, Technology, Engineering, and Mathematics Program (S-STEM). Recognized as a signature program for PUIs, S-STEM aids institutions in granting scholarships to academically gifted low-income students, ensuring their seamless journey from recruitment to graduation in STEM.

Part 2 offers a choice between two concurrent sessions:
- The HBCU Roundtable - This session invites HBCU faculty to a conversation about engaging in
STEM education or disciplinary based education research, how to obtain funding for such research, how to establish collaborations, and how it can fit into the professional goals of faculty. Ultimately, researching and publishing what works in STEM education at HBCUs, can further illuminate the academic strengths of these institutions.

- S-STEM Office Hour - Designed for faculty who want to learn more about the S-STEM opportunity, we will dive deep into the funding announcement, brainstorm fundable ideas, and discuss tools and strategies to draft a standout application well before the submission deadline.

Claudia Rankins, Senior Research Associate—PRISSEM Academic Services, LLC
Jessica Venable, Partner—Thorn Run Partners

Session 9: NSF Hours: Funding Opportunities for Broadening Participation in STEM
Saturday, November 4th 9:15 AM – 10:15 AM
Conference Theater

Recently, the National Science Board (NSB, 2020) noted that our nation’s S&E enterprise has not kept pace with demographic trends or with the centrality of science and engineering to our economy; and they’ve issued a strong call for “increased inclusion of Black people in S&E at all levels including in opportunities to participate, lead, and thrive. This is particularly timely given the deadly pandemic and deep sociopolitical divides that now make the need for more diverse scientists no longer questionable, but factual. The mechanisms by which the NSF is able to heed this call include a keen focus on investing in the most innovative approaches to broadening participation in STEM. The AAC&U Transforming STEM Higher Education Conference showcases and offers insight into the most recent funding priorities for advancing the reform of US undergraduate STEM education and the most viable and practical ways for accessing them. Session leaders will discuss future directions of undergraduate STEM education reform and review funding mechanisms for broadening participation in STEM, as well as NSF’s most recent solicitations for proposals aimed at advancing a national agenda for the reform of undergraduate STEM education that prioritizes racial equity.

Carrie Hall, Senior Program Officer—National Science Foundation

Session 10: Exploring NSF Opportunities to Support STEM Broadening Participation at HSIs
Saturday, November 4th 9:15 AM – 10:15 AM
Virginia Room

The National Science Foundation (NSF) is committed to broadening participation, and this is evident through the variety of investment priorities related to preparing a diverse, globally engaged science, technology, engineering, and mathematics (STEM) workforce; integrating research with education and building capacity; and expanding efforts to broaden participation from underrepresented groups and diverse institutions across all geographical regions in all NSF activities. To meet its priorities, it is imperative that the NSF portfolio represents the IHE community it serves, including strong representation from HSI institutions and their scholars. The NSF acknowledges that HSIs are heterogeneous and unique in many respects. Whether 2-year or 4-year, public or private, the HSIs serve a wide range of students with a diverse set of educational backgrounds. The need for tailored initiatives, policies, and practices (mindful of socio-cultural awareness) should meet the students’ needs and institutions’ expectations while advancing undergraduate students at HSIs toward higher levels of academic achievement in STEM. In addition, scientists and educators at minority-serving institutions, or MSIs, are crucial to advancing the frontiers of knowledge in the science, technology, engineering and mathematics enterprise. After attending this workshop, attendees will a) learn about NSF opportunities that specifically benefit HSIs in the AACU community, b) have a general understanding of NSF Merit Review Process, and c) will learn how to best position themselves for successful proposal submission.

Michael J Ferrera, Program Director—National Science Foundation
James Alvarez, Program Director, Division of Undergraduate Education (DUE)—National Science Foundation
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Anthony Joiner, Founder

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AAC&U TIDES INSTITUTE

TEACHING TO INCREASE DIVERSITY AND EQUITY IN STEM

LANSDOWNE RESORT & CONFERENCE CENTER
LEESBURG, VIRGINIA

JUNE 23 – 27, 2024
THURSDAY, NOVEMBER 2, 2023

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**SESSION 1.1**

**LATE BREAKING - REGULAR/LIGHTNING SESSIONS**

Potomac IV

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Technically Speaking: Building Scientific Communication Self-Efficacy**

The overall goal of the project is to improve academic competency and science efficacy to retain undergraduate STEM students so that they graduate and pursue careers/advanced study in STEM. The project focuses specifically on improving scientific communication to achieve this goal. Effective communication in science is recognized as an important component of training for STEM professionals. Two learning communities that pair STEM research and inquiry activities in biology and chemistry with a public speaking course are being implemented with intentional and sustained instruction and mastery experiences to develop students’ science communication skills. The hypothesis is that instruction in how to effectively communicate science can result in an increase in students’ understanding, confidence, and identity as a scientist. This can result in greater student engagement in the major and improved retention in STEM disciplines. Our aim is to test this curriculum intervention to determine its effectiveness in improving student achievement.

*Louise Wrensford,* Professor of Chemistry—Albany State University; *Florence Lyons,* Professor of Speech—Albany State University; *Anta’Sha M. Jones,* Assistant Professor of Biology—Albany State University; *Pamela Pitman Brown,* Associate Professor of Sociology—Albany State University; *Rhonda Porter,* Professor, Mathematics Education/Int. Provost & VPAA—Albany State University

**TYPE II: INSTITUTION LEVEL INTERVENTIONS**

**Elements of Data Science for STEM Majors is Many Problems Solved**

Our first year data science program was recently developed to improve success and retention across STEM. We engage students in their first or second semester with peer led group problem solving with novel data sets.

Materials are cloud based open educational resources which have evolved through participation of faculty instructors in an adapted community of practitioners. We have found that student’s self assessed coding confidence among other measures increase across the semester. This has translated into better outcomes across our College of Science and Technology including higher retention as part of a broader initiative.

*Jonathan M. Smith,* Associate Professor of Instruction—Temple University; *Susan Jansen Varnum,* Senior Associate Dean—Temple University; *Michael L. Klein,* Dean College of Science and Technology—Temple University

**SESSION 1.2**

**LATE BREAKING - REGULAR/LIGHTNING SESSIONS**

Potomac II

This session includes the two separate presentations listed below.

**TYPE II: INSTITUTION LEVEL INTERVENTIONS**

**The STEM Culturally Inclusive Teaching Institute: A Blended Faculty Professional Development Project for Community College and High School Faculty**

During the past two summers, a total of 18 community college faculty and 10 high school teachers completed a virtual, three-week summer professional development institute about equitable teaching practices in science, technology, engineering, and math courses, specifically focusing on culturally responsive pedagogy (Dewsbury, 2019; Gay, 2010). The institute was delivered in a blended format and included sessions led by national experts to help develop faculty understanding of Black and Latinx student needs and train faculty to incorporate culturally inclusive teaching practices into their courses. After the summer institute, the project then provided faculty participants with mentoring sessions to support their implementation of inclusive practices. The project has found preliminary evidence showing a greater percentage of Black and Latinx student success in STEM courses taught by faculty participants.

*Bernadette Sibuma,* Director, Online Learning—Massachusetts Bay Community College

**TYPE II: INSTITUTION LEVEL INTERVENTIONS**

**Inclusive Classrooms Provide Opportunity for Inclusive Leadership**

Adaptation of General Biology courses to include Learning Assistants (LAs) at a small HSI has been
transformative and led to significant increases in student success (Agolini, 2021). Benefits of LA programs include those for LAs themselves (Brelan, et al. 2023). Recognition of benefits prompts students to seek out LA positions to better prepare them for upper-level classes and to provide important leadership opportunities. Providing financial remuneration for the LAs has proven to be difficult due to financial restraints as well as the inability to pay international and undocumented students. Initial exploration of alternatives to financial remuneration was seen as inequitable to students with low economic resources. However, we have found that providing academic credit for participation, and special perks (snacks, printer access...) has actually allowed all students to seek out these experiences, regardless of citizen status, providing a more equitable opportunity for all students to benefit from these leadership experiences.

Susan Agolini, Associate Professor of Biology—Marymount University

SESSION 1.3 LATE BREAKING - REGULAR/LIGHTNING SESSIONS

Potomac V

This session includes the two separate presentations listed below.

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Examining the Relationship Between Institutional Support and Sense of Belonging in STEM at a HSI

This presentation focuses on students’ sense of belonging in STEM at HSIs and institutional support interventions that contribute to persistence in STEM. Research took place at Calumet College of Saint Joseph, a small private master’s degree granting HSI. Presentation describes best practices in providing robust wrap around student support interventions and reports the results of the first phase of an ongoing research project examining the impact of interventions on students’ sense of belonging in STEM and persistence in STEM. Data, collected through a survey after students’ first year of study, was analyzed to measure students’ sense of belonging, participation in institutional interventions, and the relationship between sense of belonging and participation in interventions.

Alyssa Rodriguez, Senior Researcher/Analyst, Grants and Strategic Initiatives—Calumet College of Saint Joseph’s; Tracy Stone, Program Director—Calumet College of St. Joseph’s

TYPE IV: STEM EDUCATION RESEARCH

Advancing Affective Skills to Build Diverse STEM Pipelines

Historically programs designed to increase participation of minoritized groups in STEM focus primarily on the development of content and related skill proficiencies. Access to these programs depends on meeting standards based on these criteria. Our STEM enrichment program is predicated on the development of what we refer to as character skills, individual and collaborative, including ethical decision making and the attitudinal way of being in science. We propose that development of content and skill proficiency may be preceded by the development of these character skills. Our assessment data shows a strong correlation between the development of these character skills and the student outcomes in the program. This correlation is particularly significant for students who come into the program without strong content and process skills supporting a growth mindset hypothesis that the “way of being” in science sets the stage for the development of content and process skills.

Duncan Quarless, Professor—SUNY Old Westbury; Fernando Nieto, Professor—SUNY Old Westbury

2:45 p.m. – 3:45 p.m. Concurrent Sessions 2

SESSION 2.1 LATE BREAKING - INNOVATION/IDEATION SESSIONS

Potomac III

This session includes the two separate presentations listed below.

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

“I Belong:” Focusing on Scientific Identity as a Way to Increase Persistence in STEM

The Hamline University Learning Community of Scholars program aims to build an inclusive and supportive educational STEM environment for new majority students who come from traditionally underserved communities and have significant responsibilities outside of their college life. This program is built around students’ needs and interests and is focused on developing students’ sense of scientific identity and academic belonging. Students’ journey through the introductory biology curriculum is supported by the parallel first year seminar focused on student reflections around diversity and inclusivity of medicine and science, growth mindset, and active learning.

During this session we will engage participants in discussing sustainable and transferable pedagogical approaches supporting students in STEM on a small liberal arts campus with a highly diverse student population, assessing the early promises of these approaches, and overcoming the challenges of these models.

Jodi Goldberg, Professor of Biology—Hamline University; Irina Makarevitch, Professor—Hamline University

TYPE II: INSTITUTION LEVEL INTERVENTIONS

How Discovering Your Science Identity Can Transform a Student Success Center

The presenter will share how to design a Student Success Center (SSC) within the College of Sciences (COS) that supports the exploration of Science Identity. Those in attendance will learn how we are redefining Career
Engaged Learning through our Science Mentors and professional development opportunities. We hope to share intentional practices on how to support today’s college STEM students by using tools such as: Mentoring programs, StrengthsQuest, NACE competences, Faculty Bootcamps, 4-Year Planning, and other career engaged platforms.

Daniel Ramirez-Escobedo, Director, College of Sciences Student Success Center—University of Texas at San Antonio; Veronica Salazar, Program Coordinator—University of Texas at San Antonio

SESSION 2.2 LATE BREAKING - INNOVATION/IDEATION SESSIONS
Potomac I

This session includes the two separate presentations listed below.

TYPE IV: STEM EDUCATION RESEARCH

Increasing the Participation of Minority Students and Advancing STEM in Agriculture Using Active Experiential Learning and Groups Pedagogic

This presentation will be focused on creative use of principles of interdisciplinary active experiential learning (AEL) in a frame of group pedagogy to broaden participation in research for students from minorities underrepresented in FANH (food, agriculture, natural, and humanity) sciences. Our project, called ASTEMA – Advancing STEM in Agriculture in HBCUs, is designed to attract high school and undergraduate STEM students to careers in high-tech agriculture, using AEL techniques, that has proven to be a powerful tool to increase student’s awareness, involvement into studies, leadership, and critical thinking abilities. Advantages and main principles of active experiential learning, team pedagogy, and interdisciplinary research as tools for students’ engagement will be described, and the step-by-step guide for creating AEL sequenced activities will be provided to attendees with the opportunity to practice it and ask questions. The evaluation of the program will be presented by the externa evaluator of the program.

Victoria V. Volkis, Professor and MS Chemistry Program Director—University of Maryland Eastern Shore; Sasha Grebenyuk, External Evaluator—WOM Communications LLC

SESSION 2.3 LATE BREAKING - INNOVATION/IDEATION SESSIONS
Tidewater II

This session includes the two separate presentations listed below.

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Marietta College's Internal Academic Conference: Ten Years of Lessons Learned by Administration and Students

Marietta College (Marietta, Ohio) has held an internal undergraduate research conference for over a decade - we (administration) and students have learned a lot of lessons. ASD is a campus-wide celebration of scholarship at Marietta College - it is such an important day that no class meetings are held on ASD! ASD provides students an opportunity to share their research, creative projects, and senior capstone projects with the Marietta College Community. Students give talks, poster presentations, demonstrations, and performances for audiences that span across disciplines, demonstrating the importance of the liberal arts at Marietta College. This year, we evaluated who and what was presented and what the students gained from it for the first time ever.

Kimberly S. Parsons, Director of Undergraduate Research Program; McCoy Professor of Biochemistry—Marietta College

TYPE IV: STEM EDUCATION RESEARCH

Innovations in Evidence: Data Collection for Structural Change in STEM Research Experiences

One task of STEM educational research and evaluation is to characterize outcomes of individual programs towards goals of diversity, equity, and inclusion (DEI). There are many short-term funded research programs with the long-term goal of broadening participation of underrepresented groups in STEM. Educational research and evaluation data collection are constrained by program timelines. Innovations are needed that provide maximal evidence from minimal effort in data collection. Moreover, we would like to courageous conversations (Singleton, 2015) about DEI with students and faculty mentors. Participants in this session will engage in the 1-2-4-ALL protocol (Lipmanowicz & McCandless, 2013). The session will begin with a brief framing of the challenge we faced and the constraints of minimal data collection. After an initial independent reflection, discussions in pairs and groups of four are intended to generate ideas based on commonalities. Groups will share takeaways to enhance data collection for change with all attendees.

Cathleen D. Cerosaletti, Associate Director—University of Rochester; Michael Daley, Executive Director Center for Profession Development and Education Reform and Associate Professor—University of Rochester; Kimberly Fluet, Associate Director Research and Evaluation (STEMM)—University of Rochester

STEM Faculty Institute: Improving Higher Education Teaching

STEMFI was an initially NSF funded project designed to improve STEM faculty instruction, by training them on student-centered teaching techniques. In short, STEMFI “provided 15 faculty annually with an intensive one-week workshop with hands-on experimentation with various student-centered teaching strategies, as well as deep instruction into the basic science of learning and assessment, course redesign support, and cohorted
and one-on-one mentoring. This mentoring continued throughout the school year as the faculty transitioned at least one major course to student-centered methods" (Shipley, 2023). STEMFI has now been adopted by and is sponsored by the university based on the results of the three year NSF study.

Geoffrey A. Wright, Professor of Technology and Engineering Studies—Brigham Young University

 sesión 2.4  LATE BREAKING - INNOVATION/IDEATION SESSIONS
Potomac IV

This session includes the two separate presentations listed below.

TYPE II: INSTITUTION LEVEL INTERVENTIONS
Building Dynamic University-Community College Partnerships

For over twenty years we have developed new ways to integrate community college (CC) students and faculty into the university research culture which is foundational to undergraduate STEM education. Although faculty at CCs are trained at research universities, they soon decouple from their field of study and, as a consequence, are isolated. As a result CC students can be unprepared for the differences in courses and mentoring they meet when they articulate. Further working with CC students and faculty improves the understanding of research university faculty and graduate students for CCs, their faculty and students. This leads to a more welcoming reception for articulating CC students and graduate students learn about opportunities to become CC faculty. An unexpected but pleasing outcome has been that participating in these projects has prepared CC faculty so that they now are independently winning STEM education grants.

Joshua B. Halpern, Chief Operating Officer—LibreTexts; Neeharika Thakur, Professor—Prince George's Community College

TYPE III: NATIONAL LEVEL INTERVENTIONS
LS-NSSA Model: Factors That Influence URM STEM Students’ Retention and Success

The Louis Stokes North Star STEM Alliance (LS-NSSA) is an initiative funded by the NSF which is intended to increase the number of URM students in STEM. The alliance is a partnership between 16 higher education institutions and 3 community partners in Minnesota. The goal of this program is to increase URM students receiving bachelor's degrees in STEM among partner institutions in a five-year period, develop an alliance of collegiate institutions and community organizations to support the previous goal, and foster institutional change toward greater diversity and inclusion. Programs were developed to connect URM STEM students to financial aid (conference travel support), undergraduate research opportunities, mentorships (faculty and near peer), professional development, and other social events. These programs were evaluated through qualitative methods to determine the impacts of LS-NSSA on key factors of student retention and success, such as academic integration, self-efficacy/confidence in STEM, and social integration (counterspace belongingness).

Cuc Vu, Graduate Student—University of Minnesota-Twin Cities

SESSION 2.5  LATE BREAKING - INNOVATION/IDEATION SESSIONS
Potomac II

This session includes the two separate presentations listed below.

TYPE IV: STEM EDUCATION RESEARCH
Affecting Female Student’s Sense of Belonging and Confidence in Computer Science Through Early Engagement in Creating Public Good

Women continue to be underrepresented in Science, Technology, Engineering, and Math (STEM) in higher education institutions and the technology field. Despite efforts to expand women’s participation in computer science (CS), the number of women in CS remains low and vulnerable to attrition. The literature suggests that the impact of other factors, beyond students’ academic performance, leading to well-being and success and affecting female students’ retention and persistence, needs attention. Opportunities for students to learn from one another, develop relationships, and build a sense of community and connectedness should be investigated. A campaign to foster a sense of belonging must include opportunities for extracurricular engagement for female students entering CS programs to quickly develop confidence and feel respected, valued, and supported. The present study illuminates the experiences of a sense of belonging for female CS students who participated as mentors in the CODE4her™ CS Mentorship Program for Girls.

Jadwiga A. Carlson, Teaching Professor—Bowling Green State University

TYPE IV: STEM EDUCATION RESEARCH
Strategies to Engage Non-Traditional Groups in Aerospace-Related STEM Career Pathways

This session examines structural support systems that lead to the advancement and hindrance factors that have potential to catalyze the career acceleration of non-traditional groups, specifically women in STEM pathways in aerospace related disciplines. Through a consensus-building approach, the aggregated perceptions of 17 Delphi panelists provided insight into best practices to support a diverse and equitable pipeline of leaders based on the nine factors supporting advancement and three factors inhibiting advancement. Attendees will learn about the importance of mentorship in promoting career development and how to improve access to education and training for non-traditional groups in STEM. The
factors related to understanding barriers faced by non-traditional groups in accessing and advancing in STEM careers; strategies for addressing bias in promotion; and ways to create environments that support diversity and promote equity in STEM academic careers will be discussed.

Kim Luthi, Assistant Faculty and Associate Program Chair, Uncrewed Systems Applications, College of Aviation—Embry-Riddle Aeronautical University;

Bettina Mrschek, Undergraduate Department Chair, College of Aviation—Embry-Riddle Aeronautical University

Uncovering Joy in These Hot Mess Times: Mindfulness Practice for the STEM Leader

This session/workshop will provide STEM faculty/administrators with the skills necessary to decompress from travel, the stressors of the academy, and life/world challenges, and discover ways to enter into the conference space and any other space, with a restorative, joyful mindset.

Stephanie Briggs, Owner—Be.Still.Move.

Harvesting Student Feedback for Growth and Pedagogical Innovation

Student Evaluations of Teaching (SETs) can be invaluable opportunities to gain insight and novel perspective. These assessments may be chock full of wisdom and creative ideas for improvement, as well as helpful confirmation of what is working well. However, they may also contain comments that reveal unprofessional bias, personal criticisms unrelated to teaching, or unhelpfully vague criticisms that undermine our motivation and inspiration to grow as educators. We developed a systematic process for educators to engage deeply with critical student feedback with the goal of minimizing anxiety, optimizing professional development, and implementing meaningful change. During this session, facilitators will provide a framework for participants to re-engage with student evaluations and distill them down to the most helpful messages. Participants will consider tangible ways to transform this information into refinements and/or revisions to courses they teach.

Rebecca F. Hazen, Professorial Lecturer and Assistant Laboratory Director—American University; Meg Bentley, Director of STEM Partnerships and Innovation—American University

Improving Student Learning and Career Readiness Through Educator Workplace Tours and Instructional Coaching

Increasing faculty adoption of evidence-based active learning strategies in science, technology, engineering, and mathematics (STEM) undergraduate education is critical to the success of students in STEM courses and to inspiring students to pursue STEM careers. To help faculty develop active learning strategies that explore real-world applications, we have taken an approach that combines two forms of professional development: instructional coaching (IC) and educator workplace tours (EWT). EWT connects faculty to the STEM workplace and IC supports faculty as they develop curricular materials based on those experiences. Assignments that align with workplace applications aim to engage students in the process of science and create meaningful, inquiry-driven educational experiences where students apply content knowledge to real-world problems. Preliminary data from a pilot study will be presented. Greater use of relevant active learning strategies should increase persistence and success in STEM disciplines, improve scientific literacy, and ensure career readiness.

Brenda Fredette, Dean; Science, Technology, & Business—PennWest; Joseph Schickel, Associate Professor—PennWest

Higher Education AI Response Framework: How Will AI Disrupt STEM Education and How Can We Respond?

The announcement of ChatGPT by OpenAI has created a lot of confusion, fear and also excitement among higher education leaders, faculty members and students. Adoption while can provide numerous opportunities and advantages for pedagogical efficiency and creativity, how the adoption will impact the fundamental goals of higher education, the nature of teaching and learning, the hiring, retention and promotion of faculty, and how it changes the learning needs of students, the nature and form of student-professor engagement and students-material engagement will require intentional, focused and ongoing conversations. The approach we take in response to the AI revolution will have severe consequences not only for learning but also for development of competencies needed for effective participation in the workforce. We elaborate
on the Higher Education AI Response Framework, that we have developed at the University of Tennessee to guide campus’ response to the AI revolution in this presentation.

**Mehmet Aydeniz**, Professor of STEM Education—University of Tennessee; **Xiaopeng Zhao**, Professor—The University of Tennessee, Knoxville; **Ozlem Kilic**, Interim Vice Provost for Academic Affairs Dean of College of Emerging and Collaborative Studies—The University of Tennessee

**TYPE IV: STEM EDUCATION RESEARCH**

**Teaching Statistics for Social Justice**

Statistics instructors have a unique opportunity to use real world datasets that center around current social justice issues. There have been many efforts to create tasks using social justice data for statistics instructors to use in their classrooms. These tasks are often very engaging and successful in bridging understanding of statistics with social justice. Unfortunately the data around these tasks is often changing so quickly, that within a few iterations of use, a successful task can often become obsolete. Though the creation and sharing of social justice tasks is of pivotal importance, perhaps the creation of a framework for others to create their own tasks may be more important. In this session, participants will be introduced to an emerging framework that can be used to develop social justice tasks for teaching statistics.

**Heather Barker**, Assistant Professor of Mathematics and Statistics—Elon University; **Kirsten Doehler**, Professor of Statistics—Elon University

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**SESSION 3.3 LATE BREAKING - INNOVATION/IDEATION SESSIONS**

**Potomac I**

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Transforming STEM Higher Education through Self-determination Theory and Growth Mindset: Theory into Practice**

The presenters have the unique situation of representing two different S-STEM projects offered at the same university and having the same project evaluator. These relationships allow for consideration of the intersection of research and evaluation as well as the project-specific challenges and successes of holistic interventions at the level of both individuals and STEM communities of practice. In addition to overlapping theoretical frameworks, both projects crafted interventions for these students at significant touch-points in the students’ experiences of undergraduate STEM education. In doing so, the projects leveraged several high-impact practices (Kuh, 2008) in combination with their respective theoretical frames. During this session we will offer a cross-sectional presentation of the reform-minded STEM instructional experiences that supported S-STEM scholars in both programming courses and introduction to engineering technology courses.

**Kimberly Fluet**, Associate Director Research and Evaluation (STEMM)—University of Rochester; **Jeanne Christman**, Associate Professor—Rochester Institute of Technology; **Sharon Mason**, Professor—Rochester Institute of Technology

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**SESSION 3.4 LATE BREAKING - INNOVATION/IDEATION SESSIONS**

**Potomac IV**

This session includes the two separate presentations listed below.

**TYPE IV: STEM EDUCATION RESEARCH**

**Use of Flipped-Learning and Education for Sustainable Development in STEM Courses to Support Underrepresented Marginalized Students**

Flipped-Learning (FL) and Education for Sustainable Development (ESD) are two active learning models that have rapidly gained attention in higher education. Their implementation in Science, Technology, Engineering, and Math (STEM) courses have yielded favorable results in student participation, course outcomes, and student retention, particularly among underrepresented marginalized students. This study sought to investigate the impact of these active learning models on student performance in a Nutrition course. A total of 128 students participated over seven semesters, revealing an overall grade improvement of 9% (p=0.034) and a 10% increase in the number of students earning an A or B in the course. Furthermore, the study found that students’ awareness and application of sustainable development principles led to ongoing awareness initiatives on campus and in the community, thereby demonstrating the development of globally aware students.

**Angela J. Lounds-Singleton**, Adjunct Assistant Professor of Nutrition—Santa Fe College; **Vilma Fuentes**, Assistant Vice President for Academic Affairs—Santa Fe College

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**A Data Analysis Research Experience (DARE) to Serve Students at Hispanic Serving Institutions (HSIs): Promoting Social Justice for Underrepresented Students**

The Data Analysis Research Experience (DARE) program is an initiative funded by the National Science Foundation (NSF) that prioritizes quantitative skills, numerical reasoning, and data analysis at the City University New York (CUNY) for faculty and students. It accomplishes this by the establishment of a Faculty Development Program (FDP) and the implementation of a data analysis research experience (DARE) for underrepresented STEM students. Quantitative reasoning (QR) skills include the ability to gather and interpret data, to draw conclusions based upon numerical evidence, and
to communicate such information to others effectively. Students in STEM fields use QR skills more often than other students. Without a solid foundation of these skills, students are unlikely to major and persist in STEM fields. QR and data analysis skills also help students succeed in the professional working world. Quantitative literacy, the ability to use and understand quantitative information, is increasingly important for democratic participation.

Esther I. Wilder, Professor of Sociology—Lehman College; Eduardo Vianna, Professor of Psychology—LaGuardia Community College; Caterina Shost, Project Manager—Research Foundation of the City University of New York (CUNY)

TYPE IV: STEM EDUCATION RESEARCH

Explicitly Stating: Exploring the Usage of ‘Social Justice’ in Engineering Education Research Through a Critical Analysis

Changing policies are impacting how education can incorporate diversity and social justice in its everyday curricular practices and student academic engagement. Thus, explicit literature about social justice is necessary and needed to progress towards Anti-Racism and broaden participation within the field of STEM and engineering. This session discusses the early findings to critically examine engineering education journals from 2010-2020 that included an explicit social justice focus by using the term "social justice" as the search criteria. Participants will be encouraged to engage in dialogue and ask questions about terminology usage, political impact, and defining social justice in engineering education.

Ahjah M. Johnson, Postdoctoral Research Fellow—University of Cincinnati, College of Engineering and Applied Science; Whitney Gaskins, Associate Dean—University of Cincinnati, College of Engineering and Applied Science

SESSION 3.5 LATE BREAKING - INNOVATION/IDEATION SESSIONS

Potomac II

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

The Progressive Implementation of the Project-Based Learning in a Course, Impact of Circumstances and Comparison of Different Teaching Modalities

The progressive implementation in STA2023 Statistical Methods for a continuous program effectiveness evaluation in that course across the different teaching and learning modalities and circumstances in the last five years, integrating interdisciplinary learning as applicable, according to the model demonstrated that minorities exposed to several High Impact Practices benefit their performance. Comparisons by type of teaching modality, type of semester for the case of the STA2023 Statistical Method taught by the same instructional personnel. Findings open the avenue to apply undergraduate research with the support of the background of the instructional personnel mentoring the students.

Jaime Bestard, Professor of Mathematics—Miami Dade College

5:30 p.m. – 7:00 p.m. Opening Keynote Address (Live streamed)
Regency Ballroom A-D

Conversations with the Soul of STEM Reform

Born in Savannah, Georgia, David Hall holds a bachelor’s degree from Kansas State University, where he was named an “All American” for his athletic and scholarly accomplishments. After graduating from Kansas State, he played professional basketball in Italy. He received his Doctor of Jurisprudence from the University of Oklahoma, where he also earned a master’s degree in human relations. He holds both an LL.M. degree and a Doctor of Juridical Science from Harvard Law School. David Hall is also a published author. His publications include works on civil rights, the U.S. Constitution and race, legal education, and social justice. He has authored a book on the intersection of law and spirituality, entitled The Spiritual Revitalization of the Legal Profession: A Search for Sacred Rivers, and lectures nationally on topics of social justice, leadership, diversity, and spiritual values in professional life.

David Hall, President—University of the Virgin Islands

7:00 p.m. – 8:30 p.m. Welcome Reception
Regency Ballroom Foyer
AAC&U Grant Writing Innovation Exchange Institute
Empowering STEM faculty to broaden the participation of talented, low-income STEM students

What to Expect:
- Expert-facilitated critical self and institutional reflection
- Opportunity to explore and gain expertise in the theory and practice of critical inquiry-based reform
- Tailored experiential learning in developing a competitive edge for NSF grant proposal submissions

May 20-24, 2024
Lansdowne Resort & Conference Center
Leesburg, Virginia

& SO MUCH MORE!
Sunrise Salutations
As the sun rises and casts its gentle glow, Stephanie will guide you on a journey of inner awakening and mindfulness. This early morning workshop offers a unique opportunity to begin your day centered, calm, and ready to embrace the day’s challenges with a sense of inner peace and vitality that will carry you through your daily endeavors. Stephanie’s expertise in mindfulness and her calming presence make “Sunrise Salutations” the perfect start to your day, helping you navigate life with a clear mind and a peaceful heart.

Don’t miss this opportunity to greet the sunrise with mindfulness and serenity.

Stephanie Briggs, Owner—Be.Still.Move.

Session 4.1 Innovation/Ideation Sessions
Potomac IV
This session includes the two separate presentations listed below.

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Collaborative Research in Undergraduate Science Course: Strategies for Success
Active learning and research experience are powerful factors for the development of student interest in science. They foster a better understanding of the subject, enhance the perception of STEM disciplines, and improve career prospects of the students. Their impact is especially important for the underrepresented minority and first generation students. One of the key challenges in the development and application of the undergraduate student research-based learning strategies in science classes is the successful targeting of a large number of participants. This session will focus on two strategies for the introduction of collaborative research and learning experience into the undergraduate Microbiology course that are scalable and practical. The effect of their implementation on learning outcomes and student experience will be discussed, as well as their applicability for other science disciplines.

Galyna Kufryk, Professor—Grand Canyon University

A Creative Cure: Xavier University of LA Revised Its Biology Curriculum to Add CREATE and CURE Courses, At Different Academic Levels. The Goal: Increase Depth of Understanding and Application Skills
A Creative Cure. The Biology Department at Xavier University of Louisiana is revising its curriculum to include CREATE and CURE courses, in several courses, taught to different academic levels. The goal of these revisions is to increase the depth of student comprehension of concepts, and to strengthen student application skills. CURE (course-based undergraduate research experiences) have been added to freshman biology labs, Genetics Lab, and Cell Biology Lab. The CREATE approach was used to revise two senior level elective courses. Embedding research experiences into required classes allows a larger number of students to engage in research and to think like a scientist. This is a great advantage over canned/demonstration lab exercises. In other courses, CREATE course design strategy (Consider, Read, Elucidate hypotheses, Analyze data, Think of the next Experiment) trains students how to read critically and use the information being read.

Michelle B. Boissiere, Head, Department of Biology—Xavier University of Louisiana; Joanna Haye, Biology Professor—Xavier University of Louisiana; Thomas Huckaba, Associate Professor, Biology—Xavier University of Louisiana; Hector Biliran, Biology Professor—Xavier University of Louisiana

Session 4.2 Innovation/Ideation Sessions
Potomac II
This session includes the two separate presentations listed below.

TYPE II: INSTITUTION LEVEL INTERVENTIONS

QUANTways: Math Literacy as a Path to Career Competencies
QUANTways is our math pathway for students in programs without a specific MATH/STAT requirement. As part of NINERways - a comprehensive project encompassing all general education mathematics and statistics courses (3500 - 5600 students/semester) - we are revising our “liberal arts” math course to include career competencies (leadership, teamwork, and communication) as learning outcomes with a coordinated community of instructors implementing evidence-based pedagogies and practices. This redesign includes removing prerequisites for the course, supplying each instructor with undergraduate peer assistants and
an active learning classroom, sharing a robust set of activities and resources, and reimagining assessments culminating with a group video project.

In this presentation, we will briefly touch on many of these exciting changes with emphasis on the adjustment to career competency outcomes and our end-of-semester project. We welcome discussion/questions/advice about any and all aspects of this collaborative, ongoing effort.

Evan Wantland, Director of Math Pathways—University of North Carolina at Charlotte; Jeannine Marie Linker, Lecturer and Coordinator of Math Placement—UNC Charlotte; Adriana Ocejo, Associate Professor and Undergraduate Coordinator—UNC Charlotte; Sarah Birdsong, Assistant Teaching Professor and QUANTways Coordinator—UNC Charlotte

TYPE IV: STEM EDUCATION RESEARCH

Creating STEM Labs with Virtual Reality and Artificial Intelligence: An Open Discourse on Improving Student Access and Success at an HSI

The Immersive Online Content (IOC) Approach is an engaging and high-quality digital learning strategy for online course content delivery. The IOC Approach utilizes Virtual Reality (VR) interactive instructional material and is a new way to improve technical science laboratory learning aimed at increasing student access, participation in scientific communities, and persistence and success in higher education. We have implemented the IOC Approach in online Biology and Chemistry laboratory courses at Florida Atlantic University (FAU) and are researching the efficacy of this approach for student learning of technical skills and discipline-specific concepts versus in-person laboratory learning. We plan to incorporate Artificial Intelligence (AI) in our IOC Approach for: adaptive learning and personalized student recommendations; assisting students in lab report reasoning and writing; and standardizing, optimizing, and automating grading. We are using technology to remove barriers, reduce disparities, and improve access for students from various underrepresented minority (URM) groups.

Evonne M. Rezler, Senior Associate Dean, College of Science—Florida Atlantic University; Jennifer L. Krill, University School Assistant Professor—Florida Atlantic University; Abigail C. Perkins, Manager of Education Research & Digital Learning Strategies—Florida Atlantic University; Julie Golden Botti, Assistant Provost for Online and Continuing Education—Florida Atlantic University; Ozlem Yavuz-Petrowski, Instructor of Chemistry/Director of Chemistry Labs—Florida Atlantic University; Oge Marques, Professor, Computer Science and Engineering—Florida Atlantic University

SESSION 4.3 INNOVATION/IDEATION SESSIONS

Potomac V

This session includes the two separate presentations listed below.

TYPE IV: STEM EDUCATION RESEARCH

What’s Your STEMspiration?: Adaptation and Validation of a Survey Instrument

The Virginia–North Carolina Louis Stokes Alliance for Minority Participation (the Alliance, an NSF LSAMP program) launched a longitudinal research project called “What’s Your STEMspiration?” to assess the differentiated impacts and effectiveness of broadening participation activities across the consortium and expand knowledge about culturally responsive STEM Intervention Programs. Based on Social Cognitive Career Theory (SCCT), this work explores what factors influence undergraduates to pursue STEM and how students’ STEM identity supports them in achieving their academic and career goals. This presentation will discuss the theoretical and conceptual frameworks, the process of building the instrument, the methodology used to validate it, and the resulting survey tool. The research team will also discuss preliminary findings and next steps in the project. The team anticipates the instrument will be useful to STEM education and equity researchers.

Kristin Morgan, Senior Director of Grants Administration and Strategic Partnerships—University of Virginia; Holly Jackson, Director of Business Essentials, Instructor—Virginia Commonwealth University; Kelly Feltault, Principal and Executive Director—Cultural Crossings Consulting, LLC

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Premortem as a Tool for Risk Assessment and Stakeholder Engagement in Institutional Change Projects

Early assessment of risk and strategic stakeholder engagement are crucial to the success of large-scale institutional change. Premortem is a technique for brainstorming possible sources of failure early in a project and identifying actions to prevent failure or minimize its impact. Michigan Technological University recently gained approval for an innovative general education program tuned specifically for a STEM institution and designed to engage all students with AAC&U’s high impact practices. As a first step in the implementation process, we facilitated premortems with our registrar staff, undergraduate advisors, faculty piloting new assessment models, and the general education leadership. Using this experience as a case study, our presentation will describe the premortem process and document how conducting premortem exercises can produce an actionable list of risks, reveal misconceptions and conflicting opinions among stakeholder groups, and build empathy and a shared mental model among stakeholders, increasing their engagement in the implementation process.
focus on metacognition and other learning approaches in their specific disciplines.

Aaron D. Trocki, Associate Professor of Mathematics—Elon University

SESSION 4.5 REGULAR/LIGHTNING SESSIONS

This session includes the two separate presentations listed below.

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Scholarship Impact on Low-Income Transfer Students in Life Sciences – Outcomes of a Track 3 S-STEM Project

To increase access and broaden participation in STEM, the Microbiology and Cell Science program at the University of Florida created an online track for transfer students in the 2+2 pathway. Transfer students are more likely to be low-income, underrepresented, and nontraditional students and face increased barriers to obtaining a degree in STEM. To promote the success of transfer students, scholarships were granted to low-income students in both on-campus and online settings through the S-STEM program. Financial support is an effective and essential intervention to increase retention in STEM degree programs, yet it alone cannot improve student outcomes in STEM. We recognize the diversity of experience, circumstance, and identity of all students, and which results in students experiencing different challenges and barriers to their academic and socioeconomic advancement and success. We therefore consider intersectional perspective to identify barriers and interpret the impact of financial scholarship on student outcomes.

Alexandria Ardisson, Assistant Scientist—University of Florida; Jennifer Drew, Senior Lecturer—University of Florida

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Cross Institutional Faculty Alliances Support STEM Transfer Students

The community college to 4 year institution transfer pathway has become a critical pipeline to a 4 year STEM degree, particularly for underrepresented populations and first-generation students. Unfortunately, although 80% of students entering community college intend to earn a four-year degree, only 13% complete the bachelor’s degree. The speakers will explain how an NSF S-STEM funded partnership among a public four-year institution and several local community colleges has expanded the pipeline for students, including minority, non-traditional-aged, and first-generation students. The speakers will also explore low-cost interventions that can be continued beyond the life of the grant. A major component is building faculty-to-faculty relationships and trust.
SESSION 4.6 SEMINARS
Conference Theater

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Continuous Improvement of Holistic STEM Programming in the Community College Setting to Serve Underrepresented and Economically Disadvantaged STEM Scholars

At our two-year urban community college, we have developed and refined a holistic STEM scholar program over the past thirteen years to better serve a diverse student population, realizing a high level of student engagement, and achieve a sense of belonging among the student participants (Strayhorn, 2011). The STEM scholars we serve are uniquely positioned to earn their Associate of Science degree and transfer to a four-year institution, requiring support services to engage them. In addition to providing essential scholarship dollars, our program consistently offers high-impact noncurricular holistic student support services. Our presentation will detail the development and maintenance of our program with particular focus on continuous evaluation and improvement. In addition to our successes, we aim to present the challenges associated with successful implementation of these practices at a commuter-based community college and how they’ve been addressed.

Allison Foster, Assistant Professor—Columbus State Community College; Adam Keller, Professor—Columbus State Community College

SESSION 4.7 SEMINARS
Jefferson Room

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Incorporating the Pedagogy of Real Talk into Biological Science Courses

The Pedagogy of Real Talk (Hernandez, 2021), learned during a 3-year professional development opportunity, is being implemented in STEM courses to increase student success within the classroom. This equity-focused pedagogy leads educators through the development of a community of practice that teaches faculty to create a sense of belonging in the classroom and engage students with an inclusive curriculum. The presenter will discuss foundational principles of The Pedagogy of Real Talk, demonstrating how it is being implemented in a science class and share the data on student success.

Lara K. Dowland, Professor, Biology—Mount Wachusett Community College

SESSION 4.8 SEMINARS
Lincoln Room

A Community of Broadening Participation Knowledge: The STEM Inclusionary

Despite the disproportionate success of HBCUs in graduating students from minoritized communities, mainstreamed undergraduate STEM education reform often fails to meaningfully embrace or pay attention to the ways in which the broadening participation prowess of HBCU STEM faculty can advance our nation’s agenda for a competitive and diverse STEM workforce. Coupled with this reality is the relative absence of durable dissemination mechanisms that capture the specific broadening participation strategies and approaches of our nation’s HBCU STEM faculty and make them easily accessible and transferable to other institutions. As a result, our national undergraduate STEM reform agenda is robbed of critical context, the most relevant and innovative theoretical underpinnings, and the benefit of cultural authenticity. This presentation will feature ongoing mixed methods explanatory research related to exploring the role of HBCU STEM faculty beliefs and classroom culture on minoritized student achievement and persistence in STEM. Attendees will also be introduced to AAC&U’s newly re-designed STEM Inclusionary, a virtual portal established to collectively address higher education’s need for a culturally responsive dissemination platform for promulgating effective broadening participation practices. In this session, attendees will get an exclusive early preview of the STEM Inclusionary, learn about its unique design and functions, and explore how they can benefit from joining this vital community of broadening participation scholars, thought leaders, and practitioners.

Keith Besterman, Project Director—AAC&U; Afiya Fredericks, Assistant Professor—University of the District of Columbia; Kelly Mack, Vice President—AAC&U

WORKSHOP 1.1
Prince William Room

TYPE II: INSTITUTION LEVEL INTERVENTIONS

How STEM Cohorts Foster Academic Success for Underrepresented Students

CASA (Creating Access to STEM for All) is a comprehensive 2-year support program supported through a US Department of Education Title V grant (Award P031C160209) that takes students through their
second year and is intended to break down systemic barriers and inequities for students interested in pursuing a degree in STEM through a structured cohort which enhance student success through mentored coursework, seminars, research opportunities, and career development. Program benefits include a shortened pathway to graduation, decreased student debt, and increased retention. Learn how we built consensus within our multidisciplinary team and support our students through a social-emotional and academic focused cohort seminar.

Brittany Pines, Senior Director, Grants and Sponsored Initiatives—Northeastern Illinois University; Matthew Graham, Associate Professor Mathematics—Northeastern Illinois University; Jennifer Hasso, Assistant Director, CASA—Northeastern Illinois University

WORKSHOP 1.2
Fairfax Room

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Equity in the Moment

Faculty who engage in group-work activities experience challenging moments where their actions could either include or alienate students. In this workshop, we will showcase an equity-based framework that individuals and programs may use in centering equity discussions in their own STEM programs. Participants will use this framework to engage with several equity-focused scenarios that instructors may encounter while students are working in groups. The goal of this workshop is to help faculty develop forethought in how they respond in the moment to difficult situations when students work in groups. In doing so, instructors will have an opportunity to create a more inclusive learning environment that does not further marginalize learners. Implications for using this framework in other settings will be shared in the hopes that participants will be better prepared to recognize and address inequitable moments as they occur in other professional spaces.

Ileana Vasu, Mathematics Professor and Chair, STEM Education Researcher—Holyoke Community College; Geillan Aly, Founder—Compassionate Math; Gizem Karali, Professor—Pomona College; Jonas D’Andrea, Professor—Westminster University

WORKSHOP 1.3
Arlington Room

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Bloom’s Taxonomy as a Framework for Updating STEM Courses in the Age of Artificial Intelligence

Higher education Science, Technology, Engineering, and Mathematics (STEM) courses must adapt to the presence of large language models (LLMs) like ChatGPT. Updating courses is crucial, and will require a return to the fundamentals. Bloom's taxonomy offers a valuable framework for aligning course learning outcomes with what artificial intelligence (AI) can and cannot do while also ensuring the integrity of the disciplines, courses, and accreditation requirements. This workshop is based on the first session of a Faculty Learning Community for Engineering and Computer Science Faculty at George Mason University but is broadly applicable to all STEM fields. In this workshop, participants will review Bloom’s taxonomy as well as the capabilities and limitations of current LLMs to determine how course content should be adapted to better prepare STEM students for the workforce. Participants will learn strategies for redesigning courses as it relates to learning outcomes and the relevant instructional activities and assessments.

Laina Lockett, Educational Developer—George Mason University

WORKSHOP 1.4
Roosevelt Room

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Preparing Faculty to Integrate Diversity, Equity, and Inclusion (DEI) into STEM Courses: An Equity-Centered Professional Development Program

Despite surmounting evidence that student-centered and equity-focused frameworks can motivate underrepresented students to pursue and complete STEM degrees, STEM faculty tend to teach in the ways they were taught, using traditional content-centered methods. Programs to support STEM faculty in incorporating research-based, equity-centered practices are lacking and are needed to sustain broadening participation efforts. In this workshop, we will present on a NSF-funded, pilot program that was developed and implemented at Michigan Engineering in 2022/23. This program, grounded in best practices from social justice education, aims to prepare STEM faculty to integrate equity-focused content and pedagogy into their courses. During this session, we will present on the program's curriculum and our facilitation approach, model activities utilized during this program, and share preliminary results collected via participant interviews by an external evaluator.

Grenmarie Agresar, Assistant Director for Strategic Initiatives—University of Michigan; Patricia Jaimes, Assistant Director of Diversity, Equity, and Inclusion—University of Michigan - College of Engineering; Tershia A. Pinder-Grover, Director, Center for Research on Learning and Teaching in Engineering—University of Michigan; Linjue “Jade” Wang, Instructional Consultant—University of Michigan
An Opportunity for Input on the New Consensus Study About Equitable and Effective Undergraduate STEM Teaching from the National Academies of Sciences, Engineering, and Medicine

In this session participants will learn about the motivation, scope, and plans for a consensus study that the National Academies of Sciences, Engineering, and Medicine began this year. The study focuses on preparing a Framework for Equitable and Effective Undergraduate STEM Teaching. The final report, to be released in 2024, will lay out Equitable and Effective Undergraduate STEM Teaching from the National Academies of Sciences, Engineering, and Medicine.

**Kerry Brenner**, Senior Program Officer—National Academies of Sciences, Engineering, and Medicine; **Archie Holmes**, Executive Vice Chancellor for Academic Affairs—The University of Texas System

**TYPE IV: STEM EDUCATION RESEARCH**

Facilitating Change in Undergraduate STEM: Innovation in Mapping the Landscape

We describe a work-in-progress NSF-funded project that examines and synthesizes the existing change literature in STEM higher education. In 2011, a synthesis of the literature highlighted four basic categories of change strategies within undergraduate STEM instruction (Henderson et al., 2011). Since 2011, there has been an increase in efforts to apply more systemic and sustainable change approaches. We are currently reviewing the change literature published after 2011 and aim to examine the themes of the change strategies systematically and generate research-based knowledge to further improve undergraduate STEM education. We will explain innovative review and coding techniques, such as through using AI, to understand the literature. This session will support STEM researchers’ understanding of the current change landscape, advances in techniques for reviewing the literature, and ask for feedback regarding crucial research conducted in the past decade to inform the project.

**Ying Wang**, Educational Researcher—FHI 360; **Rachel L. Renbarger**, Educational Researcher—FHI 360; **Andrea L. Beach**, Professor—Western Michigan University; **Charles Henderson**, Professor—Western Michigan University; **Noah Finkelstein**, Professor—University of Colorado Boulder

**SESSION 5.1** INNOVATION/IDEATION SESSIONS

Potomac IV

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

A Framework for Equitable, Student-Centered Undergraduate STEM Instruction

While minoritized students from underrepresented racial and ethnic groups, as well as low-income and first-generation college students, benefit the most from asset-based and student-centered teaching practices, they are the least likely to experience them in undergraduate STEM courses. And despite STEM faculty’s increasing awareness of the efficacy of equitable, active learning pedagogies, faculty’s knowledge of, and ability to enact, such pedagogies lags behind. Wieman (2017) concluded that the biggest barrier to faculty members’ use of evidence-based instruction is the lack of a shared framework within STEM departments to define, measure, and reward effective teaching. In this presentation, we will discuss the development of an Equitable, Student-Centered Instructional Framework for Undergraduate STEM. We will share how STEM faculty from three institutions have engaged with the framework, through professional development and peer collaborations, to incorporate the evidence-based pedagogies from the instructional framework into their courses and classrooms.

**SESSION 5.2** INNOVATION/IDEATION SESSIONS

Potomac II

This session includes the two separate presentations listed below.

**TYPE II: INSTITUTION LEVEL INTERVENTIONS**

Metacognitive Practices for Building Scientific Literacy in the First Year

Intentionally teaching metacognitive practices has been shown to support student success, particularly if these practices are meaningfully tied to disciplinary knowledge and skills (Bransford et al. 2000; Tanner, 2012). Both Queens University of Charlotte and Rochester Institute of Technology have designed first-year-courses that are focused on metacognitive practices within the sciences in order to better support every student. A key assessment question is: Do students transfer these metacognitive skills into their other courses? At Queens, work is already underway, utilizing specific assessments of student performance in a subsequent biology class.
to assess effective transfer of skills, while at RIT, this work is just beginning. We will describe examples from both institutions of curricular structures that support metacognitive strategies. The examples from two very different institutions will provide discussion points for participants to explore a variety of metacognitive practices.

Elizabeth Hane, Professor and Faculty Associate to the Provost for General Education—Rochester Institute of Technology; Jeffrey F. Thomas, Professor of Biology & Director of General Education—Queens University of Charlotte

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Learning How to Learn: Supporting the Development of Metacognitive Skills in College Algebra
The Learning at Iowa project at the University of Iowa is a campus-wide learning framework that supports student learning using content from cognitive science. The project provides training and resources that promote consistent, evidence-based messaging about effective learning to students, instructors, and staff across campus. Participants in this session will be introduced to the Learning at Iowa framework and its key components, the “Three Ms” of mindset, metacognition, and memory. We will then share a new model for peer learning support: Metacognition Mentors. These trained undergraduates support the development of metacognitive skills in a very large introductory math course with historically high DFW rates by responding to individual students’ reflective journals on their learning process. Participants will learn about the Metacognition Mentor role and the process by which we developed and refined this course-based resource, and consider how they might implement similar supports for STEM students on their campuses.

Anat Levtov, Program Manager, Learning at Iowa—University of Iowa; Cynthia M. Farthing, Associate Professor of Instruction, Department of Mathematics—University of Iowa

SESSION 5.3 INNOVATION/IDEATION SESSIONS
Potomac V
This session includes the two separate presentations listed below.

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

The Ivory Maze: Helping Our Students Navigate the “Hidden” Curriculum
What are the unwritten rules and expectations of higher education? In addition to delivering content, our courses often send implicit academic, social, and cultural messages to our students. As a result, an unofficial curriculum develops beneath our “formal” programs of study. For students who lack traditional cultural capital, the “hidden” curriculum further exacerbates barriers to student success. In this session, we will explore ways the “hidden” curriculum shows up in our course design and begin to address our own complicity in perpetuating the dominant cultural norms that often hinder us from fully actualizing the mission of our work as educators.

Melody Kelley, Associate Professor of Chemistry—Georgia State University

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Unmasking Impostor Syndrome in STEM Education: Navigating Higher Education Reform for Inclusivity and Excellence
This proposal presents an in-depth exploration of Impostor Syndrome in the context of STEM (science, technology, engineering, and mathematics) education, aiming to uncover its hidden impacts and propose innovative strategies to address this pervasive classroom challenge. We will delve into the theoretical foundations, share emerging research insights, and outline untested concepts that hold promise for advancing higher education reform within STEM fields. This interactive session encourages participants to engage in collaborative discussions, share perspectives, and collectively envision pathways towards a more inclusive and excellent “ENGAGING” STEM education environment.

Anta’Sha M. Jones, Assistant Professor of Biology—Albany State University; Claudia Calder, Assistant Professor of Counselor Education—Albany State University

SESSION 5.4 REGULAR/LIGHTNING SESSIONS
Potomac I
This session includes the two separate presentations listed below.

TYPE IV: STEM EDUCATION RESEARCH

Student Use of Metacognitive Approaches During an Undergraduate Research Experience
Metacognitive practices may promote the higher order thinking skills important in science. Research scientists likely develop these skills gradually as they repeatedly plan and complete research projects and experience successes and failures. While the connections between metacognition and academic success are established, the use and development of metacognitive skills associated with the conduct of scientific research are less understood. Our project explored the extent to which undergraduate research students use metacognitive approaches in a summer research program and in labs and research during prior semesters. To do so, we created a metacognitive “research wrapper” intervention to engage a subset of students with the theme of metacognition. We found that students reported more frequent use of metacognitive approaches during their summer research experience than in labs and research during the prior academic year. Students receiving the metacognitive intervention also reported using...
metacognitive approaches more frequently than those not receiving the intervention.

Diane K. Angell, Associate Professor of Biology—St. Olaf College; Ryan Sheppard, Associate Professor Biology and Anthropology—St. Olaf College

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**The Impact of Team Based Learning on Student Sense of Competence, Autonomy, and Relatedness**

Team Based Inquiry Learning (TBIL) is a style of learning in which class time is devoted to problem solving sessions in teams that are stable throughout the semester. The research behind TBIL indicates that the format leads to greater content mastery and increased flexibility in problem solving approaches. In this presentation, I will describe my experience and preliminary results in implementing this format in a large (~330 student) introductory linear algebra course at Brown University. Using the Equitable Learning Inquiry (ELI) survey developed by collaborators at our local CTL, we observed a significant reduction in equity gaps compared to previous semesters. Moreover, we found that math-anxious students and historically excluded students experienced increases in sense of competence, autonomy, and relatedness—variables hypothesized to be linked to student motivation and retention in STEM. Lessons learned in implementation will be shared, as will plans for further investigations.

Jordan Kostiuk, Lecturer—Brown University

**SESSION 5.5 REGULAR/LIGHTNING SESSIONS**

Potomac II

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Fostering an Equity-Minded Student Success Culture in STEM Through Faculty Development**

The session will provide an overview of a faculty professional development program at Santa Monica College (SMC) as part of the “Fostering an Equity-minded Student Success Culture in STEM Through Faculty Development” (NSF Award # 1928737) initiative. The program guides multiple cohorts of STEM faculty through year-long professional development training on equity-mindedness and racial equity in STEM education and introduces teaching practices that lead to more equitable student outcomes for underrepresented students. Participants collaborate with equity coaches and peers to identify and tailor equity practices to their courses. We collected data throughout the program in the form of participant feedback, student surveys, and student outcome metrics. During our session we will review our findings based on our first two cohorts (one completed, one on-going) that demonstrate improved student success. Attendees will gain insights in how to apply professional development training in a way that centers racial equity in STEM.

Silvana Carrion-Palomares, NSF Project Manager—Santa Monica College; Kristin Lui-Martinez, Faculty & Co-Pi—Santa Monica College

**Being in a “Good Headspace”: Making Meaning and Enacting Strategies to Achieve Holistic Well-being**

The STEM learning environment presents many challenges that prevent Black women graduate students from prioritizing their well-being. The research on the experiences of Black women graduate students in STEM is limited and often focuses on their stressors instead of foregrounding how Black women in STEM are prioritizing their well-being. This study explored the meaning-making process of Black women graduate students in STEM holistic well-being by emphasizing how they achieved holistic well-being. The study’s methodology included narrative inquiry with a Black feminist epistemological approach. The storytelling format of the narrative inquiry methodology, coupled with the Black feminist epistemology, highlighted how Black women’s experiences are a valid source of knowledge. In addition, French et al.’s (2020) Psychological Framework for Radical Healing, a strength-based framework that prioritizes People of Color and Indigenous individuals (POCI) experiences, provides a new way of envisioning and positioning Black women’s healing and liberation by centering on their wellness.

Shanalee Gallimore, Program Director—Office of Undergraduate STEM Education—AAC&U

**SESSION 5.6 REGULAR/LIGHTNING SESSIONS**

Conference Theater Ballroom

**TYPE III: NATIONAL LEVEL INTERVENTIONS**

**Physics and Astronomy SEA Change: Transforming Departmental Culture**

It will take some time for the postsecondary education community to understand the full impact of the Supreme Court ruling on race-conscious admissions and other issues that flow from that ruling. Meanwhile, the SEA Change initiative’s focus on structural change at institutional (AAAS) and departmental levels (Physics/Astronomy) aims to address the removal of barriers and support of access in ways that are sustainable and that attempt to avoid triggering legal challenges. The panel will present on SEA Change as a model for systemic change that enables the development of inclusive education and research environments.
THE JOURNAL OF STEM LEADERSHIP AND BROADENING PARTICIPATION

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SESSION 5.7  SEMINARS
Potomac VI

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Queens STEM Academy: Addressing Vexing Challenges to Improve Equity in STEM Education

Persistent disparities continue to affect STEM attainment. To address this issue, LaGuardia Community College, a Hispanic-serving institution, has adopted High-Impact Practices (Kuh, 2008). However, the necessity for a more comprehensive, integrated strategy is evident in order to effectively boost equity in STEM access and achievement. LaGuardia CC, collaborating with Queens College, secured a $4.6 million grant to create the Queens STEM Academy. This initiative aims to recruit Hispanic, low-income, and underrepresented minority students into STEM majors, enhance STEM education, support smooth transfer to Queens College, and provide career guidance.

Considering the high number of Hispanic and underrepresented minority students beginning at community colleges, transfer is critical. This grant bolsters equity in STEM access and transfer. The latter includes joint degrees and shared transfer advisement. We present the advantages and challenges of the Academy model, expected outcomes, preliminary data, and how to leverage institutional partnerships to improve equity in STEM education.

Reem Jafaar, Professor & Director of Research, Evaluation & Program Support the Queens STEM Academy—LaGuardia Community College, CUNY; Milena Cuellar, Professor & Carnegie National Faculty—LaGuardia Community College, CUNY

10:30 a.m. – 11:00 a.m.  Refreshment Break
Regency Ballroom Foyer

11:00 a.m. – 12:00 p.m.  Featured Session 4 (Pre-Registration Required)
Regency Ballroom E

Mind Full? Mindful Moment

In the midst of your busy day, “Mind Full? Mindful Moment” offers a soothing pause to recenter and recharge. This midmorning session provides an invaluable opportunity to pause, breathe, and refresh, creating a space of calm that will resonate throughout your day offering renewed focus and serenity. Stephanie’s expertise in mindfulness and her calming presence helps you to remain mindful and present as you engage in all your daily endeavors. Join Stephanie for a “Mind Full? Mindful Moment” and embrace this opportunity to replenish your mental and emotional well-being.

Stephanie Briggs, Owner—Be.Still.Move.
specific topics related to scientific literacy, quantitative reasoning, computational thinking, and belonging with the potential to aid students in overcoming perceived barriers to success. These topics were incorporated into an interdisciplinary course on grand challenges in STEM with social justice implications, including climate change, pollution, social determinants of health, and algorithmic bias. In this presentation, we will share the data that motivated the course development, the process by which the course was developed, and a snapshot of teaching materials included in the course modules. The course is the first and currently only, STEM course at Furman University to carry the new Identity, Equity, and Justice (IEJ) designation within our general education curriculum.

**Alison M. Roark**, Associate Professor of Biology—FU-HHMI IE3 Institutional Program Director—Furman University; **Casey Hawthorne**, Associate Professor of Mathematics—Furman University; **Lauren E. Jarocha**, Assistant Professor of Chemistry—Furman University

**SESSION 6.2 INNOVATION/IDEATION SESSIONS**

**Potomac II**

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Engaging First-Year Commuter Students in Departmental Learning Community Through Linked Courses**

Commuter students face unique challenges in integrating into college learning communities. There is an urgent need to investigate methods and activities that engage first-year commuter students in post-pandemic learning communities. Informed by the situated learning theory, we linked two first-year courses through joint curricular and extra-curricular activities to engage the commuter students in a departmental learning community at the University of District of Columbia, a Historical Black University and College. These activities, offered by upper-class students from student clubs and a service-learning program, provided context for the first-year students to interact with the upper-class students and helped the former to develop their sense of community and belonging. We received very positive feedback from both classes and observed increased interactions and participation in student organizations. Other commuter schools or schools with commuter students can adopt this innovative low-cost approach of linking courses to increase student engagement and retention.

**Lily Liang**, Professor—University of the District of Columbia; **Briana Wellman**, Associate Professor—University of the District of Columbia

**SESSION 6.3 INNOVATION/IDEATION SESSIONS**

**Potomac V**

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Establishing a Problem-Solving Community of STEM Scholars at a Hispanic-Serving Institution**

This ideation session describes the rationale, development, and initial implementation of a problem-solving community (PSC) of STEM scholars. The PSC includes a 5-week summer bridge program with peer-led problem-based learning. The summer bridge program targets underrepresented STEM majors at a Hispanic-Serving Institution who are transitioning from their freshman to sophomore year. The Community Cultural Wealth framework was used to inform the design and development of the PSC experiences. The PSC activities include a professor-led introduction to sophomore-level STEM course content, professional development workshops, team-building activities, and peer mentoring. The results of this work stand to inform how support programming between the freshmen and sophomore year can promote student success and retention beyond the freshmen year across STEM disciplines.

**Tomika W. Greer**, Assistant Professor and Program Coordinator—University of Houston; **Jerrod A. Henderson**, Assistant Professor—University of Houston; **Donna W. Stokes**, Professor of Physics and Associate Dean for Undergraduate Affairs and Student Success, NSM—University of Houston

**Empowering Transfer Students Through a Flexible Summer Undergraduate Research Program**

Undergraduate research is a high impact activity that leads to improved retention, diversity, motivation, and self-efficacy in STEM. Yet many summer undergraduate research experiences (SUREs) require relocation to a residential campus and commitment to full-time effort for several weeks. This is not feasible for many transfer students who are more likely to be low-income, working adults, parents, and from historically underrepresented backgrounds. To prioritize flexibility and reducing barriers to entry, a flexible SURE was developed for nontraditional, 2+2 transfer undergraduates by leveraging the partnerships and resources of a large research university and 2-year institutions. Over ten years, the program has worked towards synergizing the efforts of multiple NSF, DUE, USDA, and institutional projects providing research opportunities to 120 pre- and post-transfer students and have received positive student and faculty mentor feedback and outcomes. By rethinking SURE program models, a significant and meaningful impact can be made on transfer student success.
Supporting Undergraduates from Community College to Excel and Succeed in STEM (SUCCESS)

There is a national need for a well-educated and diverse workforce of STEM professionals. One key part of building this workforce is supporting the retention and graduation of STEM students with strong academic potential and high financial need. STEM students who seek to transfer from a community college and continue their education at a 4-year university are a central part of this student population. To design a transfer pathway for students from a community college to a primarily undergraduate institution (PUI), we assessed the needs of the transfer students and the student experiences at the two institutions, and we propose programming that incorporates and supports their navigational and cultural capital and bolsters their potential for success. This work demonstrates tools to effectively capture student voices and experiences and includes specific recommendations for programming to support transfer students in navigating a pathway to a STEM career or advanced degree.

Sirena Hargrove-Leak, Professor of Engineering—Elon University; Jen Hamel, Associate Professor of Biology—Elon University; Jessica Merricks, Assistant Professor of Biology—Elon University

Liberating STEM Education from Developmental Algebra

Mathematics is essential for learning STEM. However, college students with less preparation in algebra are often overwhelmed by developmental courses and eventually denied the opportunity to take college-level STEM courses. This situation is disproportionately prevalent among underprivileged student populations. To address this issue, we launched the Minneapolis Math (2021) and Science (2023) Pathways, which eliminate or reduce algebra prerequisites. The impact of these pathways is immediate and transformative, with significant increases in enrollment, course success and student interest. We also closed the achievement gaps and tripled the percentage of black students completing college-level math, compared to 2012.

In this presentation, I will provide an overview of the design, the implementation, and the outcomes of these pathways. I will demonstrate how curriculum innovations successfully remove the algebra barrier and create positive changes for underprivileged students, making STEM education more accessible and enjoyable for all.

Ben Weng, Dean of STEM—Minneapolis Community and Technical College

Supplemental Instruction: The Ins and Outs of Implementation

Supplemental instruction (SI) was implemented in introductory STEM courses at Queensborough Community College, a minority serving institution in New York City. Analysis of student outcomes indicates that those who attended at least one half of the scheduled SI sessions earned C or better rates and average grades that were significantly better than students that did not. C or better rates improved by 10 to 30 percentage points and average grades were at least a letter grade higher. SI sessions earned C or better rates and average grades that were significantly better than students that did not.

Alexandria Ardissone, Assistant Scientist—University of Florida; Jennifer Drew, Senior Lecturer—University of Florida

TYPE II: INSTITUTION LEVEL INTERVENTIONS

STATways: Revitalizing Introductory Statistics

STATways is our math pathway for students in social and/or health sciences. Based on UNC System recommendations developed from the Dana Center Mathematics Pathways Model, UNC Charlotte selected STATways as a pilot project for a major revision. Beginning in Summer 2019, a team of faculty and instructional designers in collaboration with stakeholders from partner programs began a complete course redesign. With an updated curriculum (outcomes), the redesigned course, now concept-based, fully coordinated, and aligned with partner program expectations, serves more than 2000 students per year. The initial success of this redesign process led to the expansion of the Math Pathways project to all gateway, general education mathematics and statistics courses as NINERways - UNC Charlotte's 2023 - 2033 Quality Enhancement Plan.

Preliminary data including student feedback are positive. Here, we will discuss the changes we have made and the vital process in making systemic changes such as these.

Evan Wantland, Director of Math Pathways—University of North Carolina at Charlotte; Jeanne-Marie Linker, Lecturer and Coordinator of Math Placement—UNC Charlotte; Adriana Ocejo, Associate Professor and Undergraduate Coordinator—UNC Charlotte; Wan Othman, Lecturer and STATways Coordinator—UNC Charlotte

SESSION 6.4 REGULAR/LIGHTNING SESSIONS

Potomac I

This session includes the two separate presentations listed below.

SESSION 6.5 SEMINARS

Potomac VI

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Supporting Undergraduates from Community College to Excel and Succeed in STEM (SUCCESS)

There is a national need for a well-educated and diverse workforce of STEM professionals. One key part of building this workforce is supporting the retention and graduation of STEM students with strong academic potential and high financial need. STEM students who seek to transfer from a community college and continue their education at a 4-year university are a central part of this student population. To design a transfer pathway for students from a community college to a primarily undergraduate institution (PUI), we assessed the needs of the transfer students and the student experiences at the two institutions, and we propose programming that incorporates and supports their navigational and cultural capital and bolsters their potential for success. This work demonstrates tools to effectively capture student voices and experiences and includes specific recommendations for programming to support transfer students in navigating a pathway to a STEM career or advanced degree.

Sirena Hargrove-Leak, Professor of Engineering—Elon University; Jen Hamel, Associate Professor of Biology—Elon University; Jessica Merricks, Assistant Professor of Biology—Elon University

Liberating STEM Education from Developmental Algebra

Mathematics is essential for learning STEM. However, college students with less preparation in algebra are often overwhelmed by developmental courses and eventually denied the opportunity to take college-level STEM courses. This situation is disproportionately prevalent among underprivileged student populations. To address this issue, we launched the Minneapolis Math (2021) and Science (2023) Pathways, which eliminate or reduce algebra prerequisites. The impact of these pathways is immediate and transformative, with significant increases in enrollment, course success and student interest. We also closed the achievement gaps and tripled the percentage of black students completing college-level math, compared to 2012.

In this presentation, I will provide an overview of the design, the implementation, and the outcomes of these pathways. I will demonstrate how curriculum innovations successfully remove the algebra barrier and create positive changes for underprivileged students, making STEM education more accessible and enjoyable for all.

Ben Weng, Dean of STEM—Minneapolis Community and Technical College

Supplemental Instruction: The Ins and Outs of Implementation

Supplemental instruction (SI) was implemented in introductory STEM courses at Queensborough Community College, a minority serving institution in New York City. Analysis of student outcomes indicates that those who attended at least one half of the scheduled SI sessions earned C or better rates and average grades that were significantly better than students that did not. C or better rates improved by 10 to 30 percentage points and average grades were at least a letter grade higher. In addition to presenting student outcomes data, we will also discuss a number of topics important to those interested in offering SI at their own campuses, including recruitment, training, and supervision of SI leaders, faculty buy-in, student reactions to SI, promoting and incentivizing student participation, offering SI in online...
course sections, evaluating the effectiveness and cost of SI, the experiences of underrepresented students, and the impact of SI on the SI leaders.

**Michael J. Pullin**, Dean for Academic Initiatives—City University of New York Queensborough Community College (CUNY); **Elizabeth Nercessian**, Director of Student Success—Queensborough Community College; **Stephan Spezio**, Director, Center for Tutoring and Academic Support—Queensborough Community College; **Jennifer Valad**, Title V Project Director—Queensborough Community College; **Shayan Woods**, Title V Activity Director—Queensborough Community College

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**SESSION 6.6 SEMINARS**
Kennedy Room

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Developing a Social Justice Curriculum: First Steps**
This session will explore ways to infuse social justice themes and perspectives into the STEM classroom. From a big picture view of the STEM curriculum and its interactions with social justice, to the details of the classroom setting and specific learning and assessment tasks, the focus will be on empowering students to ask their own questions, find and analyze real data, apply their own ideas, and draw their own conclusions. Participants will leave the session with concrete ideas and resources as they venture into the process of aligning their pedagogy more in line with their own ethical and professional values.

**Gizem Karaali**, Professor—Pomona College

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**WORKSHOP 2.2**
Lincoln Room

**TYPE II: INSTITUTION LEVEL INTERVENTIONS**

**Why, What, & How: Transforming Institutions to Support STEM Transfer Students to Bachelor’s Degree Completion**

This proposal emerges from NSF-funded longitudinal ethnographic research into transfer relationships, context, activities, and success at three U.S. universities and two community colleges. Vertical transfer from community colleges to universities has not fulfilled its potential to increase access to higher education for minoritized students (Bahr et al., 2017; Dowd, 2012; Reyes, 2011), particularly in STEM. We offer institutions and practitioners a design framework for interventions to improve transfer-student outcomes. These targeted actions highlight practices, policies, and programs that develop transfer students’ social, cultural, professional, and academic identities, both as they prepare for transfer and as they adjust post-transfer. We will share our findings of specific barriers that STEM transfer students face and institutional interventions that can alleviate these barriers. In discussing concrete actions for institutions to take, participants can learn about, reflect on, and share their campus practices to support transfer students to bachelor’s degree completion.

**Heidi G. Loshbaugh**, Senior Research Associate—University of Colorado Boulder; **Heather Thiry**, Senior Research Associate—University of Colorado Boulder

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**WORKSHOP 2.1**
Jefferson Room

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Promoting Equity in STEM Classrooms: Practicing Culturally Responsive Feminist Pedagogy**
In 2021, women comprised 35% of the STEM workforce in the US. This is only a 3% increase from 2011, despite thousands of initiatives aimed at increasing gender equity during this period. This lack of progress highlights the pressing need for reconceptualizing how we represent and teach STEM disciplines. The feminist pedagogy framework is uniquely situated to help address gender disparities in STEM classrooms by (1) reshaping existing hierarchical structures in the classroom, (2) encouraging collaborative learning, (3) promoting critical thinking, and (4) supporting social justice focused approaches to STEM. In this workshop we will introduce feminist pedagogy and how it can be implemented in STEM classrooms. Attendees will then work to develop their own feminist pedagogy-inspired classroom changes while the presenters facilitate discussions and provide guidance. This is a collaborative workshop where participants are encouraged to express themselves and incorporate their own lived experiences into their pedagogical re-design.

**Anna C. Penaloza**, Graduate Student Researcher—University of California-Davis; **Mariana Carrola**, Graduate Student Researcher—University of California, Davis; **Natalia Caporale**, Associate Professor of Teaching—University of California, Davis

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**WORKSHOP 2.3**
Roosevelt Room

**TYPE II: INSTITUTION LEVEL INTERVENTIONS**

**DEI is Core to STEM Curriculum**

In this workshop, we will discuss the integration of Diversity, Equity, and Inclusion (DEI) modules into the curriculum of the College of Engineering and Applied Science, at a major, Midwest, tier I research institution. This workshop focuses on the incorporation of the curriculum at three touch points in every student’s curriculum in the college. Students are introduced to concepts in an introductory model during their first years Engineering Foundations model. The DEI Committee
within the college partners with Academic Departments to incorporate modules into a 3rd and 5th (senior year) course, respectively. As a result, students within the college participate in, at minimum, three DEI learning experiences throughout their five-year college career. This workshop explores the curriculum’s impact on increasing inclusiveness within the college.

Whitney Gaskins, Associate Dean—University of Cincinnati, College of Engineering and Applied Science; Ahjah M. Johnson, Postdoctoral Research Fellow—University of Cincinnati, College of Engineering and Applied Science

♦ WORKSHOP 2.4
Prince William Room

TYPE III: NATIONAL LEVEL INTERVENTIONS

The Social Construction of Mathematical Difficulty: Anti-Intimidation as Antiracism

Grounded in the works of Paolo Friere, Rochelle Gutierrez, Danny B. Martin, Francis Su, Gloria Ladson-Billings, Zaretta Hammond, Frantz Fanon, and others, and informed by thirty years’ classroom experience, this seminar will illuminate mathematical difficulty as a social construct. The idea that math is difficult rests on foundational beliefs about mathematics itself, separates people from their mathematical brilliance, establishes a racialized hierarchy of dominance and oppression, enforces that hierarchy through assessment practices steeped in intimidation, and perpetuates itself through the self-interest of those of us who benefit. Ultimately, the construct wraps itself in a powerful exclusionary narrative about the nature of mathematics, its essential position in STEM education, and the kinds of people who can do it.

Patrick Morriss, Math Instructor—Foothill College

12:30 p.m. – 2:00 p.m.  Featured Session 5  [Pre-Registration Required]  Potomac III

Faculty Online Learning Communities for Gender Equity

Faculty Online Learning Communities for Gender Equity (FOLC-E) is a community of practice for departmental teams to receive support (from the project team and each other) as they address intersectional gender equity in their home departments. During this luncheon, we will demonstrate a facilitated meeting, with current FOLC-E participants discussing the challenges and successes of engaging in equity work. Following the demonstration, you will have the opportunity to ask the participants about their experiences, which includes: two years of support, personalized administrative mentors, and expert speakers. Please join us to learn how participants have navigated their equity work, and how you can apply for our next cohort.

Apriel Hodari, Principal Investigator—Eureka Scientific, Inc.; Donte McGuire, Director of Research and Evaluation—Higher Ed Insight; Samantha Elliott, Director of Center for Inclusive Teaching and Learning—St. Mary’s College of Maryland; Michael Baumgardner, Assistant Dean of Public Engagement and Enrollment—University of Albany; Daniel Vrinceanu, Professor of Physics—Texas Southern University; Stacey Jones-Willy, Chemistry Professor—Pima Community College

12:30 p.m. – 2:00 p.m.  Featured Session 6  [Pre-Registration Required]  Potomac IV

Friend or Foe: ChatGPT for Next Tier Academic Writing

In an era where artificial intelligence is revolutionizing the way we approach academia, ChatGPT emerges as both a trusted companion and a potential adversary in the world of academic writing and research grant development. Blooksy, is a pioneering content-sharing platform that offers a unique interface for writers and researchers to collaborate with AI, harnessing the power of ChatGPT. With the capacity to assist in crafting research papers, grant proposals, and even entire books, ChatGPT offers an efficient and adaptable tool for academic content creation. Join us for an insightful session that delves into the dynamic realm of AI-driven academic writing, featuring a focus on ChatGPT and its implications for scholarly endeavors.

Anthony Joiner, CEO—Blooksy; JW Jones II, Blooksy; Shantel Chapman, United States Department of Defense-US Air Force

12:30 p.m. – 2:00 p.m.  Lunch on Your Own

2:00 p.m. – 3:30 p.m.  Keynote Address (Live Streamed)

Reimagining STEM: From Artificial Intelligence to Collective Wisdom

Ruha Benjamin is the Alexander Stewart 1886 Professor of African American Studies at Princeton University, founding director of the Ida B. Wells Just Data Lab, and author of the award-winning book Race After Technology: Abolitionist Tools for the New Jim Code, among many other publications. Her work investigates the social dimensions of science, medicine, and technology with a focus on the relationship between innovation and inequity, health and justice, knowledge, and power. She is the recipient of numerous awards and honors, including the Marguerite Casey Foundation Freedom Scholar Award and the President’s Award for Distinguished Teaching at Princeton. Her most recent book, Viral Justice: How We Grow the World We Want, winner of the 2023 Stowe Prize, was born out of the twin plagues of COVID-19 and police violence and offers a practical and principled approach to transforming our communities and helping us build a more just and joyful world.
Teaching STEM Leading Change Holding on to Our Humanity

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FRIDAY, NOVEMBER 3, 2023

Ruha Benjamin, Associate Professor of African American Studies—Princeton University

3:30 p.m. – 4:00 p.m.  Book Signing and Refreshment Break
Regency Ballroom Foyer

4:00 p.m. – 5:00 p.m.  Poster Session
Independence Center A

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Poster 1: Rebuilding Online Introductory Chemistry Curriculum: Building Community, Metacognition, and Self-Confidence in Our Students
Rebecca C. Laird, Associate Professor of Instruction—University of Iowa; Renée Cole, Professor of Chemistry and Professor—University of Iowa

Poster 2: Characterizing the Teamwork Skills, Intercultural Learning Gains, and Sense of Belonging of the Students Enrolled in a Globally Focused Living-Learning Community
Aparajita Jaiswal, Intercultural Research Specialist—CILMAR, Purdue University

Poster 3: Problem-Based Learning to Support Non-Majors’ Motivation to Learn Science
Carolyn Parker, Hurst Senior Professorial Lecturer—American University; Hannah Jardine, Teaching & Learning Specialist—American University; Barbara Balestra, Senior Professorial Lecturer—American University

Poster 4: An Integrative Approach to STEM Workforce Preparation in a Biomedical Science Course
Verleen McSween, Assistant Professor of Biology—University of the Virgin Islands

Poster 5: Beyond the Board: Using Immersive Roleplaying Games to Drive Community and Engagement in STEM Courses
Chad D. Curtis, Assistant Professor—Nevada State College

Poster 6: Calculus Recitations
Leyla Botakci, Professor—Elizabethtown College; Christina Martin, Lecturer—Elizabethtown College, Elizabethtown, PA

Poster 7: Creating a Pipeline of Future Resilient Female STEM Undergrads
Sarah Baillie, Women in Science and Engineering (WISE) Program Director—State University of New York at Buffalo (SUNY)

Poster 8: Doubling Student Success Through Intrusive Advising
Emily Whitis, Student Success Coach—College of DuPage

Poster 9: Implement New Pedagogy
Jack Huang, Dr.—Jacksonville University

Nipun Chopra, Assistant Professor of Neuroscience—DePauw University

Poster 11: Integrating and Facilitating Racial Justice Conversations in Life Science Courses
Christelle Sabatier, PhD, Senior Lecturer—Santa Clara University

Poster 12: Integrating Holistic Student Support Into a STEM Major Curriculum and Its Transformative Impact on Student Engagement and Retention
Sally A. Wasileski, Professor and Chair—University of North Carolina at Asheville; Jason M. Schmelzer, Senior Lecturer—University of North Carolina at Asheville; Amanda L. Wolfe, Professor—University of North Carolina at Asheville

Poster 13: Justice, Equity, Diversity, Inclusion in STEM: Utilizing Faculty Professional Development to Foster Inclusive Excellence in STEM Teaching Practices
Karlita L. Warren, Consultant—University of La Verne; Christine Broussard, Professor—University of La Verne; Vanessa Preisler, Professor—University of La Verne

Poster 14: MCC: A CUREs Community That Lowers the Barrier to Providing Research Experiences for Undergraduates
Amy L. Springer, Senior Lecturer—University of Massachusetts Amherst

Poster 15: Mentoring Through an Informal Experiential Learning STEM Program at an HSI
Angela Chapman, Associate Professor—University of Texas at Rio Grande Valley; Llivia M. Garcia, Research Assistant—University of Texas Rio Grande Valley

Poster 16: Reflection Practices Embedded Into a STEM Course
Kyle Gipson, Professor—James Madison University
Empower your commitment to equity
— join our community dedicated to learning and implementing strategies that broaden participation in STEM

The STEM Inclusionary is higher education's first virtual portal for undergraduate STEM reform that centers HBCU scholarship, thought leadership, and expertise in graduating undergraduate STEM students from minoritized communities.

Become a part of the STEM Inclusionary to:

- Learn from, and contribute your expertise to, a culturally responsive resource on proven broadening participation practices
- Empower yourself and colleagues through mindfulness practice, survival guides, and informative research reports to fully engage in productive broadening participation practices
- Gain early access information to professional development opportunities

Scan the QR CODE to get an advance view of The STEM Inclusionary and learn how you can become a member of this important network.
Poster 17: STEMming the Tide: Incorporating Communication Education as an Essential 21st Century Skill

Kevin James Brown, Professor—Oregon Institute of Technology; Dan Peterson, Dean—Oregon Institute of Technology; Matt Schnackenberg, Professor—Oregon Institute of Technology

Poster 18: Strategies for Engagement of Non-Traditional Students in Engineering Pathways

Monica Surrency, Director of Instructional Design Operations—Embry-Riddle Aeronautical University; Kim Luthi, Assistant Faculty and Associate Program Chair, Uncrewed Systems Applications, College of Aviation—Embry-Riddle Aeronautical University

Poster 19: Supplemental Peer Instruction Reduces DFW Rate Among Pell Eligible Students in a General Biology Course

Elizabeth Godin, Lecturer of Biology—Marist College

Poster 20: The Anatomy of a Gamified Biology Course

Nathan K. Silva, Senior Lecturer of Biology—Nevada State University

Poster 21: The Use of a Bio-Inspired Educational Robot to Enhance Integrated STEM Education

Deeksha Seth, Assistant Teaching Professor—Villanova University; Lydia Ross, Assistant Professor—Mary Lou Fulton Teachers College, Arizona State University

Poster 22: Undergraduate Biotechniques Research Module: A Research-Based Teaching Module in Biological Techniques and Instrumentation Course

Sabita N. Saldanha, Associate Professor—Alabama State University

Poster 23: Understanding the Student Experience In and Reflecting on Program Design Implications of a Long-Term, Low-Intensity Undergraduate Research Experience Aimed Broadening Participation in STEM

Kimberley Preston, Researcher—Oregon State University

Poster 24: From Virtual to Reality: Innovative Student-Centered AR/VR Initiatives to Transform High-Impact Practice in STEM Courses

Dacia J. Steiner, Grant Project Director—Miami Dade College; Logan Saucer, STEM Student Transfer Manager—Miami Dade College

Poster 25: STEM Practicum

Molly Marnella, Associate Professor—Bloomsburg University of Pennsylvania

Poster 26: Strategies for Inclusive Pedagogical Training: Graduate Student Instructors Versus Experienced Faculty

Melinda Lanius, Assistant Professor—Auburn University

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Poster 27: STEM: Our Philosophy Not Just an Acronym

Samar Ghrear, STEM Starter Academy Coordinator—Springfield Technical Community College; Marlene N. Johnson, Title V Grant Director—Springfield Technical Community College; Lara L. Sharp, Dean of STEM—Springfield Technical Community College

Poster 28: SAFE Passage to Social and Academic Support: First Year STEM Identity and Belonging Interventions for Under-Resourced Students

John Wheeler, Associate Provost for Integrative Research—Furman University; Benjamin K. Haywood, Associate Director; Faculty Development Center—Furman University; John G. Kaup, Director of Science Education—Furman University

Poster 29: Active Learning and Inclusive Pedagogies through Course Transformations: Proof-of-Concept in Biology and Chemistry

Laurel K. Willingham-McLain, Consulting Faculty Developer—Syracuse University; Jessica Dewey, STEM Teaching Consultant—Duke University; Martha Kalnin Diede, Director of Strategic Initiatives—General Dynamics Information Technology; Jacques Safari Mwayaona, Faculty Development Fellow—Syracuse University; Jon French, Associate Teaching Professor—Syracuse University; Heather Coleman, Associate Professor—Syracuse University; Jason PhD, Associate Professor—Syracuse University; George Langford, Professor Emeritus—Syracuse University

Poster 30: Assessment Redefined: Designing Programmatic Competency-based and Synoptic Assessment in Physics Programs

Samantha L. Pugh, Professor of STEM Higher Education—University of Leeds; Gavin Burnell, Associate Professor—University of Leeds

Poster 31: Career Shadowing Experiences Increase Student Retention in STEM Majors

Bethany V. Bowling, Senior Associate Dean, College of Arts & Sciences—Northern Kentucky University; Allison Parker, Assistant Professor, Department of Biological Sciences—Northern Kentucky University; Denice Robertson, Director, Center for Teaching & Learning—Northern Kentucky University
Poster 32: Empathic Convergence  
Bill Hill, Executive Director of the STEAM institute—Jacksonville University

Poster 33: A Two-Quarter Seminar  
Program Increases Underrepresented STEM Students’ Sense of Belonging  
Emily J. Borda, Director, Science, Math, and Technology Education—Western Washington University; Dustin Van Orman, Research Associate, Science, Math, and Technology Education—Western Washington University; Dan Hanley, Director of STEM Education Research and Evaluation—Western Washington University

Poster 34: An Asset-Based Approach to Understand Top-Administrators’ Perspectives About Inclusive Strategies  
Liliam Casillas Martinez, Director of Center for Teaching and Learning—University of Puerto Rico-Humacao; Liz Hernandez, Senior Educational Specialist—Ciencia Puerto Rico

Poster 35: BioInnovation Labs: New Spaces for Broadening and Enriching Student Engagement in Biologically-Focused Creative Work  
Marc Facciotti, Professor—University of California, Davis; Andrew I. Yao, Research and Development Engineer—University of California, Davis

Poster 36: Challenges and Initial Findings From a Faculty Development Program for Part-Time STEM Faculty  
Kimberly A. Lawler-Sagarin, Associate Dean of the Faculty, Associate Professor, Chemistry and Biochemistry—Elmhurst University

Poster 37: Establishing a Sustainable Culture of Undergraduate Research at a Two-Year Community College  
Lance Bowen, Dean, School of Science, Technology, & Education—Anne Arundel Community College; Kirsten Casey, Assistant Dean of Science—Anne Arundel Community College

Poster 38: Higher Education Interventions for Preparing Undergraduate Students to Thrive in the Data Economy  
Shawna F. Brooks, Activity Director—Bethune-Cookman University; Antoinette Destefano, Research Manager—Bethune-Cookman University

Poster 39: Increasing Mathematics Preparedness in Incoming STEM Students  
Bethany V. Bowling, Senior Associate Dean, College of Arts & Sciences—Northern Kentucky University; Brooke Buckley, Chair, Department of Mathematics & Statistics—Northern Kentucky University

Poster 40: Recognizing and Addressing STEM Faculty Fixed Mindset  
Anne V. Kelsch, Director of Faculty Development—University of North Dakota

Poster 41: Shifting Demographics in STEM Fields Through Community College Research Program  
Jackie T. Swanik, Associate Dean—Wake Technical Community College

Poster 42: STEM Has a Major Problem – But You Can Help!  
Harold Stanislaw, Professor of Psychology—California State University, Stanislaus

Poster 43: The National Science Foundation Engineering PLUS Alliance STEM PEER Academy  
Claire J. Duggan, Executive Director—Northeastern University, The Center For STEM; Jennifer O. Love, Associate Director and Associate Teaching Professor—Northeastern University; Elizabeth H. Blume, Program Director DHS STEM PEER—Northeastern University

Poster 44: Transformative Learning Through International Research Experiences  
Mika Munakata, Professor—Montclair State University; Su San Lim, Doctoral Student in Mathematics Education—Montclair State University; Carlos Molina, Professor—Montclair State University

Poster 45: Building Capacity for Excellence in STEM Education  
Margarita M. Alarilla, Project Director—St. Mary’s University

Poster 46: Computers in Science and Math (CiSM): Incorporating Computational Problem-Solving in Science and Math Majors  
Michael C. Slade, Associate Professor—University of Evansville

Poster 47: Learning Together: An Inter-Institutional Collaboration to Lead Inclusion in STEM  
Emily J. Borda, Director, Science, Math, and Technology Education (SMATE)—Western Washington University; Holly S. Godsey, Professor—University of Utah; Marc Facciotti, Professor—University of California, Davis; Saraswathy Nair, Professor and Chair—University of Texas Rio Grande Valley
**TYPE III: NATIONAL LEVEL INTERVENTIONS**

**Poster 49: Fly-CURE and Connecting Curriculum: Multi-institutional course-based undergraduate research experiences in genetics and beyond**

*Kayla Bieser,* Chair and Associate Professor—Nevada State University; *Jacob Kagey,* Associate Professor—University of Detroit Mercy; *Joyce Stamm,* Professor of Biology—University of Evansville; *Alyssa Vrailas-Mortimer,* Associate Professor—Oregon State University; *Julie Merkle,* Assistant Professor—University of Evansville; *Jamie Siders,* Associate Professor—Ohio Northern University

**Poster 50: Student Engagement with Health Disparity Data to Illustrate That Race is a Social Construct**

*Erica Gerace,* Genomics Educator—The Jackson Laboratory

**Poster 51: Developing an Inclusion-Based Leadership Network to Support a Nationwide Multi-Institutional Collaboration to Improve DEI for Introductory-Level STEM College Students**

*Karen L. Schmeichel,* Professor of Biology—Oglethorpe University; *Renée Cole,* Professor of Chemistry and Professor—University of Iowa; *Richard Gurney,* Professor and Department Chair—Simmons University; *Rachael Hannah,* Associate Professor—University of Alaska Anchorage; *Gable Smith,* Dean of Elon College, the College of Arts and Sciences and Professor of Psychology—Elon University; *Stephanie Spong,* Director, Teaching Support and Digital Learning—University of New Mexico; *John T. Tansey,* Program Director, Professor—Otterbein University; *Jennifer K. Uno,* Associate Professor of Biology and Associate Director of CATL—Elon University; *Madison Fitzgerald-Russell,* Kathryn M. S. Johnson, Community Network Director—IH3 LCC2, Xavier University

**Poster 52: Reflections on a Peer Mentoring Program Implementation: Outcomes and Actions**

*Jillian L. Wendt,* Associate Professor of Science Education—University of the District of Columbia

**Poster 53: The NSF Nexus Institute for Quantitative Biology (NIQB) Consortium: An Inter-Institutional and Interdisciplinary Collaboration to Build Biology Modules infused with Quantitative Reasoning**

*Beatrice Lauman,* Associate Dean—University of Maryland Baltimore County (UMBC); *William LaCourse,* Dean, College of Natural and Mathematical Sciences—University of Maryland Baltimore County; *Jeffery Leips,* Professor—University of Maryland Baltimore County; *Patricia J. Turner,* Dean of Science, Engineering and Technology (Emeritus)—Howard Community College; *Lance Bowen,* Dean, School of Science, Technology, & Education—Anne Arundel Community College; *Christine DeStefano,* Assistant Dean for Science—Community College of Baltimore County (CCBC); *K. Rebecca Thomas,* Department Chair, Biology—Montgomery College; *Tory Williams,* Assistant Director for Pedagogical Research—University of Maryland Baltimore County

**Poster 54: Racial Justice Technology Policy, RJxTP, The Past and Future of Education in America**

*Maria Madison,* Interim Dean, The Heller School for Social Policy and Management—Brandeis University; *Ezra K. Tefera,* Program Director and Researcher—Racial Justice x Technology Policy Program, Heller School for Social Policy and Management, Brandeis University; *Janelle Ridley,* Founder and CEO—Affirmation Education

**Poster 55: Integrating Quantitative Skills into Undergraduate Core Biology Courses Across Institutions**

*Sarah Leupen,* Principal Lecturer—University of Maryland Baltimore County; *Kathleen Hoffman,* Professor and Associate Dean for Faculty Advancement—University of Maryland Baltimore County; *Hannah Pie,* Associate Professor—Howard Community College; *Michelle Starz Gaiano,* Professor—University of Maryland Baltimore County; *Patricia J. Turner,* Dean of Science, Engineering and Technology (Emeritus)—Howard Community College; *Tory Williams,* Assistant Director for Pedagogical Research—University of Maryland Baltimore County

**Poster 56: PERSIST: Project-Based Experience to Retain Students in STEM**

*Brian McFarland,* Associate Vice-President for Academic Affairs—Morningside University; *Kimberly Christopherson,* Professor of Education—Morningside University; *John R. Helms,* Dean of Work Learning—Sterling College; *Leugers Chad,* Associate Professor of Biology—Morningside University; *Timothy Sesterhenn,* Associate Professor of Biology—Morningside University

**Poster 57: The Impact of Late Enrollment on Student Success**

*Arlene Maki Haffa,* Professor—California State University Monterey Bay; *Corin D. Sloyne,* Associate Professor—California State University Monterey Bay; *Michael Dorsch,* Data and Visualization Analyst—California State University Monterey Bay; *Sathyan Sundaram,* Institutional Assessment and Research Senior Data Scientist—California State University Monterey Bay
Poster 58: AI Tools in the Academic Arena: Assessing Their Role in Facilitating and Detecting Cheating
Dongyang Deng, Assistant Professor—North Carolina A & T State University

Poster 59: Black is Not a Monolith: Exploring Differences in Identity and Perceptions of Stereotypes Among Black HBCU STEM Students
Laquesha Barnes, Research Assistant—University of the District of Columbia; Tamisha Charles, Undergraduate Research Assistant—University of the District of Columbia; Yanique Jordan McKenzie, Post Doctoral Scholar—University of the District of Columbia; Patrice Greene, Post Doctoral Scholar—University of the District of Columbia; Afia Fredericks, Associate Professor of Psychology—University of the District of Columbia

Poster 60: Emerging Careers in STEM Education: The Case of Underwater ROV Operators
Kent Crippen, Professor of STEM Education—University of Florida; Minji Yun, Doctoral Student—University of Florida

Poster 61: Institutional and Leadership Predictors of HBCU Success in Broadening Participation in STEM
Elizabeth Jaeger, Associate Professor of Social Science—University of the Virgin Islands; Camille McKayle, Provost, Professor of Mathematics—University of the Virgin Islands; Kimarie Engerman, Dean, Professor of Psychology—University of the Virgin Islands; Curtis Joseph, Graduate Research Assistant—University of the Virgin Islands; Karyl Askew, Principal Consultant; CASL Research Consultant—Karyl Askew Consulting

Poster 62: Leveraging In-Context Online Discussion of Open Educational Resources to Enhance Student Engagement and Learning
Marc Facciotti, Professor—University of California, Davis; Michele M. Igo, Professor and Associate Dean—University of California, Davis; Kamali Sripathi, Assistant Project Scientist—University of California, Davis

Poster 63: Measuring the “Hard to Measure”: Leveraging a Robust Explanatory Framework for Learning and Development in College to Investigate Psychoeducational Characteristics Specific to Mathematics
Brian Darrow, Assistant Professor of Mathematics—Southern Connecticut State University

Poster 64: Online and Face-to-Face Modalities for General Chemistry and the Effectiveness of “Talking the Thought Process”
Lori A. Vermeulen, Professor of Chemistry—Stockton University

Poster 65: SANTS Scholars Program: The Study of Students’ Experiences and Identities as STEM Majors
Eliza Leszczynski, Assistant Professor—Felician University; John Blevis, Assistant Professor—Felician University

Poster 66: Using Reflexivity to Support Democratic Principles for Learning About Science Instruction
James Foss, Asst. Prof. Elem Ed.—University of Minnesota Crookston

Poster 67: Early Exposure: Characterizing Teaching and Learning Experiences in STEM
Corin D. Slown, Associate Professor—California State University Monterey Bay; Dennis Kombe, Associate Professor—California State University Monterey Bay

Poster 68: Eastern Success Scholars: Interventions to Promote STEM Identification in Low-Income, High-Achieving College Students in a STEM Learning Community
Laura S. Rodriguez, Assistant Professor of Education—Eastern Connecticut State University

4:30 p.m. – 6:00 p.m.  Workshops

Workshop 3.1
Jefferson Room

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Using Case Studies to Elicit Affirming Mentoring Practices
The National Science Foundation (NSF) S-STEM Program aims to increase the number of academically talented low-income students who graduate with STEM degrees and contribute to the nation’s innovation economy. Awards fund scholarships and provide resources to create, adapt, implement, and study support strategies and identify and understand effective evidence-based activities to advance recruitment, retention, and success of STEM students. S-STEM Programs have a mentoring component or intervention whereby students are mentored by STEM faculty or STEM professionals. While STEM faculty have a great deal of experience teaching in their content area, few have formal training in mentorship. In this workshop, participants will be engaged with several mentoring case studies from which they will discover mentoring best practices that they could implement at their institution. Furthermore, the mentoring case studies could be applied and/or adapted to particular STEM programs or departments for mentor training purposes.
Ileana Vasu, Mathematics Professor and Chair, STEM Education Researcher—Holyoke Community College; Rebeckah Dupont, Professor—Augsburg University; Perla Myers, Professor—University of San Diego; Yu-Ju Kuo, Professor—Indiana University of Pennsylvania; Oscar Vega, Professor—Fresno State University

WORKSHOP 3.2
Lincoln Room

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Hiring for Transformation: Search Commitee Practices for Inclusive Faculty Hiring

Academia is a space where majoritized individuals have long been represented. Recently, student populations have become more diverse; however, changes in faculty demographics have not kept pace. This lack of representation in faculty limits the diversity of ideas and success of students from different communities. To address this, we utilized the context of faculty search committees to examine how inclusive hiring practices are understood and implemented by faculty in science, technology, engineering, and mathematics (STEM) disciplines at four research-intensive institutions. Through the facilitation of learning communities with faculty members, we were able to identify two key themes that guided an inclusive faculty hiring process. These two themes were the procedural and reflective nature of a search’s logistics and evaluation criteria. Through this work, we make recommendations on the application of inclusive hiring practices that could support the diversification and inclusion of faculty from minoritized communities across STEM at different institutions.

Erik Arevalo, Post-doctoral Scholar—University of California-San Diego; Eva Fuentes-Lopez, Graduate Student—University of California-San Diego; Mike Wilton, Assistant Teaching Professor—University of California-Santa Barbara; Stanley Lo, Teaching Professor—University of California-San Diego

WORKSHOP 3.3
Roosevelt Room

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Investigating Identities Among First Year Students

Incoming students of minority backgrounds may feel a dissonance between their identities at home and their place in their college communities, which often leads to imposter syndrome or an obstructed sense of belonging. Both faculty and student understanding of these experiences is desperately needed for students to feel comfortable in their academic communities. Through directed small-group discussions about individual experiences at Grinnell College, the objective is for incoming students to feel connected to the community, be more secure in their identities, and most importantly be made more aware of issues they may face as a collective. In this workshop, by analysis of this event in Grinnell and through similar discussions, members of other institutions may learn from findings at Grinnell to inform the next steps they may take at their own institution. Ultimately, participants may better understand how to address the niche experiences students have at their respective institutions.

Caitlin F. Ong, 2nd Year Student—Grinnell College; Budhil Thijm, Student—Grinnell College; Minna Mahlab, Director of the Science Learning Center | Lecturer—Grinnell College

SESSION 7.1 INNOVATION/IDEATION SESSIONS
Potomac IV

This session includes the two separate presentations listed below.

TYPE III: NATIONAL LEVEL INTERVENTIONS

An Innovative Community of Practice: Leveraging Transfer Student Capital to Improve Student Success

Coker University and Florence Darlington Technical College are working together on an S-STEM project titled, “Pee Dee Scholars (PDS): Forging STEM Transfer Success in the Pee Dee Region of South Carolina”. The PDS project features an innovative, cross-institutional cohort to: build a community of scholarship among STEM faculty and students; share resources; increase persistence, retention, and graduation in STEM disciplines; and improve transfer rates for students who are underrepresented in STEM. Alongside a national partner, the Yes We Must Coalition (YWMC), we have developed a new Community of Practice (CoP) across the YWMC community (37 YWMC institutional members where undergraduate Pell-dependent enrollment is more than 50% and >600 “friends” IHES), intended to support faculty-mentoring efforts related to adopting the Transfer Student Capital (TSC) framework (Lukszo and Hayes, 2020). The CoP will focus on identifying and addressing systemic barriers to success for low-income transfer students and working together to develop solutions.

Joseph E. Flaherty, Professor—Coker University; Rick Roberts, Managing Director, South Carolina Advanced Technological Education Center—Florence Darlington Technical College; Susan Henderson, Provost—Coker University; Ann Landis, Program Manager—Yes We Must Coalition; Gloria Nemerowicz, President—Yes We Must Coalition
Session 7.2 Innovation/Ideation Sessions

Session 7.3 Regular/Lightning Sessions

Session 7.2 INNOVATION/IDEATION SESSIONS

Potomac II

This session includes the two separate presentations listed below.

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Constructive Dissent for Educational Change: Hope, Joy, and Poetry for Transformation

The goal of the Constructive Dissent for Educational Change (CDEC) project is to catalyze transformation of engineering education to become antiracist. This goal is approached through a workshop that helps engineering education professionals to (1) articulate visions of an antiracist future for engineering education, (2) assess the opportunities presented by the gaps between the present and that future, and (3) identify actions to take to leverage those opportunities and work toward that antiracist future. These objectives are accomplished through a framing of "constructive dissent," dissenting from the status quo with hope and joy. The first pilot workshop was offered in May 2023 and received overwhelmingly positive feedback affirming the effectiveness of the unconventional workshop approaches, drawing on literature and theater, and the emphasis on hope and joy. Ongoing work on this project focuses on the role of hope, joy, and the use of theater and text in catalyzing transformation.

Dana Holland Zahner, Researcher—University of Colorado Boulder

TYPE IV: STEM EDUCATION RESEARCH

Academic Belonging Validation at the Major/Department Level: A Model for Expanding Opportunities and Limiting Doubts About the Potential of Underrepresented and Transfer Students to Succeed in STEM

The transfer pathway from community colleges to universities has potential for advancing equity in STEM, yet students from low-income and racially and ethnically minoritized backgrounds continue to be underrepresented in these majors. This study developed an actionable model of academic belonging validation that is grounded in the day-to-day practices inherent in STEM majors. The study takes a sociological approach to belonging that connotes membership and participation in a cultural system or environment. It also draws on validation theory, which foregrounds the influence of students’ developing views about their competence and ability to succeed in their major. Data were generated from in-depth semi-structured interviews with 48 underrepresented students in STEM. Results have implications for targeting services and enhancing day-to-day practices in departments that ensure all underrepresented STEM students have opportunities to cultivate their academic belonging and that can compensate for the situational disadvantages faced by STEM transfer students.

Vanessa Hill, Professor—Springfield Technical Community College; Monica Flippin Wynn, AVP—Gardner Institute

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Resistance is Futile: The Continuous Quest to Rethinking Teaching and Learning in STEM

The session will center on the topic of how faculty resistance hinders the process of transforming their courses into culturally relevant and inclusive communities that engage and create spaces of belonging and promote self-efficacy to historically resilient student populations. The presenters will demonstrate how difficult it is to rework the science, technology, engineering, math (STEM) classroom, particularly as we believe that the inequity, racism, and exclusion in STEM is part of a system larger than classroom dynamics. The presenters will also discuss how to lessen faculty resistance and share how their courses have been redesigned and revised, utilizing Ladson-Billings’ culturally relevant pedagogy, Freire’s humanizing pedagogy and Rendon’s validation theory. Finally, the presenters will share how their pedagogical transformations have improved how students perceived, performed, and persisted and began to feel as if they belonged and were competent to complete the work.

TYPE III: NATIONAL LEVEL INTERVENTIONS

Broadening Participation of Aerospace Engineers Through Experiential Learning and Structured Mentorship Program

Sponsored by NASA, an integrated educational, research, and professional traineeship program was established by the multi-institutional coalition led by FAMU (an HBCU) in partnership with FSU, and UCF (an HSI). This partnership unites expertise and resources with shared strategies to enhance the broadening of participation of URMs in aerospace engineering fields. The program has engaged cohorts of URMs in coordinated activities, including project-based learning, Research Experiences for Undergraduates (REU), summer internships, structured mentorship, and professional development training. In the proposed session, we will present our best practices and accomplishments empowering students professionally in collaboration with 4 NASA centers and Air Force Research Lab. We will also present preliminary results of the implementation of mentorship program.
engaging peer, and near-peer mentoring. We anticipate that the purposeful attention to creating a culture of mentorship with associated success demonstrated by program participants can be disseminated as a proven model for broadening participation.

**Chiang Shih**, Professor—FAMU-FSU College of Engineering, Florida A&M University & Florida State University; **Carl Moore**, Associate Professor—FAMU-FSU College of Engineering

**TYPE IV: STEM EDUCATION RESEARCH**

**Developing Discipline-Specific Mental Health Interventions: A Case Study in Engineering**

Within engineering, mental health distress differentially impacts students who are historically excluded from STEM and distressed students are less likely to seek help compared to their non-engineering peers. Therefore, this mixed-methods study aimed to identify targets for discipline-specific mental health interventions aimed at improving help-seeking amongst engineering students. The findings indicate that engineering students who self-report low intention to seek help for their mental health are more likely to believe that help-seeking is a sign of their own weakness and more likely to believe that it goes against the expectations of those around them. Further, they are less likely to believe that seeking help would lead to positive mental health outcomes such as making them feel better, improving their relationships and improving their academic performance. This work provides guidance for development of evidence-based, discipline-specific interventions in other at-risk student populations with their own unique educational cultures and context.

**Sarah A. Wilson**, Assistant Professor—University of Kentucky; **Joseph H. Hammer**, Associate Professor—University of Kentucky

**SESSION 7.4 REGULAR/LIGHTNING SESSIONS**

Potomac I

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Biomedical Freshman Research Initiative (BFRI): A CURE to Increase the Retention, Academic Success and Preparation of Potential Underrepresented STEM Students**

Minority students, including Hispanics or Latinos, are exiting at higher rates than their non-minority counterparts from the academic pipeline and this is especially accentuated in the science, technology, engineering, and mathematics (STEM) disciplines. Undergraduate research experiences (UREs) are becoming a critical component in increasing participation and academic achievement of underrepresented groups in the sciences however most research opportunities are offered to undergraduates later in college after the critical period of attrition and often to academically strong students who are not likely to exit from the science fields. The Biomedical Freshman Research Initiative (BFRI), is a course-based undergraduate research experience (CURE) at a MSI, was developed to provide research experiences early and to any interested student regardless of prior academic achievements. Our data suggests that BFRI is a promising avenue to provide minority students the opportunity to participate in research early on and retain them in the science pipeline.

**Sue Anne Chew**, Associate Professor—University of Texas at Rio Grande Valley (UTRGV); **Kristina Vatcheva**, Assistant Professor—University of Texas Rio Grande Valley; **Arely Salinas**, Undergraduate Student—University of Texas Rio Grande Valley; **Hilda Tejeda**, Undergraduate Student—University of Texas Rio Grande Valley

**SESSION 7.5 REGULAR/LIGHTNING SESSIONS**

Potomac III

This session includes the two separate presentations listed below.
Integration of Learning Strategies in Math Courses: Impact on Student Mindset, Self-Regulated Learning and Performance

Development of students’ growth mindset and self-regulated learning (SRL) of mathematics can be fostered by coordinating instruction and assessment with teaching and learning. This coordination can occur via the intended integration of discussions and knowledge about effective learning strategies within the math course content. The study explores and employs innovative ways to seamlessly integrate evidence-based cognitive, metacognitive, and management learning strategies within the course via the presentation of course material, class discussions, assignments, and assessments. The conceptual framework of this study will provide a model for understanding the interrelationships between four constructs: learning strategies, math mindset, SRL, and performance, while accounting for the students’ racial, gender, and math identity on the main relationships. The study will utilize a repeated measures between-subjects design and a mixed-methods approach to collect and analyze quantitative and qualitative data on the four constructs.

Sayed Mostafa, Assistant Professor—North Carolina A&T State University (NCAT); Katrina Nelson, Teaching Associate Professor—North Carolina A&T State University; Tamer Elbayoumi, Assistant Professor—North Carolina A&T State University; Kalynda Smith, Assistant Professor—North Carolina A&T State University; Guoqing Tang, Professor—North Carolina A&T State University

Creating and Sustaining a Student STEM Success Center: It’s More Than Tutoring

To better serve a diverse and changing student body, an institution should create, invest resources in, and consistently encourage the use of on-campus academic support programs. These programs may also be essential to the development of STEM-centric identities and capital among aspiring STEM professionals. The STEM Success Center (SSC) at Maryville College, an unconventional academic support program, empowers students to take ownership of their education by providing a highly accessible collaborative learning community that features a staff mentor and multiple student mentors. Over the last two years, a variety of strategies have increased student engagement with the STEM Success Center, including by students from underrepresented groups and those with high financial need. Additionally, the total number of person-hours spent in the center has increased significantly as well as the average number of hours per student. We are investigating whether increased attendance impacts academic performance as measured by course grades.

Maria Siopis, Professor of Mathematics—Maryville College; Brett Longwith, STEM Success Manager—Maryville College
AAC&U REFRAMING INSTITUTE

Re-Framing Institutional Transformation in Ways that Prioritize Non-Tenure Track/Adjunct STEM Faculty

Lansdowne Resort & Conference Center
Leesburg, Virginia

JULY 28 – AUG 1, 2024

Generously funded by the National Science Foundation
Cultivating Project Ideas for the NSF Innovation in Two-Year College STEM Education (ITYC) Program

The National Science Foundation recently launched the Innovations in Two Year College STEM Education program. Its goals are to (1) center students in the effort to advance innovation, promote equitable outcomes and broaden participation for all students in STEM education at two-year colleges, and (2) enhance the capacity of two-year colleges to harness the talent and potential of their diverse student and faculty populations through innovative disciplinary, multi-department, and college-wide efforts. In this seminar, program directors will work with attendees to cultivate project ideas that may result in proposal submissions. Program directors will highlight strategies for building successful inter- and intra-institutional partnerships and using disaggregated institutional data to provide context for the project. Attendees will learn more about the submission and review process and will be encouraged to engage program directors in a conversation with a brief summary of their potential project.

Kaylyn Owens, Program Director—National Science Foundation; Michael Davis, Academic Dean—Northern Virginia Community College

GrantWise: An Introduction to NSF S-STEM Grant Writing Success

For many faculty members, especially those without formal grant writing training or those at institutions with limited grant support, the process of “getting a grant” can seem daunting. As part of the STEM Higher Education Conference, the 2-hour GrantWise Workshop is designed for participants who are interested in securing extramural funding to bolster STEM education but don’t know where to start. We aim to demystify the grant-seeking process, emphasizing: (1) Knowledge of sponsor priorities and expectations; (2) Targeted communication skills; (3) Building and nurturing critical relationships and networks; (4) Streamlined proposal management; and (5) Crafting competitive grant proposals.

In the first segment of GrantWise, we’ll delve into the broad Federal funding ecosystem, spotlighting the National Science Foundation’s Scholarships in Science, Technology, Engineering, and Mathematics Program (S-STEM). Recognized as a signature program for PUIs, S-STEM aids institutions in granting scholarships to academically gifted low-income students, ensuring their seamless journey from recruitment to graduation in STEM.

Part 2 offers a choice between two concurrent sessions:

- **The HBCU Roundtable** - This session invites HBCU faculty to a conversation about engaging in STEM education or disciplinary based education research, how to obtain funding for such research, how to establish collaborations, and how it can fit into the professional goals of faculty. Ultimately, researching and publishing what works in STEM education at HBCUs, can further illuminate the academic strengths of these institutions.

- **S-STEM Office Hour** - Designed for faculty who want to learn more about the S-STEM opportunity, we will dive deep into the funding announcement, brainstorm fundable ideas, and discuss tools and strategies to draft a standout application well before the submission deadline.

Claudia Rankins, Senior Research Associate—PRISSEM Academic Services, LLC; Jessica Venable, Partner—Thorn Run Partners

SESSION 8.1 INNOVATION/IDEATION SESSIONS

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Inclusive Assessment: An Alternative Grading Scheme for Undergraduate Science Courses**

Labor-based grading contracts (Inoue, 2019) and self-graded participation and engagement memos (Lang, 2016) are innovative, inclusive approaches that have the potential to transform traditional grading practices. Labor-based grading contracts base grades only on the labor completed by the student and not on faculty judgment of the quality of student work. Self-graded participation and engagement memos empower students to reflect on their level of engagement and contributions to the learning community, encourage
students to take responsibility for their learning, and foster a sense of accountability and autonomy. The purpose of this ideation session is to share an example of a labor-based grading contract that includes a self-graded participation and engagement memo from an undergraduate science course, discuss preliminary data on the effectiveness of this untraditional grading scheme, consider future ways to test whether the contract is effective, and explore the benefits and challenges associated with implementing such a scheme.

**Janna M. Levin, Associate Professor—UNC School of the Arts**

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Improving Student Motivation Through Portfolio Based Ungrading**

For years we have struggled to understand what is motivating students to be successful in our Quantitative Analysis course. We previously developed a project-based learning curriculum in which students use real samples to address course objectives. Slowly over the years teaching the course, and further exacerbated by COVID, we have seen increasingly less student engagement with learning and more focus on doing the minimum to achieve a targeted grade. To refocus students on learning, we have adopted portfolio based ungrading. We engage in a conversation with students around their learning and the evidence they can provide within their portfolio. We do not assign scores or grades on any individual course activity but provide detailed feedback. We will describe the goals, the first attempt of using this approach, and ideas for expansion beyond this course. We will welcome attendees’ impressions, suggestions, and ideas.

**Brett K. Simpson, Associate Professor—Coastal Carolina University; Drew Budner, Associate Professor—Coastal Carolina University**

**SESSION 8.2  INNOVATION/IDEATION SESSIONS**

Potomac II

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Learning to Imagine Together: Engaging Undergraduate Researchers in Equity-Centered Rural Tech Initiatives**

Undergraduate research & service learning are well-documented high-impact practices (Kuh, 2009) that have a measurable impact on scholar development and future civic engagement (Chittum et al., 2022). Carnegie Mellon University’s Robotics Institute Summer Scholar’s program (RISS) uses evidence-based approaches and engages an extensive network of mentors to extend the traditional 10-week summer research experience into a multiple-stage scholar development community. A pilot project was developed that coupled these robotics undergraduate researchers with rural community and political leaders to identify barriers to STEM education and careers collectively. The project shifted from a one-direction service-learning pilot to an ongoing rural-R1 collaboration focused on mutuality and reciprocity by embedding collective impact and appreciative inquiry practices. By doing so, space was created for the community and undergraduate robotics researchers to imagine futures connected to and impacted by STEM that were empowering and supportive rather than solely connected to careers, economic survival or development.

**Rachel Burcin, Global Programs Manager & Co-Director RISS—Carnegie Mellon University; Vishwas Mruthyunjaya, Senior Research Engineer: NLP—Megagon Labs; Catherine Evans, Graduate Student—Carnegie Mellon University**

**SESSION 8.3  INNOVATION/IDEATION SESSIONS**

Potomac V

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Teaching AI Literacy for AI-Assisted Learning and Scientific Writing**

This presentation argues in favor of AI-assisted learning and writing in higher education. A novel assessment will be introduced that teaches undergraduate students how to: (i) obtain AI through ChatGPT on a course-related
topic; (ii) critically assess information produced by AI; (iii) use scientific journal articles to support thoughts and opinions; (iv) cite and reference sources in APA format; and (v) engage in informed discourse with others. Although the assessment was developed for a specific assignment type (discussion board) within a specific course (social psychology) and learning environment (asynchronous online), modifications for adaptation to any writing assignment in any course will be discussed. Best practices for deterring students’ unauthorized AI use in writing assessments will also be briefly explored.

**Seminars**

**SESSION 8.4**

**Seminars**

**TYPE III: NATIONAL LEVEL INTERVENTIONS**

**Institutional Collaboration to Recruit, Retain and Graduate Low-Income Students in Biology**

Four small, private, and primarily undergraduate institutions have partnered with the Yes We Must Coalition to implement a carefully planned and assessed series of activities with the intention of increasing the persistence of a diverse cohort of low-income students majoring in Biology across our institutions. By creating cross-institutional networks of students, faculty, project coordinators, and external scientists, we have formed a stronger network of support and scientific identity for 114 S-STEM Scholars in Biology. Our project produced positive effects on the recruitment, persistence, and graduation rate of STEM scholars, by leveraging community to positively influence student identity and success. The purpose of the presentation will be to share key quantitative and qualitative results supporting many of the programmatic elements, including an annual “STEM Scholars Institute” that brought together scholars from each institution, and to demonstrate a scalable approach to enhancing the college experience and success of low-income STEM students.

**Bo Idsardi**, Associate Professor—Eastern Washington University

**Jennifer Lamb**, Associate Professor—St. Cloud State University; **Gloria Nemerowicz**, President—Yes We Must Coalition; **Megan Mullins**

**SESSION 8.5**

**Seminars**

**Jefferson Room**

**TYPE IV: STEM EDUCATION RESEARCH**

**Relationships Between Undergraduate Instructors’ Conceptions of How Students Learn and Their Instructional Practices**

Supporting changes in undergraduate STEM instruction requires an understanding of the relationship between STEM instructors’ conceptions and practices. In this study the authors used the Teacher-Centered Systematic Reform (TCSR) model as a framework to understand how instructors’ conceptions are related to their instructional practices. This multiple methods study used qualitative methods to describe instructors’ conceptions of how students learn and quantitative methods, including a hierarchical cluster analysis, to analyze the types of relationships that exist between their conceptions and practices. We identified three distinct clusters of participants based on the relationships between instructors’ conceptions and practices: congruent lecturers, congruent active learning facilitators, and incongruent lecturers. We found that student-centered conceptions may be necessary but are not sufficient for instructors to implement active learning. Implications focus on instructional and institutional change efforts.

**Bo Idsardi**, Associate Professor—Eastern Washington University
8:00 a.m. – 9:30 a.m.  Workshops

♦ WORKSHOP 4.1
Lincoln Room

TYPE II: INSTITUTION LEVEL INTERVENTIONS
Voices of Inclusion: Supporting Students' Sense of Belonging Through Asset-Based Frameworks

Many students and particularly those historically underrepresented in STEM (including women, first generation students, low-income students, and students of color) are often perceived from a “deficit” perspective, i.e., lacking the preparation, learning abilities, and cultural capital necessary to achieve academic success. Culturally Relevant and Responsive Practices (CRP), (Ladson-Billings, 1995; Gay, 2002) and Yosso’s model of Community Cultural Wealth (CCW), are equity-centered frameworks that not only challenge this deficit perspective but offer a set of principles that is inclusive and student-centered. CRP and CCW have been helpful in centering equity in STEM teaching in our institution and may be helpful to programs looking to catalyze institutional change.

After an introduction to these frameworks and how we used them in our institution, participants will explore how these frameworks could be applied in their institutions and programs.

Ileana Vasu, Mathematics Professor and Chair, STEM Education Researcher—Holyoke Community College; Jane Lerner, Director, Title III and Learning Collaborative—Holyoke Community College

♦ WORKSHOP 4.2
Roosevelt Room

TYPE II: INSTITUTION LEVEL INTERVENTIONS
Exploring How Student-Faculty Pedagogical Partnership Can Humanize STEM Education

Drawing on a recently published literature review of how student-faculty pedagogical partnerships can humanize STEM education, this workshop invites participants to explore the five ways identified in the literature that pedagogical partnerships support such humanizing across STEM disciplines and institutional contexts. These include: (1) giving faculty access to students’ perspectives and humanity; (2) supporting faculty in being, and being perceived as, more fully human; (3) providing dedicated space and time to develop equitable approaches; (4) supporting the enactment of equitable teaching; and (5) fostering a sense of mattering, belonging, and agency in students. The facilitator will provide an overview student-faculty pedagogical partnership and of the literature review. Participants will read and discuss excerpts from articles and essays authored by faculty and student partners, consider applications to their own contexts, and identify steps they might take in their own institutions toward creating or expanding such partnership approaches.

Alison Cook-Sather, Mary Katharine Woodworth Professor of Education and Director, Teaching and Learning Institute—Bryn Mawr College

9:15 a.m. – 10:15 a.m.  Featured Session 9 [Pre-Registration Required]
Conference Theater

NSF Hours: Funding Opportunities for Broadening Participation in STEM

Recently, the National Science Board (NSB, 2020) noted that our nation’s S&E enterprise has not kept pace with demographic trends or with the centrality of science and engineering to our economy; and they’ve issued a strong call for “increased inclusion of Black people in S&E at all levels including in opportunities to participate, lead, and thrive. This is particularly timely given the deadly pandemic and deep sociopolitical divides that now make the need for more diverse scientists no longer questionable, but factual. The mechanisms by which the NSF is able to heed this call include a keen focus on investing in the most innovative approaches to broadening participation in STEM. The AAC&U Transforming STEM Higher Education Conference showcases and offers insight into the most recent funding priorities for advancing the reform of US undergraduate STEM education and the most viable and practical ways for accessing them. Session leaders will discuss future directions of undergraduate STEM education reform and review funding mechanisms for broadening participation in STEM, as well as NSF’s most recent solicitations for proposals.
aimed at advancing a national agenda for the reform of undergraduate STEM education that prioritizes racial equity.

**Carrie Hall**, Senior Program Officer—National Science Foundation

9:15 a.m. – 10:15 a.m.  Featured Session 10 [Pre-Registration Required]

Virginia Room

**Exploring NSF Opportunities to Support STEM Broadening Participation at HSIs**

The National Science Foundation (NSF) is committed to broadening participation, and this is evident through the variety of investment priorities related to preparing a diverse, globally engaged science, technology, engineering, and mathematics (STEM) workforce; integrating research with education and building capacity; and expanding efforts to broaden participation from underrepresented groups and diverse institutions across all geographical regions in all NSF activities. To meet its priorities, it is imperative that the NSF portfolio represents the IHE community it serves, including strong representation from HSI institutions and their scholars. The NSF acknowledges that HSIs are heterogeneous and unique in many respects. Whether 2-year or 4-year, public or private, the HSIs serve a wide range of students with a diverse set of educational backgrounds. The need for tailored initiatives, policies, and practices (mindful of socio-cultural awareness) should meet the students’ needs and institutions’ expectations while advancing undergraduate students at HSIs toward higher levels of academic achievement in STEM. In addition, scientists and educators at minority-serving institutions, or MSIs, are crucial to advancing the frontiers of knowledge in the science, technology, engineering, and mathematics enterprise. After attending this workshop, attendees will a) learn about NSF opportunities that specifically benefit HSIs in the AACU community, b) have a general understanding of NSF Merit Review Process, and c) will learn how to best position themselves for successful proposal submission.

**Michael Ferrara**, National Science Foundation; **James Alvarez**, National Science Foundation

9:15 a.m. – 10:15 a.m.  Concurrent Sessions 9

◆ **SESSION 9.1**  INNOVATION/IDEATION SESSIONS

Washington Room

This session includes the two separate presentations listed below.

**TYPE III: NATIONAL LEVEL INTERVENTIONS**

**Learning from HSIs’ Strategies to Cultivate Culturally Responsive Computing Education**

This presentation highlights how a study of the Computing Alliance of Hispanic-Serving Institutions (CAHSI), a network of over 80 HSIs and their partners (www.cahsi.org) demonstrates that much can be learned from HSIs to build culturally responsive computing education cultures. Results of a multiple case study that involved 102 interviews, 69 observations, and extensive document reviews from four HSI computing departments will be discussed to illustrate strategies that can be employed to promote minoritized student success in computing. Participants will explore questions including (1) How can “servingness” (Garcia et al., 2019), a framework emphasizing cultural responsiveness in HSIs, inform innovative strategies to promote student success in STEM?, (2) What strategies can be assembled to construct holistic opportunities to promote student success in STEM?, and (3) What organizational mindsets cultivate inclusive environments for students in STEM? Implications for constructing inclusive cultures of student success in HSIs and beyond will be discussed.

**Anne-Marie Nunez**, Executive Director, Diana Natalicio Institute for Hispanic Student Success—The University of Texas at El Paso

◆ **SESSION 9.2**  INNOVATION/IDEATION SESSIONS

Potomac IV

This session includes the two separate presentations listed below.

**TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS**

**Establishing a Computing Innovation Pathway for ESL Students**

Our institution has launched year one of a three-year implementation of a University Computing Innovation Pathway which serves and supports the technical career and professional development of underrepresented student populations in our local region. The project will primarily focus on supporting English as a Second Language (ESL) and low-income community members who seek training, academic credentials, and career advancement in the high-demand disciplines of computing and information technology (IT). The Computing Innovation Pathway follows a stackable credential model that offers badges, certificates, and degrees as participants progress toward a position in the high-tech, STEM industry. Core pathway points include computer competency skills for the workplace, programming essentials credential, and employment opportunities supported by the Utah Technology Apprenticeship Program (UTAP).

**Brian Rague**, Associate Dean, College of Engineering, Applied Science, and Technology—Weber State University
learn how in this session), then use that information throughout the semester to build a community of excited learners who see how your class aligns with their future goals. Asking students to reflect on their values improves academic success in STEM students from historically underrepresented groups, and discussing personal values in the classroom can help your students develop a sense of belonging. Utility-value interventions highlight the benefits of completing a STEM degree, but those benefits must be articulated in ways that resonate with each student’s personal values. Sounds like you should know what those values are!

Harold Stanislaw, Professor of Psychology—California State University, Stanislaus

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

STEM Strong: A Mental Health Initiative for Science Majors

Mental health issues increased in undergraduates worldwide during the COVID-19 pandemic. During the 2021-2022 academic year we observed an unusually large number of students reporting that mental health issues were preventing them from completing the required work in their science courses. To address this issue a series of nine events focused on helping students improve their mental health were offered to STEM students during the 2022-2023 academic year. Some sessions focused on helping students meet their basic psychological needs for autonomy, relatedness, and competence, while others were focused more directly on grit and resilience. While most students that attended the sessions reported that they found the sessions educational and enjoyable, and that they would recommend them to other students, attendance dwindled toward the end of each semester. In this presentation, information about sessions that were well-attended will be provided and ideas for increasing student participation will be discussed.

Jennifer Brigati, Professor of Biology and Chair, Division of Natural Sciences—Maryville College

How Software Can Transform the Virtual Math Classroom into a Thinking Classroom

In Peter Liljedahl’s book Building Thinking Classrooms in Mathematics, he presents 14 strategies for transforming a math classroom into a “thinking classroom”. Liljedahl defines a thinking classroom as “a classroom that is not only conducive to thinking but also occasions thinking, a space that is inhabited by thinking individuals as well as individuals thinking collectively, learning together, and constructing knowledge and understanding through activity and discussion”. Much of the research on thinking classrooms focuses on in-person classrooms. But what about virtual learning? We now know that virtual learning is not only possible, but beneficial to many students, particularly those with disabilities. Virtual learning provides flexibility that allows students to learn in an environment best suited to their particular needs. To ensure that students studying virtually reap the same benefits as students learning in class, we examine how software can transform virtual math classrooms into thinking classrooms.

Karishma Punwani, Director, Academic Product Management—Maplesoft

A New Day: Helping Students Work Through Mathematical Trauma

Students arrive at college excited about this step towards their future. However, past math experiences and a belief they are “not good at math” leave many anxious about their mathematics requirements. Moreover, socioemotional factors that affect mathematical success are often not normalized or discussed with students. This talk presents a workshop created for students that provides an opportunity for students to explore their feelings towards mathematics and teach them tools for success in college mathematics classes. Participants learn about affective factors researched in the field of mathematics education, reducing shame and teaching that their experiences are likely a result of sociohistorical forces, not their own deficits. Participants then affirm their internal motivators and learn strategies for studying mathematics. The overall goal of this workshop is to transform students’ perspective on their past experiences and on learning mathematics overall. Equity and research-based findings undergird the workshop and this presentation.

Geilann Aly, Founder—Compassionate Math

Driving Culture Change Through STEM Equity Faculty Learning Communities

Our institutional self-study identified disparities in STEM student experiences of belonging and inclusion and highlighted the importance of equity-minded practices and their impact on students, institutional policies, and department-level practices. We are engaging five cohorts of 15-18 STEM faculty in a year-long experience. First, we focus on shifting faculty mindsets and building equity capacities through STEM faculty learning communities strategically tied to leadership and teaching roles. Second, we support the development of faculty as equity
practitioners, with knowledge and skills (e.g., universal design in learning, alternative assessment) applicable in varied learning environments and decision-making spaces (e.g., college and university committees).

Heather Tarleton, Associate Dean—Loyola Marymount University (LMU)

TYPE IV: STEM EDUCATION RESEARCH

Elements of Social Capital and Counterspace Processes Facilitate S-STEM Transfer Students’ Development of a Sense of Belonging in STEM

This work explores how a cohort of S-STEM scholars developed a sense of belonging in STEM. The scholars were transfer students in various STEM disciplines and all entered our S-STEM program as “rising juniors” at an urban-serving PhD-granting institution. All scholars participated in a summer bridge, an interdisciplinary CURE, professional development, and ongoing faculty mentoring. We conducted semi-structured exit interviews with a cohort of 10 scholars to explore student sense of belonging and integration into STEM. We iteratively coded the data, we identified that elements of the Network Theory of Social Capital and Counterspaces theoretical frameworks were appropriate lenses by which to view belonging. These interview data provided a nuanced understanding of the factors that were most salient to this cohort of Scholars in their development of a sense of belonging in STEM.

Erin Shortlidge, Associate Professor of Biology and Biology Education—Portland State University

SESSION 9.5 REGULAR/LIGHTNING SESSIONS

Potomac III

This session includes the two separate presentations listed below.

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Flipping the Internship Model: Cultivating Institution & Industry Partnerships to Increase Access & Broaden Participation among 2YC Students in STEM

Team Internships is an innovative approach to enhance the career development of underrepresented students in STEM fields by flipping the traditional internship model. Bringing workplace experience to students minimizes the need for students to ‘context-switch,’ a common challenge for underrepresented students, by providing more familiar, equitable environments from which to build skills and confidence in STEM disciplines.

This Lightning Round showcases the implementation of Team Internships at Miami Dade College by STEM Legacy, a U.S. Department of Education Title III-HSI STEM grant program. Team Internships reduced barriers and increased access to workplace experience for underrepresented students. Results highlight a high completion rate and positive outcomes reported by participants, including increased confidence, a stronger sense of belonging within the STEM community, and improved preparation for future STEM careers. Overall, this work provides valuable insights into creating replicable, culturally-responsive, institution-level interventions that promote diversity and success in STEM education and careers.

Logan Saucer, STEM Student Transfer Manager—Miami Dade College; Dacia J. Steiner, Grant Project Director—Miami Dade College

SESSION 9.6 REGULAR/LIGHTNING SESSIONS

Potomac I

This session includes the two separate presentations listed below.

TYPE IV: STEM EDUCATION RESEARCH

Lessons Learned From Inter-Institutional NSF S-STEM Implementation

Community college students experience a protracted process in which they recognize or solidify their STEM identity precisely as they are attempting to accomplish a transition to a four-year university. We saw this as an opportunity to create a cohesive culturally responsive STEM community that bridges the Pima Community College (PCC) to the University of Arizona (UAZ) transition process—the transfer ecosystem (Dowd, 2012). Through a partnership between two Hispanic Serving institutions in Arizona, (PCC and UAZ), our NSF S-STEM Bridge team has identified positive outcomes toward meeting our programmatic goal of demonstrating persistence and graduation rates in low-income, academically talented STEM community college transfer students. As we move into the final year of our grant, we share lessons we learned to effectively implement and support our scholars including: planning; cross-campus communication; student recruitment; peer and faculty mentoring; Culturally-Responsive Community of Practice; student transfer best practices; scholarship distribution; undergraduate research, and more.

Jennifer M. Batchelder, Director for Arizona’s Science, Engineering, and Math Scholars (ASEMS) Program—University of Arizona; Emily Halvorson-Otts, Dean of Sciences—Pima Community College
initiatives. The research team conducted semi-structured interviews with institutional leaders and faculty at 11 public and private institutions as part of a STEM Alliance. Findings revealed a leadership perspective that frames approaches to STEM initiatives becoming a part of an institution’s fabric. The contribution of this study relates to the illumination of the tension between institutional leaders’ agency to make change sustainable versus structural and leadership networks inhibiting STEM success efforts. Learnings gathered support broadening participation, leadership’s role in developing and sustaining innovations, and institutional change needed.

Jonathan J. Okstad, Manager of Research Administration—Northwestern University; Victoria E. Callais, Research Associate—Loyola University Chicago; Norma Lopez, Assistant Professor of Higher Education—Loyola University Chicago; Demetri L. Morgan, Associate Professor of Higher Education—Loyola University Chicago

TYPE II: INSTITUTION LEVEL INTERVENTIONS

Reform across STEM Disciplines with Equity and Justice as the Guiding Principle: A Case Study at Bates College

Bates College had three primary strategies to build capacity for inclusion and address our disparities in delivering an equitable and inclusive learning experience for our students through our HHMI IE grant. The main strategy was to engage faculty and staff in robust and ongoing professional development in both racial equity and inclusive pedagogies. As we built capacity for inclusion through changing mindsets and skill sets, we supported STEM departments and programs as they changed courses, curricula, and practices in ways that were informed by their own data and student experiences. We also built a cohort-based community through academic and peer engagement to address student belonging and to center an atmosphere of support. We made considerable progress in institutional (e.g., tenure and promotion guidelines, creation of inclusive teaching center) and departmental level change (e.g., reformed courses and practices) that has increased positive outcomes for all students in STEM.

April L. Hill, Wagener Family Professor of Equity and Inclusion in STEM—Department of Biology; Tom McGuinness, Director of Institutional Research, Analysis, and Planning—Bates College; Katy Ott, Associate Professor of Mathematics—Bates College

SESSION 9.8 SEMINARS

Potomac VI

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Culturally Responsive Evaluation of STEM Initiatives in Institutes of Higher Ed: Practices & Tools Learned

We assume the history of participation in STEMM fields was built on a racist system in need of revision if minoritized people are to participate commensurate with US demographics. Much STEMM programming and evaluation can center culturally responsive practices toward equitable outcomes for minoritized students. In this seminar, we share how we have learned and adapted to project contexts practicing culturally responsive evaluation and confronting issues of power, social justice, and inequities. Evaluators build trusting relationships with stakeholders, foreground values from the beginning, middle and end, include beneficiary voices, and manage power dynamics. We design surveys to measure as outlined in theories of change, integrate qualitative data to document lived experiences, and analyze data to expose inequities, reduce harm and strengthen culturally sustaining experiences for minoritized students. Workshop attendees are invited to small group discussions of a composite case we designed to surface current challenges of culturally responsive evaluation.

Michelle Burd, Principal—Burd’s Eye View; Liz Johnson, Principal & Founder—Liz Johnson Education Consulting
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**From Books to Bots?...The Role of AI and ChatGPT in Undergraduate STEM Teaching**

James M. Lang is the founding Director of the D’Amour Center for Teaching Excellence and a former Professor of English at Assumption University in Worcester, MA. He is the author of six books, the most recent of which are *Distracted: Why Students Can’t Focus and What You Can Do About It*, *Small Teaching: Everyday Lessons from the Science of Learning*, and *Cheating Lessons: Learning from Academic Dishonesty*. A sought-after speaker, Jim has given talks and workshops on teaching and navigating Artificial Intelligence and ChatGPT at more than two hundred colleges and universities in the U.S. and abroad. He has also consulted for the United Nations on the development of teaching materials in ethics and integrity for college faculty. Lang also writes a monthly column on teaching and learning for The Chronicle of Higher Education; his work has appeared in the Chronicle since 1999. His book reviews and public scholarship on higher education have appeared in a wide variety of newspapers and magazines, including Time, Boston Globe, Chicago Tribune, and The Conversation. In September of 2016, Lang received a Fulbright Specialist grant to work with three universities in Colombia on the creation of a MOOC focused on teaching and learning in undergraduate STEM education. He has a BA in English and Philosophy from the University of Notre Dame, an MA in English from St. Louis University, and a Ph.D. in English from Northwestern University.

*James Lang, Assumption University [retired]*