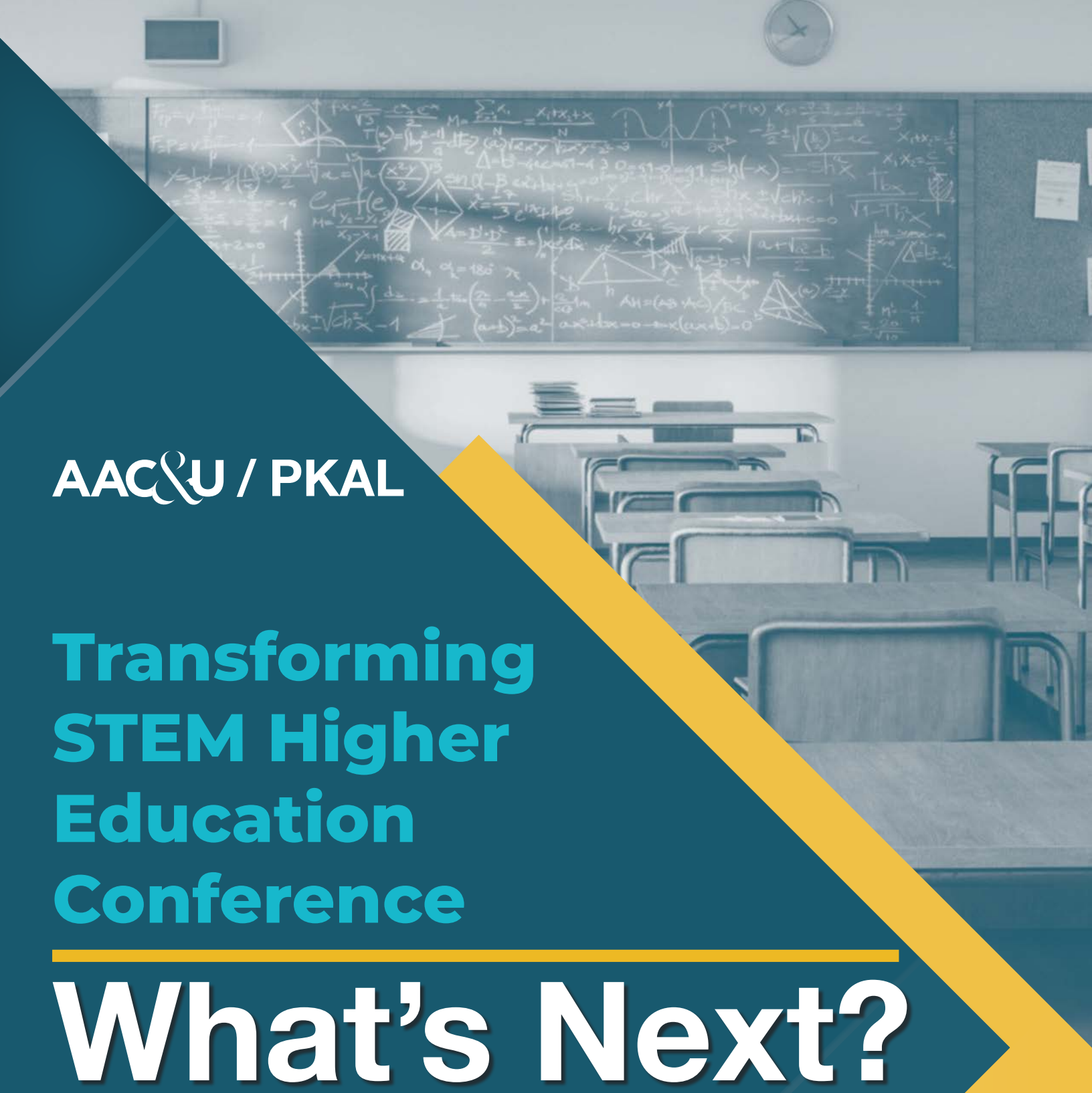


AAC&U / PKAL

Transforming STEM Higher Education Conference

What's Next?

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

November 7-9, 2024

Arlington, Virginia

2024 Transforming STEM Higher Education Conference

Teaching STEM | Leading Change | Holding On To Our Humanity

Dear Friends,

Welcome to the 2024 AAC&U Transforming STEM Higher Education Conference… I'm so, so glad to see you!

Whether you are joining us for the first time, here on a whim, or this is your conference home, I can't tell you how much I appreciate what it means for you to commit your time and energy to being here this week. And we don't take it lightly. With you in mind, my colleagues and I have searched high and low to find just the right mix of plenary speakers and featured session facilitators to journey with us in understanding *What's Next for STEM higher education reform?*…especially with the Presidential election looming so large over us right now.

The answers to this question are as complex and ambiguous as the question itself. But, one thing is clear. Indeed, it has always been clear to us. The national imperative for a diverse and competitive STEM workforce relies, in large part, on STEM faculty and the education researchers who study what they do and how they do it.

At AAC&U, we take seriously our responsibility and commitment to ensure that this conference bears this fact in mind. We also understand how, in this moment, we have to not only focus on the theories and practices of undergraduate STEM reform but also the ways in which the Presidential election has left us a bit on edge, asking questions and seriously considering our futures and the future of our democracy, and needing some respite from the madness of it all.

For that reason, in addition to the amazing speakers and facilitators you will meet this week, we've also incorporated myriad opportunities for you to maximize your "personal" time at the conference. You can attend one of the mindfulness sessions scheduled throughout our meeting agenda. Or, if you need it, be sure to take time for yourself and visit the Conference Meditation Room for a few moments of quiet rest and reflection. If you get a few moments, visit the Message Wall and enjoy the inspiring messages left there by our colleagues, or leave one yourself. I hope you also get the chance to listen to some jazz at the conference reception. And, of course, take advantage of the nearby restaurants and attractions in Arlington, VA to connect with friends and colleagues. It is my hope that there is something here for all of us to not just contribute to the important discussions we will have but also walk away feeling renewed.

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

Enjoy!

Vice President for Undergraduate STEM Education; and
Executive Director, Project Kaleidoscope

SCHEDULE AT-A-GLANCE

THURSDAY, NOVEMBER 7, 2024		
9:30 am – 7:00 pm	Conference Registration and Membership Information	*Independence Foyer, Independence Level*
1:30 pm – 2:30 pm	Concurrent Session Block 1	
2:45 pm – 4:45 pm	Featured Symposium: **Claiming Joy in These Hot Mess Times** *[Separate registration required]*	*Washington Room, Ballroom Level*
2:45 pm – 3:45 pm	Concurrent Session Block 2	
4:00 pm – 5:00 pm	Featured Symposium: **Fostering Innovative Ideas for NSF Proposals**	*Conference Theater, Ballroom Level*
4:00 pm – 5:00 pm	Concurrent Session Block 3	
5:30 pm – 7:00 pm	Opening Keynote Address **STEM Higher Education: A Time for Reformation, or Revolution?** *Kamau Bobb, Georgia Institute of Technology*	*Regency Ballroom A-D, Ballroom Level*
7:00 pm – 8:30 pm	**Welcome Reception** *featuring The D' LaMar Trio*	*Regency Foyer, Ballroom Level*
FRIDAY, NOVEMBER 8, 2024		
7:00 am – 6:00 pm	Conference Registration and Membership Information	*Independence Foyer, Independence Level*
6:30 am – 8:00 am	Breakfast	*Regency Foyer, Ballroom Level*
8:00 am – 9:00 pm	Conference Relaxation Room Open	*Tidewater 1, 2nd Floor*
8:15 am – 10:15 am	Featured Symposium: **Reclaiming Joy: Rhythm Over Time** *[Separate registration required]*	*Washington Room, Ballroom Level*
8:15 am – 9:30 am	Workshop Series – Morning	
9:45 am – 11:45 am	Featured Symposium: **NSF Hours: Funding Opportunities**	*Conference Theater, Ballroom Level*
9:45 am – 10:45 am	Concurrent Session Block 4	
10:45 am – 11:00 am	Refreshment Break	*Regency Foyer, Ballroom Level*
11:00 am – 12:00 pm	Concurrent Session Block 5	
11:00 am – 12:15 pm	Workshop Series – Afternoon	
12:30 pm – 2:00 pm	Featured Symposium: **Friend or Foe: ChatGPT** *[Lunch provided; Separate registration required]*	*Washington Room, Ballroom Level*
12:30 pm – 2:00 pm	Featured Symposium: **NASA's MOSAICS Program** *[Lunch provided; Separate registration required]*	*Tidewater II, 2nd Floor*
12:30 pm – 2:00 pm	Lunch on your own	

2:00 pm – 3:30 pm	Mid-Conference Keynote Address **Leaning into Un/Learning for More Inclusive and Equitable STEM Futures** *Leslie D. Gonzales, University of Arizona*	*Regency Ballroom A-D, Ballroom Level*
3:30 pm – 4:00 pm	Refreshment Break	*Regency Foyer, Ballroom Level*
4:00 pm – 5:00 pm	Poster Session	*Independence Center A, Independence Level*
5:00 pm – 6:00 pm	Concurrent Session Block 6	
5:00 pm – 6:15 pm	Workshop Series – Evening	

SATURDAY, NOVEMBER 9, 2024

7:00 am – 10:00 am	Conference Registration and Membership Information	*Independence Foyer, Independence Level*
6:30 am – 8:00 am	Breakfast	*Regency Foyer, Ballroom Level*
8:00 am – 10:00 am	Featured Symposium: **GrantWise: What Role Can NSF Play?** *[Separate registration required]*	*Washington Room, Ballroom Level*
8:00 am – 9:00 am	Concurrent Session Block 7	
9:15 am – 10:15 am	Concurrent Session Block 8	
10:15 am – 10:30 am	Refreshment Break	*Regency Foyer, Ballroom Level*
10:30 am – 12:00 pm	Closing Keynote Address **What Now: For Ourselves, Our Institutions, and This Nation?** *David Hall, President Emeritus, University of the Virgin Islands*	*Regency Ballroom A-D, Ballroom Level*

CONFERENCE SPONSORS

AAC&U is grateful for the generous support of our 2024 Transforming STEM Higher Education Conference sponsors.:

Maplesoft
Mathematics • Modeling • Simulation
A Cybernet Group Company

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.

THE 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.

Grasple
open exercises
for math & stats

Grasple is an online platform that enables teachers in Higher Education to find and create openly licensed exercises and easily share them with colleagues and students.

SOWISO

SOWISO is a publisher with top-quality STEM content that partners with organizations and their learners worldwide to bolster their STEM knowledge.

CONFERENCE CO-HOSTS

The AAC&U Office of Undergraduate STEM Education is proud to be co-laborers with colleagues who represent a range of organizations committed to advancing and improving STEM faculty life. Together, we work to ensure that all STEM faculty have access to the most advanced resources and technologies needed for competitively training and liberally educating undergraduate STEM students from all backgrounds.

BLOOKSY

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

NSF

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

NASA

The NASA SMD's MOSAICS Program is a new initiative to improve diversity, equity, inclusion, and accessibility (DEIA) within the NASA workforce and the broader U.S. science and engineering communities. The program's primary goal is to develop sustainable partnerships among institutions historically under-resourced by NASA (e.g., Historically Black Colleges and Universities, Tribal Colleges and Universities, Primarily Undergraduate Institutions, Primarily Black Institutions, Hispanic Serving Institutions, and Community Colleges) and very highly research-intensive universities and NASA Centers or Facilities. These partnerships are expected to focus on paid research and engineering student positions at participating institutions to transition science and engineering students from undergraduate studies into graduate schools and/or employment by NASA or related institutions.

PRISSEM
Academic Services, LLC

PRISSEM provides research development, grant development, and faculty development services to faculty and administrators in science, technology, engineering, and mathematics disciplines at Historically Black Colleges and Universities.

CONFERENCE ADVISORY COMMITTEE

Leyla Batakci, Elizabethtown College

Jaime Bestard, Miami Dade College

Michelle Boissiere, Xavier University of Louisiana

Kevin Brown, Oregon Institute of Technology

Adam Brummett, University of Iowa

Drew Budner, Coastal Carolina University

Rachel Burcin, Carnegie Mellon University

Lisa Burgess, Boston University

Olivia Carducci, East Stroudsburg University

Lilliam Casillas, University of Puerto Rico Humacao

Jennifer Christus, University of Wisconsin Oskosh

Milena Cuellar, LaGuardia Community College

Chad Curtis, Nevada State University

Danielle Daniels, University of Rochester

Jeremiah Davie, D'Youville University

Aleya Dhanji, Highline College

Jackie Fannin, Marshall University

Robert Ferguson, North Carolina A&T State University

Joseph Flaherty, Coker University

Monica Flippin Wynn, Gardner Institution

Kimberly Fluet, University of Rochester

James Foss, University of Minnesota Crookston

Brenda Fredette, Pennsylvania Western University

Jason Giuliani, Nevada State University

Patricia Golay, Florida State University

Madeleine Gonin, Indiana University

Sasha Grebenyuk, WOM Communications, LLC

Padmaja Guggilla, Alabama A&M Universiy

Joshua Halpern, Prince George's Community College and LibreTexts

Benjamin Haywood, Furman University

Vanessa Hill, Springfield Technical Community College

Aimee Hollander, Havard University

Danielle Hudson, Auburn University

Bo Idsardi, Eastern Washington University

Reem Jaafar, LaGuardia Community College

Patricia Jaimes, University of Michigan

Ahjah Johnson, University of Cincinnati

Katie Johnson, Xavier University

Gizem Karaali, Pomona College

Alexis Knaub, American Association of Physics Teachers

Jens-Uwe Kuhn, Santa Barbara City College

Sudarshan Kurwadkar, California State University, Fullerton

Rebecca Laird, University of Iowa

Shondrieka Lamb, Morehouse College

Jo Ann Lee-Joyner, Georgia State University-Perimeter College

Heidi Loshbaugh, University of Colorado Boulder

Rachel Love, Kalamazoo College

Vishwas Mruthyunjaya, Carnegie Mellon Institute

Megan Mullins, Mulline Consulting, Inc.

Luiza Nogaj, Mount Saint Mary's University Los Angeles

Harry Price, Stetson University

Samantha Prins, James Madison University

Julia Qian, University of Notre Dame

Duncan Quarless, SUNY Old Westbury

Brian Rague, Weber State University

Daniel Ramirez-Escobedo, The University of Texas at San Antonio

Nicole Retland, Fielding Graduate University

Zachary Roberts, University of the District of Columbia

Veronica Salazar, University of Texas at San Antonio

Bryan Sigel, Nevada State University

Brett Simpson, Coastal Carolina University

Corin Slown, California State University Monterey Bay

Patrick Smith, Indiana University Bloomington

Nicholas Snow, Seton Hall University

Elly Sperber, Colorado State University Pueblo

Craig Teague, Cornell College

Ezra Tefera, Brandeis University

Jeffrey Thomas, Queens University of Charlotte

Lori Vermeulen, Stockton University

Victoria Volkis, University of Maryland Eastern Shore.

Clara Voorhees, DYouville University

Ben Weng, Minneapolis Community and Technical College

David Wilson, Kalamazoo College

PROJECT KALEIDOSCOPE
STEM LEADERSHIP INSTITUTE

Leadership Development that is...

STEM FOCUSED
SOUL CENTERED

Featuring

Mindful Reflection

Strength Building

Connection

Project Kaleidoscope

Regional Networks

Our Regional Networks provide a low-cost, meaningful professional development space for STEM faculty to co-learn and co-create effective STEM teaching practices that foster an ideal learning environment for all STEM students.

Visit a Network Meeting in Your Region

- Massachusetts
- North Carolina
- Ohio
- Puerto Rico
- Texas NEW
- Washington DC

SCAN TO LEARN MORE

Coming Soon

PKAL REGIONAL NETWORK MEETINGS

Jan 8 2025	Massachusetts Worcester Polytechnic Institute Virtual		Mar 26 2025	Puerto Rico University of Puerto Rico Humacao In-Person	
Feb 21 2025	Texas University of Texas at San Antonio Virtual		Apr 12 2025	Ohio Miami University In-Person	
Mar 21 2025	North Carolina University of North Carolina, Charlotte Virtual		May 2 2025	Washington, DC New Jersey City University Virtual	

ABOUT THE CONFERENCE

Descriptions of conference sessions, symposia, and workshops are listed in the program of events that follows. Updates and announcements will be posted at the conference registration desk and through the eventScribe website and 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: STEM2024

SESSION TYPES

I: Individual Classroom/Project-Level Interventions

II: Institution-Level Interventions

III: National-Level Interventions

IV: STEM Education Research

SESSION FORMATS

Poster Sessions (60 minutes) 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 (30 minutes) 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 Sessions (30 minutes) 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 (75 minutes) provide an interactive environment for conference attendees to deeply examine, explore, and/or experience relevant theories and implementation strategies.

Facilitated Discussions (60 minutes) 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 MAXIMIIZE YOUR CONFERENCE EXPERIENCE

This conference offers various opportunities for attendees to take advantage of conference session content, symposia information, and workshop experiences; as well as to connect with colleagues, take care of themselves, and find their true emotional and spiritual centers again.

To maximize your conference experience:

- **Access the conference website** [https://aacu24stem.eventscribe. net/index.asp] and/or **mobile app** to find our links to our social media platforms and connect with other attendees.
- **Check out one of the featured symposium sessions on mindfulness** and discover new ways to manage the stress of undergraduate STEM reform. Mindfulness sessions will be held in the Washington Room (Ballroom Level) on Thursday afternoon (2:45 PM) and Friday morning (8:15 AM).
- **Listen to jazz with colleagues** during the conference reception on Thursday evening (7:00 PM). The reception is an ideal time to catch up with friends, take fun photos, or just relax to smooth jazz sounds while enjoying great food and drinks.
- **Visit the Conference Relaxation Room** in Tidewater I (2nd Floor) to enjoy a completely tech-free zone with soothing spa sounds, fruit-infused water, and calming visuals.
- **Join the conversation on X** using the hashtag **#AACUSTEM**.
- **Visit the Conference Inspiration Wall** in the Regency Foyer (Ballroom Level) to read inspiring messages from colleagues, or leave a message yourself.

WIFI

NETWORK

Hyatt_Meetings

PASSWORD

STEM2024

KEYNOTE ADDRESSES

THURSDAY, NOVEMBER 7TH | 5:30 PM

Kamau Bobb, Senior Director of the Constellations Center for Equity in Computing–Georgia Institute of Technology

STEM Higher Education: A Time for Reformation, or Revolution?

After decades of effort to reform STEM education in higher education to make it more effective, more equitable, more accessible, and more just, we find ourselves at a crossroads. The SCOTUS decision to ban Affirmative Action in higher education admissions coupled with the rise of acrimonious culture warfare in education, and the growing influence of AI in education have all dramatically changed the context of our work. While we remain steadfast in our mission, the question facing us now is whether we move ahead as reformists, or revolutionaries?

FRIDAY, NOVEMBER 8TH | 2:00 PM

Leslie D. Gonzales, Professor of Higher Education; Department Head of Educational Policy Studies and Practice; and Director of the Center for the Study of Higher Education, University of Arizona

Leaning into Un/Learning for More Inclusive and Equitable STEM Futures

This interactive plenary session will feature a historical review of the foundations of U.S. higher education, the academic disciplines, and the academic profession – with a targeted focus on STEM. Here, we will highlight how U.S. higher education has always been an exclusionary system structured by, and complicit in, a harmful racial hierarchy, where Communities of Color and their knowledge have, far too often, been marginalized and dismissed. Channeling the late Maya Angelou, we must become convinced that once we know better, we can (and should) do better. What's next is for us to learn and adapt the powerful asset-based ideas and tools to support our work as equity-committed educators and informed reformers (or revolutionaries) of undergraduate STEM education.

SATURDAY, NOVEMBER 9TH | 10:30 AM

David Hall, President Emeritus–University of the Virgin Islands

What Now: For Ourselves, Our Institutions, and This Nation?

There are special moments or inflection points in our professional and personal lives when we are faced with the simple but profound question, "*What Now*?" How we understand and interpret the question, and how we act upon it, has enormous consequences. This plenary address will explore how faculty and leaders in STEM, and in higher education generally, should attempt to answer this question as creative actors on the institutional and societal stage of life and the academy. This requires that we are as self-reflective as we are critical of policies and other leaders because the decisions we make as STEM reformers (or revolutionaries) will determine what is next for each of us and for our students. Here, we will explore how we move from being passive observers to being active creative leaders who can usher in transformation. More importantly, with the Presidential election decisions made nationally, just days before this conference, we will thoughtfully confront the broader question of "*What Now*?" for this nation, the world, and for ourselves.

FEATURED SYMPOSIA

Claiming Joy In These Hot Mess Times

[Separate registration required]

Thursday, November 7th | 2:45 pm – 4:45 pm

Washington Room, Ballroom Level

This session will focus on how joy and wellness-centered practices can be the foundation for, and the reminder of why our humanity matters particularly in these challenging, hot mess times. We will explore, reflect, and engage in redefining and reclaiming joy as an integral part of how to mindfully balance and grapple with what's next in undergraduate STEM reform.

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

Fostering Innovative Ideas for NSF Proposals that Aim to Transform STEM Education at Two-Year Colleges

Thursday, November 7th | 4:00 pm – 5:00 pm

Conference Theater, Ballroom Level

The National Science Foundation Innovation in Two-Year College (ITYC) Program recognizes that two-year colleges serve a diverse student population, are uniquely positioned to create innovative solutions for achieving STEM equity, and play a pivotal role in providing affordable access to higher education and career-relevant STEM pathways to the workforce. The NSF ITYC program aims to support potentially transformative projects advance innovative evidence-based practices in undergraduate STEM education and promote inclusive equity-oriented initiatives at the Nation's two-year colleges. In this session, program directors will work with attendees to generate ideas that may result in proposal submissions. Program directors will highlight strategies for building successful partnerships and using disaggregated institutional data to provide context for potential projects. Attendees will learn more about the submission and review process and will be encouraged to engage program directors in a conversation about their potential project ideas.

Kalyn S. Owens, *Program Director— National Science Foundation;* ***Michael J. Davis,*** *Expert—National Science Foundation;* ***Christine Delahanty,*** *Program Director—National Science Foundation*

Re-Claiming Joy: Rhythm Over Time

[Separate registration required]

Friday, November 8th | 8:15 am – 10:15 am

Washington Room, Ballroom Level

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 R. Briggs, *Owner—Be.Still.Move.*

NSF Hours: Funding Opportunities for Broadening Participation in STEM

Friday, November 8th | 9:45 am – 11:45 am

Conference Theater, Ballroom Level

The U.S. National Science Foundation supports research and work that creates a more diverse and capable science and engineering workforce, and to broaden the implementation of evidence-based systemic change strategies that promote equity for STEM students and faculty in academic workplaces and the academic profession. The NSF has many programs that provide grants to enhance the systemic factors that support equity and inclusion and to mitigate the systemic factors that create inequities in the academic profession and workplaces. Systemic (or organizational) inequities may exist in areas such as policy and practice as well as in organizational culture and climate. 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 L. Hall, *Lead Program Director—National Science Foundation*

NASA Science Mission Directorate MOSAICS Program: A Funding Program for Faculty at Under-Resourced Emerging Research Institutions

[Lunch is provided; Separate registration required]

Friday, November 8th | 12:30 pm – 2:00 pm

Tidewater II, 2nd Floor

To address the needs of faculty and students at under-resourced emerging research institutions (U/ERIs), such as historically Black colleges and universities (HBCUs), primarily undergraduate institutions (PUIs), and tribal colleges and universities (TCUs), NASA's Science Mission Directorate (SMD) unveiled the Bridge Program in Fall 2021. This community-NASA co-created program aims to create bridges between faculty and students at U/ERIs and research scientists and engineers at NASA centers and facilities. In Fall 2022, NASA convened a five-day workshop for scientific community members to provide input for the Bridge Program, now called MOSAICS. This session will provide an overview of the program and its guiding principles, updates on current and future funding opportunities, and a networking session for questions and answers.

Nicolle Zellner, *Professor of Physics—Albion College;* ***Padi Boyd,*** *Program Director—NASA Science Mission Directorate;* ***Marianne Smith,*** *Senior Faculty—Oak Crest Institute of Science*

Friend or Foe: ChatGPT for Next Tier Academic Writing HOSTED BY BLOOKSY

[Lunch is provided; Separate registration required]

Friday, November 8th | 12:30 pm – 2:00 pm

Washington Room, Ballroom Level

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*

GrantWise: What Role Can the National Science Foundation Play for What Comes Next in STEM Higher Education?

[Breakfast is provided; Separate registration required]

Saturday, November 9th | 8:00 am – 10:00 am

Washington Room, Ballroom Level

Are you looking for funding to support STEM students or your ideas for how to not only improve STEM education, but contribute to meaningful reform? Do you have ideas for collaborating with your colleagues across disciplines or institutions on how to do this important work? Are you from an institution that receives little federal research funding?

If you answered yes to one or more of these questions, this featured session is for you!

The first part of this session will offer an overview of NSF's mission, its overall strategic interests related to broadening the participation of marginalized students, and its merit review criteria. Participants will learn about NSF funding opportunities that can be leveraged to advance and accelerate broadening participation research and practice. Special focus will be placed on analyzing relevant, real-world case studies that address challenges and successful strategies associated with inter- and cross-disciplinary research and interventions, as well as those that cross institutional boundaries. The second part of this session invites participants to consider how they may become more engaged in STEM education research, how to establish collaborations with evaluators and colleagues in the social sciences, and how taking these steps can fit into their professional goals, reduce their workload demands, and empower them to be advocates and influencers in undergraduate STEM reform.

Claudia Rankins*, Senior Research Associate—PRISSEM Academic Services*

BLOOKSY

Academic writing, simplified.

From writing your research proposal to producing that manuscript for publication...Blooksy maximizes your productivity so you can focus on content.

ANTHONY JOINER
FOUNDER

AI WRITER | **CUSTOMIZED TEMPLATES** | **AI RESEARCH ASSISTANT**

www.blooksy.com

AAC&U

TIDES INSTITUTE

TRANSFORMING INSTITUTIONAL DRIVERS FOR EXCELLENCE IN STEM

23-27 **June 2025**

Lansdowne Resort
& Conference Center
Leesburg, Virginia

LEARN MORE https://tinyurl.com/TIDESAACU

THURSDAY, NOVEMBER 7, 2024

9:30 AM – 7:00 PM **Conference Registration and Membership Information**

Independence Foyer, Independence Level

1:30 PM – 2:30 PM **Concurrent Session Block 1**

This session block is comprised of 30-minute presentations, two per room.

♦ SESSION 1.1 INNOVATION/IDEATION SESSIONS

Potomac IV, Ballroom Level

1:30 PM – 2:00 PM

Team Learning for Underserved Students: Challenging Perceptions of which Psychological and Social Factors Predict Student Experiences with Group Work

TYPE IV: STEM EDUCATION RESEARCH

There are multiple gaps in our knowledge of how contextual factors impact students' experiences in and perceptions of team learning environments, particularly for students not at four-year institutions and members of historically marginalized groups. We examined the relations between several cultural and individual psychosocial factors and students' perceptions of group work and how these relations might differ for three groups of historically marginalized students at Highline College, a two-year MSI. We found that students' independent self-construals, through the mediating influences of self-efficacy and belonging, impacted their willingness to engage in and perception of learning in group work. Additionally, we found that the relationship between psychosocial factors and group work outcomes were different for distinct student groups, such as recent immigrants. Together, this research suggests several opportunities for targeted interventions and highlights the importance of considering the unique experiences of students from historically marginalized groups to make group work more inclusive.

Aleya Dhanji, *Physics Faculty—Highline College;* ***Matthew Graham,*** *Research Associate—University of Oregon;* ***Eric Baer****, Geology Faculty—Highline College*

2:00 PM – 2:30PM

Using Interdependence to Promote Sense of Belonging and Academic Success

TYPE IV: STEM EDUCATION RESEARCH

Developing a sense of belonging can increase academic performance and promote retention and progression in STEM programs and may be particularly important for historically underrepresented students (e.g., first-generation students, women, African American students, Latinx students). One way to develop a sense of belonging is to promote interdependence among students as they work collaboratively toward a common goal. This innovation/ideation session will share a model for promoting interdependence among science and mathematics students taking a first-year experience course as part of a learning community along with a science or mathematics course. Interdependence is used to promote students' sense of belonging and academic success in their science and mathematics courses. Participants will help with refining the model and identifying ways to measure the impact of the model.

Kadian M. Callahan, *Associate Dean for Student Success and Community Engagement—Kennesaw State University*

♦ SESSION 1.2 INNOVATION/IDEATION SESSIONS

Potomac I, Ballroom Level

1:30 PM – 2:00 PM

Integrating Artificial Intelligence for Successful Student Outcomes at Private Predominantly Undergraduate Institutions

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Artificial Intelligence tools in twenty first century college courses have reached a level of importance that we must not overlook. This includes ensuring that we leverage the use of diverse resources and tools with a limited budget in most cases. We know that automated grading and learning analytics in our course platforms have already been developed and tested. However, we will explore options to utilize in our course development to ensure the efficacy of our current programs and courses. While artificial intelligence continues to evolve, we as higher learning educators must continue to understand current research and the impacts. With this, we can integrate for our students' success.

Leslie M. White, *Assistant Professor of Education—Rust College;* ***Cambria U. Chatman,*** *Graduate Student Assistant—Alabama State University*

2:00 PM – 2:30 PM

Ask Knightbot! Implementing an Ethical AI Chatbot at Scale for University of Central Florida Students

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Artificial Intelligence Chatbot solutions are becoming increasingly expected by our incoming students, but there are challenges to implementing this technology in an ethical and effective way. Join us in learning how the University of Central Florida, a HSI institution serving over 69,000 students and awarding 4,119 STEM baccalaureate degrees during 2022-2023, implemented an AI chatbot at scale using the Mainstay platform. We will discuss key design elements and lessons learned to ensure

the technology is used in an effective manner for our students. We will also discuss how ethical challenges addressed, including topics such as mandatory reporting. Engagement data will be provided to demonstrate effectiveness, and next steps will be discussed, including how, as part of a Postsecondary Student Success Grant from the DoE, UCF is bringing the chatbot into a gateway math course to improve academic outcomes, students sense of belonging, and retention in the STEM fields.

Brooks Pingston, *Project Manager—University of Central Florida;* ***Brendan Tyler Walsh,*** *Director, Center for Higher Education Innovation—University of Central Florida*

♦ SESSION 1.3 REGULAR SESSIONS

Potomac III, Ballroom Level

1:30 PM – 2:00 PM

Utilizing Intentionality to Increase STEM Identity for Historically Excluded Students in Research Experiences for Undergraduates

TYPE III: NATIONAL-LEVEL INTERVENTIONS

The Collaborative Approaches among Scientists and Engineers Research Experience for Undergraduates explores innovative approaches to multidisciplinary research problems which also allows for the participation of a critical mass of students from groups historically excluded in STEM. Students work on projects led by teams of 2 faculty mentors from 2 distinct disciplines in the sciences or engineering. Through these interactions, students gain experience in understanding how disciplines work together to approach problem-solving and how to apply skills from their disciplines in novel ways. The program also focuses on the needs of these students as developing scholars through professional development workshops which help improve sense of belonging and self-efficacy. Additionally, faculty and graduate student mentors' professional development enhances their skills of intentionally fostering effective mentor-mentee relationships by increasing cultural competency. The research findings from this work can be transformational for mentoring historically excluded students in STEM in academia, governmental and national laboratories.

Kimberly X. Mulligan, *Sr. Assistant Dean of Strategic Initiatives and Programs—Auburn University;* ***Cordelia Brown,*** *Senior Lecturer—Auburn University*

2:00 PM – 2:30 PM

The Curriculum-Wide C. Elegans Pipeline (CURE) Offers All Biology Majors at a Majority-Minority PUI Access to a Multi-Year Research Experience

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

CUREs are an effective means to improve access to high-impact research experiences for all STEM undergraduates, especially at institutions that serve under-represented groups. Because CUREs conducted in one class over a single semester can have limited outcomes, we designed the "C. elegans Pipeline CURE" (CPC), to integrate C. elegans-based research iteratively throughout the biology curriculum at Oglethorpe University (OU), a small Atlanta-area majority-minority teaching college. In the CPC, C. elegans biology is incorporated into two introductory courses, thereby setting the stage for two upper-class CURE classes based on the epigenetics research of the Katz Lab at Emory University, a nearby R1 institution. Our data indicate that this recursive CURE strategy recapitulates the benefits of a traditional apprentice-style experience entirely within the established curriculum. The CPC lowers the inclusion barrier by ensuring that biology students of all races, genders, and abilities have access to the benefits of performing original STEM research.

Karen L. Schmeichel, *Professor of Biology—Oglethorpe University;* ***David J. Katz,*** *Associate Professor—Emory University;* ***Onur Birol****, Teaching Faculty and Academic Advisor—Georgia Institute of Technology;* ***Teresa W. Lee,*** *Assistant Professor—University of Massachusetts Lowell;* ***Brandon S. Carpenter,*** *Assistant Professor—Kennesaw State University;* ***Lisa L. Hayes,*** *Associate Professor—Oglethorpe University*

♦ SESSION 1.4 REGULAR SESSIONS

Potomac II, Ballroom Level

1:30 PM – 2:00 PM

Research Preparation Tutorials: An Interactive Approach for Improving Research Accessibility and STEM Workforce Readiness

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

To address the growing need for STEM talent and enhance opportunities for individuals from diverse socioeconomic backgrounds, national STEM education and workforce development experts endorse the adoption of effective higher education practices that enhance critical thinking and problem-solving skills through practical applications. We developed a flexible approach to create reusable interactive learning content aimed at making undergraduate research experiences more accessible and effective. Our Research Preparation

Tutorials (RPTs), each spanning 10-20 hours, offer structured training in research concepts, tools, and methods, tailored to the needs of individual faculty for recruitment and training. Collaborating with research domain experts, we have successfully implemented over 50 unique RPTs across eight STEM disciplines. This presentation will detail the design and implementation methodology of RPTs and examine student outcomes and survey data, demonstrating the effectiveness of RPTs in improving research accessibility and workforce readiness.

Daniel H. McIntosh, *Professor of Physics and Astronomy—University of Missouri-Kansas City*

2:00 PM – 2:30 PM

BUILDing Aspirations and Identity: Examining the Efficacy of Research and Mentorship in Promoting Undergraduates' Science Identity and Graduate Degree Aspirations

TYPE IV: STEM EDUCATION RESEARCH

Research increasingly focuses on intervention-like strategies designed to support the success of underrepresented students in science, technology, engineering, and mathematics (STEM) majors. This presentation applies Carlone and Johnson's (2007) science identity development framework to examine the efficacy of a 10-year federally funded initiative (BUILD) in developing undergraduates' science identity, career plans, and graduate school intentions. Applying a quasi-experimental design, we find that the initiative significantly increased BUILD-exposed students' science identity, plans to pursue a biomedical research career, and intentions to enroll in a STEM-focused graduate program after completing their bachelor's degrees. Moreover, we find that the program worked especially well for Latino students and Pell Grant recipients. We will discuss implications for institutions looking to adapt and scale these strategies, particularly among fcampuses committed to improving targeted interventions for underrepresented groups.

Kevin Eagan, *Associate Professor—University of California-Los Angeles;* ***Andre Hiwatig,*** *Undergraduate Research Analyst—University of California-Los Angeles*

♦ SESSION 1.5 REGULAR SESSIONS

Potomac V, Ballroom Level

1:30 PM – 2:00 PM

Curricular Complexity and Broadening Participation in STEM: A Case Study of 60 U.S. Computer Science Programs

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

The structure, prerequisites and overall complexity of some programs create barriers that impede student success. Inspired by the methodology of previous papers which demonstrated an inverse relationship between curricular complexity and program quality, we investigated the relationship between curricular complexity and the representation of women earning CS degrees. We created curricular maps of 60 U.S. computer science degrees and calculated measures such as program complexity, course blocking, delay factor, and total math/CS credits to understand complexity's correlation with the representation of women CS majors. Our results show that degree complexity, blocking factor, and delay factor are all inversely related to the representation of women. In addition, we provide suggestions to enhance degree programs based on the insights gained. Although applied to computing, this type of analysis is applicable to all STEM degrees.

Carla E. Brodley, *Professor and Dean of Inclusive Computing—Northeastern University;* ***Albert Lionelle****, Associate Teaching Professo****r****—Northeastern University*

2:00 PM – 2:30PM

Linked-Course Communities Can Increase STEM Student Success: Results from a Randomized Controlled Trial

TYPE II: INSTITUTION LEVEL INTERVENTIONS

A randomized controlled trial (RCT) was conducted to measure the impact on STEM student success of linked-course learning communities at Bridgewater State University, a public university with approximately 9,000 undergraduate students. First-time, first-year students in STEM majors were assigned to either be part of a linked-course community or the control group via a matched random assignment process that considered major, math placement, gender, race, income, commuter status, and first-generation status. Students in the linked-course communities (n=127) took a common, content-based First Year Seminar, their initial math course, and the first course in their major with other students. The control group (n=164) was assigned unlinked schedules consisting of the appropriate mathematics and science course for the major and placement. Students in the community saw significantly higher retention within STEM (91.3% versus 81.7%), and generally higher grade rates and credits earned.

Thomas P. Kling, *Professor of Physics—Bridgewater State University;* ***Laura Ramsey,*** *Professor of Psychology—Bridgewater State University*

♦ SESSION 1.6 REGULAR SESSION

Potomac VI, Ballroom Level

1:30 PM – 2:00 PM

Toward a Reparative Humanism in STEM Higher Education

TYPE IV: STEM EDUCATION RESEARCH

In this session, we will examine the concept of Reparative Humanism and what it means to reimagine STEM education through that lens. A STEM that is grounded in humanistic principles will cultivate learning environments that not only prepare students to tackle global challenges but also support their growth and wellbeing. Such an approach is essential for sustaining and advancing the educational and democratic purposes of higher education in these challenging times.

To underscore the urgency and relevance of this shift, we will share recent data from undergraduate STEM students that illuminate their perceptions of these existing educational frameworks and their ideas on how the current ethos of STEM can be expanded to better reflect diverse epistemologies and lived realities. In doing so, we hope to highlight the critical role of student voices in reshaping STEM education to be more inclusive and responsive to both individual and collective needs. Integrating student insights into our discussion, we aim to provide a richer, more grounded understanding of how STEM education can evolve to meet the demands of our times and contribute more effectively to the public good.

Mays Imad, *Associate Professor—Connecticut College;* ***Michael Reder,*** *Director of the Joy Shechtman Mankoff Center for Teaching and Learning—Connecticut College;* ***Dina Isakov****, Student—Connecticut College;* ***Libby Kotei-Fearon,*** *Student—Connecticut College*

2:00 PM – 2:30 PM

Preparing Students for STEM Success: How Integrating Holistic Student Support into a STEM Major Impacts Student Engagement and Retention

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Students interested in earning a STEM degree come to college with a wide range of prior experiences, skills, and confidence to navigate college. The UNC Asheville Chemistry Scholars Program, funded by NSF S-STEM, prepares students for STEM success by integrating holistic student support into the chemistry major curriculum. Support addresses the academic, social and emotional needs of undergraduates, and is scaffolded across three phases: first-year transition; building identity as a chemistry major; and transition to careers upon graduation. Elements include a first-year seminar (FYS) course, faculty mentoring, community building, high-impact undergraduate research, and career professional development. This session focuses on 6 years of implementation and research findings on student retention and engagement of the FYS, Science and Practice of Learning and Thriving in College, that prepares students to build rigorous study skills, emotional intelligence skills, and campus connections to meet the breadth of changes and challenges facing first-year STEM students.

Sally A. Wasileski, *Professor and Chair—University of North Carolina at Asheville;* ***Jason M. Schmeltzer,*** *Senior Lecturer—University of North Carolina at Asheville;* ***Amanda L. Wolfe****, GlaxoSmithKline Distinguished Professor—University of North Carolina at Asheville*

2:45 PM – 4:45 PM Featured Symposium

Washington Room, Ballroom Level

Claiming Joy In These Hot Mess Times

This session will focus on how joy and wellness-centered practices can be the foundation for, and the reminder of why our humanity matters particularly in these challenging, hot mess times. We will explore, reflect, and engage in redefining and reclaiming joy as an integral part of how to mindfully balance and grapple with what's next in undergraduate STEM reform.

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

2:45 PM – 3:45 PM Concurrent Session Block 2

This session block is comprised of either 30- or 60-minute presentations, up to two per room.

♦ SESSION 2.1 FACILITATED DISCUSSION

Conference Theater, Ballroom Level

2:45 PM – 3:45 PM

STEM Ready Pathway Program: Empowering Tomorrow's STEM Leaders with Alternative Credentials

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Through a dynamic partnership between Montgomery County Public Schools (MCPS), Montgomery College (MC), the Universities at Shady Grove (USG), and the University of Maryland, Baltimore County (UMBC), the STEM Ready Pathway Program is revolutionizing the educational landscape and preparing K-16 students for successful degrees and careers in STEM, enabling learners to acquire microcredentials along their pathway. The philanthropic investment of JP

Morgan Chase and the TalentReady program has been an enabling factor that contributed to the pathway program's development. Learn collaborative methods used to create microcredentials with a focus on diversifying the future workforce and shaping the trajectory of underrepresented students. Students earn microcredentials that highlight career competencies and experiential learning experiences during high school, community college or the undergraduate degree program.

Collin Sullivan, *Program Director for Digital Credential Innovation—University of Maryland, Baltimore County;* ***Sarah Gardenghi,*** *Assistant Vice Provost, Educational Pathways and Partnerships—University of Maryland Baltimore County*

♦ SESSION 2.2 INNOVATION/IDEATION SESSIONS

Potomac VI, Ballroom Level

2:45 PM – 3:15 PM

Creating a Sea Change: Expanding Course-Based Undergraduate Research Experiences Across Curriculum

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

While Course-based Undergraduate Research Experiences (CUREs) have become a new norm for impactful pedagogy in lab-based courses, expanding CUREs to other fields and non-lab courses remains challenging. We aim to understand faculty and student needs in developing and implementing sustainable and effective CUREs in non-lab courses. Using evaluation surveys of existing Hamline CUREs, we highlight student voices and needs, elucidate differences in CUREs learning outcomes and perceptions for students with different identities, and propose approaches to initiate and sustain the wave of developing and implementing CUREs across curriculum.

Using the development and implementation of a novel non-lab Linear Algebra CURE as a case study, we will engage participants in discussing sustainable and transferable pedagogical approaches supporting faculty in developing and implementing CUREs for non-Lab courses.

Irina Makarevitch, *Professor, Associate Provost—Hamline University;* ***Emery Thul,*** *Student—Hamline University;* ***Bridget Jacques-Fricke****, Associate Professor of Neuroscience—Hamline University;* ***Katharine Adamyk,*** *Assistant Professor of Mathematics—Hamline University*

3:15 PM – 3:45 PM

Developing Programs to Support Student Success in Course-Based Research Experiences Using the Thriving Framework

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

At the University of Minnesota Duluth's Swenson College of Science and Engineering, we have recently initiated a five-year SAIL (Swenson Active and Innovative Learning) program. Funded by a donation from the Swenson Family Foundation, the goal of this program is to engage every first-year student in our ten departments in a research, design, or professional experience appropriate for their major without barriers to enrollment. We are supporting this goal with two approaches. First, we are supporting an "Imagination" phase to help faculty develop Course Based Undergraduate Research Experiences (CUREs), Vertically Integrated Projects (VIP), and other professional experiences in the first year curriculum. Second, we are using a Thriving framework to organize and assess the efficacy of our SAIL programs on student success. By examining the elements of our programs from the perspective of student thriving, others will be able to implement similar programming and improve student success in STEM.

Anne E. Kruchten, *Education Program Specialist II—University of Minnesota Duluth;* ***Rachel Ellestad,*** *Associate Dean of Student Success—University of Minnesota Duluth;* ***Wendy L. Reed****, Dean of the Swenson College of Science and Engineering—University of Minnesota Duluth*

♦ SESSION 2.3 INNOVATION/IDEATION SESSIONS

Potomac II, Ballroom Level

2:45 PM – 3:15 PM

Bringing Together a Community: Exploring Biology Major's Engagement in an Informal Departmental Learning Space Designed for Inclusion and Diversity

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Informal learning spaces are taking on an increasingly significant role in university settings to enhance the student experience. While prior research has demonstrated the value of larger informal spaces such as learning commons and libraries, less is known about the impact of and student engagement in smaller unstructured community spaces (e.g., study rooms, atriums). This presentation will focus on the design, implementation, and assessment of an intentionally designed departmental space at a large public institution intended to improve the experience of students historically underserved and poorly retained in biology/biotechnology. Early mixed methods results have documented the benefit of the space for students of

diverse backgrounds and in offsetting barriers associated with student success. This exploratory project adds to our understanding of the contributions of unit-level community spaces on student growth, and may be of interest to other faculty and administrators seeking to develop such spaces at their institutions.

Joseph Harsh, *Associate Professor—James Madison University;* ***Isobel Cobb,*** *Graduate Student—James Madison University;* ***Tim Bloss****, Associate Professor—James Madison University*

3:15 PM – 3:45 PM

A Holistic, Multi-Faceted, Community Approach for Supporting STEM Students

TYPE IV: STEM EDUCATION RESEARCH

In the wake of the COVID-19 pandemic, fostering a sense of community and support in STEM education has become more crucial than ever. Many incoming students are entering college with significant gaps in their preparation, particularly in STEM fields. This was compounded by a hesitation to utilize typical tutoring services. These and other factors led to increased DFW rates in certain STEM courses as well as decreased retention in some STEM majors at Augustana. To address these issues, we have developed innovative programs specific for students at Augustana aimed at creating a culture that re-engages students, encourages collaborative learning, and supports the development of their scientific identity and fostering their growth in STEM from their initial matriculation through graduation. This proposal highlights key initiatives, including the STEM Scholars program, Supplemental Instruction, and a developing Math Tutoring Center, which collectively strive to build a robust community of support for our students.

Carl Olimb, *Associate Professor of Mathematics—Augustana University;* ***Nathan Grau,*** *Professor of Physics—Augustana University;* ***Joel Johnson****, Interim Provost—Augustana University*

♦ SESSION 2.4 INNOVATION/IDEATION SESSIONS

Potomac III, Ballroom Level

2:45 PM – 3:15 PM

MSU St. Andrews STEM Center: Strengthening the Pipeline for STEM Inclusion

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Under-represented students often "opt out" of STEM career paths as early as upper elementary, a problem that seriously weakens the impact of college level transformative interventions.

MSU Extension and MSU Innovation Center have collaborated to develop a STEM education and outreach hub at St. Andrews to serve as a central point of contact for teachers, youth, parents, community members, industry experts and university researchers to collaborate in providing experiential learning opportunities that are designed to increase understanding of STEM and provide mentorship and academic preparation for youth interested in entering the STEM profession.

The value of deliberate and intentional out-of-school programs that engage youth from 5 to 18 in STEM-focused experiential developmentally appropriate activities will be discussed. Preliminary assessment plans to monitor program impact will be discussed.

Robin A. McGuire, *Science Educator—Michigan State University Extension*

3:15 PM – 3:45 PM

Building Diverse STEM Enrollment in Dual Enrollment and Early College Programming

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

This session will discuss how early college and dual enrollment programs can deliver more extensive and rich STEM coursework to diverse high school students. Dual enrollment and early college programs have been proven to improve high school and college achievement, but have largely focused on general education transfer classes, with only a few programs having a more explicit STEM focus. Drawing from institutional data on STEM course taking and on the demographic composition of these classes, we will discuss both the findings of low STEM coursetaking rates and the need for greater diversity in STEM classes offered by dual enrollment and early college programs. The session will examine potential personal and structural reasons for this pattern of STEM avoidance by students, and propose several solutions that engage with school "gatekeepers" to build a more robust STEM student/career pipeline.

Russell Olwell, *Dean of Education and K16 Partnerships—Middlesex Community College;* ***Marie Tupaj,*** *Dean of STEM—Middlesex Community College*

♦ SESSION 2.5 REGULAR SESSIONS

Potomac IV, Ballroom Level

2:45 PM – 3:15 PM

Change Strategies Supporting Equitable, Student-Centered Instruction in Undergraduate STEM Courses and Departments

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Research has shown that minoritized students, as well as low-income and first-generation college students, benefit the most from asset-based and student-centered teaching practices, yet they are the least likely to experience them in undergraduate STEM courses. The NSF-funded project, Building Education Theory through Enacting Reforms in STEM (BETTER in STEM), employs a unique combination of research-based change strategies to support STEM faculty members' use of equitable, student-centered instruction in undergraduate STEM courses. Our change strategies and tools, grounded in a novel instructional framework, are designed to maximize impacts and have broad application across STEM disciplines and institutions. We will discuss the implementation of our change strategies that address both individual faculty and departmental barriers to reform. We will share our lessons learned from our work with a first cohort of STEM faculty across three very different institutions- a community college, a public four-year, and a large Hispanic Serving Institution.

Dan Hanley, *Director of STEM Education Research and Evaluation—Western Washington University;* ***Saraswathy Nair,*** *Professor and Chair—University of Texas at Rio Grande Valley;* ***Pat Burnett****, Associate Professor—Whatcom Community College*

3:15 PM – 3:45 PM

Students Expressing Discomfort About Racism Are More Likely to Seek Change

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

At the University of Vermont, a principally white institution (PWI), Introduction to Forensic Biology is a high enrollment non-majors science class meeting this requirement. Most studies of the impact of such 'diversity' courses use pre-post surveys, which do not reveal students' thinking or feelings around race and racism. To have a deeper understanding of students' responses, we qualitatively analyzed anonymized student reflections after they read an opinion piece discussing the Aubrey killing and took the Harvard Implicit Bias Test. This analysis reveals the most common responses were discomfort or absence of emotion. Students who wrote about their discomfort were more likely to also reflect on pathways to change. Our results support Boler's proposal (1999) that experiencing discomfort can trigger change in students' approaches to challenging social problems.

Linden E. Higgins, *Senior Lecturer—University of Vermont*

♦ SESSION 2.6 REGULAR SESSIONS

Potomac V, Ballroom Level

2:45 PM – 3:15 PM

Keeping STEM Within Reach: Strategies for Improving Grades and Retention in Undergraduate Biology Courses

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

BIO 101: Introduction to Biology lecture and lab course is a critical gateway course due to its key role in the first year for both biology majors and students in several other STEM majors. Data from BIO 101 show a high rate of retention in the biology sequence (i.e., enrolling in BIO 102 in the spring semester) for students who earned grades A or B (83%). The retention drops to 72% for students who earned C grades and plummets to 26% for those who earned a D, F, or withdrew (DFW) from the course. This presentation discusses strategies used to increased retention and engage students through novel and well tested methods in an Introductory Biology course. By improving grades and retention rates for Introduction to Biology course and increasing STEM identity, we can empower our diverse student body to thrive in their biology coursework as they progress through the major.

Clara Voorhees, *Professor—D'Youville College*

3:15 PM – 3:45 PM

Retention, Success, Persistence, Assistance Oh My!

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

STCC has supported the Supplemental Instruction, SI, Program during several iterations since 2010. The current program falls under our Hispanic Serving Institution Title 3 and Title 5 grants. The program in its current form is a result of 12 years planning, learning what works and what doesn't for our diverse student body and focusing in STEM areas such as Computer Technologies.

The results are clear cut the students do considerably better with a SI. We want to share what we have learned during SI journey by presenting our findings, videos thoughts from SI's and directly from the students themselves.

Brian I. Candido, *Professor and Department Chair—Springfield Technical Community College;* ***Renee Tetrault,*** *Professor—Springfield Technical Community College*

♦ SESSION 2.7 REGULAR SESSIONS

Potomac I, Ballroom Level

2:45 PM – 3:15 PM

The Benefits of Study Away for Undergraduate STEM Students

TYPE IV: STEM EDUCATION RESEARCH

This study examines the impact of study away programs on STEM college students and questions the assumption that study away programs detract from their technical training. Using concurrent mixed methods, we test if study away programs lead to drop in content mastery and if any losses are balanced by gains in professional skills and self-confidence. Our findings show a small drop in STEM content mastery for students who studied away, but that there are significant gains in professional skills such as communication skills, teamwork, and creative problem-solving, and in self-efficacy. Furthermore, these non-technical skills are important for career readiness as graduates can no longer solely rely on STEM content mastery for professional success. The results suggest that STEM education should consider including study away programs in their curriculum to help students develop key professional skills and the confidence to use them.

Crystal H. Brown, *Assistant Professor—Worcester Polytechnic Institute;* ***Kent Rissmiller,*** *Associate Dean of the Global School—Worcester Polytechnic Institute*

3:15 PM – 3:45 PM

Extracurricular Opportunities Supporting Enhanced STEM Workforce through Certificate Attainment

TYPE IV: STEM EDUCATION RESEARCH

The UHD project targets security training of emerging and current workforce populations especially those underrepresented. These efforts support a highly skilled workforce able to quickly build and transfer these critical security proficiencies into the Houston workforce. Certification within the areas of security will form one of the most important outcomes of success. Key population targets for this proposal center around emerging workforce comprised of current college undergraduates readying to enter the workforce and continuing workforce already in the industry.

Mary Jo deGarcia D. Parker, *Executive Director Scholars Academy/Natural Science Faculty—University of Houston, Downtown*

4:00 PM – 5:00 PM Featured Symposium

Conference Theater, Ballroom Level

Fostering Innovative Ideas for NSF Proposals that Aim to Transform STEM Education at Two-Year Colleges

Hosted By
The National Science Foundation

The National Science Foundation Innovation in Two-Year College (ITYC) Program recognizes that two-year colleges serve a diverse student population, are uniquely positioned to create innovative solutions for achieving STEM equity, and play a pivotal role in providing affordable access to higher education and career-relevant STEM pathways to the workforce. The NSF ITYC program aims to support potentially transformative projects advance innovative evidence-based practices in undergraduate STEM education and promote inclusive equity-oriented initiatives at the Nation's two-year colleges. In this session, program directors will work with attendees to generate ideas that may result in proposal submissions. Program directors will highlight strategies for building successful partnerships and using disaggregated institutional data to provide context for potential projects. Attendees will learn more about the submission and review process and will be encouraged to engage program directors in a conversation about their potential project ideas.

Kalyn S. Owens, *Program Director—National Science Foundation;* ***Michael J. Davis,*** *Expert—National Science Foundation;* ***Christine Delahanty,*** *Program Director—National Science Foundation*

4:00 PM – 5:00 PM Concurrent Session Block 3

This session block is comprised of 30-minute presentations, two per room.

♦ SESSION 3.1 INNOVATION/IDEATION SESSIONS

Potomac I, Ballroom Level

4:00 PM – 4:30 PM

Cultivating Cyber Scholars: Research Support for Online STEM Students

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Undergraduate research offers unique challenges and opportunities for online STEM students. This study examines the impact of a framework of support (the Research Scholars Program) designed for geographically distributed students who are completing their degree programs exclusively online. The Research Scholars Program includes curricular options, an online resource repository, research skills workshops, and faculty and near-peer research mentoring. Our study investigates the impact of a framework of undergraduate research support for fully online students on student outcomes, including student research skills and competencies, as well as their research interest and STEM identity. The

online resource repository and research mentoring showed notable student participation within the framework of support. The findings highlight the efficacy of a support structure in promoting undergraduate research within virtual learning environments, providing powerful insights for enhancing student engagement in higher education and bringing this high impact practice to a growing cohort of students in higher education.

Darryl Chamberlain, *Assistant Professor—Embry-Riddle Aeronautical University - Worldwide;* ***Robert Deters,*** *Associate Professor—Embry-Riddle Aeronautical University;* ***Brent Terwilliger****, Associate Professor—Embry-Riddle Aeronautical University*

4:30 PM – 5:00 PM

The Teaching Academy: From Online Training to Micro-Credentialing

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Effective teaching by GTA's directly impacts undergraduate student performance, leading to higher grades and promoting student success in upper division courses. Minority serving institutions often face a harder time retaining STEM focused undergrads, where a review of the literature shows that low retention rates of minority students specifically is due in large part to instructional (Henderson et al. 2014) methods. The Teaching Academy begins with a university-wide online asynchronous training module, followed by enrollment in a skills-based communities of practice (CoP) and culminates in a teaching and instruction badge. The framework provides a place to start, curatable communities, and a focused finish line. The innovative program at George Mason University provides a scalable and structural framework of training and development of masters and doctoral GTA's in partnership with Teaching and Learning Centers for Excellence, university academic support centers, and the Graduate Division to enhance the undergraduate STEM student experience.

Laurence Bray, *Senior Associate Provost for Graduate Education—George Mason University;* ***Stephanie Bluth,*** *Associate Director for Graduate Professional Development—George Mason University*

♦ SESSION 3.2 INNOVATION/IDEATION SESSIONS

Potomac II, Ballroom Level

4:00 PM – 4:30 PM

Applying the "Liberation Literacies" Framework to STEM Education: Fostering Equity, Inclusion, and Empowerment

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

"Liberation Literacies" has its foundation in language in the classroom and in the ways we teach English learners in the United States. This work explores how the "Liberation Literacies" framework can be applied to STEM education, highlighting its potential to promote equity, inclusion, and empowerment among learners. The "Liberation Literacies" framework is being presented as a concept in STEM that pushes for a more critical and inclusive approach to STEM. The following approaches will be presented; class-based research projects, global learning, and two that utilize technology as a tool, virtual lab simulations, and video presentations. These approaches aim to achieve two main goals: challenge dominant narratives and empower marginalized groups in STEM. Grounded in the principles of cultural affirmation, relevance, empowerment, critical consciousness, and community engagement, the "Liberation Literacies" framework offers a transformative approach to STEM education that centers students' cultural and linguistic identities, experiences, and voices.

Paul Kasili, *Professor—Bunker Hill Community College*

4:30 PM – 5:00 PM

The "Race and Revolution" First-Year Seminar: Teaching Leadership by Reclaiming the University of Mary Washington's Social Justice Tradition

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

In 2011 the University of Mary Washington honored the legacy of Civil Rights leader and our distinguished late history colleague Dr. James Farmer by celebrating the 50th anniversary of the Freedom Rides he organized. Our faculty honored Dr. Farmer by creating a first-year seminar titled "Race and Revolution: James Farmer and the Struggle for Civil Rights." This model of a first-year seminar is designed to build students' leadership ability and to motivate students to engage with the social justice tradition of our university. The multidisciplinary perspectives and pedagogical approaches of faculty representing a broad range of disciplines inform each year's course design. STEM faculty can easily teach this type of seminar as the research skills needed in science translate naturally to teaching what we can learn about leadership from the Civil Rights Movement.

Suzanne Sumner, *Professor of Mathematics—University of Mary Washington;* ***Kristin Marsh,*** *Professor of Sociology—University of Mary Washington*

♦ SESSION 3.3 INNOVATION/IDEATION SESSIONS

Potomac III, Ballroom Level

4:00 PM – 4:30 PM

The UNIDOS Center for HSI Community Coordination: Amplifying and Coordinating the Work of Hispanic Serving Institutions

TYPE III: NATIONAL-LEVEL INTERVENTIONS

Recently selected for funding by the National Science Foundation, the UNIDOS Center for HSI Collaboration leverages the collective strength of HSIs by coordinating and amplifying their efforts, fostering collaboration, and encouraging innovation within the HSI community, particularly in STEM and STEM education. UNIDOS is a collaborative effort led by HSIs for HSIs, with a leadership team of five HSIs that reflect the rich diversity of the communities they serve. The Center is developing the infrastructure to generate and disseminate new knowledge, successful practices, and effective design principles arising from work at HSIs. This session will present the theoretical foundations for the Center as a national backbone organization and the current plans for reaching the Center's goals. We will facilitate a discussion on the needs of HSIs and the students they serve and seek feedback from participants on how the Center can best support the national HSI community.

Monica Cardella, *Director, School of Universal Computing, Construction and Engineering Education (SUCCEED), Professor—Florida International University;* ***Johanna Delgado Acevedo,*** *Director, UNIDOS Center for HSI Community Coordination—Florida International University*

4:30 PM – 5:00 PM

In Search of STEM Education Best Practices: An Empirical Model and Framework

TYPE IV: STEM EDUCATION RESEARCH

Sponsored by the National Science Foundation, this presentation highlights the findings of a three-year study using Data Envelopment Analysis (DEA) with data from the Integrated Postsecondary Education Data System (IPEDS) at the National Center for Education Statistics, to effectively measure the efficiency of Hispanic Serving Institutions (HSIs) graduating Hispanics with STEM degrees. The guiding research question was: On what input measures do we select efficient HSIs to serve other HSI institutions as benchmarks for program improvement in graduating Hispanics with STEM degrees? An outcome of this work is a framework for investigating and organizing 107 best practices at HSIs identified for increasing Hispanics earning STEM degrees. Participants can expect to learn about the conceptual nature of the DEA model and the research design for identifying best practices at benchmark (efficient) HSIs that Rising (less efficient) HSIs can consider for adoption to higher levels of Hispanics graduating with STEM degrees.

Omar S. Lopez, *Professor—Texas State University*

♦ SESSION 3.4 REGULAR SESSIONS

Potomac IV, Ballroom Level

4:00 PM – 4:30 PM

Community of Care in the Mathematics Classroom

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Students entering the math classroom often express anxiety and concern about taking a mathematics course online. This can be due to their past educational experience, belief they are bad at math or lack of education in their past regarding mathematics. Adding to the stress adult learners have other responsibilities outside of the classroom including but not limited to their careers, child care and caring for other family members. The community of care recognizes that it is overall student mastery of course level objectives that are important not the week or day in which they master these objectives. Flexibility in learning plans allows the student to reduce anxiety and focus on the topic at hand, mathematics.

Leah Murray, *Professor of Mathematics—Walden University*

4:30 PM – 5:00 PM

Beyond Numbers: Exploring Qualitative Methods for Inclusive STEM Practices to Support Veterans and Non-Traditional Groups in Foundational Courses

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

This session explores structural learning support systems that lead to the collaboration and professional development of Veterans and non-traditional engineering students who serve as peer leaders in asynchronous, online engineering programs at Embry-Riddle Aeronautical University. Innovative practices to understand ways to strengthen undergraduate students' acclimation, advancement, and commitment in STEM pathways related to aerospace will be discussed.

Kimberly Luthi, *Department Chair Applied Aerospace Science College of Aviation—Embry-Riddle Aeronautical University;* ***Monica Surrency,*** *Director of Instructional Design Operations—Embry-Riddle Aeronautical University*

♦ SESSION 3.5 REGULAR SESSIONS

Potomac V, Ballroom Level

4:00 PM – 4:30 PM

Shifting Mindsets: Faculty Transforming Their Pedagogical Approaches After the Deep Teaching Residency

TYPE IV: STEM EDUCATION RESEARCH

In this session we present the results of a faculty development program called the 'Deep Teaching Residency' on the ways in which faculty adjusted their mindsets towards teaching their classrooms. We will explain the origins and operationalization of the Deep Teaching approach, the rationale for its immersive structure, and the reasons why residency participants were able to shift their mindset toward a paradigm that centered their thinking on the role systemic structural impacts on equity-based practices.

Bryan Dewsbury, *Associate Professor—Florida International University;* ***Tess Killpack,*** *Associate Professor—Salem State University;* ***Carolyn L. Sandoval****, Director, Teaching and Learning Commons—University of California, San Diego*

4:30 PM – 5:00PM

Panel Discussion: Insights into a Culturally Responsive Faculty Development Training – Summer Institute

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Panel discussion with creators/facilitators of the Summer Institute (SI), a grant funded Culturally Responsive Faculty Development training program at Palm Beach State College (PBSC) – a public HSI in South Florida. Panelists include Department of Education Title V Grant Director Lisa Walther, Lead Faculty Development Coach Dr. Emmanuel Alvarado, and faculty participant of SI Dr. Shadreck Chitsonga, Professor of Mathematics. The panel will be moderated by the National Science Foundation's STEM Articulation and Transfer Collaborative (SATC) Grant Coordinator Brandon White.

Brandon White, *Grant Coordinator—Palm Beach State College;* ***Lisa M. Walther,*** *Program Grant Director, Title V—Palm Beach State College;* ***Emmanuel Alvarado****, Professor III—Palm Beach State College;* ***Becky Mercer,*** *Associate Dean—Palm Beach State College;* ***Shadreck S. Chitsonga,*** *Professor III—Palm Beach State College*

♦ SESSION 3.6 REGULAR SESSIONS

Potomac VI, Ballroom Level

4:00 PM – 4:30 PM

Empowering Tomorrow's Innovators: The Journey of the STEM Scholar Program at TCU

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

The declining number of underrepresented students completing a STEM degree is a concerning challenge for higher education. With only 15% of African Americans, 16% of Hispanics, and less than 1% of Native Americans earning their STEM bachelor's degrees, as reported by Tonisha B. Lane (2016), action is urgently needed. This presentation aims to share the data and insights gained from the STEM Scholar Program at TCU, serving as a case study on how a STEM enrichment program in higher education can significantly impact the recruitment, development, and retention of underrepresented students in STEM fields. The objective of this presentation is to provide participants with a framework for supporting, assessing, and creating successful enrichment programs that promote the retention and development of underrepresented student populations as they pursue education and careers in STEM. This framework is grounded in research and continuous learning from the operation of the STEM Scholar Program.

Zoranna Jones, *Assistant Dean—Texas Christian University;* ***Richard Fordjour,*** *Graduate Assistant—Texas Christian University*

4:30 PM – 5:00 PM

InSciTE: An Equity-Based Approach to STEM Education at Central Michigan University

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

At Central Michigan University, the College of Science and Engineering started in 2023 a new undergraduate program called InSciTE (Integration of Science, Technology and Engineering) to provide diverse students with an interdisciplinary space to explore STEM challenges and solutions. Designed as a 15-credit certificate to complement existing majors, InSciTE consists of five skill-based courses taken over a four-year period as a cohort. Each course is centered around students acquiring transferable skills (including collaboration, communication, data and time management), with students driving the actual content of the course based on their interests. In this session, we will present a summary of the program creation and implementation before highlighting key equitable practices at the core of the InSciTE pedagogical approach.

We will share key findings from the assessment of the program during the presentation with a lens of transferring this work to other institutions.

Wiline Pangle, *Program Director—Central Michigan University;* ***Tracy Galarowicz,*** *Associate Dean of the College of Science and Engineering—Central Michigan University*

5:30 PM – 7:00 PM **Opening Keynote Address**

Regency Ballroom A-D, Ballroom Level

STEM Higher Education: A Time for Reformation, or Revolution?

After decades of effort to reform STEM education in higher education to make it more effective, more equitable, more accessible, and more just, we find ourselves at a crossroads. The SCOTUS decision to ban Affirmative Action in higher education admissions coupled with the rise of acrimonious culture warfare in education, and the growing influence of AI in education have all dramatically changed the context of our work. While we remain steadfast in our mission, the question facing us now is whether we move ahead as reformists, or revolutionaries?

Kamau Bobb *Senior Director, Constellations Center for Equity in Computing—Georgia Institute of Technology*

7:00 PM – 8:30 PM **Welcome Reception, featuring The D' LaMar Trio**

Regency Foyer, Ballroom Level

AAC&U REFRAMING INSTITUTE

RE-FRAMING INSTITUTIONAL TRANSFORMATION IN WAYS THAT PRIORITIZE NON-TENURE TRACK/ADJUNCT STEM FACULTY

27-31
JULY 2025

LANSDOWNE RESORT & CONFERENCE CENTER
LEESBURG, VA

GENEROUSLY FUNDED BY THE NATIONAL SCIENCE FOUNDATION

FOR MORE INFORMATION VISIT HTTPS://TINYURL.COM/AACUREFRAMING

FRIDAY, NOVEMBER 8, 2024

7:00 AM – 6:00 PM **Conference Registration and Membership**

Independence Foyer, Independence Level

6:30 AM – 8:00 AM **Breakfast**

Regency Foyer, Ballroom Level

8:00 AM – 9:00 PM **Rest and Relaxation Room Open**

Tidewater I, 2nd Floor

8:15 AM – 10:15 AM **Featured Symposium**

Washington Room, Ballroom Level

Re-Claiming Joy: Rhythm Over Time

This session will focus on how joy and wellness-centered practices can be the foundation for, and the reminder of why our humanity matters particularly in these challenging, hot mess times. We will explore, reflect, and engage in redefining and reclaiming joy as an integral part of how to mindfully balance and grapple with what's next in undergraduate STEM reform.

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

8:15 AM – 9:30 AM **Workshop Series - Morning**

This session block is comprised of 75-minute workshops, one per room.

♦ WORKSHOP W1 WORKSHOP

Potomac I, Ballroom Level

8:15 AM – 9:30 AM

Developing STEM Literacy: Student Progression Through Classroom-Based Reading, Reflection, and Dissemination Practices

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

STEM Literacy is an oft-discussed intervention, but can be difficult to meaningfully integrate into content-focused curricula. When effectively introduced and assessed, literacy-based pedagogy offers methods by which students can explore higher-level learning and personal expression of scientific concepts. Classroom interventions from structured note-taking and informal discussion posts, through scaffolded writing assignments, empower students to describe complex concepts using clear and understandable terms. In this workshop, participants will derive literacy-focused activities appropriate throughout the STEM curriculum. We will share examples of scaffolded projects rooted in the scientific process. Courses with an inherent framework of literacy, including CUREs and Curriculum-through-writing courses provide a foundation of literacy by which students can comfortably explore novel topics. The iterative use of rubrics will be presented as a further method to build student understanding and success. The impact of writing and literacy across multiple course levels and modalities permits greater, and more meaningful, learning for students.

Samantha Parks, *Principal Lecturer—Georgia State University;* ***Stephanie J. Gutzler,*** *Senior Academic Professional; Director of Undergraduate Studies—Georgia State University*

♦ WORKSHOP W2 WORKSHOP

Potomac II, Ballroom Level

8:15 AM – 9:30 AM

Advancing Institutional Change Through the SEER Process: Examining your Sphere of Influence in STEM Education Reform

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Understanding our individual spheres of influence in STEM education reform is critical in seeing the opportunities and levers at our disposal in advancing institutional change efforts. However, as change agents, we often fail to see the true potential of our spheres of influence as we connect with campus constituents in a variety of ways. Literature has well established the importance of individuals' connective potential and the power that comes from serving as a connection between network nodes, including increased social capital. The goal of this workshop is to provide participants with the means to deeply examine their spheres of influence, engage in rich discussion about their connective potential with colleagues, and apply their increased insight to a new institutional change approach, namely, the SEER Process.

Lucas B. Hill, *Researcher, Evaluator, Director of Research (CIRTL)—University of Wisconsin-Madison;* ***Evangeline Su,*** *Outreach Specialist—University of Wisconsin-Madison*

♦ WORKSHOP W3 WORKSHOP

Tidewater II, 2nd Floor

8:15 AM – 9:30 AM

Supporting Faculty Promotion to Full Professor: You Are Enough, You Have Enough

TYPE III: NATIONAL-LEVEL INTERVENTIONS

Colleges and universities strive to create equitable and inclusive workplaces, yet common barriers prevent qualified marginalized faculty from applying for full professor. We created a holistic peer-to-peer mentoring community, and using our group's collective knowledge

we opened pathways and supported each in successfully applying for full professor. This model is broadly applicable.

In this workshop, we will offer an opportunity for others to build their own model of support for the faculty promotion process. We will explore barriers to promotion: 1) imposter syndrome, 2) lack of formalized mentorship, and 3) latent structural barriers that reproduce the dearth of minoritized faculty in academe. Participants will create a plan identifying strategies for providing faculty-centered pathways to promotion and outlining solutions for overcoming the barriers.

This workshop is appropriate for associate professors, personnel and budget committee members, department chairs and deans, centers for teaching and learning leaders, and diversity, equity, and inclusion professionals.

Alison Hyslop, *Professor/Associate Dean—St. John's University;* ***Manouchkathe Cassagnol,*** *Professor—St. John's University;* ***Paula Lazrus****, Professor—St. John's University*

♦ WORKSHOP W4 WORKSHOP

Arlington/Fairfax Room, 3rd Floor

8:15 AM – 9:30 AM

iNaturalist as an AI intervention in STEM Reform

TYPE IV: STEM EDUCATION RESEARCH

The proposed workshop will provide participants with a comprehensive overview of an AI application, iNaturalist, and its applications in Biology and STEM education. As a part of the workshop, we propose a Civic Engagement BioBlitz activity, leveraging iNaturalist to catalog organisms and address species distribution dynamics. Building upon our successful implementation of outdoor ecology exercises using iNaturalist, this activity will empower STEM students to actively contribute to scientific research while connecting with their local communities. By curating student entries through a dedicated biohub on the iNaturalist platform, we aim to foster a culture of collaboration and data sharing among participants.

Dmitry Brogun, *Assistant Professor—Kingsborough Community College, City University of New York;* ***Christina Colon,*** *Professor—Kingsborough Community College, City University of New York*

♦ WORKSHOP W5 WORKSHOP

Roosevelt/Lincoln Room, 3rd Floor

8:15 AM – 9:30 AM

Unleashing Active Learning Strategies in College Mathematics Classrooms for First Time College Students

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Active learning strategies are essential for improving math comprehension among first-year college students transitioning from high school, and their significance extends to all STEM fields. Recognizing the unique challenges these students face, professors can implement dynamic methods to enhance engagement and understanding. Techniques such as collaborative problem-solving, interactive discussions, and hands-on activities empower students to actively participate in their learning process. These strategies not only deepen their understanding of mathematical concepts but also promote critical thinking, teamwork, and problem-solving skills, which are crucial across STEM disciplines. By tailoring active learning approaches to the specific needs of first-year students, educators create an environment that fosters mathematical proficiency and supports the overall development necessary for success in STEM fields, easing the transition from high school to college-level coursework.

Daniel Martinez, *Associate Professor of Mathematics—Seminole State College*

♦ WORKSHOP W6 WORKSHOP

Potomac VI, Ballroom Level

8:15 AM – 9:30 AM

Low Cost - High Impact: Success Skills Students Will Actually Use

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

This workshop addresses the following questions: 1) Why don't students use the success skills they already know, and know will help them be more successful?; 2) Are there effective success skills that students more readily adopt as part of their academic practice?; 3) What are the defining parameters that distinguish these?

Approaching success skills from a neurobiological basis of fundamental learning, we will present a new methodology in developing effective and efficient success skills that students will actually use. Termed Low-Cost/High-Impact (LC—HI) these success methodologies are low cost (implementation) to both students and faculty while being high impact in terms of student learning and class engagement.

The workshop will present specific examples that can be easily implemented into any class without loss of topical content and offer time for faculty to utilize the LC—HI approach in developing their own methods.

Peter Shull, *Associate Professor—Penn State University*

♦ WORKSHOP W7 WORKSHOP

Potomac III, Ballroom Level

8:15 AM – 9:30 AM

Resetting the Default: Using Choice Architecture to Sustain High-Impact Practices

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

A choice architect structures choices for others in such a way to nudge them into making particular decisions while maintaining a sense of autonomy and independence. By working thoughtfully as choice architects, instructors, developers, and administrators have the ability to design systems in which High-Impact Practices (HIPs) become a default choice, rather than a restorative counter measure, increasing the likelihood of their sustained adoption. In this interactive workshop, participants will identify where they may serve as a choice architect, consider the critical values that form the bedrock of their choice architecture, and leverage their experiences of frustrations around student choices to develop ideas and interventions for building new. As an illustration, the presenters will share their experiences in using this framework to structure a large-enrollment introductory mathematics course and a small, upper-level laboratory based course.

Jordan Kostiuk, *Senior Lecturer—Brown University;* ***Sara Mueller,*** *Consultant—Brown University*

♦ WORKSHOP W8 WORKSHOP

Potomac IV, Ballroom Level

8:15 AM – 9:30 AM

Strategies to Decolonize STEM Classrooms

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Strategies to make undergraduate curricula culturally sensitive for persons excluded due to their ethnicity and race from STEM (PEERS) are limited. The task become greater among the LatinX community due to the highly Eurocentric curriculum that invisibilise most important accomplishments of Latin American cultures in STEM courses. Consequently, we have implemented a decolonizing 3-day retreat to train STEM students in the interrelation of colonialism, colorism and euro-centrism culture of Science. We also discuss gender inequities, lack of social justice in discriminated communities of color and provided students with anti-racist trainings. The specific strategies to create a culturally-sensitive student community included; (1) dictionary of terms, (2) conferences by senior students on racism, colorism and STEM Eurocentric culture, (3) the walk of privilege and (4) group discussions after reading a paper on colorism in STEM combined with the Color of the skin video from HHMI Bio-interactive.

Lilliam Casillas Martinez, *Director of Center for Teaching and Learning—University of Puerto Rico Humacao;* ***Josee Védrine-Pauléus,*** *Professor/Director DIVAS/ Co-Director Center for Inclusive Teaching & and Learning—University of Puerto Rico at Humacao;* ***Sandra Rodriguez****, Professor of Biology—University of Puerto Rico at Humacao*

♦ WORKSHOP W9 WORKSHOP

Potomac V, Ballroom Level

8:15 AM – 9:30 AM

Using an Ecosystem Model to Support Practitioners in Changing the Institutional Quantitative Skills Support Landscape

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

This workshop will introduce participants to the ecosystem model of quantitative skills support developed through conversations among faculty and staff at eight selective, small liberal arts colleges. The ecosystem comprises four domains: bridge programs with a quantitative component, approaches to assessing readiness and advising, curricular on-ramps, and supplementary support for courses that require quantitative skills. Workshop participants will analyze the strengths and weaknesses of the ecosystem at their institutions, select one of the four ecosystem domains that could be strengthened on their campus, and explore factors and questions for stakeholders that might maximize the effectiveness of that domain in their local context. Participants will leave the workshop with a potential framework for identifying approaches to aligning and changing their institutional quantitative skills support systems to better meet student needs.

Melissa Eblen-Zayas, *Professor of Physics—Carleton College;* ***Laura Muller,*** *Director of Undergraduate and STEM Education—The Jackson Laboratory*

9:45 AM – 11:45 AM **Featured Symposium**

Conference Theater, Ballroom Level

NSF Hours: Funding Opportunities for Broadening Participation in STEM

Hosted By
The National Science Foundation

The U.S. National Science Foundation supports research and work that creates a more diverse and capable science and engineering workforce, and to broaden the implementation of evidence-based systemic change strategies that promote equity for STEM students and faculty in academic workplaces and the academic profession. The NSF has many programs that provide grants to enhance the systemic factors that support equity and inclusion and to mitigate the systemic factors that create inequities in the academic profession and workplaces. Systemic (or organizational) inequities may exist in areas such as policy and practice as well as in organizational culture and climate. 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 L. Hall, *Lead Program Director—National Science Foundation*

9:45 AM – 10:45 AM **Concurrent Session Block 4**

This session block is comprised of 30- and 60-minute presentations, up to two per room.

♦ SESSION 4.1 FACILITATED DISCUSSION

Arlington/Fairfax Room, 3rd Floor

9:45 AM – 10:45 AM

A Tale of Two Sections (at the Same Time): Student Achievement Outcomes and the Student-Faculty Experience in Simulcasted STEM Courses

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

At a large, minority-serving, research-intensive institution in the Southeastern U.S., more students seek online learning opportunities in efforts to balance their studies with familial responsibilities and off-campus employment than ever before. We currently face challenges in engaging remote learners with classroom-level experiences that contribute to a sense of belonging to the institutional community. Belongingness is a predictor of student persistence across demographic backgrounds, and lower measures of belongingness disproportionately impact students from historically marginalized communities, thus negatively affecting their persistence (Gopalan & Brady, 2020). Cultivating remote and in-person environments that foster belongingness is paramount to broadening participation in STEM. We offered introductory biology classes in which sessions were simulcasted, or livestreamed, so students could attend synchronously online or in person. Using a mixed-methods approach, we investigated learner engagement, achievement, and overall experiences. We will share our findings and discuss our pedagogical approaches to maximize in-class engagement and attendance across modalities.

Stephanie J. Gutzler, *Senior Academic Professional; Director of Undergraduate Studies—Georgia State University;* ***Will Kerr,*** *Assistant Director of User Experience—Georgia State University*

♦ SESSION 4.2 FACILITATED DISCUSSION

Roosevelt/Lincoln Room, 3rd Floor

9:45 AM – 10:45 AM

Holistic Teaching Evaluation as a Lever for Supporting Equitable and Effective Teaching

TYPE III: NATIONAL-LEVEL INTERVENTIONS

This discussion session will introduce participants to an approach to teaching evaluation that is holistic in nature and is designed to support equitable teaching as well as retention of diverse faculty members. The discussion will describe a 6-year project and research study of the implementation of this approach at three public research universities. Results from the cross-case analysis will highlight contextual factors that support or hinder adoption of this new approach to teaching evaluation. Participants will explore how to use the tools that have resulted from the project to more equitably document diverse faculty contributions to effective and inclusive education. The session will also explore how the process of recognizing and rewarding teaching is a lever for institutional change. Finally, participants will also learn about an emergent national community organized around the work of transforming teaching evaluation.

Gabriela Weaver, *Assistant Dean and Professor—University of Massachusetts Amherst*

SESSION 4.3 INNOVATION/IDEATION SESSIONS

Potomac I, Ballroom Level

9:45 AM – 10:15 AM

An Ecological Systems Theory Approach to Enhance STEM Identity Among Undergraduate Women at an HSI Engaged in a Mixed Level Pro-Social Community Service Experience

TYPE IV: STEM EDUCATION RESEARCH

Alverno College is an undergraduate women's institution and an HSI located in Milwaukee, WI. Through NSF IUSE HSI (award #2122903) funding we apply Brofenbrenner's ecosystem model to refine pro-social community-based experiences within the STEM curriculum to a mixed-level design and measure the impact on belongingness, science identity, and perception of STEM as a helping field. Using best practices to engage underserved populations in STEM, the modified curriculum requires advanced STEM majors to collaborate with community organizations and apply their STEM knowledge to address an unmet need that directly helps the communities where they live. Students make their work public through blog posts. Beginning students read these posts and reflect on the values found within the pro-social community projects. Surveys and interviews are used to measure the impact of the mixed-level curriculum design on belonginess, science identity, and perceptions of scientists.

Mikelene Ray, *Professor of Psychology—Alverno College;* ***Angela Frey,*** *Associate Dean of Academic Affairs, College of Health Sciences—Marquette University;* ***Jenny Johanson****, Professor of Physical Sciences—Alverno College*

10:15 AM – 10:45 AM

HERstories of STEM Excellence Through the Lens of Career Embeddedness Theory

TYPE IV: STEM EDUCATION RESEARCH

Spelman College has a history of academic excellence and disproportionate production of students from underrepresent backgrounds who earn advanced STEM degrees. HERstories uses video interviews to highlight factors common to African American female students who persist in science (undergraduate) and related STEM career pathways (graduate school, professional school and STEM workforce) from Spelman College. Using the lens of Career Embeddedness Theory, Spelman students and alumnae participants at each stage of the STEM workforce were interviewed to better detail the factors contributing to persistence in STEM. The interviews identified common and unique contributors to persistence in STEM for this population. These findings inform recommendations for broadening participation of underrepresented students and women in scientific disciplines using visual storytelling as a novel mode of dissemination. Further, this approach and other outcomes may inform HBCUs on how to tell the story of their unique value proposition and effective methods of sharing that story.

Mark E. Lee, *Associate Professor of Biology—Spelman College*

SESSION 4.4 INNOVATION/IDEATION SESSIONS

Potomac II, Ballroom Level

9:45 AM – 10:15 AM

Subverting Anti-Inclusion Efforts: Reframing Diversity, Equity, and Inclusion as an Epistemic Good

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Anti-diversity, equity and inclusion (DEI) legislation is increasingly prevalent in higher education. As of May 24, 2024, the Chronicle of Higher Education is tracking 85 bills in 28 states and the US Congress. Further, the Chronicle is tracking anti-DEI changes at 160 campuses across 23 states. One way to refute anti-DEI rhetoric is to reframe the issue from a moral good (i.e., it is just and right to include all people, especially those who have been un- and underrepresented) to an epistemic good (i.e., the more people from varied backgrounds and perspectives working in STEM, the better able we are to develop new ideas, root out biases, and explore different facets of understanding our universe). This shift in strategy in classrooms, courthouses, and the realm of public opinion refocuses the discussion on evidence-based reasons for inclusion and away from the current dichotomies of right/wrong and fair/unfair.

Amy F. Johnson, *Professor of Chemistry—Eastern Michigan University;* ***W. John Koolage,*** *Professor of Philosophy and Director of General Education—Eastern Michigan University*

10:15 AM – 10:45 AM

Introducing a New Model for Introductory Biology that Integrates Sociologically Relevant Content and Inclusive Practice

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

This project introduces an alternative organizing framework to introductory biology classes based on addressing scientific problems relevant to today's developing biologists. Students across four sections of introductory biology were either taught using a traditional structure that covered standard biological content in typical order (basic chemistry, macromolecules, organelles, cellular division, etc.) or a framework based on investigating colon cancer, which disparately affects populations in the Delta

regions of the United States. In the latter structure, students investigated real-world data and considered how biological phenomena like genetic mutation impact protein function and treatment outcomes while investigating how historical practices like redlining correlate to health disparities. Students were introduced to foundational concepts, but content order was dictated by what aspect of colon cancer was being discussed. We will present the course outline, learning objectives, outcomes, and an example series of class sessions and activities introductory biology is reimagined to be more relevant.

Laura MacDonald, *Associate Professor of Biology—Hendrix College*

♦ SESSION 4.5 INNOVATION/IDEATION SESSIONS

Potomac III, Ballroom Level

9:45 AM – 10:15 AM

Enhancing Student Success in Introductory STEM Courses: A Three-Fold Strategy

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Introductory courses often serve as a gateway course for many STEM majors, especially underserved students (Stitzel & Raje, 2022). With an aim to enhance the performance of underperforming students on exams and thus persistence (Harris et al., 2020), the focus of the current study is on integrating three pedagogical practices: (a) Early low-stakes exam followed by a class period on incorporating metacognition for higher order college learning (Cook et al., 2013) (b) Wrappers providing opportunities to practice metacognition after every exam (Hodges et al., 2020) (c) Scaffolded grading where repetitive assessment of key learning concepts is performed (Snow, 1993). We show that the preliminary results from an introductory biology course are promising.

Pallavi Limaye, *Assistant Professor in Residence—University of Connecticut*

10:15 AM – 10:45 AM

Fostering and Assessing Conceptual Understanding in Early STEM Courses

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Research on teaching and learning in early college STEM courses has identified a need to address underpinning concepts during instruction and on assessments. Faculty teaching early STEM courses are challenged with teaching a plethora of learning objectives in a limited amount of time, which may lead to a focus on lower levels of cognitive demand. All students deserve opportunities to develop their understanding of foundational concepts in STEM. This presentation highlights innovative practices designed to foster and effectively assess conceptual understanding in introductory-level STEM courses. We showcase strategies used in two sections of an introductory STEM course that include developing classroom routines to explain concepts; emphasizing application questions; and revising assessments for higher cognitive demand. In addition to considering preliminary data on students' perceptions of learning, participants will discuss how to adapt pedagogical strategies and assessments to focus on conceptual understanding in their STEM disciplines.

Aaron D. Trocki, *Associate Professor of Mathematics—Elon University;* ***Hwayeon Ryu,*** *Associate Professor of Mathematics—Elon University*

♦ SESSION 4.6 REGULAR SESSIONS

Potomac IV, Ballroom Level

9:45 AM – 10:15 AM

Navigating Pathways: A Faculty Perspective on Biology Transfer Initiatives

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Explore the transformative journey of the Transfer Initiative project, spearheaded by the Minnesota Private College Council, in fostering stronger relationships and streamlined pathways between community colleges and universities. Through a comprehensive approach, we highlight four pivotal experiences that significantly enhance faculty learning and collaboration. Using the Biology major as a case study at Saint Catherine University, we delve into these steps, from addressing biases to immersive lab visits and curriculum reviews. Our findings underscore the importance of understanding transfer student challenges and crafting adaptable pathways. Join us to discover how these strategies cultivate a supportive network, accelerate student success, and energize faculty engagement. For detailed results and insights, visit www.mnprivatecolleges.org/transfer. This initiative is made possible by generous funding from The Teagle Foundation and the Arthur Vining Davis Foundations.

Kellie S. Agrimson, *Assistant Professor—St. Catherine University*

10:15 AM – 10:45 AM

Transforming STEM Transfer Pathways at an HSI: Applying the Shared Equity Leadership (SEL) Toolkit for Systemic Change

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

LaGuardia Community College, an HSI, is addressing the critical issue of establishing effective STEM transfer pathways to support underrepresented students. Funded by a $4.6 million USDOE grant, LaGuardia established the Queens STEM Academy. The work resulted in developing articulation agreements with Queens College via the

STEM Ladder, STEM Learning, and STEM Link initiatives to holistically support students' journey from the start of their two-year college to their transferring to a four-year partner. Utilizing the Change Leadership Toolkit and the SEL Toolkit, this session will share insights on engaging stakeholders, assessing institutional capacity, and identifying strategic levers to create sustainable and transformative reforms. Early results show increased faculty and staff engagement, better credit transfer processes, and higher credit accumulation for students enrolled in first-semester learning communities. This session aims to provide valuable lessons for other institutions committed to advancing equity and success for underrepresented transfer students in STEM.

Reem Jaafar, *Professor of Mathematics and Director of Research and Evaluation, the Queens STEM Academy—LaGuardia Community College, CUNY;* ***Milena Cuellar,*** *Professor and Carnegie National Faculty—LaGuardia Community College, CUNY*

♦ SESSION 4.7 REGULAR SESSIONS

Potomac V, Ballroom Level

9:45 AM – 10:15 AM

Impact of Professional Development on Faculty Understanding of Inclusive Teaching

TYPE III: NATIONAL-LEVEL INTERVENTIONS

Efforts to change faculty instructional practices in higher education have been on-going for several decades. Professional development commonly focuses on tactics: tools faculty can implement to improve student outcomes. The focus on tactics can lead many instructors to choose what is easiest rather than what is most appropriate for their students, with reduced impacts. For transformational change to occur, faculty need to deepen their instructional mental models, moving from a toolbox of tactics to an understanding of equitable pedagogy. In this presentation, we explore faculty mental models of inclusive teaching following a week-long module focused on diversity, equity, and inclusion (DEI) concepts during a six-week high engagement, online professional development course. Analysis of participant reflections revealed variation in definitions of 'inclusive teaching,' with most participants failing to include all three core DEI concepts. We describe patterns of variation across cohort and demographic parameters and the implications for professional development efforts.

Linden E. Higgins, *Senior Lecturer—University of Vermont*

10:15 AM -10:45 AM

Assessing the Success of a 14-Institution Collaborative STEM Inclusivity Initiative

TYPE IV: STEM EDUCATION RESEARCH

The 14-institution collaboration of the HHMI IE3-funded Learning Community Cluster 2 (LCC2) seeks to improve student belonging for marginalized students in STEM through multiple initiatives and cross-institution projects. This study examines faculty perceptions of the collaboration's success in reaching its goals after the first year of grant funding, including the implementation of equitable collaborative principles and specific projects involving peer-to-peer connections, faculty professional development, and introductory STEM curriculum development. This study utilizes the four-frames framework in conjunction with queer theory to explore how a unique, transformative project like the LCC2 may begin to address challenges in student belonging in STEM education. This presentation will offer insights based on an LCC2-wide survey examining member perceptions of the equity principles in action, individual interviews with team members, and some initial findings from focus groups with representatives from each of the 14 institutions.

Madison Fitzgerald-Russell, *Postdoctoral Scholar—University of Iowa;* ***Renée S. Cole,*** *Professor and Chair of Chemistry—University of Iowa;* ***Erin Shortlidge****, Associate Professor of Biology and Biology Education—Portland State University;* ***Christy Wentz,*** *Business Intelligence Analyst—Hamilton College*

♦ SESSION 4.8 REGULAR SESSIONS

Potomac VI, Ballroom Level

9:45 AM – 10:15 AM

Creating Vibrant Peer-Facilitated STEM Student Learning Communities through Campus Partnerships

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Duke University's Academic Resource Center offers peer-facilitated learning communities for many 100 to 200 level STEM courses through our STEM Advancement Through Group Engagement (SAGE) program. SAGE has successfully supported undergraduate students through partnerships with faculty and staff across the university. In this session, we will discuss how the SAGE model combines active learning, metacognition, and community building to positively impact students. We will then dive into how key partnerships have provided resources to support students in STEM gateway courses, helped with recruitment of diverse students to serve as peer facilitators, allowed for targeted enrollment of students, and facilitated the gathering of data to evaluate the effectiveness of SAGE groups.

Cheryl Beierschmitt, *Academic Resource Center Peer Education Manager—Duke University*

10:15 AM – 10:45 AM

Supporting Productive Peer Teaching Debrief Conversations in Undergraduate STEM Education

TYPE IV: STEM EDUCATION RESEARCH

Groups of instructors from three different institutions engaged in peer observation and debrief conversations as part of a larger project working to develop and implement a framework promoting student-centered, equitable teaching practices in undergraduate STEM courses. We analyzed seven debrief conversations from five different groups to learn what factors contribute to productive debrief conversations following a peer observation. Debrief conversations were transcribed and qualitatively analyzed by applying codes generated to characterize how groups engaged in conversation, and the content of their conversations. We found that more productive conversations were less evaluative and consisted of more equal talk time amongst participants. In this presentation, we will share detailed results, as well as suggestions and tools that can be used to support productive debrief conversations.

Josie Melton, *STEM Education Researcher—Western Washington University;* ***Dustin S. J. Van Orman,*** *STEM Education Researcher—Western Washington University;* ***Dan Hanley****, Director of STEM Education Research and Evaluation—Western Washington University;* ***Abbey Gray,*** *Undergraduate Research Assistant—Western Washington University;* ***Makayla Wilson,*** *Undergraduate Research Assistant—Western Washington University*

10:45 AM – 11:00 AM Refreshment Break

Regency Foyer, Ballroom Level

11:00 AM – 12:00 PM Concurrent Session Block 5

This session block is comprised of 30- and 60-minute sessions, up to two per room.

♦ SESSION 5.1 FACILITATED DISCUSSION

Arlington/Fairfax Room, 3rd Floor

11:00 AM – 12:00 PM

Applied Inclusive Excellence: Facilitated Discussion on Broadening the Use of Evidence-Based Inclusive Pedagogies

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

To make high quality college education accessible to students from all backgrounds, course instructors need to use inclusive pedagogies. Yet broad adoption of inclusive practices often meets challenges associated with lack of awareness and skills, workload concerns, unclear values alignment, and low institutional recognition for the work. This facilitated discussion will explore the literature demonstrating the positive impact of inclusive instruction for students. We will then stimulate debate on how to encourage more faculty and more departments to adopt inclusive strategies and include them in evaluation of faculty progress toward promotion and/or tenure. As grantees in the HHMI Inclusive Excellence initiative, session facilitators predict mutual benefits for all participants in this discussion, as we share our preliminary work in this domain while also soliciting attendees' ideas, all with underlying emphasis on institutional vocabularies and conditions that promote (or prohibit) pedagogical progress for faculty, and thus inclusive success for students.

Samantha Parks, *Principal Lecturer—Georgia State University;* ***Sherri B. Briggs,*** *Project Coordinator, Center for the Advancement of Students and Alumni (CASA)—Georgia State University;* ***Kyle Frantz****, Professor, Neuroscience Institute and Department of Biology Co-Director, CASA—Georgia State University*

♦ SESSION 5.2 FACILITATED DISCUSSION

Roosevelt/Lincoln Room, 3rd Floor

11:00 AM – 12:00 PM

"What's the Business with STEM?" The Future Impact of STEM Entrepreneurship on Underrepresented Communities

TYPE IV: STEM EDUCATION RESEARCH

What will solve the disparity of diverse Science, Technology, Engineering and Math (STEM) businesses in the U.S., prepare underrepresented students to occupy family-supporting jobs, close the equity gap in clinical research and shrink the wealth gap? The integration of STEM and entrepreneurship curriculum taught in K-12 and higher education will secure the U.S. position in innovation, science research and remediate wealth and equity gaps in Black, Indigenous and People of Color (BIPOC) communities. In partnership with collegiate business faculty, STEM educators have an opportunity to pioneer innovative curriculum resulting in maximized exposure to STEM, growth in STEM collegiate graduation rates, diversification in STEM careers and surges in STEM innovation and STEM-related small businesses. This session titled, "What's the Business with STEM?" will guide educators and provide tools to build new STEM curriculum or amend current curriculum integrating and applying entrepreneurship.

Kamela Goodwyn, *Academic Professional—Milwaukee Area Technical College*

SESSION 5.3 INNOVATION/IDEATION SESSIONS

Potomac I, Ballroom Level

11:00 AM – 11:30 AM

Mathematics Isn't a Spectator Sport: Exploring the Use of AI to Foster Productive Struggle in Undergraduate Education

TYPE IV: STEM EDUCATION RESEARCH

Productive struggle in mathematics, the process where students engage with challenging problems to build deeper understanding and skills, is essential for learning. But since immediate, targeted feedback is required to ensure the struggle is productive rather than frustrating, it is very difficult to provide opportunities for productive struggle in higher education settings where students mostly work on their own. At Maplesoft, we are exploring ways that AI can be combined with "traditional" math technology to provide undergraduate students with the meaningful guidance they need to enter and maintain a state of productive struggle. Tools like "Check My Work," guided interactive tutors, content-specific hints, feedback on mistakes, and opportunities to tackle similar problems all play a role. In this session we'll explore the successes and challenges of these efforts, and invite the audience to contribute their ideas and discuss the needs of their students.

Karishma Punwani, *Director of Academic Product Management—Maplesoft*

11:30 AM – 12:00 PM

Innovative Co-Enrollment Coupling of Academic Success Strategies and Precalculus to Support High-Priority Students in STEM Majors

TYPE II: INSTITUTION LEVEL INTERVENTIONS

To expand access to Georgia Tech while simultaneously improving time to degree completion, a comprehensive analysis of factors impacting graduation rate revealed precalculus (MATH 1113) is a vital academic context for intervention among our highest priority students, especially STEM majors. Over the Fall 2024 semester, collaborators from the Institute's Academic Success and Advising team and the School of Mathematics are partnering to pilot special sections of our first-year seminar for precalculus students. The co-enrollment learning environment provides a vehicle for customized assignments aligned to the precalculus course pacing to drive engagement in academic support services, skills development, and individualized academic planning accounting for MATH 1113, which is not included in degree maps for STEM majors. This Innovation Session will present findings that informed the strategy and the course design for the pilot intervention. We will also share our assessment plan and any early evidence of student success.

Anna Newsome Holcomb, *Director of Retention and Completion Initiatives—Georgia Institute of Technology;* ***Lorett Swank,*** *Executive Director of Academic Success and Advising—Georgia Institute of Technology;* ***Lacy Hodges****, Director of Undergraduate Analytics and Planning—Georgia Institute of Technology*

SESSION 5.4 REGULAR SESSIONS

Potomac II, Ballroom Level

11:00 AM – 11:30 AM

Student Use of Metacognitive Approaches During a Summer Undergraduate Research Experience

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Research scientists likely develop strong metacognitive skills from repeatedly planning and completing research projects and experiencing successes and failures. We had two primary research questions. Q1: To what extent do students report engaging in metacognition during their summer research experience, and how does this compare to their previous lab/research experiences? Q2: To what extent do students enrolled in a metacognitive intervention report more frequent use of metacognitive strategies compared to students not enrolled in that intervention? We found that all students reported more frequent use of metacognitive approaches during summer research compared to their prior lab/research experiences, with those enrolled in the metacognitive intervention showing only modest increases. Other data indicate that while students also reported small gains in their research skills, there were no differences in any other survey responses including those related to their attitude towards science, their understanding of science or their understanding of the research process.

Diane K. Angell, *Associate Professor—St. Olaf College;* ***Ryan Sheppard,*** *Associate Professor—St. Olaf College*

11:30 AM – 12:00 PM

A Novel Model: A Learning-Skills Program Supporting Student Success in STEM

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

There are concerns about students' readiness for university, particularly regarding gaps in learning skills and their ability to manage various factors in the learning process. Skills like time management can be taught, enhancing student performance. However, due to extensive content coverage, there is little time for learning-skills instruction in STEM-specific courses. We will discuss a new discipline-focused learning-skills program model implemented at Sacramento State. It supported students in lower-level STEM courses through peer-led mentoring and workshops on discipline-specific skills. Faculty incorporated the program differently:

some integrated it as a part of the course, while others offered it as an additional resource. Preliminary findings suggest that the program's success lies in faculty buy-in and its incorporation as a course component. We also uncover the reasons STEM students choose to (or not to) participate and identify participation barriers. This information will help institutions adapt this program model for student success.

Sayonita Ghosh Hajra, *Associate Professor—California State University, Sacramento*

♦ SESSION 5.5 REGULAR SESSIONS

Potomac III, Ballroom Level

11:00 AM – 11:30 AM

Examining Success Factors for Black Male Undergraduate STEM Majors

TYPE III: NATIONAL-LEVEL INTERVENTIONS

Racial minorities are 25% of the U. S. population but represent only 10% of the STEM workforce. African American males are also underrepresented as STEM degree earners. Based on a qualitative research study on African American male STEM undergraduates from 4-year universities, session attendees will examine the lived experience of this underserved group. Attendees will review strategies to support underrepresented minorities at colleges and universities and learn how the support of this population will have a positive impact on the STEM workforce. Session attendees will examine success factors for racial minorities in STEM in general, and African American STEM majors in particular.

Robert Shields, *Assistant Director, Teaching and Learning Center—California Baptist University*

11:30 AM – 12:00 PM

Exploring the In-Home Experiences of Black Students Pursuing STEM Degrees

TYPE IV: STEM EDUCATION RESEARCH

Exploring the In-Home Experiences of African American Students Pursuing STEM Degrees is a Phenomenological Case study that examines the experiences of five African American students at a Historically Black College. This study explores the internal (within oneself) and external (interactions with parents and siblings) attributes of the in-home experiences; Focusing on how the internal and external experiences impacted African American students' decisions to pursue STEM degrees. The themes that emerged were (1) Conflict Experienced Early on Improves Character Development. (2) Your Focus Influences Who You Become, (3) The Power of Parental Persuasion in Student Achievement, and (4) A Positive Mindset Creates a Positive Self-Image.

Michael Lewis, *Associate Dean of Academic Advising—Wake Technical Community College;* ***Bapange G. Kasonga,*** *Student Researcher—East Carolina University*

11:00 AM – 12:15 PM Workshop Series - Afternoon

This session block is comprised of 75-minute workshops, one per room.

♦ WORKSHOP W10 WORKSHOP

Potomac I, Ballroom Level

11:00 AM – 12:15 PM

Meeting Skill Assessment Needs with the ELIPSS Transferable Skill Rubrics

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Transferable skills such as communication, teamwork, critical thinking, and problem solving are frequently cited as important outcomes for STEM programs. However, these skills are not always explicitly developed or assessed during typical coursework. In a well-aligned curriculum with skill-based learning goals, students are given assignments that compel them to develop particular transferable skills. Feedback and assessment must close this loop for gains in student skill. The goal of this workshop is to provide participants with strategies to tailor the ELIPSS transferable skill feedback rubrics (elipps.com) to particular assignments within their courses, thus allowing for the assessment of skills for their own courses. The ELIPSS feedback-focused skill rubrics will be explored within the context of typical assignments in STEM classrooms to demonstrate how these rubrics can be easily combined and customized to meet the assessment needs of any classroom or laboratory activity in which skill development is a desired component.

Juliette Lantz, *Professor and Chair of Chemistry—Drew University;* ***Suzanne Ruder,*** *Professor and Associate Chair of Chemistry—Virginia Commonwealth University;* ***Renée S. Cole****, Professor and Chair of Chemistry—University of Iowa*

♦ WORKSHOP W11 WORKSHOP

Potomac IV, Ballroom Level

11:00 AM – 12:15 PM

The Power of 5-Minute Self-Regulation Strategies in the STEM Classroom

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

This workshop serves as an introduction to a collaboration between an engineering educator and a student support service director to create a series of 5-minute interventions to introduce students to self-regulation techniques to promote the basic psychological needs (BPN) of autonomy, competence, and relatedness in a

classroom environment. Recent studies indicate that even minimal social interactions between faculty and students can produce significant benefits, that are directly related to student success. This endeavor was embraced to de-normalize stress culture in the STEM classroom and supplant it with a culture of care and support from faculty and staff. STEM students are known for not seeking mental wellness support, so this effort brings the strategies to them in the STEM class. This interactive workshop will provide attendees with an opportunity to: practice the high-impact, small scale low cost interventions; ask questions; and discuss strategies for implementation on their campus.

Harly Ramsey, *Associate Professor of Technical Communication Practice and Associate Director of Engineering in Society Program—University of Southern California;* ***Julie Loppacher,*** *Director of the Kortschak Center for Learning and Creativity—University of Southern California*

♦ WORKSHOP W12 WORKSHOP

Potomac V, Ballroom Level

11:00 AM – 12:15 PM

Enhancing Undergraduate Research through Critical Race Theory: Evidence and Outcomes from the BUILD PODER Program

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

BUILD PODER (BP) is a pioneering training program using Critical Race Theory (CRT) to develop faculty mentor and student training curricula within the biomedical sciences. This workshop features four speakers who will provide empirical evidence on the impact of BP on student outcomes. Dr. Lin will provide an overview of the BP program and its objectives. Dr. Vargas will describe the faculty mentor training, highlighting the interplay between "the individual" and "the system" in the reproduction of racism and intergenerational injustice. Dr. Escobedo will reveal outcomes from the four-week summer training to prepare first-year students for mentored research experiences, including increased scores for mentor relationships, research self-efficacy, and a sense of community. Finally, Dr. Moon will discuss year-long student training science outcomes, such as the direct and indirect effect of BP participation on mentor satisfaction, science identity, and self-efficacy, and how CRT-informed mentoring significantly predicted student science outcomes.

Gabriela Chavira, *Director of the Office of Undergraduate Research—California State University, Northridge;* ***Judith Lin,*** *Senior Research Fellow—California State University, Northridge;* ***Sungmin Moon,*** *Senior Research Fellow—California State University, Northridge;* ***Jose Vargas,*** *Senior Research Fellow—California State University, Northridge*

♦ WORKSHOP W13 WORKSHOP

Potomac VI, Ballroom Level

11:00 AM – 12:15 PM

Increase the Odds of STEM Transformation Success with Systems Change

TYPE III: NATIONAL-LEVEL INTERVENTIONS

In this workshop we will introduce participants to the conditions of systems change. The six conditions are organized across three levels: explicit, structural conditions of policies, procedures, and resource flows; semi-explicit, relational conditions of relationships/connections and power dynamics; and an implicit, transformative condition of mental models. Each participant will complete a conditions of systems change grid applying each condition to a STEM transformation effort in which they are engaged. Participants will articulate actions to address each condition as related to their transformation effort.

By the end of the workshop participants will be able to: 1.) Articulate the conditions of systems change; 2.) Explain the value of working across levels, particularly moving beyond the explicit level; 3.) Apply the conditions to a transformation effort in which they are currently engaged; and 4.) Articulate specific actions to address each condition within that transformation effort.

Jessica Santangelo, *Professor—Hofstra University;* ***Alison Hyslop,*** *Professor and Associate Dean—St. John's University;* ***Jacqueline Lee****, Professor—Nassau Community College*

12:30 PM – 2:00 PM **Featured Symposium (separate registration required)**

Tidewater II, 2nd Floor

NASA'S Science Mission Directorate MOSAICS Program: A Funding Program for Faculty at Under-Resourced Emerging Research Institutions

Hosted By
NASA SMD's MOSAICS Program

To address the needs of faculty and students at under-resourced emerging research institutions (U/ERIs), such as historically Black colleges and universities (HBCUs), primarily undergraduate institutions (PUIs), and tribal colleges and universities (TCUs), NASA's Science Mission Directorate (SMD) unveiled the Bridge Program in Fall 2021. This community-NASA co-created program aims to create bridges between faculty and students at U/ERIs and research scientists and engineers at NASA centers and facilities. In Fall 2022, NASA convened a five-day workshop for scientific community members to provide input for the Bridge Program, now called MOSAICS. This session will provide an overview of the

program and its guiding principles, updates on current and future funding opportunities, and a networking session for questions and answers.

Nicolle Zellner, *Professor of Physics—Albion College;* ***Padi Boyd,*** *Program Director—NASA Science Mission Directorate;* ***Marianne Smith****, Senior Faculty—Oak Crest Institute of Science*

12:30 PM – 2:00 PM **Featured Symposium (separate registration required)**

Washington Room, Ballroom Level

Hosted By BLOOKSY

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*

12:30 PM – 2:00 PM **Lunch on Your Own**

2:00 PM – 3:30 PM **Mid-Conference Keynote Address**

Regency Ballroom A-D, Ballroom Level

Leaning into Un/Learning for More Inclusive and Equitable STEM Futures

This interactive plenary session will feature a historical review of the foundations of U.S. higher education, the academic disciplines, and the academic profession – with a targeted focus on STEM. Here, we will highlight how U.S. higher education has always been an exclusionary system structured by, and complicit in, a harmful racial hierarchy, where Communities of Color and their knowledge have, far too often, been marginalized and dismissed. Channeling the late Maya Angelou, we must become convinced that once we know better, we can (and should) do better. What's next is for us to learn and adapt the powerful asset-based ideas and tools to support our work as equity-committed educators and informed reformers (or revolutionaries) of undergraduate STEM education.

Leslie D. Gonzales, *Professor of Higher Education; Department Head of Educational Policy Studies and Practices; and Director of the Center for the Study of Higher Education—University of Arizona*

3:30 PM – 4:00 PM **Refreshment Break**

Regency Foyer, Ballroom Level

American Association of Colleges & Universities

AAC&U
GRANT WRITING
INNOVATION EXCHANGE INSTITUTE

May 18-22 2025

Lansdowne Resort & Conference Center
Leesburg, VA

What to Expect:

- Access to experiential learning exercises aimed at developing a competitive edge for NSF grant proposal submissions
- Exposure to the theory and practice of critical inquiry-based reform strategies for institutions and STEM leaders
- Expert-facilitated self and institutional reflection
- & SO MUCH MORE!

Empowering STEM faculty to broaden the participation of talented, low-income STEM students.

NSF

4:00 PM – 5:00 PM **Poster Session**

Independence A, Independence Level

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Poster P1: Activating Students' Career/Transfer-Success and Self-Efficacy: Miami Dade College's STEM Career Launchpad Summer Program

Logan Saucer, *STEM Student Transfer Manager—Miami Dade College, Wolfson Campus;* ***Marie Lunie Estimable,*** *Grant Coordinator—Miami Dade College, Wolfson Campus*

Poster P2: Bridging Disciplines from the Classroom to Careers: How to Develop Early Commitments in STEM Pathways through Uncrewed and Autonomous Systems

Kimberly Luthi, *Department Chair of the Applied Aerospace Science College of Aviation—Embry-Riddle Aeronautical University*

Poster P3: Clinical Interviews for Understanding Students' Statistical Thinking

Laura K. Callis, *Associate Professor—Curry College*

Poster P4: Collaborative Mini-Zines for Student Self-Efficacy

Jeff Rients, *Associate Director of Teaching and Learning Innovation—Temple University*

Poster P5: Inclusive Chemistry: Incorporating Cultural Fluency and an Ecological Approach to Healthcare into an Introductory Health Sciences Chemistry Laboratory Using Case Studies

Gina J. Mancini-Samuelson, *Professor—St. Catherine University*

Poster P6: Incorporating "Grading for Equity" Approaches into the Introductory Biology Classroom

Lana E. McCorkle, *Undergraduate Student—Hendrix College;* ***Audrey C. Nony,*** *Undergraduate Student—Hendrix College;* ***Laura MacDonald,*** *Associate Professor of Biology—Hendrix College*

Poster P7: Incorporating Digital Education Technology in Online Nursing Education

Shannon Manfredo, *Nursing Faculty—Herzing University*

Poster P8: Innovating for Equity: Transforming STEM Education through Interdisciplinary Approaches and Emerging Technologies

La'Quata Sumter, *Professor—Technical College System of Georgia*

Poster P9: Integrating Gaming in Online Nursing Education to Increase Student Engagement

Shannon Manfredo, *Nursing Faculty—Herzing University*

Poster P10: Let's Talk it Out: How Enhanced Mathematics Instruction Can Transform Student Mathematics and Science Identities and Eliminate Cultural Barriers to Teaching and Learning

Keva M. Yarbrough, *Contributing Faculty—Walden University*

Poster P11: Leveraging Natural Language Processing to Gain Insights into Learner Experiences in Virtual Laboratory Courses

Debra McLaughlin, *Professor—University of Maryland, Global Campus;* ***Meenu Vikram****—University of Maryland, Global Campus*

Poster P12: New Materials for Combatting Technology Illiteracy in Biology Education

Audrey C. Nony, *Undergraduate Student—Hendrix College*

Poster P13: Preparing Teachers for Transformative Inclusive Mechatronics Leadership

Ruthmae Sears, *Professor of Mathematics Education and Associate Director of Coalition for Science Literacy—University of South Florida;* ***Stephanie A. Arthur,*** *Assistant Professor of Instruction—University of South Florida;* ***Robert Potter,*** *Professor and Senior Associate Dean—University of South Florida;* ***Alexandro Castellanos,*** *Professor of Instruction—University of South Florida;* ***Brandy Jackson,*** *CEO Scoutlier—University of South Florida*

Poster P14: Revolutionizing STEM Education: Incorporating 3D Printing for Enhanced Engagement and Active Learning

Rosie K. Dutt, *Instructor and Adjunct lecturer—Washington University in St. Louis*

Poster P15: Socio-Emotional Learning and Resilience Among Elementary Preservice Teachers

Mamta Singh, *Associate Professor—Lamar University*

Poster P16: STARTing and Staying in STEM: An Undergraduate Research Program at a Community College

Sarah Horstman, *Associate Director of STEM Academic Research and Training (START)—Wake Technical Community College*

Poster P17: STEM Instructional Designers: Building Bridges of Collaborative Pathways

Maia Bland, *Lead Learning Experience Designer - STEM—University of Texas at San Antonio;* ***Alexia Pollock,*** *Instructional Designer - STEM—University of Texas at San Antonio*

Poster P18: The Dynamic Research Education Academy for Mentoring Womxn in STEM at Simmons University

Donna Beers, *Professor—Simmons University;* ***Arpita Saha,*** *Associate Professor of Chemistry—Simmons University;* ***Meghan Johnston,*** *Associate Teaching Professor—Simmons University;* ***Jane Lopilato,*** *Associate Professor—Simmons University;* ***Megan McCarty,*** *Associate Professor—Simmons University*

Poster P19: The Impact of In-Class Breathing Exercises to Enhance Student Mental Health in a Large General Chemistry Lecture

Alexander Korfiatis, *Student—Saint Louis University*

Poster P20: Transforming Introductory Mathematics Pedagogy: Addressing the Perception Gap to Foster STEM Diversity

Sheila Tabanli, *Assistant Professor—Rutgers University, New Brunswick Campus*

Poster P21: U-RISE at Marquette: Supporting Underrepresented Student Entry into Biomedical-Related PhD Programs Using Research-Focused Professional Development and an Ecosystem of Mentoring

Angela Frey, *Associate Dean of Academic Affairs, College of Health Sciences—Marquette University*

Poster P22: Using Writing to Enhance Student Outcomes in an Upper-Level Mathematics Course

Sarah Birdsong, *Assistant Teaching Professor—University of North Carolina at Charlotte*

Poster P23: Virtual Immersive Simulations and In-Person Experiential Opportunity in Pharmacy Education for Secondary and Post-Secondary Students from Underrepresented Communities

Leanne Perry, *Research Administrator—University of Toronto;* ***Lachmi Singh,*** *Director of Quality Assurance; Planning and Academic Change/Equity Project Specialist—University of Toronto*

Poster P24: Visualize Your Curriculum: Using a Curriculum Map to Analyze Courses, Fix Gaps, and Increase Inclusion

Caralyn Zehnder, *Senior Lecturer—University of Massachusetts Amherst*

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Poster P25: A Holistic Plan for Fixed-Term Track Faculty Development in the College of Sciences at UTSA

Terri Matiella, *Assistant Dean of Instruction, Assessment, and Faculty Development—University of Texas at San Antonio*

Poster P26: A View from the Shadows: The IRACDA BETTR Program as a Framework to Develop Teaching Skills in Postdoctoral Scholars

Eric P. Chang, *Associate Professor—Pace University*

Poster P27: Embracing Inclusive Excellence at Centre College

Jennifer L. Muzyka, *Professor of Chemistry—Centre College;* ***Eva Cadavid,*** *Associate Professor of Philosophy—Centre College;* ***Katherine Andrews,*** *Director of Research—Centre College*

Poster P28: How Well Do You Know YOUR Students? Institutional and Disciplinary-Specific Strategies for Inclusion

Lizzy Compton, *Instructor—Miami University*

Poster P29: Inclusive Excellence at the Nation's Most Diverse Campus: From Disadvantaged Beginnings to Graduating with Honors

Reni Ivanova, *Professor of Mathematics, Founding Director of the STEM Honors Program—University of Hawaii at Hilo*

Poster P30: Incorporating a Connection-Building Approach into Undergraduate Learning Spaces

Trudy Thomas-Smith, *Associate Professor—SUNY Oneonta;* ***Kimberly N. Cossey,*** *Assistant Professor—SUNY Oneonta;* ***Valerie Rapson,*** *Assistant Professor—SUNY Oneonta*

Poster P31: Making an Impact through the Title V BEST Grant

Margarita Alarilla, *Project Director—St. Mary's University*

Poster P32: Mutual Mentoring Groups for Teaching-Focused Faculty

Christiane I. Healey, *Senior Lecturer II—University of Massachusetts Amherst;* ***Rosa Moscarella,*** *Senior Lecturer—University of Massachusetts Amherst*

Poster P33: Navigating Minority Stress in STEM

Hessam K. Mirgolbabaei, *Assistant Professor—University of Minnesota*

Poster P34: Teaching Innovation Can Change STEM Higher Education

Geoff Wright, *Professor of Technology and Engineering Studies—Brigham Young University*

TYPE III: NATIONAL LEVEL INTERVENTIONS

Poster P35: Developing Change Leaders to Advance Teaching and Learning in Higher Education: A Change Leadership Development Program

Rachel L. Kennison, *Director of the Center for Education, Innovation and Learning in the Sciences—University of California, Los Angeles;* ***Lucas B. Hill,*** *Researcher, Evaluator, and Director of Research (CIRTL)—University of Wisconsin-Madison*

Poster P36: DIVAS (DIversificadas y Valientes): Study About Latina's Self-Efficacy Levels in STEM

Josee Védrine-Pauléus, *Professor; Director of DIVAS; co-Director of the Center for Inclusive Teaching and Learning—University of Puerto Rico at Humacao*

Poster P37: Virtual Course Exposes Students to Careers in Biomedical Sciences and Confirms Interest in Research Careers

Erica Gerace, *Program Manager, for Genomics Education and Experiential Learning—The Jackson Laboratory*

TYPE IV: STEM EDUCATION RESEARCH

Poster P38: Beyond the Monolith: A Mixed Method Study on Identity, Community, and Support at Historically Black Colleges and Universities

Patrice Greene, *Postdoctoral Scholar—University of the District of Columbia;* ***Gelysia Anderson,*** *Undergraduate Student—Howard University;* ***Niya A. Mogheeth,*** *Undergraduate Student—Louisiana State University;* ***Yanique Jordan Mckenzie,*** *Undergraduate Student—University of the District of Columbia;* ***Afiya Fredericks,*** *Associate Professor of Psychology—University of the District of Columbia*

Poster P39: Culturally Specific Assessment (CSA) for Leadership: Harnessing HBCU Leaders' Experiences to Transform STEM Higher Education

Angelicque Tucker-Blackmon, *Director of Research—University of the Virgin Islands;* ***Nicole Retland,*** *Associate Faculty and Director of Operations, CASL—Fielding Graduate University;* ***Elizabeth Jaeger,*** *Associate Professor/Researcher—University of the Virgin Islands*

Poster P40: Exploring Potential Benefits and Unintended Consequences of an Early Exposure to Computer Science (EECS) Sequence Offered to Participants in a Computer Science and Mathematics Focused S-STEM Project

Joseph A. Brobst, *Research Assistant Professor—Old Dominion University;* ***David Hartenstine,*** *Professor—Western Washington University*

Poster P41: If Past Systemic STEM Failures Could Talk, What Would They Teach Us?

Avery Austin, *Lead Math Support Specialist—Northern Virginia Community College*

Poster P42: The Role of Women Leaders at Historically Black Colleges and Universities in Broadening Participation in STEM

Kimarie Engerman, *Dean/Associate Director—University of the Virgin Islands;* ***Angelicque Tucker Blackmon,*** *Director of Research—University of the Virgin Islands;* ***Elizabeth Jaeger,*** *Associate Professor/Researcher—University of the Virgin Islands*

5:00 PM – 6:00 PM **Concurrent Session Block 6**

This session block is comprised of 30-minute sessions, up to two per room.

♦ SESSION 6.1 INNOVATION/IDEATION SESSIONS

Conference Theater, Ballroom Level

5:00 PM – 5:30 PM

Globally Competent STEM Teaching: Using Place-Based Frameworks to Strengthen P-16 STEM Education

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Virtual Galápagos, an iUSE NSF-funded pilot program, seeks to improve science and pedagogical knowledge among undergraduate students through the creation of interactive digital curriculum for elementary-aged learners. The Galápagos Islands, one of the world's most biodiverse environments, acts as the focal point for this project. Participants use design-based approaches to develop modules featuring interdisciplinary science topics, including earth systems and ecosystem dynamics.

Undergraduate designers ground their curriculum in inclusive science teaching and learning practices that promote engagement. Initial successes of the program include sustained participant commitment and positive educator feedback of curriculum. We seek collegial input on our plans to expand this program in order to invite new institutions, voices, and perspectives. Presenters will pitch a multi-institutional scale-up of the project from the current pilot to evaluate its feasibility and potential effectiveness for elevating undergraduate STEM education in support of current and future K-12 STEM teachers.

Margery (Meg) Gardner, *Assistant Professor and Director of Teacher Preparation—Colgate University;* ***Karen Harpp,*** *Professor of Earth and Environmental Geosciences and Peace and Conflict Studies—Colgate University*

5:30 PM – 6:00 PM

The Impact of a Pilot Introductory Anatomy and Physiology Course on Undergraduate Student Success in Anatomy and Physiology

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Anatomy and Physiology courses are often referred to as "gateway" or "pathway" courses and historically have high D/F/W rates. Efforts to improve student learning outcomes in Anatomy and Physiology support pathways to upper division undergraduate majors and health related career fields, such as athletic training, kinesiology, physical therapy, occupational therapy, and physician assistant medicine. This, in turn, helps meet the demands of the modern allied-health workforce.

The purpose of this project is to design and measure the impact of a pilot "Introduction to Anatomy and Physiology" course on final grades and D/F/W rates in Anatomy and Physiology as compared to no pre-requisite or another natural science pre-requisite. The outcomes of this intervention, a course built on aligned learning objectives, including the development of academic self-efficacy and strong disciplinary study skills, can be used to make data-informed decisions related to advising, curriculum, and degree requirements of pre-health majors.

Juliana Marino, *Senior Lecturer and Program Director—University of North Carolina at Charlotte*

♦ SESSION 6.2 INNOVATION/IDEATION SESSIONS

Potomac II, Ballroom Level

5:00 PM – 5:30 PM

Integration of Mathematics into the Life Science Courses: Challenges and Strategies for Success

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Working knowledge of mathematics is increasingly important for the deep comprehension and learning on many biological disciplines. It is also a powerful factor in student performance and retention in STEM. Math skills are essential for the better understanding of the subject, critical thinking, learning outcomes, and the improvement of 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 improvement of math skills of biology students is the large variety of their background knowledge and the lack of class time that could be dedicated to this. This session will focus on the strategies for the successful integration of the mathematics into the undergraduate biology courses that improve the learning experience, and that are scalable and practical. Their effect on learning outcomes and student experience, and their applicability for other science disciplines will be discussed.

Galyna Kufryk, *Professor—Grand Canyon University*

5:30 PM – 6:00 PM

Universal Design for Learning in Introductory Statistics Courses

TYPE IV: STEM EDUCATION RESEARCH

Simulation-based inference (SBI), inquiry-based learning (IBL), and student collaboration have been effective at helping a wide range of learners. However, IBL and groupwork can sometimes have unintended negative effects for some groups of students, particularly those who have historically been excluded from high quality mathematics education. This presentation describes preliminary results from the first seven months of a three-year research project investigating instructional practices that support students in introductory SBI courses. Five instructors with a history of closing the achievement gap at a less selective college with a neurodiverse student body participated in video stimulated recall interviews. Twelve students shared their experiences in introductory statistics. The instructional practices identified add more detail to the Universal Design for Learning (UDL) Guidelines for post-secondary statistics courses that use active learning strategies. As the percentage of college students with learning differences increases, all institutions must examine their use of UDL aligned practices.

Laura K. Callis, *Associate Professor—Curry College*

♦ SESSION 6.3 REGULAR SESSIONS

Potomac III, Ballroom Level

5:00 PM – 5:30 PM

Culturally Sustaining Pedagogy: Reimaging Mathematics for Teachers

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

The Culturally Sustaining Mathematics Education Project (CMP) was created to support K-12 preservice teachers and mathematics majors. The purpose is to redesign the mathematics for Teachers courses for Elementary and Middle-level majors to establish culturally sustaining pedagogies (CSP). This allows students to strengthen their mathematical proficiencies and develop positive and productive mathematics identities. Additionally, Secondary Math Education and Mathematics majors serve as peer tutors to expose them to teaching practices emphasizing the strands of proficiency that may not addressed in their math content courses. Simultaneously, peer tutors and learners develop mathematical proficiencies and identities through a culturally sustaining lens.

Nicola D. Edwards, *Associate Professor of Mathematics Education—Delaware State University;* ***Delayne Johnson,*** *Associate Professor of Mathematics Education—Delaware State University*

5:30 PM – 6:00 PM

Empowering Preservice PK-8 STEM Teachers to Empower Their Future Students

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Many preservice PK-8 STEM teachers (PTs) struggle with fraction concepts and tend to lack fraction number sense. In an effort to address this deficiency, we introduced and implemented fraction number talks to PTs in a mathematics content course designed for future PK-8 STEM teachers. Fraction number talks are short classroom conversations built around a problem or series of problems. This active learning approach allows students to think independently, share strategies, and compare strategies with their classmates. By surveying PTs at the beginning and end of the semester, we found that PTs have a greater sense of confidence in their fraction number sense after engaging with fraction number talks.

Jenny Gibson, *Lecturer—James Madison University;* ***Alexis Stevens,*** *Associate Professor of Mathematics Education—James Madison University*

♦ SESSION 6.4 REGULAR SESSIONS

Washington Room, Ballroom Level

5:00 PM – 5:30 PM

Replacing Roadblocks with Roadmaps for STEM Majors at Community Colleges

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Completing a STEM major at a 4-year institution can be challenging – especially for the increasing number of students who start their academic journey at a community college. The choices made shortly after graduating from high school can have profound impacts years later, when students learn they have missed a critical prerequisite or taken courses out of sequence, then struggle with a high unit load as they attempt to navigate myriad requirements before their financial aid expires. These roadblocks to degree completion can be eliminated by providing those same students with roadmaps that can help them choose courses at their community college that will facilitate completion of their major after they transfer to a 4-year institution. Come to this session to learn about the roadmaps we developed at California State University, Stanislaus with our community college partners; leave with ideas about how to create roadmaps for your own campus.

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

5:30 PM – 6:00 PM

Enhancing STEM Persistence and Transfer Through Cross-Functional Teams: A Model for Supporting Underrepresented Community College Students

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

This study highlights the impact of cross-functional teams in supporting underrepresented community college students in STEM. By analyzing 5 years of data from the NSF-funded STEM Scholars program at Oakton College outside Chicago, IL, we demonstrate how collaborative efforts between academic and support services significantly improve student persistence and transfer. Despite scalability challenges, the program's model offers valuable insights for institutional changes necessary to support future cohorts of STEM students. This research finds that cross-functional teams played a crucial role in identifying and addressing academic, enrollment, financial, and personal challenges, effectively identifying and mitigating potential roadblocks to persistence. This collaborative model ensured students received the necessary support to succeed and allowed practitioners to simultaneously identify and address institutional barriers through collective action. Although scaling this model poses challenges, we suggest approaches to address them.

Michelle E. Naffziger-Hirsch, *Distinguished Professor of Sociology—Oakton College;* ***Anuneeta Mitra,*** *Research Analyst—Oakton College*

5:00 PM – 6:15 PM Workshop Series - Evening

This session block is comprised of 75-minute workshops, one per room.

♦ WORKSHOP W14

Tidewater II, 2nd Floor

5:00 PM – 6:15 PM

Restoring the Shine: Rekindling the Light Within STEM Students

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

STEM students enter college with more than 16,000 hours of academic work experience, indicating strong potential for seamless academic success. However, many students struggle to leverage their prior knowledge, resulting in poor performance on college assessments. This issue is often misattributed to inadequate high school preparation, poor study tactics, or lack of effort, whereas the real challenge lies in transitioning to the college academic paradigm. Students frequently feel confident in their knowledge before tests but find the material unfamiliar during assessments, causing self-doubt. Through ethnographic observations across various North American campuses, we identified a set of key metacognitive practices and perspectives that both students and faculty often overlook. Educators have used these insights to improve core institutional metrics such as DFW rates, academic progress, graduation rates, and overall satisfaction. Participants will learn how to leverage new tools and existing course resources to positively impact their students and institutions.

Leonard Geddes, *Educator—The LearnWell Projects*

♦ WORKSHOP W15

Potomac IV, Ballroom Level

5:00 PM – 6:15 PM

Developing Critical Thinking and Problem-solving Skills

TYPE III: NATIONAL-LEVEL INTERVENTIONS

The key to graduating talented and useful STEM majors is not learning, it is development. Development of the ability to solve complex, multi-step problems by critical thinking and the efficient exchange of ideas. A student can't develop critical thinking skills by listening to a professor, watching a video, or reading a book. These are all good ways to learn. However, the only way to develop the ability to think critically and deeply for a long time is – not surprisingly – to think critically and deeply for a long time. In this workshop, I will present a raft of problems that require students to think critically for a long time to reach a new level of understanding and I will give many proven teaching strategies that will get the students to embrace the struggle.

Ed Meyer, *Professor—Baldwin Wallace University;* ***Meridith Witt,*** *Associate Professor—Baldwin Wallace University*

♦ WORKSHOP W16

Potomac I, Ballroom Level

5:00 PM – 6:15 PM

A Research-based Framework to Support STEM Transfer Students' Success and Professional Preparation

TYPE IV: STEM EDUCATION RESEARCH

The transfer pathway from community colleges to universities has not fulfilled its potential to increase access to STEM bachelor's degrees for students from underserved communities (Bahr et al., 2017; Dowd, 2012; Reyes, 2011). Indeed, throughout the transfer process, students face barriers in accessing social, academic and career-related support (NASEM, 2016; Wang, 2021). We will present a research-based framework to improve STEM transfer student outcomes. The student-centered framework connects to students' developing academic, cultural, and professional identities. Useful to both two-year and four-year institutions, the framework highlights practices that can improve STEM transfer student outcomes at each stage of the transfer process—as students prepare for transfer during community college, adjust to university after transfer, and transition into careers or graduate school after completing their degree. Participants will gain an understanding of the institutional interventions that support transfer students' academic success and career readiness.

Heather Thiry, *Senior Research Associate—University of Colorado Boulder;* ***Raquel Harper,*** *Research Associate—University of Colorado Boulder*

♦ WORKSHOP W17

Potomac V, Ballroom Level

5:00 PM – 6:15 PM

Implementing An Ungrading Approach Into Your Classroom

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

An ungrading approach emphasizes frequent detailed feedback on student's learning over numerical scores and grades. This approach has been implemented in a wide range of disciplines but is not widely adopted in STEM. The goal of this workshop is to provide time

and resources for interested instructors to adopt an ungrading approach in some portion of their course and to leave with a clearer understanding of implementing the ungrading method into their course. An overview of the ungrading approach and how it has been applied in our courses will be presented. Participants will work in small groups to discuss concerns and hesitations about ungrading adoption along with adjusting their individual course resource to an ungrading format. Participants are asked to bring in possible course materials or ideas they wish to consider for transition to ungrading during this workshop.

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

♦ WORKSHOP W18

Potomac VI, Ballroom Level

5:00 PM – 6:15 PM

Strategies for Adjusting STEM Assessments in the Age of Generative Artificial Intelligence

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

In the era of generative artificial intelligence (GenAI) (i.e., ChapGPT), STEM educators have the challenge of updating their assessments due to the advancement of this emerging technology. While GenAI offers new opportunities, it also necessitates a reevaluation of traditional assessment methods. In this workshop, participants will review Bloom's taxonomy as a framework for assessing current capabilities and limitations of GenAI. Through interactive exercises, participants will explore strategies for updating assessments such as exams, and projects for in-person and online learning environments. Authentic assessments, such as alternatives to traditional exams, will also be explored as a way to prepare students for a workforce that both utilizes and restricts GenAI. Participants will leave with an action plan for revising at least one high stakes assessment for their course. This workshop is based on a session that was originally part of a GenAI Faculty Learning Community for STEM Faculty at George Mason University.

Laina Lockett, *Educational Developer—George Mason University*

THE STEM INCLUSIONARY

SCAN ME!

Funded by the National Science Foundation

Elevating our excellence commitment to new levels of inclusion

Join our community of broadening participation inclusionaires!

LEARN ABOUT early information on professional development opportunities

EMPOWER yourself, colleagues, and campus leaders through mindfulness practices, survival guides, and research reports

ACCESS expertise on proven broadening participation practices

The STEM Inclusionary is a virtual platform that serves as a digital sanctuary for strengthening HBCU expertise, thought leadership, and professional development aimed at broadening the participation of minoritized STEM students.

SATURDAY, NOVEMBER 9, 2024

7:00 AM – 10:00 AM **Conference Registration and Membership Information**

Independence Foyer, Independence Level

6:30 AM – 8:00 AM **Breakfast**

Regency Foyer, Ballroom Level

8:00 AM – 10:00 AM **Featured Symposium (separate registration required)**

Washington Room, Ballroom Level

GrantWise: What Role Can the National Science Foundation Play for What Comes Next in STEM Higher Education?

Hosted By PRISSEM Academic Services, LLC

Are you looking for funding to support STEM students or your ideas for how to not only improve STEM education, but contribute to meaningful reform? Do you have ideas for collaborating with your colleagues across disciplines or institutions on how to do this important work? Are you from an institution that receives little federal research funding?

If you answered yes to one or more of these questions, this featured session is for you!

The first part of this session will offer an overview of NSF's mission, its overall strategic interests related to broadening the participation of marginalized students, and its merit review criteria. Participants will learn about NSF funding opportunities that can be leveraged to advance and accelerate broadening participation research and practice. Special focus will be placed on analyzing relevant, real-world case studies that address challenges and successful strategies associated with inter- and cross-disciplinary research and interventions, as well as those that cross institutional boundaries. The second part of this session invites participants to consider how they may become more engaged in STEM education research, how to establish collaborations with evaluators and colleagues in the social sciences, and how taking these steps can fit into their professional goals, reduce their workload demands, and empower them to be advocates and influencers in undergraduate STEM reform.

Claudia Rankins, *Senior Research Associate—PRISSEM Academic Services*

8:00 AM – 9:00 AM **Concurrent Session Block 7**

This session block is comprised of either 30- or 60-minute presentations, up to two per room.

♦ SESSION 7.1 FACILITATED DISCUSSION

Arlington/Fairfax Room, 3rd Floor

8:00 AM – 9:00 AM

Using Design-Thinking Strategy in Development of a Multiplayer Game to Address Textile-based Environmental Injustice: Expanding Interdisciplinary Inclusion and Transforming STEM Education and Action

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Aftermath Learning Lab at Boston College is an environmental health research and art lab whose mission is to reduce global textile waste and other technology-related pollution through interdisciplinary STEM research at the intersection of art, policy, developmental psychology, education, and public health with an environmental justice lens. By combining the perspective of various experts, Aftermath Learning Lab is able to effectively integrate a design-thinking approach to innovate STEM-based solutions to the textile waste crisis.

Aftermath Learning Lab has become a model for interdisciplinary design-thinking throughout various STEM-related projects and coursework including the creation of a multiplayer game designed to educate on the topic of textile pollution-based environmental and health impacts.

In this session, participants will learn about the increasing importance of interdisciplinary design-thinking collaboration in STEM fields and consider solutions-oriented approaches to promoting cross-disciplinary collaboration at the university intervention as well as course levels.

Julia DeVoy, *Dean of Undergraduate Programs and Students—Boston College, LSEHD;* ***Pablo Colon-Quinones,*** *Research Assistant, Aftermath Learning Lab—Boston College;* ***Carrie Kandall,*** *Research Assistant, Aftermath Learning Lab—Boston College*

♦ SESSION 7.2 FACILITATED DISCUSSION

Roosevelt/Lincoln Room, 3rd Floor

8:00 AM – 9:00 AM

Include Inclusion in STEM Courses: Strategies to Develop Inclusive Course Content and a Social Justice Mindset in Science Classrooms

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

In this workshop, participants will analyze the need for and benefits of inclusive content in STEM courses. The value-added benefits to society when science is more inclusive will also be addressed. Strategies, examples and activities to develop more inclusive content will be engaged.

Michelle B. Boissiere, *Associate Professor and Department Head of Biology—Xavier University of Louisiana*

♦ SESSION 7.3 INNOVATION/IDEATION SESSIONS

Potomac I, Ballroom Level

8:00 AM – 8:30 AM

A First Look at a Reimagined Introductory Engineering and Computer Science Experience with Integrated Advising

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Students from underrepresented backgrounds often face challenges in undergraduate STEM education, especially in terms of retention and sense of belonging (Rainey et al., 2018). In this presentation, we describe an effort to reimagine the introductory engineering and computer science experience at the University of the Pacific with the aim to develop student success skills and to promote a sense of belonging. While similar efforts have been conducted at other institutions across the country, in this presentation, we specifically discuss the user-centered and collaborative curriculum development process we engaged in, as well as the novel integration of advising directly into the curriculum.

Shelly Gulati, *Professor—University of the Pacific;* ***Sebastian Dziallas,*** *Assistant Professor—University of the Pacific*

8:30 AM – 9:00 AM

Hybrid Cars are Driving Us into the Future... Why Not a Hybrid Undergraduate Advising Model to Guide the Way for STEM Students?

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Creating a sustainable undergraduate advising for STEM disciplines appears to be a common challenge for institutions--not to mention an additional burden for (already overtaxed) faculty that struggle with increasing demands on their time. This presentation profiles a possible solution modeling the use of professional advising staff to navigate the administrative obligations associated with academic policy enforcement and implementation while preserving the faculty contribution of curriculum/program design & development and career mentoring of students. Utilizing academic advisors as liaisons, they are able to provide real-time feedback to academic departments on the front-line impact of policy, curriculum & class scheduling changes as well as provide as campus resource brokers to help students optimize their college experience and likelihood of graduation.

Natalie M. Sumrow, *Executive Director—University of Houston;* ***Ashley Cook,*** *Director—University of Houston*

♦ SESSION 7.4 INNOVATION/IDEATION SESSIONS

Potomac II, Ballroom Level

8:00 AM – 8:30 AM

Rethinking the "Teaching Assistant" Paradigm: Using Trained Undergraduate "STEM Consultants" to Promote Active, Collaborative, and Inclusive Learning in Introductory Math and Science Courses

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Embedding teaching assistants in introductory courses is a common practice in science, technology, engineering, and mathematics (STEM). These assistants often focus primarily on content delivery and receive little to no training in inclusive pedagogy. We developed a program in which undergraduate students, including many who hold one or more minoritized identities, participate alongside their faculty mentors in a two-day workshop focused on active, collaborative, and inclusive learning and are then embedded as "STEM consultants" in introductory courses. Consultants attend class and/or laboratory and meet weekly with their faculty mentors to develop lesson plans for activities that they independently lead during supplemental instruction sessions. We conducted surveys of students enrolled in courses with and without these STEM consultants to assess student attitudes about STEM; we also conducted surveys of consultants and their faculty mentors. These surveys indicate that the STEM Consultants Program contributes to a positive introductory STEM experience.

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

8:30 AM – 9:00 AM

The Curriculum Fellows Program: Workforce Development for Future STEM Educators and Higher Education Leadership

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

This session examines how a STEM postdoctoral program cultivates future educational developers, higher education leaders and faculty. The Program recruits PhD scientists to design or improve curriculum for graduate programs, and undergraduate courses, and emphasizes teaching, assessment innovation, and career exploration. The Program features a mentoring web of collaborative learning communities and close faculty mentorship, providing a relationship-rich environment that promotes the growth and success of its fellows. Analysis of program alumni indicates that this postdoctoral training leads to innovation across both the campus that embodies this program and campuses that hire the fellows into faculty and administrative positions. How undergraduate campuses can adopt similar programs and the potential outcomes based on this programs alumni data will be discussed.

Aimee Hollander, *Director of the Curriculum Fellows Program—Harvard*

♦ SESSION 7.5 INNOVATION/IDEATION SESSIONS

Potomac III, Ballroom Level

8:00 AM – 8:30 AM

Leveraging Interdisciplinary Projects to Promote Success Among 2YC Students in STEM: The Math Art Design Challenge at Miami Dade College

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Middleton (2013) demonstrated that students' mathematical motivation, driven by interest, identity, self-efficacy, and utility, significantly impacts cognitive achievement and academic success, especially in community college settings (Reyes, 2010). Community college students often face unique challenges, leading to low self-efficacy and avoidance of math courses (Bahr, 2010; Hughes & Gibbons, 2018; Jiang et al., 2020). To address these issues, Miami Dade College's Wolfson Campus created the Math Art Design Challenge. This interdisciplinary experiential learning opportunity, funded by STEM Legacy's COALESCE program, aimed to enhance students' mathematics identity and self-efficacy through the design of math-inspired sculptures. Students participated in faculty-mentored research and professional development, building career competencies outlined by the National Association of Colleges and Employers. By integrating math, art, and architecture, this pilot program sought to broaden participation in STEM and prepare students for careers. It culminated in student presentations of designs based on the Fibonacci sequence, parabolas, and a dodecahedron.

Willian Neris, *Department Chairperson—Miami Dade College, Wolfson Campus;* ***Logan Saucer,*** *STEM Student Transfer Manager—Miami Dade College, Wolfson Campus;* ***Marie Lunie Estimable****, Grant Coordinator—Miami Dade College, Wolfson Campus*

8:30 AM – 9:00 AM

Leveraging Student Voices: Creating Culturally Responsive Internship Experiences for Computer Science Majors in a Community College District

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

How do we increase institutional capacity to support workforce development and create pathways into STEM with internships for Latinx students across a community college district? The Maricopa Community College District, ASU Center for Broadening Participation in STEM started with a self-assessment tool created by ASU and Exelencia in Education to develop an assessment of their institutional capacity to support Latinx student servingness and their capacity to establish data-driven practices in various areas, including internships. Phoenix College is an HSI used as a testing site to create a program to distribute to other campuses in the district. Phoenix College is central to students' lives in the region and workforce development. This facilitated discussion highlights how student voices (e.g., surveys and interviews) as part of data-driven practice to implement internships, support student success (e.g., student support, culturally responsive pedagogy, recruitment, industry partners), and institutional data capacity.

Katy M. Pinto, *Professor of Sociology—California State University, Dominguez Hills;* ***Gloria Gonzalez,*** *Professor—Johns Hopkins University;* ***Anna Tanguma*** *Associate Director of the Research, Center for Broadening Participation in STEM—Arizona State University;* ***Caroline VanIngen-Dunn,*** *Senior Director of the Center for Broadening Participation in STEM—Arizona State University;* ***Noé Ortiz,*** *Senior Manager of Program Operations—Excelencia in Education;* ***Paul Ross,*** *Associate Vice President and Chief Information Officer—Phoenix College*

♦ SESSION 7.6 INNOVATION/IDEATION SESSIONS

Potomac IV, Ballroom Level

8:00 AM – 8:30 AM

STEM Education Research Incubator: Innovation for Inclusion and Expansion in Undergraduate STEM Research

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

The STEM Education Research Incubator (SERI) is an innovation within a larger undergraduate research experience. Students in the SERI cohort participate in curated research experiences, while building their identity as a researcher in both individual and collaborative endeavors. Modules and experiences are curated by a faculty mentor and center belonging, lived experiences, relationships and identity. Modules include videos, readings, peer and mentor interactions, as well as identification of goals and outcomes. Students pursue their own line of inquiry, are mentored by a faculty member, and share their experiences with others in the SERI cohort. The experiences are student-centered as opposed to faculty centered and seek to empower students as future researchers.

Helen Douglass, *Associate Professor of STEM Education—The University of Tulsa*

8:30 AM – 9:00 AM

Expanding Faculty and Student Engagement with Macrosystems Ecology and Data Science through Collaborative Research Projects in the Macrosystems Ecology for All (MEFA) Research Coordination Network

TYPE III: NATIONAL-LEVEL INTERVENTIONS

Macrosystems ecology explores links among geophysical, biological, and social-cultural processes across scales, and provides valuable insights into complex environmental problems. However, many faculty in teaching-oriented positions in higher education are not comfortable with macrosystems concepts or data science techniques used in macrosystems research. The Macrosystems Ecology For All Research Coordination Network (MEFA, NSF Award 2213541) is a diverse and welcoming community for faculty to gain the necessary training to become full participants in macrosystems science. We support collaborative, multi-institution projects that address macrosystems questions, use existing environmental datasets, and serve as vehicles for teaching undergraduate students macrosystems ecology and data science. Our projects include Diversity, Equity, and Inclusion (DEI) plans within the project management framework and are encouraged to emphasize community involvement. MEFA embodies a transferable model for developing collaborative, cross-institution, inclusive research teams that provide faculty development alongside rich opportunities for undergraduate education through research and data analysis experiences.

Laurel J. Anderson, *Professor—Ohio Wesleyan University;* ***Matthew Heard,*** *Associate Professor—Belmont University;* ***Kristy Hopfensperger****, Professor—Northern Kentucky University;* ***Mary Beth Kolozsvary,*** *Professor of Environmental Studies and Sciences—Siena College;* ***Sara Scanga,*** *Professor of Biology—Utica University;* ***Tracy Gartner,*** *Professor of Environmental Science and Biology—Carthage College;* ***Jose-Luis Machado,*** *Associate Professor of Biology—Swarthmore College;* ***Andrew McCall,*** *Associate Professor of Biology and Environmental Studies—Denison University;* ***Timothy McCay,*** *Professor of Biology and Environmental Studies—Colgate University*

♦ SESSION 7.7 REGULAR SESSIONS

Potomac V, Ballroom Level

8:00 AM – 8:30 AM

Belonging as Both a Cause and An Effect: Implications for Academic Success and Well-Being

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

You may be familiar with the substantial body of literature that demonstrates how students' sense of belonging can be leveraged to improve their success. Fostering a sense of belonging improves retention and academic performance, especially among students who are historically underrepresented in STEM. But did you know that helping students feel they belong at their institution and in your class is itself a desirable outcome? Belonging is central to well-being and foundational for mental health – and can be improved with a variety of practices that you can easily incorporate in your classroom and on your campus. Attend this session to understand why so many of your students struggle with their well-being, how it impacts your classroom and their academic performance, and what you and your institution can do to help.

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

8:30 AM – 9:00 AM

Elevating Student Voices to Catalyze Student Belonging and Early Momentum

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Given that belonging has consistently been shown to be a significant predictor of academic success, higher education practitioners and institutional researchers would be well served to understand how the systemic,

structural, and relational aspects of their institution either support or thwart student belonging. In this session, presenters from Motivate Lab (University of Virginia) will share some of the background research on student belonging and the Student Voices Initiative. The Student Voices Initiative arose out of an ongoing five-year partnership between the College System of Tennessee (TBR) and the University of Virginia – Motivate Lab. The Student Voices Initiative uses a Youth Participatory Action Research approach (YPAR), which engages students at every level of the research process. This process includes conducting evidence-based focus groups, coding protocols, and providing actionable recommendations to institutions intended to enable institutions to implement systemic improvements for the benefit of future students.

Chris S. Hulleman, *Professor—University of Virginia;* ***Kenneth Barron,*** *Professor—James Madison University;* ***Yoi Tibbetts,*** *Research Assistant Professor—University of Virginia*

♦ SESSION 7.8 REGULAR SESSIONS

Tidewater II, 2nd Floor

8:00 AM – 8:30 AM

College Students Reflect on Their Socialization into STEM and Observe Their Higher-Education STEM Contexts in a New Course on Inclusion, Diversity, Equity, and Accessibility

TYPE IV: STEM EDUCATION RESEARCH

Despite efforts to broaden participation, STEM fields remain dominated by white, Western, and male worldviews. A new course focused on inclusion, diversity, equity, and accessibility in STEM aims to educate students about the exclusionary culture of STEM and to empower them to become advocates for change through identifying and pushing back against inequities as they continue in the field of science. Prior to assessing the effectiveness of the course, we analyzed enrolled students' baseline understanding of their own socialization into the world of STEM and the ways they perceive this world to be enacted in higher education contexts. This work reveals how these STEM students recognize and reflect critically on various forms of social identity and capital that have influenced their path into science. Additionally, students describe, connect, and critique four aspects of the figured worlds of science in their postsecondary learning spaces: people, artifacts, rules, and meaningful acts.

Michele G. Wheatly, *Professor of Biology—Syracuse University;* ***Jessica Dewey,*** *Teaching Consultant for Learning Innovation and Lifetime Education—Duke University;* ***Laurel K. Willingham-McLain****, Consulting Faculty Developer at the Center for Teaching and Learning Excellence—Syracuse University;* ***Jacques Safari Mwayaona,*** *Faculty Development Fellow at the Center for Teaching and Learning Excellence—Syracuse University*

8:30 AM – 9:00 AM

The Intersection of LGBTQ+ and STEM Identities for Undergraduate Science-Major Students

TYPE IV: STEM EDUCATION RESEARCH

Strong connections to identities may lead to increased success for marginalized students in STEM, including both marginalized and STEM identities. LGBTQ+ science-major students in this study had varying levels of connection to either their STEM or LGBTQ+ identities, leading some participants to actively exclude their LGBTQ+ identities from STEM spaces or to disconnect their science identity from their LGBTQ+ identity. This study utilizes a queer theory framework for exploratory qualitative research methods, focusing primarily on interviews with participants and purposefully examining and seeking to eliminate the power differential between researcher and participant, an approach that is considered by some queer researchers as crucial for queer theory interview work. Queer theory can be used to question the meaning and usefulness of categories and to look beyond what is easily observable, and this study utilizes a queered approach to understanding participants' connections across their identities.

Madison Fitzgerald-Russell, *Postdoctoral Scholar—University of Iowa*

♦ SESSION 7.9 REGULAR SESSIONS

Potomac VI, Ballroom Level

8:00 AM – 8:30 AM

Designing Artificial Intelligence Applications to Help Students Review Course Content Guided by Teaching Principles

TYPE IV: STEM EDUCATION RESEARCH

The launch of ChatGPT 3 in late 2022 kickstarted new revolution in artificial intelligence applications in all corners of society, including education. Although quickly adopted by students, instructors and educational institutions scrambled to incorporate and regulate this new technology with great potential but still many flaws and pitfalls.

This work presents two applications built on top of ChatGPT with the focus on evaluating its potential whilst trying to make it adhere to good teaching practices and allowing control over the AI conversation flow and content. The main application allows students to chat with an AI that will review specific course topics with them. The flow and content of this conversation can be carefully crafted by an instructor using another application where they can upload relevant course materials and outline the concepts that should be covered during the discussion to enhance the quality of AI generated conversation with the students.

PJ Van Camp, *Lecturer and Curriculum Fellow in Biomedical Informatics—Harvard University*

8:30 AM – 9:00 AM

Strategic Orchestration of a Multistakeholder Partnership for Semiconductor Workforce Development: A Case Study of the North Texas Semiconductor Workforce Development Consortium (NTxS-WDC)

TYPE III: NATIONAL LEVEL INTERVENTIONS

This study evaluates the effectiveness of the North Texas Semiconductor Workforce Development Consortium (NTxS-WDC) in bridging the U.S. semiconductor industry's skills gap. We focus on the consortium's orchestration mode, a crucial factor in managing collaboration among diverse stakeholders (educational institutions, private sector partners, and policymakers). A mixed-methods research design employing survey and interview data, with data analysis conducted by an external evaluation team, provides insight into the effectiveness of the NTxS-WDC's hybrid orchestration model (combining elements of multiple orchestration modes depending on the task or sector within the partnership) in promoting stakeholder engagement and program alignment with industry needs. Key findings suggest that this model significantly increases stakeholder collaboration and alignment with evolving industry demands. This research offers valuable insights for replicating this model in national-level STEM education reform efforts, highlighting the critical role of third-party evaluation in driving innovation.

James Hobbs, *Assistant Professor and Department Chair—Tarrant County College;* ***Sridurga Linga,*** *Graduate Research Assistant—University of Texas at Arlington;* ***Jin Liu,*** *Associate Professor—University of Texas at Arlington;* ***Cory Forbes,*** *Associate Dean for Research and Fenton Wayne Robnett Endowed Professor—University of Texas at Arlington;* ***Ted Moise,*** *Director, North Texas Semiconductor Institute—University of Texas at Dallas*

9:15 AM – 10:15 AM Concurrent Session Block 8

This session block is comprised of either 30- or 60-minute presentations, up to two per room.

♦ SESSION 8.1 FACILITATED DISCUSSION

Arlington/Fairfax Room, 3rd Floor

9:15 AM – 10:15 AM

Equitable Teaching Practices to Support Student Belonging: Professional Development for Graduate Teaching Assistants

TYPE III: NATIONAL-LEVEL INTERVENTIONS

At research universities in the United States, many undergraduate courses in biology (e.g., laboratories, recitations) are taught by Graduate Student Teaching Assistants (GTAs), yet GTAs often do not receive training or guidance on teaching. In 2023, two institutions developed communities of practice to support GTAs in using equitable teaching practices that support student belonging and growth. Institutions adapted practices and strategies from their previous work in the Student Experience Project, which demonstrated that positive classroom experiences are associated with better academic outcomes. In this session, presenters will share lessons learned from their communities of practice, discuss how professional development for GTAs can influence STEM classrooms and environments, and provide resources for GTA communities of practice. Participants will engage in dialogue with presenters about the importance of engaging graduate students in the process of transforming undergraduate STEM education.

Samantha Levine, *Director—Association of Public and Land-Grant Universities;* ***Oona Takano,*** *PhD Candidate—University of New Mexico;* ***Jasmine Vidrio,*** *Graduate Student—University of Colorado Denver*

♦ SESSION 8.2 FACILITATED DISCUSSION

Roosevelt/Lincoln Room, 3rd Floor

9:15 AM – 10:15 AM

Embedding Culturally Relevant Instructional Supports for Self-Directed Learning in Online College STEM Courses

TYPE IV: STEM EDUCATION RESEARCH

Many college students are still honing their skills for managing their learning, but instructors can assist them. Guided by a researcher and a practitioner, this session focuses on instructional strategies to bolster students' abilities to motivate and manage their learning processes--referred to as self-directed learning skills in online STEM courses. Presenters will share theoretical,

empirical, and practitioner-focused perspectives to cultivate motivation and manage learning processes. They will delve into creating inclusive environments, addressing emotional and metacognitive barriers, that foster skill development. Through both small and whole group discussions, participants will collaborate and learn from one another.

The session revolves around these core questions:

1. How can instructors integrate SDL support in online courses?
2. How do contextual factors and students' experiences influence SDL skill development?
3. What support is necessary to implement SDL strategies effectively?

By addressing these questions, instructors can enhance students' abilities to navigate their learning journeys effectively.

Krystal Thomas, *Senior Education Researcher—SRI Education;* ***Rebecca Griffiths,*** *Senior Principal Education Researcher—SRI Education;* ***Paul Burkander****, Senior Education Researcher—SRI Education;* ***Arif Rachmatullah,*** *Education Researcher—SRI Education;* ***Brian Sayre,*** *Professor and Chair of Biology—Virginia State University;* ***Akilah Thompson,*** *Senior Research Assistant, Community College Research Center at Teachers College —Columbia University;* ***Wanda Velez,*** *Instructor of Biology—Virginia State University*

♦ SESSION 8.3 INNOVATION/IDEATION SESSIONS

Potomac I, Ballroom Level

9:15 AM – 9:45 AM

AI-Driven Collaborative Case Study Development to Enhance Learning and Inclusivity in Clinical Microbiology

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

This presentation explores an innovative approach using AI, specifically ChatGPT, to develop Clinical Microbiology case studies in a college lecture classroom. This method serves as a formative assessment tool, enhancing student engagement and understanding while guiding the appropriate use of AI to meet course learning objectives. By integrating AI into case study development, students actively participate in group learning, aligning with the goals of Inclusive Excellence and active learning. This approach balances AI-assisted tasks with independent learning, fostering critical thinking and problem-solving skills. Additionally, it models ethical AI use and prepares students for their future careers by emphasizing responsible and effective AI integration. This strategy advances undergraduate STEM education by providing formative assessment opportunities and preparing students for academic and professional success.

Christine R. Rodriguez, *Associate Director of the Center for Academic Excellence; Professor of Biology Practice—Fairfield University*

9:45 AM – 10:15 AM

Artificial Intelligence, Virtual Reality, and Eye Tracking Equipment Used to Research Why Underrepresented High School Seniors are Abandoning STEM

TYPE IV: STEM EDUCATION RESEARCH

Underrepresented minority participation in STEM has been a concern since the early 2000s. Various reports indicate the United States is falling behind other countries in STEM proficiency which jeopardizes its position as a global leader. Past studies used variables of administrative data, college major declarations, surveying, and testing.

This research utilizes a mix method approach to include eye tracking technology. The eye tracking will capture interactions as students navigate through a virtual reality environment engaging in both traditional and modern/smart classroom stimuli. Eye tracking combines with virtual reality to map student engagement during a session, and it recognizes implicit human attention. Data collection and analysis allows for automated & objective tracking of visual behavior and assesses the student's behavioral changes while in the virtual environment. The research will be used to determine what socioeconomic barriers (if any) are causing students to abandon STEM fields.

Andrea Spool-White, *PhD Student—North Carolina A&T State University*

♦ SESSION 8.4 INNOVATION/IDEATION SESSIONS

Potomac II, Ballroom Level

9:15 AM – 9:45 AM

Bridging the Research to Practice Gap with Faculty Change Agents and Student Ambassadors

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

In an era when the value of higher education is questioned while the STEM retention challenges persist, a new debate has started on whether AI is taking over the jobs of humans. In the middle of this turmoil, a faculty group forms an accountability group while transforming their teaching practices grounded on the presenter's innovative instructional framework. This framework stems from cognitive science and social-emotional learning. This interdisciplinary, non-hierarchical faculty group fosters scholarly identity by receiving grants, serving on panels, and conducting peer-observations. An effort becomes more impactful when this framework

is taught as a course to support retention in STEM. The student ambassador program involves conducting research reviews on affective-domain challenges and presenting their work. This work can be transferable to: 1) foster a sense of belonging for teaching faculty in research-intensive institutions, 2) promote the instruction of evidence-based STEM study strategies to students, and 3) create communities with diverse identities.

Sheila Tabanli, *Assistant Professor—Rutgers University, New Brunswick Campus;* ***Crystal Akers,*** *Associate Teaching Professor—Rutgers University;* ***Duaa Raza****, Student—Rutgers University*

9:45 AM – 10:15 AM

Identifying Critical Shifts to Navigate Collaborative Institutional Change

TYPE III: NATIONAL-LEVEL INTERVENTIONS

Lasting, sustainable, institutional change is challenging. The 14-institution HHMI-funded Learning Community Cluster 2 (LCC2), is a collective network that aims to increase STEM diversity through unified and focused institutional efforts that navigate common pitfalls associated with failed institutional change. LCC2's goal is to create and maintain undergraduate STEM environments where every student has the opportunity to succeed and experiences a sense of belonging within STEM. To achieve this, the LCC2 community embarked on a modified waterfall collaborative codesign change process. A key component of this process is the identification of critical shifts, summarized by statements of the current state and desired state. More than 150 faculty, staff, and administrators determined critical shifts on the most impactful barriers to our work–inherent beliefs about STEM belonging, community, STEM culture, STEM academic opportunities, coursework, and pathways to success. These critical shifts define our collective intent and anchor LCC2 decision-making processes.

Kathryn M.S. Johnson, *LCC2 Network Director—Xavier University;* ***Renée S. Cole,*** *Professor and Chair of Chemistry—University of Iowa;* ***Melissa Darnell****, Member Manager—CoCreative Consulting, LLC;* ***Richard W. Gurney,*** *Professor of Chemistry and Chairperson of Chemistry and Physics—Simmons University;* ***Rachael M. Hannah,*** *Associate Professor of Biological Sciences—University of Alaska Anchorage;* ***Gary Lewandowski,*** *Associate Provost for Strategic Initiatives—Xavier University;* ***John T. Tansey,*** *Professor of Chemistry and Program Director of Biochemistry and Molecular Biology—Otterbein University;* ***Jennifer K. Uno,*** *Associate Professor of Biology and Associate Director of the Center for the Advancement of Teaching—Elon University*

♦ SESSION 8.5 INNOVATION/IDEATION SESSIONS

Potomac III, Ballroom Level

9:15 AM – 9:45 AM

Career Readiness for the STEM Disciplines

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

For the General Education requirements at the University of Mary Washington, students must take a course designated "After Mary Washington." This requirement focuses on ten core competencies that were adopted from a set defined by the National Association of Colleges and Employers. Students can meet the After Mary Washington (AMW) course requirement by taking AMW-designated courses created by faculty in several STEM disciplines or with other approved options. Recently, the AMW program has been expanded to include making connections between coursework in the major and the skills students gain. Faculty are encouraged to become familiar with the AMW competencies and to emphasize which competencies their courses address. This presentation will include examples of STEM AMW courses and examples of syllabi that emphasize AMW competencies. Participants will have the opportunity to consider how they can revise their courses to encourage their students to connect coursework with their professional development.

Debra L. Hydorn, *Professor of Mathematics—University of Mary Washington;* ***Deborah O'Dell,*** *Professor of Biology—University of Mary Washington*

9:45 AM – 10:15 AM

Developing Experiential Learning Cell Therapy Course with Industry Partnership

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Through our partnership with Kite Pharma, a biopharmaceutical company specializing in cell therapy, we developed an experiential learning course titled Cell Therapy. The main goal of this course is to not only provide graduating biology seniors with knowledge about biomedical advances but, more importantly, to provide them with biotechnology workforce-validated skills and the experience of being trained by employees from Kite Pharma and learning about the day-to-day work of a cell therapy specialist.

Cherry Liu, *Assistant Professor—Hood College*

♦ SESSION 8.6 INNOVATION/IDEATION SESSIONS

Potomac IV, Ballroom Level

9:15 AM – 9:45 AM

Building and Sustaining an Undergraduate, All-Majors Community of Informal STEM Educators

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Partnerships between universities and K-12 have the potential to broaden access to pivotal STEM experiences, however, obstacles such as funding and fluctuating volunteer interest create barriers to sustaining reciprocal partnerships. Furthermore, informal STEM is often inconsistent with school STEM, which can interfere with learning and frustrate teachers. To address these obstacles, we developed (1) a model for training volunteers of all majors to be informal educators, "STEM Corps"; (2) a teacher approved, research-informed K-5 curriculum; and (3) a partnership with Boys & Girls Club serving 90 students, 80% from economically-disadvantaged communities. In addition to the STEM learning opportunities, the interdisciplinary nature of STEM Corps (100 students representing 20 majors) combined with frequent interactions throughout the academic year offers children an array of "like-me" role models and demonstrates that "everyone is a STEM person". We will discuss the model and preliminary outcomes with a focus on volunteer motivation, training, community-building, and benefits.

Kerry O. Cresawn, *Director of the Center for STEM Education and Outreach—James Madison University*

9:45 AM – 10:15 AM

Broadening the Representation of Chemists in the Classroom

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Representation of chemists in chemistry classrooms at all levels is heavily dominated by white men. Both the historical and modern scientific stories and contributions from non-male and people of color remain largely invisible even though numerous studies have shown that belonging and the ability to identify as a scientist are important factors to success in STEM and commitment to careers in STEM. Analyses of modern textbooks at the general chemistry and physical chemistry levels perpetuate the stereotype of the white male chemist. This session will present examples of introducing a broader representation of chemists in the general chemistry and physical chemistry classrooms and a plan for a larger, accessible database for instructors to learn about under-represented chemists.

Kristen D. Fulfer, *Associate Professor of Chemistry—Centre College*

♦ SESSION 8.7 REGULAR SESSIONS

Potomac V, Ballroom Level

9:15 AM – 9:45 AM

Examining Undergraduate Engineering Technology Students' Sense of Self-Determination: Intersections Among Basic Psychological Needs

TYPE I: INDIVIDUAL CLASSROOM/PROJECT-LEVEL INTERVENTIONS

Qualitative and quantitative data were collected from Engineering Technology students, many from populations traditionally underrepresented in Engineering, who were recipients of an NSF S-STEM scholarship at Rochester Institute of Technology. Programming for the scholarship recipients was informed by Self-Determination Theory (SDT), which posits that when three basic psychological needs-competence, relatedness and autonomy-are met, individuals will be intrinsically motivated to support their own personal growth and well-being. Initial quantitative results indicated that the project activities were successful in building a sense of autonomy and relatedness in the scholars, but perceptions of competence were not as strong. Follow-on qualitative findings point to the interconnectedness of the three psychological needs of SDT and suggest that if autonomy is met, relatedness is necessary for competence development. The results of this study are significant for other programs aimed at increasing broader participation through SDT or other similar frameworks.

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

9:45 AM – 10:15 AM

Understanding Racialized Trauma in Engineering Education: A Systematic Review on BLI Students' Experiences

TYPE III: NATIONAL-LEVEL INTERVENTIONS

This presentation explores the under-researched area of stress, distress, and trauma (SDT) among Black, Latino, and Indigenous (BLI) engineering students, highlighting the impact of racial discrimination and microaggressions. Our systematic literature review analyzed existing engineering education research (EER) to uncover how racialized trauma affects BLI students' outcomes. Findings reveal a significant gap in addressing structural racism in engineering education. This work underscores the need for further research and institutional change to support BLI students effectively.

Whitney Gaskins, *Associate Dean—University of Cincinnati;* ***Elahe Vahidi,*** *Postdoctoral Scholar—University of Cincinnati;* ***Kelly Cross****, Assistant Professor—Georgia Institute of Technology*

♦ SESSION 8.8 REGULAR SESSIONS

Potomac VI, Ballroom Level

9:15 AM – 9:45 AM

Math Requirements in STEM and Broadening Participation: An Analysis of the Math Requirements of 199 CS degrees in the U.S.

TYPE III: NATIONAL-LEVEL INTERVENTIONS

For many years, there has been debate and disagreement as to the role of mathematics in some STEM disciplines. This paper attempts to answer this question for computer science and presents the results of an analysis of the math requirements of 199 Computer Science BS/BA degrees from 158 U.S. universities, looking not only at which math courses are required, but how they are used as prerequisites (and corequisites) for computer science (CS) courses. Our analysis shows that while there is consensus that discrete math is critical, and further that calculus is almost always required, there is little consensus as to when a student should have mastered these subjects. Based on our analysis of how math requirements impact access, retention and on-time degree completion for the BS/BA in CS, we provide recommendations for CS departments to consider that also have implications for the larger STEM higher-ed community.

Carla E. Brodley, *Professor and Dean of Inclusive Computing—Northeastern University;* ***Catherine Gill,*** *Executive Director—Northeastern University*

9:45 AM – 10:15 AM

Evaluating STEM Calculus Preparatory Pathways

TYPE IV: STEM EDUCATION RESEARCH

Do college algebra, trigonometry, or precalculus enhance completion of calculus? Learn about and discuss the latest research out of California on throughput to science, technology, engineering, and math (STEM) calculus by high school preparation level with equity implications.

Terrence Willett, *Dean of Research, Planning, and Institutional Effectiveness—Cabrillo College;* ***Lauren Ilano,*** *Researcher—RP Group*

♦ SESSION 8.9 REGULAR SESSIONS

Tidewater II, 2nd Floor

9:15 AM – 9:45 AM

A Social Network Analysis of the (STEM)2 Network: A Multi-Institution, Multidisciplinary Approach to Transforming Undergraduate STEM Education

TYPE III: NATIONAL-LEVEL INTERVENTIONS

The (STEM)2 Network catalyzes collaborations among biology, chemistry, and math faculty pursuing STEM transformation at two- and four-year institutions. Three theoretical frameworks underlie the Network: communities of transformation, systems design for organizational change, and emergent outcomes for diffusion of innovations.

We used Social Network Analysis (SNA) to determine if the Network is achieving the goal of connecting faculty across disciplines and institutions, and identify characteristics of highly connected individuals. The results indicate that the Network structure successfully creates connections both within and across disciplines and institutions. For example, average path length and modularity decreased and density increased through time. Highly connected individuals are those with leadership roles in the Network.

During this presentation, participants will identify collaborations that would help them overcome specific challenges, select elements of the (STEM)2 Network structure that they could adopt and adapt, and identify how SNA can visualize and quantify collaborative connections.

Alison Hyslop, *Professor and Associate Dean—St. John's University;* ***Jessica Santangelo,*** *Professor—Hofstra University;* ***Jacqueline Lee****, Professor—Nassau Community College;* ***Lawrence Hobbie,*** *Professor—Adelphi University;* ***Eugenia Evilla-Cuesta,*** *Professor—Adelphi University;* ***Peter Novick,*** *Professor—Queensborough Community College*

9:45 AM – 10:15 AM

Departmental Action Teams Can Catalyze Sustained First- and Second-Order Change at Individual, Group, and Institutional Levels

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

Models supporting intentional, sustained departmental change have emerged in recent years, including those initiated by the Departmental Action Team (DAT) Project. This qualitative study focused on three DATs that each received two years of external facilitation. The study sheds light on mechanisms underlying successful, sustained departmental change. We identified key supports and impediments to sustained departmental change initiatives. Despite the presence of impeding factors, each DAT in the study achieved a range of sustained change impacts at the individual, group, and institutional levels. The emergence of internal facilitators supporting change teams, the formation of new change teams, and ongoing support from departmental leaders were critical factors in sustaining change. This work contributes empirical confirmation of team-based departmental change theory and provides insights around conditions and mechanisms important for creating and sustaining departmental change initiatives.

Sarah B. Wise, *Senior Research Associate—University of Colorado Boulder;* ***Courtney Ngai,*** *Associate Director of the Office of Undergraduate Research and Artistry—Colorado State University;* ***Joel C. Corbo****, Senior Research Associate—University of Colorado Boulder*

♦ SESSION 8.10 REGULAR SESSION

Conference Theater, Ballroom Level

9:15 AM – 9:45 AM

Shifting Faculty Beliefs and Embedding Equity in STEM: Process-Level Findings from the First Two Years of a Train-the-Trainer Program Comparing Cohorts 1 and 2

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

The implicit racialized beliefs of faculty about teaching, learning, and students are fundamental to STEM education and student outcomes. This presentation focuses on a program developed by LMU to shift these beliefs and enhance faculty skills through multi-semester learning communities linked to leadership and teaching roles. Through personalized coaching, expert support, and reflective practices, the program fosters equity-minded teaching while expanding student research opportunities and improving institutional accountability through data stewardship.

The presentation will share process-level findings from the first two years, comparing cohort 1 and cohort 2 (with ongoing data collection for cohort 2). This comparison highlights the program's effectiveness and evolution. As both a participant in cohort 1 and facilitator of cohort 2, I will offer insights into the program's "train the trainer" model, showcasing how faculty leaders are equipped to mentor their peers and embed equity in teaching and institutional practices.

Christina Eubanks-Turner, *Professor—Loyola Marymount University*

9:45 AM – 10:15 AM

Motivating Learners: Improving Student Outcomes in Math through Online Faculty Professional Development

TYPE II: INSTITUTION-LEVEL INTERVENTIONS

This study reveals that a brief, intensive, evidence-based, online professional development course focused on equipping mathematics faculty with knowledge and tools to support student motivation can have downstream effects on student learning outcomes. We offered the Motivating Learners Course to a cohort of math faculty from a single department at a large Hispanic Serving (HSI) state university in California during the 2022-2023 academic year. Information about the Motivating Learners Course was distributed widely across the department and instructors volunteered to participate (n = 25). Using propensity score matching to control for pre-existing differences between students of faculty who participated in the course and a control group of comparison faculty (n = 35), we found that the probability of passing the course was 76.4% for students whose instructors participated in the course compared to 69.5% for students whose instructors who did not participate in the course (h = 0.16).

Chris S. Hulleman, *Professor—University of Virginia;* ***Kenneth Barron,*** *Professor—James Madison University;* ***Yoi Tibbetts,*** *Research Assistant Professor—University of Virginia*

10:15 AM – 10:30 AM Refreshment Break

Regency Foyer, Ballroom Level

10:30 AM – 12:00 PM **Closing Keynote Address**

Regency Ballroom A-D, Ballroom Level

What Now: For Ourselves, Our Institutions, and This Nation?

There are special moments or inflection points in our professional and personal lives when we are faced with the simple but profound question, "*What Now*?" How we understand and interpret the question, and how we act upon it, has enormous consequences. This plenary address will explore how faculty and leaders in STEM, and in higher education generally, should attempt to answer this question as creative actors on the institutional and societal stage of life and the academy. This requires that we are as self-reflective as we are critical of policies and other leaders because the decisions we make as STEM reformers (or revolutionaries) will determine what is next for each of us and for our students. Here, we will explore how we move from being passive observers to being active creative leaders who can usher in transformation. More importantly, with the Presidential election decisions made nationally, just days before this conference, we will thoughtfully confront the broader question of "*What Now*?" for this nation, the world, and for ourselves.

David Hall, *President Emeritus—University of the Virgin Islands*

Center for the Advancement of STEM Leadership

JOURNAL OF STEM LEADERSHIP AND BROADENING PARTICIPATION

The Journal of STEM Leadership and Braodening Participaton is an open-access, peer-reviewed journal that captures the true stories, strategies, triumphs, and challenges of undergraduate STEM leaders whose work is wholly committed to broadening participation.

Issue 1, Volume 1 Now Available

Visit Our Website casl-jslbp.net to Read More

Scan to view author guidelines

Funded by the National Science Foundation

What our authors and readers are saying...

"Finally!...there's a space just for me and my leadership perspective."

"JSLBP is the loud answer to the quiet question that so many ask about broadening participation...how do STEM reform leaders manage to do it so well?"

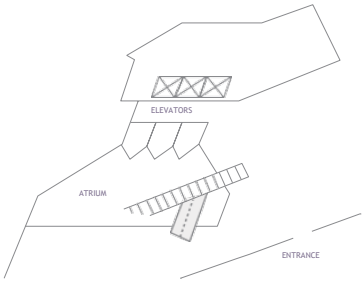
HYATT REGENCY®

HYATT REGENCY CRYSTAL CITY AT REAGAN NATIONAL AIRPORT

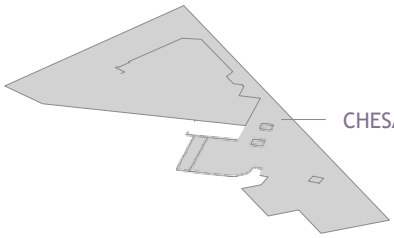
2799 Richmond Highway
Arlington, VA 22202, USA
+1 703 418 1234
hyattregencycrystalcity.com

FLOOR PLAN

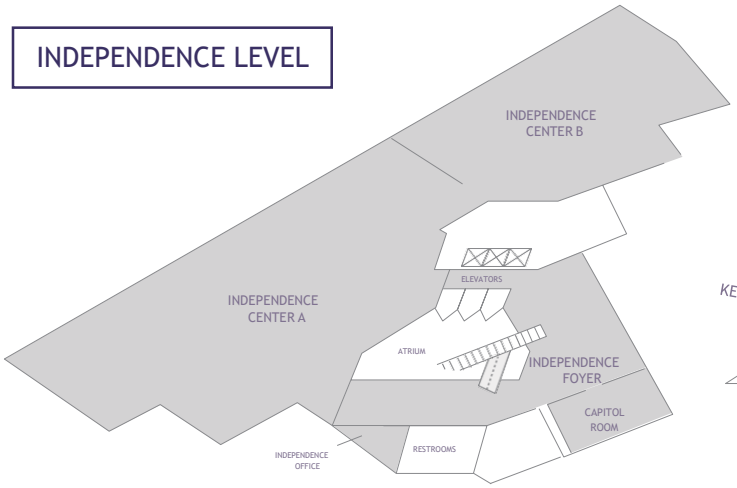
LOBBY



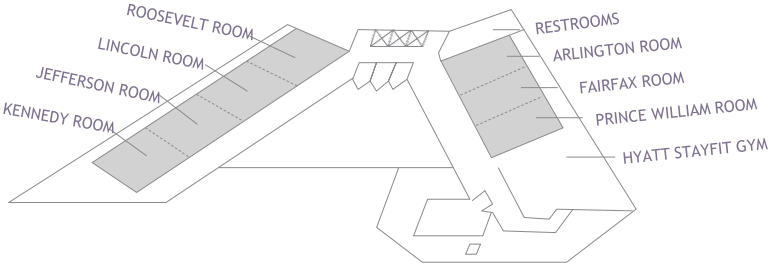
ROOFTOP



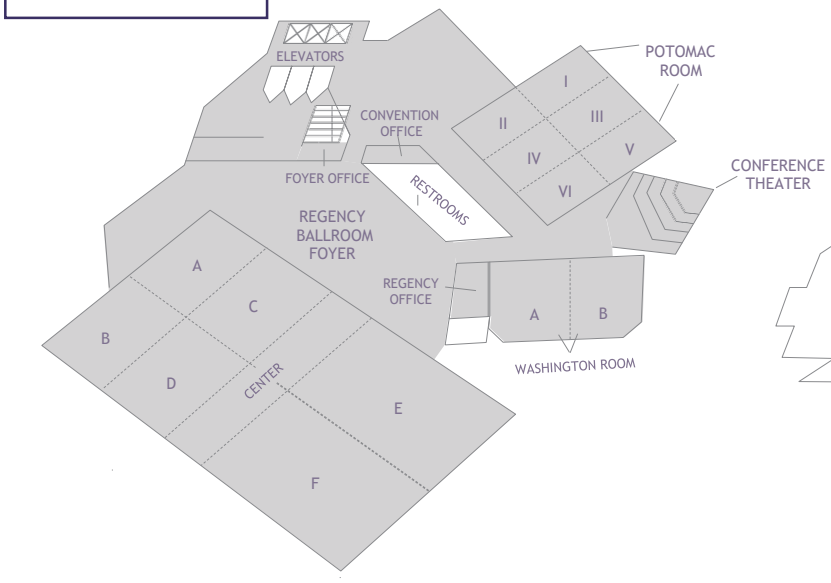
INDEPENDENCE LEVEL



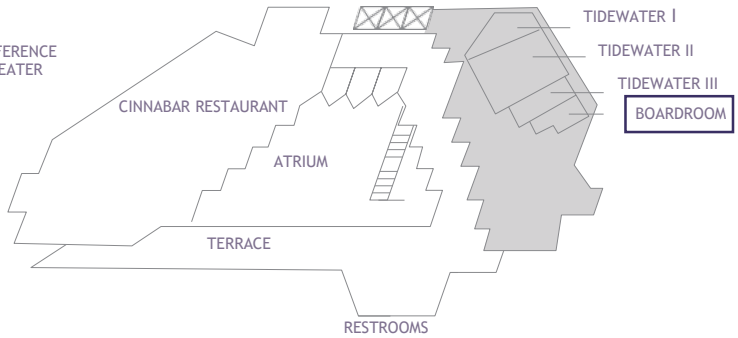
THIRD FLOOR



BALLROOM LEVEL



SECOND FLOOR



Teaching STEM.

Leading Change.

Holding on to Our Humanity.