SCHEDULE

8:15 - 8:45 am
ARRIVE TO ZOOM ROOM AND WATCH PKAL WELCOME VIDEO

8:45 - 9:00 am
OPENING AND WELCOME
- Thomas Kling, Professor of Physics, Bridgewater State University on behalf of the MA PKAL Regional Network
- Kristen Porter-Utley, Dean of the College of Mathematics and Sciences, Bridgewater State University

9:00 - 10:15 am
PLENARY: THE AMERICAN PHYSICAL SOCIETY’S INCLUSION, DIVERSITY AND EQUITY ALLIANCE (APS-IDEA)
- Jesús Pando, Chair of Physics and Astrophysics, DePaul University, Steering Committee, APS IDEA

10:15 - 10:30 am
BREAK

10:30 - 11:45 am
CONCURRENT SESSIONS I

Panel 1. Incorporating EDI in Undergraduate Physics Curricula: From Exercises to Full Courses Interventions on Your Campus
- Moderated by Viva Horowitz, Hamilton College
- Kristen Burson, Hamilton College
- Allison Daubert, Bridgewater State University
- Evan Halstead, Skidmore College
- Janice Hudgings, Pomona College
- Beth Parks, Colgate University

Workshop 2. The PULSE Diversity, Equity and Inclusion Rubric: A Resource for Departmental Self-Assessment
- Monica Loryn Linden, Brown University
- Judy Awong-Taylor, Georgia Gwinnett College
- Loretta Brancaccio-Taras, Kingsborough Community College

Parallel A. Examining & Reforming Departments and Practices
1. How to Develop a Science Department IDEA Committee: A First-Semester Reflection
2. Centering DEIR: Framing and Implementing Collaborative Research Experiences in the Chemistry Curriculum at Bridgewater State University
Parallel B. Making Broad Reforms
1. An Instructional-Teams Project for supporting instructional reform
2. Equity and Inclusion Practices of a Large Diverse Chemistry Discipline at a Young Public College
3. Departmental Pathways to Antiracist Pedagogy
4. Addressing departmental climate and culture as a gateway to reforming the curriculum of a teaching-focused department in a research-1 institution

LUNCH BREAK

12:30 - 1:45 pm CONCURRENT SESSIONS II

Workshop 3. Engaging Faculty with Student Data and Reflective Practices to Promote Inclusive Excellence in STEM
- Jill Sible, Virginia Tech
- Erica Echols, University of Tennessee Knoxville
- Hao Wang, Virginia Tech

Workshop 4. A Call to Action! Strategies for STEM Department Chairs in Creating Equity-Minded Faculty Workloads
- Gypsy Denzine, Virginia Commonwealth University

Parallel C. Reforms at Course and Department Level
1. Scaffolding Student Communication Skills with Electronic Laboratory Notebooks Across the Chemistry Curriculum
2. Backward-designing General Education STEM Courses to Empower Engaged Citizens
3. Inclusive advising initiatives to support biology majors’ holistic career preparation and personal growth
4. Integrating STEM & Social Justice: Addressing the Social Justice Dynamics of Chemistry to Facilitate DEI Initiatives in the Classroom
5. Mentored Academic Service-Learning Applied to Gateway Physics Courses Promoting Community, a Diverse, Safe Learning Environment, and Engagement

Parallel D. Transforming Department Cultures
1. Embedded: How teaching professors can be agents of change in revolutionizing STEM teaching at research universities
2. Building a critical mass: Leveraging a faculty learning community to address microaggressions
3. Building a More Inclusive Classroom in Gateway STEM Courses & Effecting Change at the Department Level through an Instructor Community of Practice

BREAK

2:00 - 3:15 pm CONCURRENT SESSIONS III

Workshop 5. Addressing the Metacognitive Equity Gap at the Departmental Level: Research Shows Us How
- Saundra Yancy McGuire, Louisiana State University
Parallel E. Transforming Institutions
1. Entering Mentoring: Inclusive Faculty To Student Mentoring
2. Building a Culture of Research and Support in STEM at an HBCU
3. Complexities of change: Lessons from an institution’s efforts to transform STEM teaching

Parallel F. Listening to Student Voices
1. Leveraging student-faculty partnerships to implement a DEI major requirement in a chemistry department
2. Stories of Inclusion: One Physics Department’s Process to Collect and Learn from Stories
3. Talented Hispanic & Black NSU Computing Student Sounding Board
4. Partnering with students to promote equity and inclusion at the department level

Parallel G. Reforms in Mathematics and Data Science
1. BEAR Exam: Toward a (More) Equitable Math Placement Test
2. Teaching Data Science to Early College High School Students: A Head Start for STEM Equity in Massachusetts
3. How Covid-19 taught us to reform our teaching of mathematics to promote equity and inclusion
4. Governors State University Serving the Underserved and Promoting Student Success through a Statistics Lab

3:15 - 3:30 pm  BREAK
3:30 - 4:45 pm  CONCURRENT SESSIONS IV

Workshop 6. Exploring How STEM Faculty Conceptions of Equity Inform Their Practices
❖ Tatiane Russo-Tait, University of Texas at Austin
   Gareth Gingell, Dell Medical School at the University of Texas at Austin

Workshop 7. Implementing an Equity Audit
❖ Kimberly LeChasseur, Worcester Polytechnic Institute
   Kris Wobbe, Worcester Polytechnic Institute

Parallel H. Studying and Addressing Climate and Culture
1. Re-engineering, Re-imaging and Redesigning Campus Culture and Climate to Support Undergraduate Black Women in STEM Education
2. Embracing Diversity in the Workplace

Parallel I. Approaches for Equity Minded Reform
1. Transforming Annual Reviews to Catalyze Equity and Innovation
2. Departmental-level equity reform through a virtual support community of departmental teams: Introducing the FOLC-E
3. Trying to move too fast: A department that chose to prioritize internal equity before rushing to action
# ABSTRACTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Plenary</td>
<td>6</td>
</tr>
<tr>
<td>Concurrent Sessions I</td>
<td>7</td>
</tr>
<tr>
<td>Concurrent Sessions II</td>
<td>10</td>
</tr>
<tr>
<td>Concurrent Sessions III</td>
<td>15</td>
</tr>
<tr>
<td>Concurrent Sessions IV</td>
<td>20</td>
</tr>
</tbody>
</table>
OPENING PLENARY:
The American Physical Society’s Inclusion, Diversity and Equity Alliance (APS-IDEA)

Dr. Jesús Pando
Chair of Physics and Astrophysics Department
DePaul University, Founding Member, APS Forum on Inclusion and Diversity

Abstract
Despite +30 years of programming aimed at increasing the representation of historically minoritized communities, physics as a community remains woefully un-diverse. For example, in 2020 only about 15% of physics bachelor’s degrees went to Latinx/African American students (combined). Overall, these communities make up ~45% of the undergraduate student body. The situation becomes worse as one goes “up the ladder”. For example, only about ~5% of physics faculty come from these two communities combined. So why haven’t programs aimed at increasing diversity worked in physics? In the language of the Theory of Change, previous programs were attempts at first order change in which the means of producing results changed, but not the culture or values of the community. This leads to programming which is not sustainable and produces only local and temporary pockets of success. With APS-IDEA we are attempting to encourage the community to undergo second order change; a process in which values and structures are first addressed before any programming is developed. In this presentation, I will describe how APS-IDEA works to achieve second order change, focusing on how working with the alliance, we use our guiding principles to construct a framework for change.

Biography
Dr. Jesús Pando earned his PhD under Prof. Li-Zhi Fang at the University of Arizona. His thesis centered on the development of the wavelet transform for use in the study of large-scale structure. He received the Chateaubriand post-doctoral, followed by an NSF international post-doctoral fellowship to continue his work at the Observatoire de Strasbourg, France.

In general, his research focuses on the uncovering of structure from a noisy background. Originally, he focused the formation of large-scale structure formation in the universe, using higher order correlations to uncover the clustering patterns of matter in the universe. Along with continuing to study large-scale structure, he is also now investigating secondary structure detection and prediction in proteins.

Dr. Pando has long been involved in efforts to increase the number of underrepresented groups in the sciences. He is a founding organizer of the new American Physical Society’s (APS) Forum on Inclusion and Diversity, serves on the steering committee for the APS-IDEA program, and has been a member of the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) for more than 15 years. He served as a board member of the National Society of Hispanic Physicists for more than decade, chaired the APS Committee on Minorities, and served on the National Academies of Sciences Astronomy and Astrophysics Decadal Survey. He continues to serve on numerous other committees and panels dealing with the issues faced by underrepresented students and professionals in STEM fields.

Dr. Pando currently serves as the Chair of the Physics and Astrophysics Department at DePaul University.
CONCURRENT SESSIONS I

10:30 - 11:45 AM

Panel 1
**Incorporating EDI in Undergraduate Physics Curricula: From Exercises to Full Courses**
Moderated by Viva Horowitz, Hamilton College
Panelists: Kristen Burson, Hamilton College; Allison Daubert, Bridgewater State University; Evan Halstead, Skidmore College; Janice Hudgings, Pomona College; and Beth Parks, Colgate University

In this moderated panel discussion faculty from primarily undergraduate institutions will discuss exercises and reforms to physics curricula to directly include diversity and equity topics. Our efforts range from incorporation of individual exercises, to semester-long assignments, and even full courses devoted to structural hierarchies and equity in physics. Panelists will discuss how equity, diversity, and inclusion elements can be incorporated throughout a curriculum, from first year courses to upper level electives. The session will additionally address how efforts through online learning communities can support departmental growth. Faculty will discuss how their online learning community through the American Physical Society Inclusion, Diversity, and Equity Alliance (APS-IDEA) has served as a mechanism for inspiring change in their individual departments.

Workshop 2
**The PULSE Diversity, Equity and Inclusion Rubric: A Resource for Departmental Self-Assessment**
Monica Loryn Linden, Brown University; Judy Awong-Taylor, Georgia Gwinnett College; and Loretta Brancaccio-Taras, Kingsborough Community College

The Partnership for Undergraduate Life Sciences Education (PULSE) is a community of life sciences faculty leaders committed to fostering the educational practices and programs that best prepare undergraduate students to tackle 21st-century challenges. PULSE has developed the PULSE Rubrics (Brancaccio-Taras et al. 2016), a set of five rubrics which are used by departments to assess their work in the areas of curriculum, assessment, faculty practice and faculty support, infrastructure, and climate for change. Spurred by recent events of violence, injustice, systemic racism, and the national movement to rethink how colleges and universities could address such inequities, PULSE developed and added the Diversity, Equity, and Inclusion (DEI) Rubric. The purpose of the DEI Rubric is to have STEM departments self-assess their DEI work by: reviewing their practices and pedagogies; beginning a dialogue about educational, departmental, and institutional equity gaps; and determining a departmental consensus score for each rubric criterion. Most of the DEI rubric is also applicable and useful to non-STEM departments. In this session, presenters will describe the use of the DEI Rubric and participants will work in groups to engage with the rubric. Throughout the session, presenters will facilitate group discussions; engage participants on how the rubric works; demonstrate how to facilitate departmental consensus scoring; and discuss how to enhance DEI work in a department or on a campus by addressing barriers, finding allies, and developing strategies to improve DEI work. Presenters include PULSE Fellows from various institute types, thus providing diverse institutional perspectives.
Parallel A

Examining & Reforming Departments and Practices

1. How to Develop a Science Department IDEA Committee: A First-Semester Reflection
Mickey Dehn, Julie Takacs, and Vennece Fowlkes, Anne Arundel Community College

The presenters will share experiences and accomplishments after one semester of establishing an Inclusion, Diversity, Equity and Anti-racism (IDEA) committee, a faculty-driven initiative started at Anne Arundel Community College (Arnold, MD). This workshop will guide participants through the initial steps of assessing their departmental climate and establishing a committee of peers. Participants will be provided steps to navigate the process of creating an IDEA committee.

2. Centering DEIR: Framing and Implementing Collaborative Research Experiences in the Chemistry Curriculum at Bridgewater State University
Edward Brush, Alyssa R. Deline, and Saritha Nellutla, Bridgewater State University

Achieving equitable outcomes in undergraduate STEM education is imperative for a socially just society. Centering diversity, equity, inclusion, and respect (DEIR) in these efforts requires innovative approaches that extend beyond a student’s experience within a single course. Specifically, this discussion forum will highlight strategies for framing and implementing authentic, collaborative research experiences as a department-wide effort in the chemistry department at Bridgewater State University and will encourage the participants to explore new ideas that center DEIR at their department level. Some examples of coordinated efforts include the scaffolding of research and collaborative skills throughout the curriculum, the use of hybrid and virtual tools to expand access to undergraduate research experience, the integration of DEIR topics within collaborative coursework, the involvement of students in curriculum development efforts, and interdisciplinary engagement.

Parallel B

Making Broad Reforms

1. An Instructional-Teams Project for Supporting Instructional Reform
Karrie Lattimore, University of Arizona

The Instructional-Teams Project (I-TP) at the University of Arizona (NSF DUE-1626531) supports high-quality active-learning instruction in large-enrollment STEM courses through building high-functioning instructional teams with diversified roles and high-quality instructional tasks that create opportunities for formative assessment of student thinking. The I-TP has leveraged institutional-level change initiatives and instructional resources to directly support instructors’ use of evidence-based instructional practices in their classrooms. Since Spring 2017, 38 instructors from 19 different departments have participated in the project, representing a significant impact on students across campus. To better characterize how I-TP participation influenced instructors’ practice, we followed up with instructors on their motivations and goals for participating in the I-TP, and how participation has led to instructional change. Participants include those teaching in-person, asynchronous online, and synchronous remote, giving us insight into how the I-TP has impacted ways instructors implement instructional change with the support of instructional teams in different teaching modalities. The I-TP has also looked at ways instructor participation in the project has impacted student outcomes across the whole student body of a course, as well as among under-represented populations.
2. Equity and Inclusion Practices of a Large Diverse Chemistry Discipline at a Young Public College
Chantelle Anfuso and Patrice Bell, Georgia Gwinnett College

Georgia Gwinnett College (GGC) is a public, four-year liberal arts college that first opened its doors in 2006. Starting with a single chemistry faculty member at that time, the chemistry discipline at GGC now benefits from a large, diverse faculty body, consisting of 39 full-time and over 10 part-time faculty members. Establishing a new chemistry discipline afforded unique opportunities to build an inclusive faculty culture, including practices that promote equitable opportunities for professional development, workload allocation, and leadership positions to all faculty levels. This report will highlight some of the impactful practices incorporated into the discipline, including: inclusive faculty searches; equal opportunities for all full-time faculty to teach at all levels of the curriculum; a collaborative method of determining the teaching schedule each semester; democratic decision-making protocols; shared governance leadership structures; and a set of Chemistry Bylaws which explicitly outline the policies and procedures for each of the aforementioned practices. The theme behind many of the inclusive practices discussed here is a democratic and collective approach to decision-making, which allows all faculty to participate in building the type of culture, curriculum, and future that they want to see for both students and faculty at GGC. These practices have also afforded ample leadership opportunities for junior faculty, female faculty, and faculty identifying with historically excluded racial and ethnic groups. This diverse, engaged faculty body is in turn very active with on-campus student organizations and off-campus community organizations that promote diversity and inclusivity for future scientists.

3. Departmental Pathways to Antiracist Pedagogy
Amy Elizabeth Johnston and Santosha Adhibhatta, Framingham State University

It has been well established that antiracist pedagogies improve student success and increase retention especially among students of color and minorities. A STEM racial equity workshop sponsored by the HHMI has been conducted for faculty in the college of STEM at Framingham State University during Summer 2020 and 2021, where two members of the faculty from the Environment, Society, and Sustainability Department took part over the past two years. Faculty workshops within the Department have also been conducted post these workshops. We discuss in detail, the inclusive and anti-racist practices and pedagogical changes that were adopted by several faculty members within the department post the departmental discussions. We hope that such departmental reforms will reduce DFW rates and improve the retention of underrepresented students in our fields.

4. Addressing Departmental Climate and Culture as a Gateway to Reforming the Curriculum of a Teaching-Focused Department in a Research-1 Institution
Brandon Campitelli, Texas Institute for Discovery Education & University of Texas Austin and Sara Stewart Stevens, University of Texas Austin

Higher education institutions are investing in extensive curriculum redesign efforts that rely on faculty to collaboratively develop a shared vision, and better align curriculum to this vision. While well-intentioned, such efforts are often undertaken without an appreciation of the complexity of the change process and may stall in departments without support for the cultural changes involved. Here, we present on a curriculum redesign effort that initially stalled because of an internal culture of scarcity and individualism. Recently, this department has shown signs of substantial improvement by centering cultural reform through community building at the heart of their curriculum redesign effort.
CONCURRENT SESSIONS II

12:30 - 1:45 PM

Workshop 3
Engaging Faculty with Student Data and Reflective Practices to Promote Inclusive Excellence in STEM
Jill Sible, Virginia Tech; Erica Echols, University of Tennessee Knoxville; and Hao Wang, Virginia Tech

The Inclusive Excellence program at Virginia Tech, funded by the Howard Hughes Medical Institute, situates science departments and the faculty that comprise them, as the units of change. A key strategy toward creating lasting changes in practices and attitudes that are more equitable and inclusive has been the engagement of faculty as co-creators, rather than adopters, of the STEM reform initiatives. Three practices, in particular, have proven effective: 1) sharing disaggregated student success data with departmental faculty and responding iteratively to their request for more information, 2) empowering departments with the resources to design and implement locally relevant change initiatives, and 3) engaging faculty in regular reflective practices through focus groups and open-ended surveys. This approach has resulted in faculty-initiated shifts from isolated activities to sustainable initiatives and even policy changes such as tenure and promotion guidelines that explicitly address competency in inclusive excellence. In this session, facilitators will share examples of these practices and the ensuing outcomes to build inclusion in undergraduate science programs. Then the participants will engage in an activity to consider their own institutional structures, cultures, and challenges toward inclusion, and map a strategy to implement their own inclusive excellence initiative.

Workshop 4
A Call to Action! Strategies for STEM Department Chairs in Creating Equity-Minded Faculty Workloads
Gypsy Denzine, Virginia Commonwealth University

This highly interactive session focuses on how department chairs can be courageous academic leaders by setting the policies, culture, and climate to ensure equity in faculty workloads. Although service typically does not receive the attention, as the “big two” (teaching and research), service is where strong academic leaders can provide the necessary direction and transparency to foster faculty workload equity. This session begins with department chairs reflecting on the types of faculty members in their department. We will review a faculty identity model that identifies one’s commitment to their discipline, as well as one’s commitment to their university/college. Understanding faculty profiles is an important first step before assigning workloads. Next, we will review the research on “glamour service” versus “academic housework.” Most importantly, we will discuss strategies for how department chairs can be transparent with faculty and facilitate workload equity. The latest work on faculty discretionary spaces will be reviewed and we will explore the ACE-ENgAGE report (O’Meara, et al, 2021) on equity in faculty workloads. Several models for how to share a faculty workload document will be presented. Department chairs will be guided through an exercise to create a specific plan for addressing workload equity. The call to act now to ensure equity at the department level just arrived!
Parallel C  
Reforms at Course and Department Level

1. Scaffolding Student Communication Skills with Electronic Laboratory Notebooks Across the Chemistry Curriculum  
Sarah Soltau, Bridgewater State University

In Fall 2018, Bridgewater State University (BSU) began to use Electronic Laboratory Notebooks (ELNs) in our biochemistry laboratory courses. These ELNs were designed as an opportunity for students to develop better written communication skills and help students improve their data analysis and recordkeeping skills. The ELNs provide real world preparation for industrial jobs in the chemical and biotechnology industries that use ELNs. Student surveys show that students appreciated the change from the paper-based lab notebook to the ELN and found it easier to use and organize. To broaden the impact of this work across the curriculum, the Department of Chemical Sciences at BSU was awarded an Academic Innovation Fund grant from BSU during the Spring 2020 semester to expand the ELN initiative to all chemistry laboratory courses. Grant support enabled the purchase of laptop computers to be used in the laboratories to increase access and equity of ELNs to all students. The grant also supported faculty-led development of appropriate notebook templates and assessment criteria for each of these courses and workshops for full and part-time faculty on the use of ELNs. During the 2020-2021 academic year, many of the original goals of the grant had to be modified due to primarily remote laboratories due to COVID-19, which instead allowed students to focus more on data analysis skills. In the current academic year (2021-2022), we are beginning the full implementation of ELNs across the curriculum, including scaffolding communication skills and the development of e-notebook portfolios for all students.

2. Backward-designing General Education STEM Courses to Empower Engaged Citizens  
Christopher G. Murphy, The College of New Jersey

The COVID-19 pandemic has made it all too clear how important it is that society be STEM-proficient. Higher education has a clear mandate to prepare a scientifically and quantitatively literate society, and general education STEM courses must play a central role in that preparation. However, we often forward-design these courses from our own disciplinary lenses, attempting to impart to students the fundamental concepts of the discipline. Although such forward-designed courses may function well to produce disciplinary practitioners, they frequently miss the mark in preparing students to engage as citizens. In contrast, backward-designed GenEd STEM courses seek to provide students with the essential skills, knowledge, and attitudes they need to better their lives and to understand and address important, difficult societal issues. After an examination of the learning goals that backward-design establishes for general education STEM courses, this interactive session will explore the types of course structures and pedagogies (e.g., courses topics, materials, assignments, assessments) needed to support backwards-designed outcomes. Participants will engage with examples that are transferrable across courses and disciplines, and they will develop one or more of these components for their own courses.

3. Inclusive advising initiatives to support biology majors’ holistic career preparation and personal growth  
Jennifer Kowalski, Julia Angstmann, Marva Meadows, Carmen Salsbury, and Kyryll Savchenko, Butler University

Recent literature on advising and mentoring best practices indicate that inclusive or “appreciative” practices promote retention of all students, particularly those from underrepresented groups. Among our efforts to increase diversity equity, and inclusion (DEI) within the Biological Sciences Department at Butler University, a private, predominately white, undergraduate institution in Indiana, we conducted surveys of sophomore and senior biology majors regarding their sense of belonging and experiences in all aspects of departmental life, with the hope of identifying areas to focus future DEI efforts. Results of spring 2020 surveys indicated that, although students generally felt well-
supported and included in our classrooms (with seniors reporting greater comfort in expressing themselves and a greater sense of support than sophomores), all students did not feel equally supported during advising appointments with department faculty. Numerical data and narrative comments indicated disparities in advisors’ approaches to advising in terms of their (1) knowledge about career options and required preparation for those careers and (2) support of students’ goals, particularly students not meeting traditional GPA benchmarks for graduate or professional schools. To address these issues, in Fall 2021 we developed and implemented an Inclusive Advising workshop, in which department faculty co-developed a set of biology-specific prompts following the Appreciative Advising Model (Bloom et al. 2008) and curated a list of 69 biology-related careers. These resources, along with a year-by-year list of career exploration and preparation activities to guide students’ progressive career discernment, were provided to all biology advisors. Student survey, resource, and workshop development will be addressed.

4. Integrating STEM & Social Justice: Addressing the Social Justice Dynamics of Chemistry to Facilitate DEI Initiatives in the Classroom
Elisabeth Stoddard, Drew R. Brodeur, Katherine Foo, Kimberly LeChasseur, and Valerie Smedile Rifkin, Worcester Polytechnic Institute

As instructors looking to center equity and inclusion in the classroom, research tells us that approaches to inclusion must address marginalization, increase access, and create environments where students feel welcome, respected, and valued. Using a social justice framework to guide DEI in the classroom allows us to intentionally address, examine, and analyze issues of global injustice, particularly in contexts where access and marginalization are at play. This requires students and educators to examine structural and individual factors that may perpetuate systemic injustice. As an interdisciplinary team of chemists, social scientists, and instructional designers, we developed a 3-part project as part of Chemistry 1030: Kinetics, Equilibrium, and Thermodynamics. The project looks at soil, water, and air contamination caused by e-waste in Agbogbloshie, an e-waste dump and commercial district in Accra, Ghana. It explores the socio-economic and political contexts that has led this to be one of the largest e-waste sites, the associated chemical systems at play, public and environmental health impacts of chemical contaminants, interactions among chemical compounds, as well as issues of land tenure, livelihoods, waste colonialism, and culture. Each component of the project addresses both chemistry and issues of social injustice. It also prepares students for each of their exams and introduces them to global innovators in chemistry with diverse identities. We will share lessons learned, outcomes, and critical approaches to assessment.

5. Mentored Academic Service-Learning Applied to Gateway Physics Courses Promoting Community, a Diverse, Safe Learning Environment, and Engagement
Charles M. Fortmann, St. Johns University

A voluntary mentored STEM-focused Academic Service-Learning (AS-L) opportunity was made available to an Introductory College Physics Class. AS-L is a recognized high impact practice increasing engagement, learning outcomes, and retention. In this case student volunteers helped the course instructor to design and present scientific demonstrations to local elementary school students. Through the shared goals, the respect for student ideas, and the goal to engage a diverse class of elementary students in the joy and wonder of scientific discovery the diverse group of university student volunteers were likewise embraced. The students and professor designed safe, hands-on, experiments that could easily be transported to a elementary school. Each week four to five student volunteers traveled to the school in one car. Experiments included a demonstration of the electrical potential employing a Van de Graaf generator, light diffraction – lens and color separation, magnets, electro-magnets, and simple electric motors. The university students helped the elementary school students identify key elements of the experiments and demonstrations (it should be noted that most modern era school students of any age do not have almost no hands-on experience with building and assembling physical experiments or even toys). Positive outcomes and community building is evidenced in part by the volunteers joining each other at review sessions, seeking deeper understanding of the material, and ultimately all achieving excellent grades. The Professor’s appreciation and respect for student
Parallel D

**Transforming Department Cultures**

1. **Embedded: How Teaching Professors can be Agents of Change in Revolutionizing STEM Teaching at Research Universities**
   Robin Dunkin, Guido Bordignon, Jody Greene, Guila Gurun, and Paul Koch, University of California-Santa Cruz

   Teaching professors at the University of California Santa Cruz are taking a bottom-up leadership approach to revolutionizing teaching at an R1, HSI institution. The research-centric culture and professional incentive structure at R1 universities have hindered the widespread adoption of evidence-based and equity-minded teaching practices. Over the past decade, an institutional decision to embed teaching professors in each department within the division of Physical and Biological Sciences at UC Santa Cruz has been a fruitful strategy supportive of division-wide pedagogical change. In this discussion, we intend to reflect on obstacles and solutions and solicit solution-oriented experiences from participants about topics such as the role teaching professors play in faculty development, the formal and informal work of culture change within departments, the challenges associated with only having small numbers of teaching professor per department, differences in research expectations for the teaching professor role across departments, and evaluation of teaching professors for tenure.

2. **Building a Critical Mass: Leveraging a Faculty Learning Community to Address Microaggressions**
   Kristen Helmer and Paula L. Sturdevant Rees, University of Massachusetts Amherst

   The two presenters – one a faculty developer and Director of Programming for DEI with our Center for Teaching and Learning (CTL), the other the Assistant Dean and Director of the Engineering Office of DEI – will describe their collaborative effort to drive departmental change around the issue of microaggressions. Departmental practices and culture in STEM fields are often characterized by implicit biases which can manifest in microaggressions with detrimental impact particularly on students from historically marginalized populations. For changes in departmental practices and culture to happen, it is necessary to develop a critical mass of people in a department who share common language and understandings about critical issues, such as microaggressions. This is hard to accomplish through general faculty development programming offered through a teaching center. We were able to build such a critical mass by offering a series of virtual workshops on recognizing and responding to microaggressions in Spring 2021 to faculty and graduate students in all departments of the College of Engineering. This collaboration developed out of the relationship that the two presenters built through the year-long TIDE (Teaching for Inclusiveness, Diversity, & Equity) Ambassadors faculty learning community. Through our impactful collaboration we were able to a) reach faculty who would otherwise not attend CTL programming on this topic; b) impact department practices and culture by building foundational knowledge on the topic with a critical mass of people in each department; and c) engage faculty as social change agents.

3. **Building a More Inclusive Classroom in Gateway STEM Courses & Effecting Change at the Department Level through an Instructor Community of Practice**
   Melissa Oddo, Denise Bartell and Lesley Berhan, University of Toledo

   In this session, we will discuss the creation of an innovative model for faculty development for gateway STEM instructors, the Equity Champion Community of Practice, as part of our participation with the Association of Public and Land Grant Universities’ (APLU) Student Experience Project (SEP). We will also discuss the impact of the Equity
Champions program on departments with multiple faculty participants, and the potential to effect departmental change through the participation of Department Chairs in the program. The Equity Champions, started in Summer 2020, creates a semester-long community of practice wherein instructors learn together, share ideas, and work together to develop resources supporting equity in their gateway STEM classes. Equity Champions have implemented evidence-based changes in their classroom to improve students’ sense of belonging, identity safety, and growth mindset, including: revising their syllabi to include student attuned-language, creating welcome letters and videos, and sharing their personal stories of belonging. They have also used an innovative new tool called Ascend which assessed the immediate impact of changes in their classrooms. One member said, “being an Equity Champion has opened my eyes to how I can create a more inclusive classroom. I feel the tools I implemented, from exam wrappers to sharing my own personal struggles, have helped me become a more effective instructor and improve student success.” We will explain how this model has the ability to effect lasting change in faculty behavior and have an impact on meaningful change in attitudes vs. time commitment associated with these ongoing faculty development experiences.
CONCURRENT SESSION III

2:00 - 3:15 PM

Workshop 5

Addressing the Metacognitive Equity Gap at the Departmental Level: Research Shows Us How
Saundra Yancy McGuire, Louisiana State University

Educational equity refers to closing the achievement gap between different groups of students, e.g. majority vs minoritized. (Harris and Herrington, 2006). Metacognitive equity refers to closing the gap between students who have acquired effective thinking and learning strategies and those who have not. Often, whether a student possesses those strategies—rather than any lack of innate ability or talent—makes the difference between academic success and discouraging failure in STEM courses. However, effective learning strategies can be taught, sometimes with immediate and dramatic improvements in academic performance. (McGuire, 2015, 2018). This interactive session will present research-based learning strategies that have proven effective for increasing STEM student success. We will discuss research on promoting student learning through metacognitive approaches, with a particular lens on improving equity in the classroom. Evidence of improved achievement of learning outcomes in STEM classes will be provided. Additionally, suggestions for how effective approaches can be implemented on a departmental scale will be provided. The session blends cognitive science and learning theory, providing evidence-based approaches that are broadly applicable to all STEM courses.

Parallel E

Transforming Institutions

1. Entering Mentoring: Inclusive Faculty To Student Mentoring
Jamie A. Turgeon-drake, University of South Dakota

Success in college is strongly influenced by the quality of faculty mentoring that students receive and this is especially true for students from under-represented groups. The University of South Dakota-HHMI Inclusive Science Initiative hosts an Entering Mentoring program once an academic year for faculty, research faculty, graduate student research faculty and staff to promote inclusive ideas and foster positive mentoring experiences inside the lab, classroom settings and beyond on the university’s campus. In sharing our curriculum and modifications we hope to encourage other universities to adapt a similar program that will fit their universities needs.

2. Building a Culture of Research and Support in STEM at an HBCU
Verleen McSween and Lawanda Cummings, The University of the Virgin Islands

The Virgin Island Institute for STEM Education, Research, and Practice (VI-ISERP) is the STEM Workforce Development component of the Virgin Islands Established Program to Stimulate Competitive Research (VI-EPSCoR) initiative. The goal of VI-EPSCoR is the development of the U.S. Virgin Islands scientific capacity and ability to support economic growth. Addressing this goal in workforce development, VI-ISERP, has employed a 3-prong approach focused on 1) STEM teacher professional development, 2) student mentoring/training, and 3) research capacity and infrastructure development. The resulting constellation of programming and supports seek to address the persistent
underrepresentation of minorities and women in STEM fields. The Mentoring and Research Infrastructure component supports pre and early-career STEM professionals and promotes their research productivity. The VI-ISERP team has created unique psychological and professional skill scaffolding for undergraduate, graduate, and early career professionals to bolster industry-relevant skills and navigational resiliency. We employ mentoring compacts and success plans to capitalize on faculty/student relationships, host research support groups like Voices of Women in STEM (VOWS) to create community and accountability, and intensive training in education research through university partners like the Professional development for Emerging Education Researchers- Virgin Islands (PEER-VI) Field school through Rochester Institute of Technology.

3. Complexities of Change: Lessons from an Institution’s Efforts to Transform STEM Teaching

Alisa Hutchinson, Peter Hoffmann, S. Aslı Ö zgün-Koca, Karen Myhr, and Sara Kacin, Wayne State University

Despite decades of research validating the use of active learning and other student-centered instructional practices in improving student performance (Freeman et al., 2014), such techniques have failed to achieve status quo as routine pedagogy in undergraduate STEM classes (Henderson et al., 2011). Active learning strategies have also been shown to be beneficial in reducing the achievement gap for underrepresented students in undergraduate STEM courses (Theobald et al., 2020), underscoring the importance of establishing them as a standard practice to address urgent societal needs for equity and inclusion. In recent years, efforts have increasingly focused on institution-level interventions to drive transformation and several perspectives for approaching these changes have emerged. This presentation will share results from an eight-year, NSF-funded project to support faculty at a large urban research university to incorporate evidence-based teaching methods (active learning strategies) across STEM disciplines and increase reflection, feedback, and conversations focused on teaching. Our presentation will review how different elements of our reform effort met (or did not meet) their objectives, how sustainable they are, and what lessons our project offers to reform efforts at colleges and universities in a range of contexts. We will reflect on our lessons learned by considering our experiences through the lens of Henderson et al.’s (2011) four-quadrant model (which framed our project), while also considering the potential influences of sensemaking & sensegiving as well as faculty identity on change at the departmental and institutional levels.
2. Stories of Inclusion: One Physics Department’s Process to Collect and Learn from Stories
Jamie Kern, Alex Whitman, and Thomas P. Kling, Bridgewater State University

The Physics Department at Bridgewater State University (BSU) consists of 60 students, 10 full-time faculty and staff, and numerous part-time faculty. The department’s Inclusion, Diversity Equity Alliance Team, associated with the American Physical Society IDEA program, set out to learn more about its culture through collecting stories from all department stakeholders. After an initial story collection, the BSU APS IDEA Team worked with University’s Vice President of Diversity and Student Success to bring in external moderators and facilitate a student discussion of themes drawn from the stories. The department has continued to collect stories through a website that is made publicly accessible through QR codes on flyers posted throughout the department. The hope is that these flyers, which state values and expectations as well as providing a means for feedback, will contribute to a broader effort to create a more inclusive and equitable environment.

3. Talented Hispanic & Black NSU Computing Student Sounding Board
Meline Kevorkin and Greg Simco, NovaSoutheastern University

This brief presentation will share the benefits of a Talented Hispanic & Black NSU STEM Student Sounding Board, a strategy group representing the student voice. The Board had two primary functions: (1) meeting quarterly to provide the college administration with feedback on curriculum and instruction (e.g., content relevance from the perspective of today’s diverse college student), and suggesting new/updated co-curricular activities and wrap-around services; and (2) serving as outreach ambassadors/role models for potential and current STEM undergraduates. These student Board members coordinate with faculty and staff to develop their own creative research-informed ideas on how to engage with targeted students in-person, or via social media platforms (e.g., Twitter, Instagram, Tik Tok). This was designed to be responsive to the socioeconomic needs and priorities of Black & Hispanic youth and college students informed by sources such as information developed by students serving as advocates leading choice-focused talks and workshops helping college-bound underrepresented minority students navigate the high school to college journey. This covers both academic and non-academic matters, encouraging students to complete specific actions based on time frame (e.g., registering for classes, signing up for scheduled project activities), and referring students to academic support services (e.g., tutoring, writing support). Without being overly intrusive, this also helped to “nudge” students who may be experiencing any mental health/wellness/personal issues impacting their studies, referring them to internal and external resources and services (e.g., stress counseling, healthy eating/sleeping habits, physical exercise, eye strain due to excessive screen time, community financial and wellness resources).

4. Partnering with students to promote equity and inclusion at the department level
Karen Lange and Ann Trenk, Wellesley College

At Wellesley College, students are serving as Inclusive Excellence Student Advisors in STEM departments. In these paid roles*, the Student Advisors collaborate with faculty liaisons (and each other) to develop initiatives that enhance inclusion at the department/program level. We describe our collaboration with the Math Department Student Advisors and reflect on the advantages and further potential of this model. Our Student Advisors worked with us to develop a climate survey of students in core introductory math/stat courses in 2020-2021. They took the lead on administering the survey and analyzing the results. This year the Student Advisors coordinated student feedback during our faculty hiring process, and they have served as a sounding board for other issues. Having Student Advisors in place enables our department to solicit student views more efficiently and consistently, gives students a place to go if they have concerns or ideas, and sends all students the message that the department is open to feedback and values diversity and equity. The information gathered has been valuable for developing faculty understanding of student experiences and perspectives. This understanding, in turn, allows the department to take more effective action towards equity and inclusion.  

*These Student Advisor positions are funded by a grant from the Howard Hughes Medical Institute.
Parallel G  
Reforms in Mathematics and Data Science

1. BEAR Exam: Toward a (More) Equitable Math Placement Test  
Matt Salomone, Bridgewater State University

Inequitable outcomes for students of color are a well-known bug (feature?) of most standardized tests, and higher education has begun to dismantle math placement policies that rely on such tests to limit new students’ access to credit-bearing math courses. Yet, the holistic measures of student readiness typically used in their place, such as high school grades, offer little insight into students’ specific math content skills. We present a placement policy that aims to address both concerns. Bridgewater’s locally-developed “BEAR Exam” replaced standardized Accuplacer exams in 2020, and initial findings show its placement rates are similar to Accuplacer’s - but BEAR dramatically reduced the non-credit placement rate gap for our students of color in 2021.

2. Teaching Data Science to Early College High School Students: A Head Start for STEM Equity in Massachusetts  
Russ Orwell and Joanna Blanchard, Merrimack College

Data Science has been a growing field in higher education, and a growing career field across many industries. While higher education institutions have created graduate degrees, majors and certificates for these programs, many young people know little about the field and the opportunities therein, particularly students from low-income and minoritized communities. To address these inequities as the field scales up, Merrimack College has offered an introductory data science class for students at Lawrence High School as part of its early college program. These students are in a standard introductory class alongside undergraduate peers, and complete all the same work, projects and presentations. Initial data indicate that students in the class gain a broader perspective on data science as a potential major and career field, and also are able to see more real world applications for their coursework. These factors would all argue for far more data science coursework offered at the high school/undergraduate level, particularly for students unlikely to be exposed to this field through family or community connections. Students and/or undergraduate teaching assistants will participate in this session as well to give their first-hand perspective.

3. How Covid-19 Taught Us to Reform our Teaching of Mathematics to Promote Equity and Inclusion  
Angie Hodge-Zickerman, Brian Beaudrie and Barbara Boschmans, Northern Arizona University

The Covid-19 pandemic brought forth a lot of forced changes in the ways both teaching and learning occur. Many discuss the challenges of these forced changes, but what did we learn from these changes that can make our classrooms more equitable and inclusive? Our mathematics for elementary teachers working group taught our mathematics for elementary teachers’ classes in a variety of modalities during the pandemic including fully remote and in a hybrid manner. We learned that many of the changes made in our teaching actually helped us to be more inclusive of students with different learning styles and learning preferences. In this session, we will share the changes in teaching practices that we will keep as part of our teaching going forward. Changes in classroom notes, lessons, group work, assessment, and differentiated instruction will be shared with the attendees of this session. Time/space will also be left for audience members to share any additional reform to teaching practices that they learned with each other.
4. Governors State University Serving the Underserved and Promoting Student Success through a Statistics Lab
Andrae Marak, Chris Tweddle and Shukmei Oh, Governors State University

Governors State University (GSU) is a regional comprehensive Minority Serving Institution (MSI) and an emerging Hispanic Serving Institution (HSI). GSU’s first-year students – largely first generation, lower socio-economic status, and students of color – have a first-year retention rate of 52%, well below the Illinois average of nearly 80%. A major obstacle to first-year student success at GSU is the high DFW rate of students in our General Education Mathematics gateway course – MATH 2100: Elementary Statistics (3). MATH 2100 had a DFW rate over 40 percent with even higher rates among our non-Honors eligible students. We created a team within the mathematics program that designed a co-requisite laboratory – MATH 2101: Elementary Statistics Lab (1) - that provided additional support and application of mathematical concepts for students who arrived at the university underprepared for success in Mathematics and quantitative reasoning. The goal of MATH 2101 was to reduce DFW rate of our non-Honors eligible students to match that of our Honors eligible students (from approximately 45% to 25%). This proposal explores the ways in which the creation of the co-requisite built a cross-university collaboration involving our Center for the Junior Year, Academic Resource Center, and Mathematics program and deployed Peer Mentors, Supplemental Instructors, Graduate Assistants, and Program Faculty to improve student success. These cross-departmental reforms to our teaching practices vis-à-vis an important Mathematics gateway course promote equity and inclusion by enhancing student success for our students who come from largely underserved communities.
CONCURRENT SESSIONS IV

3:30 - 4:45 PM

Workshop 6
Exploring How STEM Faculty Conceptions of Equity Inform Their Practices
Tatiane Russo-Tait, University of Texas at Austin and Gareth Gingell, Dell Medical School at the University of Texas at Austin

The study that informed this workshop explored how postsecondary STEM faculty conceptualized equity and whether and how those conceptions informed their practices. Findings revealed three distinct conceptions of equity that were associated with teacher- versus student-centered instruction, and different beliefs about supporting students in their courses. Using this data, composite narratives were developed to describe the perspectives and practices of groups of professors with different conceptions. This workshop’s goal is to use these composite narratives to illustrate how different conceptions of equity relate to practices that can support or hinder student success. Participants will reflect on their conceptions and how those may be informing their own practices and interactions with students. They will also consider the benefits of using this approach as a starting point to engage in conversations in their institutions about developing a collective definition of equity in order to successfully advance reform efforts.

Workshop 7
Developing and Implementing an Equity Audit
Kimberly LeChasseur and Kris Wobbe, Worcester Polytechnic Institute

Have you moved through your institution’s diversity trainings...yet find yourself, your department, your institutional team falling short of equitable and inclusive educational practices? An equity audit might help you to collectively take stock of your current situation and provide a roadmap for realigning actions with values. In this session, we will provide guidance for how to conduct an equity audit. Strategies, resources, and lessons learned from our own experiences will be organized into four phases: 1) planning and committing to an equity audit, 2) identifying the right questions to ask, 3) making sense of data to surface new questions, and 4) addressing new questions with action. Within each phase, attendees will be invited to nominate problems of practice that they anticipate facing and to brainstorm approaches to overcoming potential barriers (eg, resistant colleagues, difficulty accessing appropriate data).

Parallel H
Studying and Addressing Climate and Culture

1. Re-engineering, Re-imaging and Redesigning Campus Culture and Climate to Support Undergraduate Black Women in STEM Education
Ansley Booker, Mercer University

This study explored the lived experiences of Black women who successfully earned graduate STEM degrees at PWIs
to determine which factors were considered barriers or catalysts for their matriculation, graduation, and job success. The data revealed several barriers including a “chilly” campus environment, racism/sexism/discrimination, and bias. The catalysts included mentors, BIPOC faculty, and a cohort model. When barriers were not mitigated, negative outcomes persisted including pay inequities, “glass obstacles” and decreased retention and matriculation. The lens in which the study was conducted utilized Social Cognitive Career Theory and Tinto’s Model of Institutional Departure. This study is timely and unique in that it is a review of the academic and career journeys of the participants as well as insight into the academic environments of HBCUs and PWIs. The results of the study may provide insight into the retention, matriculation of Black women in STEM disciplines where they are often underrepresented minorities.

2. Embracing Diversity in the Workplace
Jesse Ross, CFRE, International Professional Speaker, Executive Coach and Consultant

Communicating in a diverse, multicultural environment can be awkward. For example, someone might make a sweeping and inappropriate generalization to a coworker about what “his people” are like, causing discord. More subtle problems can involve the differences in how people from different cultures communicate. A gesture that’s acceptable in one culture might be meaningless or offensive in another. How do you communicate well and be aware of cultural conflicts that crop up, even subtle ones? This workshop explores how to be aware of our own biases, and how we can make our workplaces a barrier free environment so our customers get the best experience possible.

Parallel I
Approaches for Equity Minded Reform

1. Transforming Annual Reviews to Catalyze Equity and Innovation
Elizabeth Long Lingo, Sue Roberts, Jeanine Skorinko, Chrysanthem Demetry and Worcester Polytechnic Institute

Annual reviews conducted by department heads provide an invaluable yet often untapped opportunity to help springboard and foster short and long-term professional development of all faculty members, resulting in more equitable outcomes for all faculty. Annual reviews are especially important for mid-career faculty (i.e., Associate Professors) since there is greater opportunity for department heads to foster creativity and innovation after the first promotion. As part of its ADVANCE Adaptation grant (2018-2021), WPI piloted a new model for faculty annual reviews that transformed these conversations from an evaluative to a professional development model, with an explicit goal on fostering greater equity within departments and addressing systemic biases that constrain the advancement of women and BIPOC in advancement to full professor. The new model embraces a “Reflect, Inquire, and Develop integrative possibilities” model of discovery, and includes a discussion guide for department heads and reflective preparation prompts for faculty members. The pilot program was ultimately implemented widely across the university, and includes leadership training for department heads on how to catalyze innovation of faculty as creative experts while also achieving greater equity and collective departmental and organizational goals.

2. Departmental-level Equity Reform through a Virtual Support Community of Departmental Teams: Introducing the FOLC-E
Melissa Hayes Dancy, Western Michigan University; Apriel Hodari, Eureka Scientific; Samantha Elliot, St. Mary’s College of Maryland and Shayna Krammes, Eureka Scientific

The FOLC-E (Faculty Online Learning Community - Equity) is a model for departmental-level equity reform that utilizes the power of social connection to support stakeholder teams from STEM departments as they engage in a two-year process of equity reform. We implement this model to specifically address intersectional gender equity in STEM departments. We work with teams of typically three members of a department (with at least one person holding significant administrative power) for two years in a virtual community. The community meets biweekly.
Each cohort has about 5 teams. In year one the teams learn about systemic inequity and organizational change. With the support of facilitators and other teams, they evaluate their own department for change opportunities and design a reform project with the potential for departmental-level sustained reform. In year two, teams implement their projects, manage challenges, and evaluate impact. In this talk, we present the design principles and underlying research we use to structure the FOLC-E. These include: a community to support the challenges of implementation, a mentor for each team with extensive experience in higher education administration and change, focus on systemic (not individual) change, required full departmental buy-in, and organic programming based on the unique situations and needs of participants. This project, “Faculty Online Learning Communities for Gender Equity: Targeting Departmental Level Change In STEM” is supported by the NSF ADVANCE Partnership grants 2121899, 2152524, and 2121858.

3. Trying to Move Too Fast: A Department that Chose to Prioritize Internal Equity Before Rushing to Action
Tamily Weissman and Norma Velazquez-Ullo, Lewis & Clark College

In the summer of 2020, the Biology Department at Lewis & Clark College made a purposeful shift inward, questioning inequities in our interactions with each other as faculty and staff. We had been focused on diversity, equity, and inclusion more generally for a number of years, for example in faculty searches, research mentoring for underrepresented students, revamping our introductory curriculum to be more student-focused, and addressing growth mindset and stereotype threat in the classroom. However, it was not until we debated our reaction to the #ShutDownSTEM movement, following George Floyd’s murder, that we asked more difficult questions about how our department itself was influenced by white culture. After collecting and discussing feedback from students, we discovered an impasse: either create immediate action items to address the feedback, or slow down to understand inequities among ourselves as faculty. We chose to focus at the department faculty/staff level, considering that this internal work could provide a model for the work we ultimately wished to do in empowering BIPOC students. Two members of our department designed weekly discussions on race, with readings and assignments modeled after anti-racism workshops they had attended at Lewis & Clark. Our approach had successes and failures, which will be discussed in the presentation. We also initiated broader meetings with other STEM-focused departments, which allowed colleagues to learn about and dovetail with cross-campus efforts. Our experiences provide one potential template for departments looking for ways to begin self-reflective work on how inequities influence department culture at the faculty/staff level.