65th Annual Meeting
October 16th, 2021
On-line meeting via Zoom

Program Overview (in Pacific Standard Time)

8:30      Welcoming Remarks
8:35-12:30 Concurrent Sessions
12:30-1:00 pm Break for lunch
1:00-4:00 pm Professional Development Workshop
4:00 pm    Awards
            Virtual Happy Hour
Our Mission
Members of ACUBE share ideas and address the unique challenges of balancing teaching, research, advising, administration, and service. We are a supporting and mentoring community that provides professional development opportunities to:

- Develop and recognize excellence in teaching
- Incubate new and innovative teaching ideas
- Involve student research in the biology curriculum
- Advise and mentor students in and out of the classroom
- Enhance scholarship through our national, peer-reviewed journal Bioscene

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Steering Committee Meetings:
Friday October 15th  2:00 PST
Sunday October 17th  2:00 PST
ACUBE’s 65th Annual Meeting Professional Development Workshop

Decolonial Approaches to Teaching & Research in Biology

This workshop invites college biology educators to hold two things at once: the joy of learning through the lens of science AND to consider how colonial and settler-colonial structures and practices are embedded in biology. Drawing from history of science and current approaches to decolonial scientific practice, this workshop brings into consideration some ways that scientists can respond to the epistemic impacts of colonialism in their work. How might this knowledge change our approaches to building biology-community and collaborators, curriculum, day-to-day responsiveness and programs? You can expect content on the history of colonialism and how this has informed and persists in the contemporary social structures of Biology and Science; our policies, formal and informal social practices, and the consequential barriers and bind-spots. You will also be offered two particular journeys by the scientists who have incorporated this reckoning into their research and teaching. If you accept this invitation, we will offer a framework in which to locate yourself in this journey.

Presented by Aadita Chaudhury, Emma Coddington, and Sheila Colla

Aadita Chaudhury is a research assistant to the ERC-funded Sonic Street Technologies project at Goldsmiths, University of London and a PhD candidate in Science & Technology Studies at York University, Canada. Her doctoral dissertation project explores the multifaceted cultural, material and environmental meaning-making, building on her ethnographic and media research on fire ecology and wildfire management in California and internationally. Her research further investigates the practices surrounding both ecosystem and built environment fires around the world to situate how themes of coloniality, valuation and race emerge in the context of fire management. Broadly, she is interested in decolonial, feminist and arts-based approaches to understanding human-environment relations.
**Emma Coddington** is a neuroethologist and neuroendocrinologist whose work is led by the question: How do stress and pro-social experiences shape internal state, unconscious decision making, and ultimately behavior. In alignment with her upbringing in New Zealand, she learns from and with animals, but her NSF-funded biophysics research has focused mainly on newts, and to a lesser extent mice, guinea pigs, frogs, and caterpillars. Te Ao Māori principles guide this work. And, weaving disability and critical race theory is a natural extension that intentionally incorporates social ecology into the framework of understanding animal behaviors, human behaviors, and human institutions. She is a white-presenting HoH-crip Associate Professor who has worked at the U.Otago, Ohio U., Oregon Health Sciences U., U.Wyoming, and Willamette U. Due to the increasing requests to bring this work to other institutions and her own disabilities she elects to be an independent scholar these days, and can be contacted at: resilience4dj@gmail.com

**Sheila Colla** is an Associate Professor in the Faculty of Environmental and Urban Change at York University, Toronto, ON, Canada. Dr. Colla’s interdisciplinary research focuses on the conservation of native wildlife, particularly pollinators. Her work also considers the human dimensions of the field including community science, environmental policy development, stakeholder engagement, and co-production of knowledge with Indigenous collaborators.
The Bio-Rad Explorer education program is proud to sponsor the 65th Annual ACUBE Meeting!

Saturday, October 16 — 10:10 am PDT

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65th Annual ACUBE Meeting Program

8:30-8:35 Welcome Remarks

8:35-8:55 Session I
20-minute concurrent sessions

Online Weekly Check-Ins – Increasing Student Feedback in Response to the Covid 19 Pandemic
Christina Wills, Rockhurst University

Addressing the challenge of motivating and preparing Graduate student teaching assistants with a TA eLearning module
Michael K Mills, University of Georgia

Evaluating open-note examinations: student perceptions and preparation methods in an undergraduate biology course
Abby Beatty, Auburn University

A Pedagogical Tool for Effective Teaching and Learning in Biological Science
Samriti Dhawan
Goswami Ganesh Dutta Sanatan Dharma College, Chandigarh

9:00-9:40 Session II
40-minute concurrent sessions

Active Learning & Video Games
Joseph Ankrom, Binghamton University

Build-a-Course Workshop
Rebecca Burton, Alverno College

Quantitative Modeling in Biology Undergraduate (QMBUG) Courses: Teaching Approaches and Student Outcomes
Lyrica Lucas and Anum Khushal
University of Nebraska-Lincoln
9:45-10:05  Session III
20-minute concurrent sessions

Instructor reasoning behind assessment strategy changes during and after a pandemic
Todd Lamb, Auburn University

Synchronous Student Teamwork in an Asynchronous Course
Andrea Bierema, Michigan State University

Utilizing Student Experience Project (SEP) Practices to Increase Student Belonging and Inclusion in Large Enrollment Introductory Biology Courses
Samantha Furr and Tonya Bates
University of North Carolina at Charlotte

Creating and Assessing a MOOC for Convergent Education in the light of COVID-19, BLM, and climate change
Tara Prestholdt, University of Portland

10:10-10:50  Session IV
40-minute concurrent sessions

Teaching Like a Pro in Your First Years
Rebecca Burton, Alverno College
Jason Wiles, Syracuse University
Tara Prestholdt, University of Portland

Student perceptions of emphasizing the relevance of course content and using a holistic student development approach
Elias Miller, SUNY Binghamton

Factors that impact comfort and use of active learning strategies, particularly during the pandemic-induced shift to remote learning
Robert J Bills, Binghamton University

Cutting Edge Medicine: CRISPR Cell & Gene Therapy
Damon Tighe and Ian Harwood, Curriculum and Training Specialist, Bio-Rad Explorer education program
Bio-Rad Laboratories
10:55-11:15 Session V
20-minute concurrent sessions

Projects are not just for kids: Integrating science outreach projects into undergraduate learning during a pandemic
Randi Sims, Clemson University

Cyber Peer Led Team Learning (cPLTL) Supports Women in Science, Engineering, Technology, and Mathematics (STEM)
Mariah Maxwell, Syracuse University

A History of Biology Assignment to Increase Student's Awareness of Marginalization in Biology
Neil Haave, University of Alberta

Using an Environmental Justice Case Study to Teach Policymaking in a Science Ethics Course
Melissa Haswell, Delta College

11:20-12:00 Session VI
40-minute concurrent sessions

Self-Assembly Models of Viral Capsids: How 4D Printed Models Challenge Biology Education
John Jungck, University of Delaware

Addressing the Impact of Unconscious Bias in the Classroom
Virginia Glazier, Niagara University

Glycolysis at the Globe: Using Theater to Teach Complex Metabolic Pathways
Jennifer Billman, HACC
Central Pennsylvania's Community College

Using Student Experience Project (SEP) practices to transform student success, with a lens on equity at classroom, departmental, and institutional levels
Kimran Buckholz, Kelly Howe, and Sushilla Knottenbelt
University of New Mexico
12:00-12:30 Session VII
Poster session

Earth, Water, and Fire (EWF): Using the African Diaspora to Teach and Support a Diverse, Equitable, and Inclusive Environment to Enhance Interest in the GeoSciences
Camellia Moses Okpodu, University of Wyoming

Alcohol production and bacteria as a laboratory course exercise
James Graves, University of Detroit Mercy

Applying the Molecular Toolkit
Alissa Hulstrand, Northland College

An analysis of the coverage of climate change in ecology and introductory biology textbooks
Ryan Dunk, University of Northern Colorado

The Influence of Urban Noise on Eastern Gray Squirrel Behavior
Ruth Darling, Westfield State University

12:30-1:00 Break for lunch

1:00-4:00 Session VIII
Professional Development Workshop

4:00 Session IX
Awards and Virtual Happy Hours
Online Weekly Check-Ins – Increasing Student Feedback in Response to the Covid 19 Pandemic
Christina Wills, Rockhurst University

In March 2020, we all experienced a dramatic shift to online learning. In response to this move, I implemented a weekly, online check-in utilizing a brief, graded survey in the Rockhurst learning management system (LMS) as a means to take attendance. I quickly discovered that a weekly check-in allowed me to easily and quickly gain valuable student feedback to not only connect more closely with my students but to also more quickly alter class materials and activities to meet learning needs. I have continued to utilize a weekly survey even as I returned to in-person learning. In this presentation, I will outline the survey design, grading scheme, and provide specific examples of student feedback. I have found this move to weekly survey results rewarding and extremely useful as compared to only utilizing middle and/or end of the semester course surveys. Not only am I able to more quickly respond to learning needs, I believe this activity has significantly increased in-person student engagement in the classroom and increased my rapport with my students.

Addressing the challenge of motivating and preparing Graduate student teaching assistants with a TA eLearning module
Michael K Mills, University of Georgia

An informal needs assessment of previous and current graduate teaching assistants (TAs) revealed that despite the various tools available to TAs, several graduate students felt unprepared and consequently unmotivated to teach undergraduates in a Microbiology program. So we conjectured that an interactive 'TA Tutorial' eLearning module might be a solution to this need. The expectancy-value theory of motivation suggests that motivation can be affected by increasing the expectancy that an outcome can be achieved. It also postulates that motivation can be improved by increasing the value of achieving that outcome. Using Articulate Storyline 360, we designed a TA Module to introduce TAing and address frequently-asked questions about TAing to increase the value and expectancy of graduate students to be effective teaching assistants. Participating graduate students were surveyed before and after the tutorial to ascertain how the module affected their level of preparedness and motivation to TA. Preliminary results show that although the module made it easier for graduate students to access resources for TAs, student motivation only slightly increased. The data also suggests that motivating and preparing graduate students to be effective teachers requires more research and planning.
Evaluating open-note examinations: student perceptions and preparation methods in an undergraduate biology course
Abby Beatty, Auburn University

Vision and Change: A Call to Action, outlined six core competencies intended to guide undergraduate biology education, including the application of science and critical thinking (1). However, the common way we evaluate student competencies (i.e., via closed-note multiple-choice testing) rewards and emphasizes the memorization of details rather than the development of critical-thinking abilities (2-4). Open-note testing has the potential to shift this emphasis (5), as other disciplines have demonstrated (6). Proponents of open-note testing applaud the ability to focus students on gathering and critically analyzing material from multiple sources rather than storing information for quick retrieval (7, 8) and its ability to decrease student testing anxiety (9-11). Opponents of open-note testing criticize their inability to increase student performance (12, 13), however, these claims are contested (14, 15). As we know exam performance is highly correlated with exam preparation methods (16-19), we investigated student perceptions and preparation methods in an undergraduate biology course for open-note versus closed-note examinations. Specifically, we investigated the following two research questions: (1a) How do students perceive open-note exams impact their exam scores, anxiety, and amount they studied? (1b) How do these perceptions relate to performance outcomes? (2a) How do students prepare for open-note exams? (2b) How do these responses relate to performance outcomes? We surveyed students directly after each of their three open-note exams. The surveys included Likert-scale questions about student anxiety, time spent studying, and perceived performance on each of these open-note exams. Likert-scale results demonstrate students perceived increased exam scores, decreased anxiety, and claimed to study less for these open-note exams. The students who had greatly reduced anxiety due to open-note tests significantly outperformed those students who had unchanged anxiety, and students who did not change the amount of time they studied for tests outperformed those students who greatly decreased their study time for these open-note tests. To answer our second question, the survey asked one open-ended question: How do you think you studied differently for this open-note exam compared to how you would study for a closed-note exam? We created nine codes through first- and second-cycle analyses to analyze the open-ended question and then used linear-mixed effects models to assess for a relationship between codes and student performance. Open-ended survey response results suggested many students adapted their study habits by focusing on note preparation and broad conceptual understanding rather than rote memorization. The students who focused on note preparation significantly outperformed those students who did not focus on either of those study habits. Our results provide a solid starting point for understanding how undergraduate STEM students prepare for a scalable, novel type of examination that lends itself to a more genuine experience in science, as compared to memorization.
A Pedagogical Tool for Effective Teaching and Learning in Biological Science
Samriti Dhawan, Jasveen Dua Goswami Ganesh Dutta Sanatan Dharma College, Chandigarh

The theory and practice of learning and how this process influences the social and psychological development of learners is called Pedagogy. In order to arouse curiosity among learners towards living world and related biological concepts, adequate teaching-learning methods need to be adopted. Field-based study is critical to teaching and learning biology, student involvement and curiosity would be kindled when they learn by doing. In this regard there is a dire need for inexpensive, useful pedagogical tools that can foster interest in science. This presentation is concerned with exploring the use and application of one such innovative tool—Foldscope™. Foldscope™ is a low cost, paper microscope that can help to magnify beyond the ability of unaided eye and explore our surroundings at the microscopic level. This frugal tool can reach to masses because of its portability, affordability and unique features to enhance practical learning. Foldscope is explored as a befitting substitute to costly microscopes that each student can own individually and learn Biology easily.

Session II

Active Learning & Video Games
Joseph Ankrom, Binghamton University

Up to 40% of students who initially choose a STEM major will switch to non-STEM majors, despite STEM graduates being in high demand. STEM attrition is attributed to lack of interest, social integration, social support, motivation, as well as weed-out culture and heavy reliance on passive lecture. A switch to active learning has been shown to improve students outcomes, but buy-in to active learning, by both students and instructors, can be a major obstacle to its implementation. Students who buy-in to active learning perform better in active learning classroom. Studies have shown similar skill set requirements in some video games and active learning. Since approximately 70% of college students play video games regularly, exploring these similarities provides a potential avenue to improve student buy-in to active learning. To this end, we surveyed students in large-enrollment introductory biology classes that use active learning to investigate the relationship between gaming, buy-in to active learning and perceived and actual performance in active learning classes. In this presentation, we will show the relationship between gaming experience, buy-in to active learning and expected class performance.
Build-a-Course Workshop  
Rebecca Burton, Alverno College

Need to design a new course or refresh an old one? Don’t just grab the textbook and use the table of contents. This workshop will be a hands-on opportunity to develop course outcomes, criteria, rubrics, and an assessment plan using backwards design.

Quantitative Modeling in Biology Undergraduate (QMBUG) Courses: Teaching Approaches and Student Outcomes  
Lyrica Lucas and Anum Khushal, University of Nebraska-Lincoln

Quantitative modeling (QM) comprises quantitative measures of variables, translation among tables, graphs, and figures, the modeling process, and the nature and purpose of models. While the community understands the relevance of quantitative modeling in biology, and some undergraduate biology courses have incorporated it, there is still a vacuum in describing instructor behaviors and showing proof of learning of particular aspects of QM. This ongoing study aims to determine how instructors are incorporating evidence-based practices related to quantitative modeling into their biology classes, examine the effect on student learning of this critical skill, and lay the groundwork for further integration of QM into biology courses using a course observation protocol and a quantitative modeling assessment. Our research team at the University of Nebraska-Lincoln is looking for undergraduate biology professors who design and teach quantitative biology themes in their classes who are interested in participating in this continuing study. Our ACUBE presentation will include an overview of the project (including its goals, methodologies, and projected outcomes) as well as information on how to participate in the research.

Session III

Instructor reasoning behind assessment strategy changes during and after a pandemic  
Todd Lamb, Auburn University

Literature studying the effects of the COVID-19 pandemic on education demonstrated enormous effects on instructors and students in the spring 2020 semester. However, the details concerning instructor assessment choices during this time are less clear. For this reason, we developed a survey where we asked whether instructors changed how they assessed students
during and after the COVID-19 semester, and what motivated these assessment choices. More specifically, we explored the following three research questions:
(1) How did assessment type change during the transition to online learning due to COVID-19?
(2) Were any of these changes evidence based or motivated by equity concerns?
(3) How did potential changes in assessment due to COVID-19 impact instructor choices in subsequent semesters? Surveys were sent out to instructors across the country at various institutions. Our participants represent a random sample of biology instructors selected from multiple institution types across the United States. A combination of quantitative analysis and thematic coding was used to analyze responses. We found that instructors commonly removed components of assessment more often than adding them, specifically exams and participation forms of assessment. We also found that instructors reported strongly considering equity when making changes to assessment and the most common equitable concern for assessment by instructors was access to learning resources. Finally, instructors reported using exams and quizzes less for assessment in subsequent semesters after the emergency transition to remote instruction. This research contributes to our understanding of instructor choices during and after the pandemic, and motivations for changes to assessment. Future research will reevaluate how instructors can effectively adjust their assessments to unique learning situations

Synchronous Student Teamwork in an Asynchronous Course
Andrea Bierema, Michigan State University

I teach flipped-style undergraduate science courses for non-science majors with 100-180 students per section. Each week, students learn basic concepts toward the beginning of the week and later apply those concepts to case studies and other activities. Prior to the pandemic, students worked in teams of 3-5 students during class to apply concepts. So that students did not have to fit synchronous meetings in their schedule every week but still could meet with other students throughout the semester, I changed our assessments to team activities. Students completed surveys (on CATME.org) that asked questions regarding demographics, their preferred style of team, and their schedule availability. I used this information to put students in teams. Because I was no longer present during the teamwork component of the course, I added a team charter worksheet that included information on how and how often they would meet and their expected response time to quick questions. Students had the opportunity to provide feedback to the instructors regarding which members were not fully participating and which ones were doing so well as a teammate that they should be acknowledged with an award. If team members indicated that a student was not participating but that student felt otherwise, then we requested that team member to provide evidence of their work, such as a Google doc version history documentation. To have students improve upon their teamwork skills, I added teamwork skills objectives to the course and had students reflect via a journaling assignment on how they are doing with their teamwork skills and how they can continue to improve.
Utilizing Student Experience Project (SEP) Practices to Increase Student Belonging and Inclusion in Large Enrollment Introductory Biology Courses
Samantha Furr and Tonya Bates, University of North Carolina at Charlotte

More diverse student populations are being enrolled in institutions of higher education than ever before. It is well understood that there is a need to ensure the success of every student who is pursuing their academic goals; however, data shows that approximately four out of every ten new college students will not graduate within six years. The Student Experience Project (SEP) is a collaborative endeavor that uses innovative, research-based practices to build equitable learning environments and instill a sense of belonging in students on campuses across the nation. Change recommendations from the SEP include ideas to increase social belonging, practices to foster academic encouragement and growth mindset, and ways to cultivate a supportive and inclusive classroom. However, in large enrollment STEM courses, faculty often find these recommendations challenging to implement. In addition to the number of students, additional factors affecting the successful adoption of these practices may include instructor hesitancy, time constraints, and diverse student populations. Examples of SEP practices that have been successfully implemented in a high enrollment introductory biology course to cultivate a supportive and inclusive classroom will be provided, and are applicable to both face-to-face and online delivery. Data collected from student feedback and surveys using Copilot Ascend show significant positive changes in self efficacy, identity safety, social belonging and social connectedness across all survey participants with overall increases up to 26%. Striking increases in structurally disadvantaged or numerically underrepresented groups in STEM such as structurally disadvantaged races, those with high financial stress, and women were also observed. Encouraging these positive experiences of community, belonging, and academic support in the classroom can increase a student’s likelihood of succeeding in the course and persisting in the STEM field.

Creating and Assessing a MOOC for Convergent Education in the Light of COVID-19, BLM, and Climate Change
Tara Prestholdt, Kali Abel, Louisa Egan-Brad, Ruth Dittrich, Vail Fletcher
The University of Portland

Summer of 2020 in Portland was insane – wildfires, Black Lives Matter protests, and COVID-19 was going to force us to be online for the rest of the year... At the last minute we created a massive online open course (MOOC) for any UP student and it was a smashing success. I will discuss the format of the course as well as some data and assessment in the realm of convergent education, one of NSF’s big ideas for future investment.
Session IV

Teaching Like a Pro in Your First Years
Rebecca Burton, Alverno College
Jason Wiles, Syracuse University
Tara Prestholdt, University of Portland

What works in the classroom? How can you maximize the cooperation of students, peers, and administrators as you implement the best in innovative pedagogy? What effective and efficient strategies will allow you to focus your time and attention on what matters most? Where can you find excellent “turn-key” activities? Master teachers will facilitate a discussion on pedagogy, logistics, and careers for new and aspiring biology educators. Experienced educators are also welcome.

Student perceptions of emphasizing the relevance of course content and using a holistic student development approach
Elias Miller, SUNY Binghamton

Students from underrepresented backgrounds are more likely to persist in STEM if they believe that what they are learning can provide them with tools to better their communities. One way to achieve this is to contextualize course content in ways that empower students to develop positive identities with science. Given the disproportionate loss of women and persons excluded based on ethnicity or race (PEERs) from STEM degree programs, we examined student responses to incorporating modules that emphasized either content-relevance or whole-person development into discussion sections of a large-enrollment introductory environmental sciences course. Reflection activities in the content-relevance sections emphasized how the course content related to societal problems of interest, while reflection activities in the whole-person development sections focused on how to use college and career to live a fulfilled, productive life. To measure the impact of these different reflection modules, we administered pre-/post-surveys with questions that queried science motivation, sense of belonging in science, and general satisfaction with college and life. We are also using qualitative analysis to compare themes that arise in open-ended responses to the prompt: “Is having formalized discussions about your personal development useful in college?” Preliminary findings show that overall, students, as well as teaching assistants, responded positively to both types of reflection activities. Students described the discussions as “thought provoking” and “necessary”, in some cases recommending that the focus of the modules be expanded into a full course. We are comparing the impact of the different modules to determine differences in their impact on belonging and motivation. We plan to use our findings to develop module templates that can be incorporated into other courses that can increase student perception of relevance and nurture whole-student development.
Factors that impact comfort and use of active learning strategies, particularly during the pandemic-induced shift to remote learning
Robert J Bills, Binghamton University

The pandemic forced the majority of post-secondary instructors into an unfamiliar remote setting. In light of this sudden shift in instructional modality, we wanted to know what teaching strategies instructors were using in their remote spaces and how factors like experience, general pedagogical training for in-person spaces and specific pedagogical training for remote spaces affected comfort with and use of active learning and inclusive teaching strategies. We surveyed a convenience sample of over 300 post-secondary STEM educators through their affiliations with national STEM organizations. This method produced a sample biased toward experience with professional development, approximately half of which was focused on remote instruction. The majority of responders were white (80%), tenured/tenure-track (83%), females (71%) from biology departments (66%) not in administrative leadership positions (60%). The majority of responders reported no prior experience teaching in remote spaces and that number was even greater for teaching hybrid courses. Participation in pedagogical training for in-person and remote teaching was overwhelmingly provided by respondents’ own campuses. The national pedagogical programs most utilized were disciplinary society workshops and the Summer Institute on Scientific Teaching. We examined relationships between factors like level of teaching experience or types of formal pedagogical training and the level of teaching comfort in classes differing in size and venue. Not surprisingly, participants reported being more comfortable using active learning strategies than inclusive teaching strategies and were more comfortable using either technique in smaller versus larger classes, and in-person versus remote venues. Training in remote teaching was related with increased comfort in remote spaces, but had no effect on in-person, while pedagogical training focused on in-person teaching correlated with increased comfort in both spaces. Our findings advocate for institutions to provide professional development for their current and future faculty to better prepare them for disruptions to our typical teaching formats.

Cutting Edge Medicine: CRISPR Cell & Gene Therapy
Damon Tighe and Ian Harwood, Curriculum and Training Specialist, Bio-Rad Explorer education program, Bio-Rad Laboratories

CRISPR and cell and gene therapy are changing what medicine will be possible in your students’ lifetimes. In this talk you’ll learn about gene editing technology and potential therapeutic applications to treat genetic diseases, affect gene expression, and modify cells in the body. You’ll also learn how to teach CRISPR in your classroom hands-on with models and minimal equipment with the Out of the Blue CRISPR and Genotyping Extension kits from the Bio-Rad Explorer education program. Attendees may enter to win a prize.
Session V

Projects are not just for kids: Integrating science outreach projects into undergraduate learning during a pandemic
Randi Sims, Clemson University

In the wake of the COVID pandemic, undergraduate students around the country experienced a transition from in-person, hands-on learning to an online, asynchronous environment. The change was especially detrimental for students enrolled in experiential research or outreach classes, such as in our marine science outreach class, Something Very Fishy (SVF). Traditionally, undergraduates in SVF worked to integrate theater, climate change literacy, and marine science into a fun, hands-on STEAM experience for elementary students. However, with COVID restrictions, we went where the rest of the world did: online. In continuing our undergraduates and elementary students in experiential learning, we transitioned to building interactive online learning modules for elementary schools. This alteration set the precedence for a project-based, online learning experience where undergraduates were placed in groups of three to four with a team leader. Undergraduate groups were tasked with creating online learning modules in PowerPoint related to marine ecology themes and ocean literacy principles. To understand the benefits of this project-based learning, we assessed students through pre and post-surveys for changes in ocean literacy concept retention, scientific identity, communication, education, and technology skills. SVF students exhibited an increase in their perception of knowledge about marine science and conceptual understanding of ocean literacy principles. Student skills in communication and technology also increased by the end of the projects. Despite the challenges posed by an online environment, project-based learning was still an effective tool for integrating undergraduates into marine science outreach and may be a positive benefit to an otherwise negative situation.

Cyber Peer Led Team Learning (cPLTL) Supports Women in Science, Engineering, Technology, and Mathematics (STEM)
Mariah Maxwell, Syracuse University

Peer Led Team Learning (PLTL) is an active learning model that is particularly effective for improving the academic achievement and retention of women in Science, Technology, Engineering, and Mathematics (STEM). Cyber Peer Led Team Learning (cPLTL) is a recently developed variation of PLTL that has been transitioned from a face-to-face environment to a synchronous online setting. Studies have found that PLTL and cPLTL students earned comparable educational outcomes in terms of standardized final exam scores and final course grades. Given PLTL’s benefits for women and cPLTL’s similarities to PLTL, we were interested in understanding the impact that cPLTL had on women in an introductory biology course at a large
R1 research institution. We found strong evidence that participating in cPLTL improves the retention of women in STEM, and that student perceptions of cPLTL are generally high, especially for women. We found that participating in cPLTL may have several additional benefits, such as increased motivation, feelings of belonging, comfort in asking questions, understanding of course content, and support in forming a strong science identity.

A History of Biology Assignment to Increase Student's Awareness of Marginalization in Biology
Neil Haave, University of Alberta

In the wake of the social unrest in the summer of 2020, I implemented a marginalized biologist assignment for the Winter 2021 offering of the capstone course for Augustana's biology degree program, AUBIO 411 - History and Theory of Biology. The task asked students to identify a biologist that had been marginalized in biology's history, explain why and how they were marginalized, how their biologist was significant to biology, and share their findings via a publicly accessible website. The overarching educational objective of this assignment is to foster in students an understanding that an important lesson from their biology degree is that diversity is a good thing not only for ecosystems but also for the health of their own social and academic communities. This was a team assignment consisting of five students per team (25 students in the class = 5 teams for W21). Students found the task challenging but rewarding. A sample of the students' public work will be shared at the conference presentation and will be used to prompt a discussion among participants about the utility of such assignments to raise biology students' awareness of marginalization in biology.

Using an Environmental Justice Case Study to Teach Policymaking in a Science Ethics Course
Melissa Haswell, Delta College

This 20-minute presentation will outline an environmental justice case study activity developed for use in a decolonized science ethics course that is taught using an anti-racist theoretical framework. The activity is part of a two-week module that scaffolds the concepts of ethical research design, scientific integrity, and the social/public policymaking roles of scientists. This specific module also emphasizes the ethical decision-making partnership between scientists, health care practitioners, and public health officials. Students are encouraged to think beyond the stereotypical roles of doctor or bench scientist in order to develop an understanding of how they might potentially be involved in a public event where their scientific work is heavily scrutinized and used to drive public policy.
Self-Assembly Models of Viral Capsids: How 4D Printed Models Challenge Biology Education
John R. Jungck
University of Delaware

For a long time biologists have focused on the notions of ATP driven work to counter the force of entropy which would lead to disorganization. However, the organization of many biological systems is entropy driven by the release of water bound to proteins or nucleic acids. Macroscopic structures that self-assemble or self-fold help us visualize and explore principles of entropy-driven biological organization. In this talk, I will demonstrate self-assembling viral capsid models built of pentagonal and triangular capsomeres to produce a dodecahedron and an icosahedron. Besides demonstrating these 4D printed models, I will discuss some activities with Origami and Magniforms available to help students understand efficiency of self-folding (another form of 4D printing) of 2D projections of 3D polyhedra geometrically (Dürer nets) and topologically (Schlegel diagrams), and the Nobel Prize work of Caspar-Klug that explains the structure of many polyhedral viral capsids and quasicrystal exceptions to these rules with models using Penrose tiles. How do such models challenge relationships between entropy and evolution in understanding principles of biological self-organization?

Addressing the Impact of Unconscious Bias in the Classroom
Virginia Glazier, Niagara University

Unconscious bias influences every aspect of our interactions with students, yet we as educators and scientists often consider ourselves to be unbiased and objective in our interactions with students. This seminar will define unconscious bias and describe how unconscious bias can have an impact on a student’s performance not only in one class, but the cumulative effects of unconscious bias at a college wide level. Some simple approaches to reduce the impact of unconscious bias particularly in grading will be discussed.

Glycolysis at the Globe: Using Theater to Teach Complex Metabolic Pathways
Jennifer Billman, HACC Central Pennsylvania’s Community College

Metabolic pathways present numerous challenges for introductory biology students. Often presented in textbooks as a series of complex images with dull text, students struggle to grasp the dynamic nature of metabolic pathways such as the glycolytic pathway. After years of watching my students' eyes glaze over when we came to the dreaded cellular metabolism chapter, I created a kinesthetic learning activity that steps them through the glycolytic pathway.
Students take on roles as various molecules, stage crew, or show producer to kinesthetically move through the steps of glycolysis. The result of this change to instruction was both an increase in student engagement with the content and an increase in student attainment of the learning outcome (both on the unit exam and the final exam); not to neglect that students had fun learning glycolysis! In this presentation I will introduce participants to my Glycolysis at the Globe activity, review the materials needed (not much!), demonstrate the activity, and share student feedback (and assessment results). Participants will leave this session with a new way of teaching glycolysis which is both fun (for faculty and students), rigorous, and shown to improve student learning.

Using Student Experience Project (SEP) practices to transform student success, with a lens on equity at classroom, departmental, and institutional levels

Kimran Buckholz, Kelly Howe, Sushilla Knottenbelt, University of New Mexico

The Student Experience Project (SEP) is a collaboration of university leaders, faculty (across 6 institutions), researchers and national education organizations dedicated to supporting academic success, college retention and degree attainment, especially for our historically least-served students. SEP uses social psychological research to develop new approaches, tools and resources that can be applied at the classroom, departmental and institutional levels to eliminate equity gaps in student experience and achievement. Interventions developed by SEP focus on identity safety, self-efficacy, growth mindset, and social belonging.

A valuable place to implement SEP practices is directly in the classroom to establish a consistently equitable learning environment. In our biology classrooms, we strive to normalize course and life challenges, provide accessible course and university resources, emphasize belonging, value diversity, and foster a growth mindset. We will describe several categories of SEP interventions used within our courses.

A key component of SEP is amplifying student voice and encouraging student leadership. Peer Learning Facilitators (PLFs) are undergraduates who become part of the instructional team for a class they have successfully completed. We will describe how PLFs serve as important partners in improving the student experience and equity in our biology classrooms.

We have developed a “Student Success Initiative” in which we partner with students, for students, to extend SEP practices into our department. This is a collaboration with our Biology Undergraduate Society (BUGS). Together, we are creating initiatives and events to improve student success, as well as collect information to identify barriers to student success and ways to mitigate those challenges.

Our work is extending to the whole of the University of New Mexico through 60 SEP faculty fellows across our campus. These faculty have implemented changes within the classroom on course policy and messaging. Several of the fellows from the initial cohort have become faculty champions and catalysts of institutional change by taking ideas beyond their classrooms to departments, colleges or schools.
Save the Date!

ACUBE’s 66th Annual Meeting will be in person
(we hope..)

In Portland, Oregon
October 21st (Friday), 2022