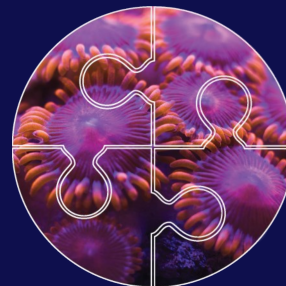
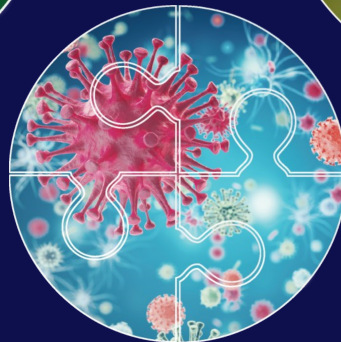


*Variants in Biology Education: What can we learn  
from pandemics?*

**8th LIFE DISCOVERY—  
DOING SCIENCE**

***Biology Education Conference***



**March 23 - 25, 2023**  
**Florida A&M University,**  
**Tallahassee, Florida**

**Organized by:**  
Ecological Society of America  
Botanical Society of America  
Society for the Study of Evolution  
Society for Economic Botany

A project of the  
**LifeDiscoveryEd Partners**

The Ecological Society of America is proud to be a lead organizer of the

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In an effort to conserve resources, we have not printed session descriptions as part of the program.

You can view full session descriptions at the registration desk or view them online

**[esa.org/ldc](http://esa.org/ldc)**

**Twitter feed:  
#LDC2023**

## Conference Planning Committee

**Warren Sconiers**, University of Colorado (chair)

**Rosny Jean**, Florida A&M University (co-chair)

**Rhea Esposito**, National Ecological Observatory Network (NEON)

**Phil Gibson**, University of Oklahoma, Botanical Society of America

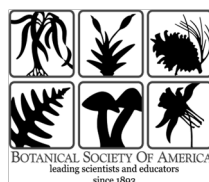
**Jennifer Hartley**, Botanical Society of America

**Richard Kliman**, Cedar Crest College, Society for the Study of Evolution

**Vanessa Koelling**, Auburn University at Montgomery, Society for the Study of Evolution

**Paul Strode**, Science Teacher, Fairview High School, Boulder CO

## Conference Partners



# Conference Collaborators

**Many thanks to our Conference Collaborators who promoted the conference to their professional networks:**

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American Indian Science and Engineering Society (AISES)  
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American Institute of Biological Sciences (AIBS)  
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Biodiversity Literacy in Undergraduate Education Data Initiative (BLUE)  
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Ecological Research as Education Network (EREN)  
Entomological Society of America  
Integrated Digitized Biocollections (iDigBio)  
Florida A&M University Sustainability's Institute  
National Association of Biology Teachers (NABT)

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## Friday Keynote Speaker

Friday, March 24, at 8:00 AM, *Grand Ballroom (Room 106)*



**Dr. Victor Ibeanusi** is the Dean of the School of the Environment at Florida A&M University. He is also the Founder and Editor-in-Chief for the International Journal of EnergyWaterFoodNexus. His current efforts include leading and advancing the EnergyWaterFoodNexus (EWFN) initiative as a new science enterprise addressing the vexing challenges set by global climate change that is impacting access to safe water, procurement of sustainable energy, and food security. He seeks transformative innovation built on open science with integration of novel applications and new technologies towards a truly disruptive and accelerated transformation to sustainable development.

## Saturday Keynote Panelists

Saturday, March 25th at 8:00 AM, *Grand Ballroom (Room 106)*



**Dr. Heather Lanthorn** is the co-Director of the Mercury Project at the Social Science Research Council, and an affiliate at the Busara Center for Behavioral Economics and the Dignity Project. She holds a ScD in Global Health and Population, an MPH in Health Behavior, and a BA in Medical Anthropology. The Mercury Project is a consortium of researchers working around the world to find cost-effective and scalable interventions that build vaccine demand and support science-based health decision making. The work of the consortium will provide a foundation for data-driven interventions, programs, and policies enabling the creation of a healthier information environment.

## Keynote Panelists

Saturday, March 25th at 11:45 AM, *Grand Ballroom (Room 106)*



**Dr. Brenda Spencer** is the Director of the Undergraduate Student Success Center at Florida A&M University. Dr. Spencer is a native of Tallahassee, Florida. She received her bachelor's and master's degrees from FAMU and a Ph.D. in higher education administration from Florida State University. Dr. Spencer has extensive experience in student success programming and counseling students with academic, personal, and career issues. She is a member of the National Association of Student Personnel Administrators (NASPA) and the Association of College and University Housing Officers-International (ACUHO-I), among other professional organizations. Dr. Spencer is also actively involved in various educational and service efforts within the Tallahassee community.



**Dr. Tamara Basham** is a professor of Environmental Science at the Collin County Community College Plano Campus in Plano, Texas, north of Dallas. In addition to teaching Environmental Science courses and working with students on independent research projects, Tamara works to promote Universal Design for Learning (UDL) and Diversity, Equity, and Inclusion (DEI) guidelines and methodologies within her institution. Additionally, she has collaborated with fellow BioQuest/QUBES community members to advocate and work for the inclusion of Social Justice issues in STEM curricula. Over the years, she has found that open, honest communication, power sharing, and kindness are keys to improving student success.

# Friday Short Presentations

9:45 AM - 10:15 AM

## **The silent pandemic of antimicrobial resistance**

**| Room: 106, Grand Ballroom**

*Ashvini Chauhan, Florida A&M University*

*Ashish Pathak, Florida A&M University*

Audience: Undergraduate Lower Division

By the year 2050, multiple drug-resistant (MDR) bacterial infections will cause more deaths relative to cancer. This presentation will focus on structure and functions of microbiota within former nuclear weapons production facilities that remain contaminated with heavy metals. Discussions will facilitate ideas to mitigate a bacterial pandemic that may be the next global pandemic. These research findings can be used as a pedagogical tool and in the context of citizen science activities.

## **Iterative assessment for evaluating the dynamics of understanding evolution**

**| Room: SGA 100**

*Andrew Martin, University of Colorado*

*Spencer Buck, United States Air Force*

Audience: Undergraduate Lower Division

This discussion focuses on variation in student understanding of evolution over time revealed by implementing and analyzing a free-response assessment multiple times in a semester. The approach combines learning theory, a discovery framework from AI research, and multivariate methods of analysis from ecology to reveal student pathways of understanding.

## **Lesson Plans and Lessons Learned from the Network of Conservation Educators and Practitioners**

**| Room: 104C**

*Suzanne Macey, American Museum of Natural History*

Audience: Undergraduate Lower and Upper Division

The pandemic is challenging us to rethink teaching and learning. The Network of Conservation Educators and Practitioners (NCEP) latest issue of Lessons in Conservation focuses on educators' reflections and active learning resources for both in-person and online.

## **Agriculture Undergraduate**

**| Room: 104B**

*Monica Burr, Alcorn State University*

*Adam Kay, St. Thomas University*

Audience: Undergraduate Lower & Upper Division  
Growing attrition from STEM majors is occurring in part because content and activities can seem disconnected from real-world challenges. I will describe a network making undergraduate biology education more tangible through engaging programming using urban agriculture as a model.

2:30 PM - 3:00 PM

## **The Challenges and Opportunities of Teaching Pandemic Mismatch, Ignorance and Plurality**

**| Room: 106, Grand Ballroom**

*Richard Schulerbrandt Gragg III, Florida A&M University*

*Almondo Morain, Florida A&M University*

*Hannah Lowenthal, Florida A&M University*

Audience: Undergraduate Upper Division & Graduate  
The purpose of this workshop is to share how, culturally relevant and responsive, Covid issues and answers were addressed and delivered in a combined course of undergraduate: upper division and graduate environmental science students.

## **Preventing pandemics: an interdisciplinary introduction to academic writing and collaboration**

**| Room: 104B**

*Miranda Welsh, Duke University*

Audience: Undergraduate Lower & Upper Division

This project-based, first-year undergraduate course uses the topic of epidemics to illustrate the value of interdisciplinary approaches to complex problems. Student teams investigate contemporary epidemics from several disciplinary perspectives to develop skills in literature research, academic writing, and collaboration.

## **Case Study Student Project Framework: Genomic Surveillance of SARS-CoV-2 Variants**

**| Room: SGA 100**

*Maria Stanko, New Jersey Institute of Technology*

Audience: Grades 9-12, Undergraduate Lower Division  
Presentation of a framework for a scaffolded 'research' project designed for a large introductory biology class. In the primary example presented, students predict new SARS-CoV-2 variants of concern, requiring application of concepts and skills (mutation, gene expression, graphing, writing) to current events.

## **Uncovering Hidden Figures of Natural History Collections Using Digital Data Sleuthing & Storytelling**

**| Room: 104C**

*Molly Phillips, BioQUEST*

Audience: Undergraduate Lower & Upper Division  
In this presentation we will introduce a series of modules meant to train the next generation of scientists to be data sleuths and storytellers, engaging learners in authentic research experiences within a social justice framework using open tools and resources.

# Friday Short Presentations

3:15 PM - 3:45 PM

## **Course-based Undergraduate Research Experience for Students Under-represented in Biology (CURESUB) | Room: 104C**

*Prabir Mandal, Edward Waters University*

*Anita Mandal, Edward Waters University*

Audience: Undergraduate Upper Division

Course-based undergraduate research experiences (CUREs) are increasingly common because they engage students in research at schools that lack substantial research infrastructure or simply can not accommodate large populations in internship-style research. At Edward Waters University, we propose to establish a research coordination network that enhances undergraduate biology education by capitalizing on the advantages of CUREs as a model system.

## **Exploring the Effects of Invasion on Plant Morphology: a BCEENET Course-based Undergraduate Research Experience | Room: 104B**

*Caroline DeVan, New Jersey Institute of Technology*

Audience: Undergraduate Lower & Upper Division

This presentation will introduce the audience to a course-based undergraduate research experience that allows students to explore morphological impacts of invasion on plants using digitized natural history collections.

Examples of implementation in both online and in-person classes will be shared.

## **Promoting the spread of positive student attitudes about plants and scientists via online mentoring | Room: 106, Grand Ballroom**

*Jennifer Hartley, Botanical Society of America*

*Catrina Adams, Botanical Society of America*

Audience: Grades 9-12

As climate change and food shortages loom, increasing students' interest in plants and science professions is increasingly important. With this in mind, PlantingScience enables science professionals to mentor high school+ students as they explore plant-related concepts in the classroom.

## **Making ecology more inclusive: Student perspectives | Room: SGA 100**

*Felix "Javi" Berrios Ortega, University of Puerto Rico*

*Khanh Ton, University of New Hampshire*

*Tatjana Washington, University of Chicago*

Audience: Undergraduate Lower & Upper Division

This presentation provides an overview of how RCN-UNIDE seeks to increase human diversity outreach in undergraduate ecological education by emphasizing the importance of elevating students' voices in developing meaningful interventions

## PlantingScience Fellows Needed

PlantingScience is seeking 30 early-career scientists to participate in a research project with high school teachers and their students this summer and fall.

We are seeking applicants with an abiding interest in:



- Collaborating with high school teachers to help students learn how to conduct research on photosynthesis and cellular respiration.
- Taking part in collaborative professional learning with classroom teachers to help enhance the practice of teaching science in high schools.
- Participating in a research project to discover how collaborations among teachers, research scientists, and students can lead to enhanced student learning and improved attitudes towards plant science and scientists.
- Mentoring small teams of students online as they work more with plants and experience working through their own science investigation.
- Working with a diverse group of students, teachers, and scientists.

Accepted Fellows will receive up to \$1,000 in stipends for participation.

Applications must be received by  
**March 31, 2023.**

For more information or to apply, visit:

[www.plantingscience.org](http://www.plantingscience.org)



This material is based upon work supported by the National Science Foundation under Grant #2010556

# Saturday Short Presentations

9:15 AM - 9:45 AM

**Focus Questions: Why This is my Best Year Teaching Biology | Room: SGA 100**

*Thomas Oviatt, BVSD / Fairview High School*

Audience: Grades 9-12, Undergraduate Lower Division  
We will discuss using STeLLA modeled focus questions at the beginning of units/lessons as a way to improve student engagement, agency, and inclusion in biology.

**Using big data in biology courses for non-science majors - the Mosquito Module | Room: 104B**

*Anja Kade, University of Alaska Fairbanks*

Audience: Grades 9-12, Undergraduate Lower Division  
In our online teaching module, undergraduate students examine Alaska mosquito diversity in space and time by exploring publicly available data through our ShinyApp, which integrates biological and climatological info from the National Ecological Observatory Network.

**Engaging Students in Authentic Scientific Investigations Through Citizen Science | Room: 104C**

*Sarah Jones, Chicago Botanic Garden*

Audience: Grades 9-12, Undergraduate Lower & Upper  
Discover how to engage students in authentic research! Citizen science provides a unique, accessible way to launch student investigations while reinforcing ecological concepts. Come join Budburst, an education-focused citizen science project investigating climate change impacts on plants, pollinators, and ecosystems.

10:00 AM - 10:30 AM

**Population and Economic Growth: Effect Upon Deforestation - Data Inquiry in the High School Classroom | Room: 104B**

*James Lehner, The Taft School*

Audience: Grades 9-12, Undergraduate Lower Division  
Many websites can provide valid, current information that can be used to yield important relationships between various categories of study. Students will research deforestation, economic and population growth and the pandemic impact to yield patterns and gain skills.

**DataVersify: Humanizing and diversifying scientist role models in data literacy instruction |**

**Room: SGA 100**

*Melissa Kjelvik, Michigan State University*

Audience: Grades 9-12, Undergraduate Lower & Upper  
Strategies and resources demonstrating the use of scientist profiles in tandem with data literacy will be shared. Results from our efficacy study, which examined how the inclusion of diverse scientist role models in undergraduate instruction affected student attitudes.

**Getting back to ecology: Making connections to sustainability through the 4DEE framework |**

**Room: 104C**

*Erica Tietjen, Nevada State College*

Audience: Undergraduate Lower Division & Upper  
In higher education, sustainability-focused campus initiatives have grown. The Four-Dimensional Ecology Education (4DEE) framework provides an opportunity to expose students to the value and relevance of ecological science to sustainability, particularly through the human-environment interaction dimension. I will share my experiences with undergraduate learners as they have worked toward making those connections.





## Free Teaching Resources and Professional Development for Life Science Educators

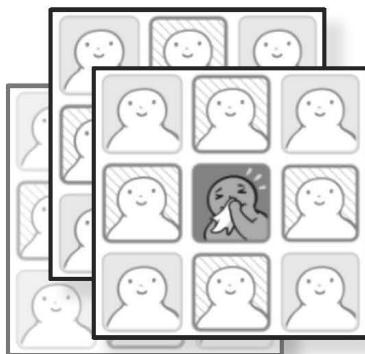
Join us for these  
**LDC 2023 events**

### Movie Night

Watch and discuss  
two classroom films:

- **COVID-19 Sparks Community Action**
- **Mystery of the Buffalo Boom**

Friday, March 24th at 7:00–8:00 PM  
Efferson Student Union's Grand Ballroom



### Workshop

**Modeling Epidemics:  
Using an HHMI BioInteractive Simulator  
to Study Real Outbreaks**

Saturday, March 25th at 12:45–2:15 PM  
Efferson Student Union's Grand Ballroom

Visit [biointeractive.org](https://biointeractive.org)

## Thursday At-a-Glance

- 12:00 PM** Registration Opens, *Grand Ballroom (Room 106), H. Manning Efferson Student Union*
- 1:00 PM** Fieldtrip - FAMU's Viticulture Center for Small Fruit Research (\$20)
- 2:00 PM** Fieldtrip - National High Magnetic Laboratory Tour
- 2:00 PM** Fieldtrip - FAMU School of the Environment's Rattlermoji Buoy (\$20)
- 7:00 PM** Informal Gathering at Proof Brewing Company

## Friday At-a-Glance

- 7:30 AM** Registration Opens, *Grand Ballroom (Room 106), H. Manning Efferson Student Union, FAMU*
- 8:00 AM** Welcome/Keynote: Dr. Victor Ibeanusi, Florida A&M University, *Grand Ballroom (Room 106)*

**9:30 AM** Break

	<b>Short Presentation <i>Grand Ballroom (106)</i></b>	<b>Short Presentation <i>Room: SGA 100</i></b>	<b>Short Presentation <i>Room: 104B</i></b>	<b>Short Presentation <i>Room: 104C</i></b>
<b>9:45 AM</b>	Chauhan: The silent pandemic of antimicrobial resistance	Martin: Iterative assessment for evaluating the dynamics of understanding evolution	Burr: Agriculture Undergraduate	Macey: Lesson Plans and Lessons Learned from the Network of Conservation Educators and Practitioners

**10:15 AM** Break

	<b>Workshop <i>Grand Ballroom (106)</i></b>	<b>Workshop <i>Room: SGA 100</i></b>	<b>Workshop <i>Room: 104B</i></b>	<b>Workshop <i>Room: 104C</i></b>
<b>10:30 AM</b>		Sumter: Drones Flying High as New Tool for Field Biologists.	Prevost & Beck: Assess What's Important: Creating Assessments Aligned to 4DEE	Buntz: Scientific Method, Stats & Ecology

**12:00 PM** Lunch, *Grand Ballroom (Room 106)*

**1:00 PM** Education Share Fair Session 1, *Grand Ballroom, Room 106*

**2:15 PM** Break

	<b>Short Presentation <i>Grand Ballroom (106)</i></b>	<b>Short Presentation <i>Room: SGA 100</i></b>	<b>Short Presentation <i>Room: 104B</i></b>	<b>Short Presentation <i>Room: 104C</i></b>
<b>2:30 PM</b>	Gragg: The Challenges and Opportunities of Teaching Pandemic Mismatch, Ignorance and Plurality	Stanko: Case Study Student Project Framework: Genomic Surveillance of SARS-CoV-2 Variants	Welsh: Preventing Pandemics: An Interdisciplinary Introduction to Academic Writing and Collaboration	Phillips: Uncovering Hidden Figures of Natural History Collections Using Digital Data Sleuthing & Storytelling

**3:00 PM** Break

	<b>Short Presentation <i>Grand Ballroom (106)</i></b>	<b>Short Presentation <i>Room: SGA 100</i></b>	<b>Short Presentation <i>Room: 104B</i></b>	<b>Short Presentation <i>Room: 104C</i></b>
<b>3:15 PM</b>	Hartley: Promoting the Spread of Positive Student Attitudes About Plants and Scientists via Online Mentoring	Ortega: Making Ecology More Inclusive: Student Perspectives	DeVan: Exploring the Effects of Invasion on Plant Morphology: a BCEENET Course-based Undergraduate Research Experience	Mandal: Course-based Undergraduate Research Experience for Students Underrepresented in Biology (CURESUB)

3:45 PM Break

	<b>Workshop Grand Ballroom (106)</b>	<b>Workshop Room: SGA 100</b>	<b>Workshop Room: 104B</b>	<b>Workshop Room: 104C</b>
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4:00 PM		Russell: Turning ecological research into engaging online modules for undergraduates through Gala/OCELOTS	Wofford-Mares: Budget Science: How to Implement Inquiry-Based Organismal Labs Without Breaking the Bank	Haupt: Bringing the Rocky Shore into the Classroom – a CURE to Explore Scientific Discovery
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5:30 PM Plenary Announcements

6:00 PM Dinner

7:00 PM Movie Night with HHMI

## Saturday At-a-Glance

7:30 AM Registration Opens, *Grand Ballroom (Room 106), Efferson Student Union, FAMU*

8:00 AM Keynote: Dr. Heather Lanthorn, Social Science Research Council, *Grand Ballroom (Room 106)*

9:00 AM Break

	<b>Short Presentation Grand Ballroom (106)</b>	<b>Short Presentation Room: SGA 100</b>	<b>Short Presentation Room: 104B</b>	<b>Short Presentation Room: 104C</b>
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9:15 AM		Oviatt: Focus Questions: Why This is my Best Year Teaching Biology	Kade: Using Big Data in Biology Courses for Non-Science Majors – the Mosquito Module	Jones: Engaging Students in Authentic Scientific Investigations Through Citizen Science
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9:45 AM Break

10:00 AM		Kjelvik: DataVersify: Humanizing and Diversifying Scientist Role Models in Data Literacy Instruction	Lehner: Population and Economic Growth: Effect Upon Deforestation – Data Inquiry in the High School Classroom	Tietjen: Getting back to ecology: Making Connections to Sustainability Through the 4DEE Framework.
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10:30 AM Break

10:45 AM Networking Session, *Grand Ballroom (Room 106)*

11:45 AM Lunch Keynote Panel: Dr Brenda Spencer, Florida A&M University and Dr. Tamara Basham, Collin County Community College Plano Campus, *Grand Ballroom (106)*

	<b>Workshop Grand Ballroom (106)</b>	<b>Workshop Room: SGA 100</b>	<b>Workshop Room: 104B</b>	<b>Workshop Room: 104C</b>
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1:00 PM	Strode and Gibson: Modeling Epidemics: Using an HHMI BioInteractive Simulator to Study Real Outbreaks	Muth: Microbiomes for All – Experimental Design and Data Analysis for Complex Environmental Microbiomes	Kalluvila: A Faculty-Driven Collaborative Effort to Expand the Use of OER During the Pandemic in a Large Community/Technical College setting.	Lanthorn: Fostering science information literacy in the classroom?
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2:30 PM Break

2:45 PM Education Share Fair Session 2, *Grand Ballroom (Room 106)*

3:45 PM Wrap Up

4:00 PM Adjourn

# Friday Workshops

10:30 AM - 12:00 PM

**Assess What's Important: Creating Assessments Aligned with the 4DEE Framework | Room: 104B**

***Luanna Prevost, University of South Florida***  
***Christopher Beck, Emory University***

Audience: Undergraduate Lower & Upper Division  
Transform your assessments in majors, non-majors and interdisciplinary courses. Learn how to apply the 4DEE framework and use multidimensional learning tools to create or modify your assessment items. Please bring a sample learning objective and assessment from your course.

**Scientific Method, Stats & Ecology | Room: 104C**

***Jennifer Buntz, Central New Mexico Community College***

Audience: Grades 9-12, Undergraduate Lower Division  
Three Quantitative Biology @ Community College teaching modules will be presented. Developed via collaboration between math and biology faculty, these modules focus on teaching statistics in ecological and/or health related contexts. Contextualizing these topics within Scientific Method will be covered.

**Drones flying high as new tool for field biologists | Room: SGA 100**

***La'Quata Sumter, Focusing On Me, Inc***

Audience: Grades 9-12, Undergraduate Lower Division  
Drones are increasingly used in agriculture, rescue missions, and aerial photography. This ability has made drones a worldwide phenomenon, and they are now more popular than ever. Biologists and scientists in other fields can use drones to track and monitor wildlife. In this session, attendees can experience hands-on, real-world challenges and missions using drones.

4:00 PM - 5:30 PM

**Budget Science: How to implement inquiry-based organismal labs without breaking the bank |**

**Room: 104B**

***Sarah Wofford-Mares, Florida State University***  
***Lori Tolley-Jordan, Jacksonville State University***

Audience: Undergraduate Lower & Upper Division  
Low-cost, inquiry-based lab (IBL) activities can boost accessibility to necessary scientific skillsets, helping students secure jobs. This workshop will demonstrate the design and implementation of an organismal IBL with broad application that teaches students collaboration, computer skills, and data analysis/interpretation.

**Turning ecological research into engaging online modules for undergraduates through Gala/OCELOTS | Room: SGA 100**

***Ann Russell, Iowa State University***

***Suzanne Macey, American Museum of Natural History***  
***Charles Willis, University of Minnesota***  
***Chris Beck, Emory University***

Audience: Undergraduate Lower & Upper Division  
Learn about creating and adopting online, undergraduate-level modules in tropical ecology. In this NSF-funded network, researchers work with specialists in 4DEE, pedagogy, interactive data tools, and media to create research-based modules, hosted on Gala, a user-friendly, open-source and open-access platform.

**Bringing the rocky shore into the classroom - a CURE to explore scientific discovery | Room: 104C**

***Alison Haupt, CSU Monterey Bay***

Audience: Undergraduate Lower & Upper Division  
DIMES (<https://tinyurl.com/a52nuwub>) marine ecology teaching modules focus on the scientific process and computational literacy. This workshop will demonstrate the intertidal module and how it can be adapted across education-levels and used in virtual, field, or classroom settings.



TRANSFORMING ECOLOGY EDUCATION ONE DIMENSION AT A TIME

## FOUR-DIMENSIONAL EDUCATION ECOLOGY (4DEE) FRAMEWORK

1. CORE ECOLOGICAL CONCEPTS
2. ECOLOGICAL PRACTICES
3. HUMAN-ENVIRONMENT INTERACTIONS
4. CROSS-CUTTING THEMES



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SCAN THE QR CODE TO LEARN MORE OR VISIT [WWWESA.ORG/4DEE](http://WWWESA.ORG/4DEE)

# Saturday Workshops

1:00 PM - 2:30 PM

**A Faculty Driven Collaborative Effort to Expand the Use of OER During Pandemic in a Large Community College | Room: 104B**

*Thomas Kalluvila, Milwaukee Area Technical College  
Carl Morency, Milwaukee Area Technical College*

Audience: Undergraduate Lower & Upper Division  
Open Educational Resources have proved to bring equity in classrooms, especially during pandemic. Our college has established an open-access team to bring all stakeholders together. The collaborative efforts led by a faculty-driven approach expanded the use of OER in all educational areas including biological sciences.

**Modeling Epidemics: Using an HHMI BioInteractive Simulator to Study Real Outbreaks | Room: Grand Ballroom**

*Paul Strode, Fairview High School  
Phil Gibson, University of Oklahoma*

Audience: Grades 9-12, Undergraduate Lower Division  
Participants will use new HHMI BioInteractive resources to predict and simulate the spread of an infectious disease in a population using the Susceptible - Infectious - Removed (SIR) model. Participants will collect data, generate graphs, and use data from authentic outbreaks.

**Microbiomes for All - Experimental Design and Data Analysis for Complex Environmental Microbiomes | Room: SGA 100**

*Theodore Muth, City University of New York*

Audience: Grades 9-12, Undergraduate Lower & Upper  
Advances in DNA sequencing and analysis technologies have made microbiome research projects accessible to undergraduate students and high school students. Microbiome projects allow students to explore the diversity and complexity of their local environmental microbiomes. Microbiome projects are flexible and able to address core learning goals in a range of courses, including introductory biology, ecology, genetics, environmental studies and others.

**Fostering science information literacy in the classroom | Room: 104C**

*Heather Lanthorn, Mercury Project*

Audience: Grades 9-12, Undergraduate Lower & Upper  
In this session, we will define mis-, dis-, and malinformation and information literacy—and then define (science) information literacy goals for our students. Together, we will draw on literature and experience to build small ‘tricks’ and a ‘skills lab’ lesson plan to build information literacy and self-efficacy over a semester.



# Education Share Fair Roundtable

This session is designed for educators to share or gather feedback on teaching ideas and activities with a peer working group. Ideas or activities may be at any stage of development. Authors describe their teaching idea for about 15 minutes and then facilitate feedback regarding the core concepts addressed, methodology, misconceptions, assessment, educational extensions or implementation in various institutional settings and audiences. There will be two rounds of 30 minutes each per session.

## Friday 1:00 PM - Session 1

### Round 1

#### Table #1

##### **Active learning: How to get students involved better?** *Behzad Ghanbarian, Kansas State University*

Audience: Grades 9-12, Undergraduate Lower Division  
Active learning is a key component in teaching. Although some students are naturally involved in class discussions, some need motivations beyond extra-credit points. In this proposal, we present ways to encourage students to get involved, speak up, and share ideas.

#### Table #2

##### **Phenology Network and Citizen Science in a General Botany Course**

*Leah Dudley, East Central University*  
Audience: Undergraduate Lower Division  
National Phenology Network's app Nature's Notebook and resources will be introduced, including use in General Botany, a lower level undergraduate course. The project description with supporting documents will be presented as well as formative and summative assessment tools (Visualization Tool).

#### Table #3

##### **Biomes Worldbuilding Learning Activity** *LeRoy Humphries, Southeastern Community College*

Audience: Grades 9-12, Undergraduate Lower Division  
Planet Earth has a wide range of ecological zones, called biomes, based on precipitation and temperature. This activity promotes an understanding of how biomes are defined, and how this affects the organisms living there.

#### Table #4

##### **Using COVID-19 Real World Scenario to understand Fake Information.**

*Cora Varas-Nelson, Pima Community College*  
Audience: Undergraduate: Lower Division  
Undergraduate students in the first two years of college should be able to understand science and how to determine fake information. This module is to investigate a Covid-19 real-world scenario in which we will do a structured review and analysis of information.

#### Table #5

##### **A Place for Storylistening in the 4th Dimension of 4DEE: Augmenting Scientific Data** *Anne Cross, Tulsa Community College*

Audience: Grades 9-12, Undergraduate Lower and Upper  
Participants will explore storylistening as an active learning technique for undergraduate STEM classes. Storylistening generates narrative evidence to inform ecological reasoning and to enhance the human dimension of the 4DEE framework. Finally, storylistening could advance antiracism and DEI throughout STEM.

#### Table #6

##### **Lank Back and Renewable Energy** *Tamara Basham, Collin County Community College*

Audience: Grades 9-12, Undergraduate Lower Division  
To mitigate climate change, we must transition to renewable energy sources. Accessing and storing renewable energy requires mined materials. This activity uses a proposed mine in Arizona as a case study of the environmental ethical issues of renewable energy use.

#### Table #7

##### **Lab Assessment of Biological Courses that use OER** *Thomas Kalluvila, Milwaukee Area Technical College*

Audience: Undergraduate: Lower Division  
I use Open Educational Resources (OER) for my Anatomy & Physiology course. I am currently developing lab assessment tools for my student population of this course. This session would help me to share my progress and get feedback from other faculty.

### Round 2

#### Table #1

##### **Course Based Undergraduate Research experience for underrepresented Biology major students** *Anita Mandal, Edward Waters University*

Audience: Undergraduate Lower & Upper Division  
I am teaching Ecology for biology majors. I am interested to adopt and teach the effect of host-pathogen interaction of those causes infectious disease in the wildlife populations. I am in a very initial stage of planning. My plan is to include non majors as well.

**Table #2****Course-based Undergraduate Research Experience for Students Under-represented in Biology (CURESUB)***Prabir Mandal, Edward Waters University*

Audience: Undergraduate Lower & Upper Division  
 Course-based undergraduate research experiences (CUREs) are increasingly common because they engage undergraduates in research at schools that lack substantial research infrastructure or simply can't accommodate large undergraduate populations in internship-style research. We at Edward Waters University, propose to establish a research coordination network (RCN) that enhances undergraduate biology education by capitalizing on the advantages of course-based undergraduate research experience in OMICS as a model system.

**Table #3****Goldenrod Ball Gall Ecology Lab: Investigating a tri-level trophic system to test the predictions of natural selection***Christine Barlow, Ivy Tech Community College*

Audience: Undergraduate Lower Division  
 In this lab, students investigate ecological interactions between a plant, a gall maker, and species that exploit the gall maker. Students are challenged to think deeply about ecological theories and to generate hypotheses that are tested in the field.

**Table #4****DataVersify: Integrating scientist profiles with data literacy***Melissa Kjelvik, Michigan State University*

Audience: Grades 9-12, Undergraduate Lower & Upper  
 DataVersify materials aim to highlight scientist role models and their stories alongside data literacy instruction. While we have tested beta versions of our materials, we are currently seeking feedback as we scale up our design and select appropriate learning platforms.

**Table #5****Making "sense" out of surface area to volume relationships***Jenise Snyder, Ursuline College*

Audience: Grades 9-12, Undergraduate: Lower Division  
 Using a multimodal approach, students will explore surface area to volume relationships. Using quantitative skills and their senses of taste and/or sight with different size coated candies, students will determine how smaller cells and larger cells differ in these relationships.

**Table #6****Using an Internal Course Narrative to Improve Student Outcomes in Introductory Organismal Biology***Thomas McCabe, The University of Texas at El Paso*

Audience: Undergraduate: Lower Division  
 This resource is an alternative organization of topics for introductory organismal biology that focuses on a progression through levels of biological scale to support student conceptual understanding of concepts in ecology and evolution.

**Table #7****Training Materials for the NEON Plant Diversity Sampling Protocol***Rhea Esposito, National Ecological Observatory Network*

Audience: Undergraduate Lower & Upper Division  
 The National Ecological Observatory Network (NEON) is considering providing training materials publicly. Here, we present our training on the Plant Diversity protocol as an example curriculum, and gather feedback about using our materials in an educational setting more broadly.

**Saturday 2:45 PM - Session 2****Round 1****Table #1****Hybrid teaching in Biology post Covid-19***George Belcourt, Stone Child College*

Audience: Undergraduate Lower Division  
 The hybrid approach to classroom learning is that lessons and assignments are tailored more around the students learning from an online platform rather than the traditional classroom. Microsoft Teams is utilized frequently, and for some students this method worked extremely well and for others not so well.

**Table #2****A proposed introduction to ethology exercise at the Aquarium of Niagara***Simon Bird, Aquarium of Niagara*

Audience: Grades 9-12, Undergraduate Lower Division  
 This proposed high-school and introductory undergraduate level exercise aims to provide students an introduction to ethology and an understanding of animal behavior through observation, data recording and analysis of aquatic animals while adhering to the 5E principles of learning.

## Round 2

### Table #3

#### **Redlining and Environmental Justice**

*Janel Ortiz, California State Polytechnic University*

Audience: Undergraduate Upper Division

We explore inequity in environmental health and nature by utilizing a redlining map. Student groups analyze a city to see who has access to greenspaces by looking at patterns of tree cover, minoritized populations, house values, and impervious surface.

### Table #4

#### **When do lilacs bloom? Exploring real-world data in the classroom**

*Sarah Jones, Chicago Botanic Garden*

Audience: Grades 9-12, Undergraduate Lower Division

This activity aims to build data literacy skills through student exploration and interpretation of an authentic dataset from Budburst ([budburst.org](http://budburst.org)), a nationwide citizen science program studying the connection between climate change and the timing of seasonal life stages in plants.

### Table #5

#### **Creating a One-page Role-Playing Game for Understanding Organismal and Ecological Concepts**

*Darcy Ernst, Evergreen Valley College*

Audience: Grades 9-12, Undergraduate Lower & Upper

This resource guides students in creating a one-page role-playing-game (RPG) based on an organism and its role in an ecological community. Students research the life history and interactions of an organism to create their RPG. Includes instructor resources for facilitation.

### Table #6

#### **Redesigning Environmental Microbiology Lab to Include Authentic Inquiry Based Learning.**

*Philips Akinwale, DePauw University*

Audience: Undergraduate Lower & Upper Division

Replacing "cookbook" laboratory activities with inquiry-based labs allowed students to be engaged through applying scientific processes to design experiments, utilize quantitative reasoning, and effectively communicate results. Such an approach can be achieved using Biolog-Ecoplate to quantify metabolic-profiling of bacterial diversity.

### Table #1

#### **Enhance the use of OER in STEM education for Equity & Diversity**

*Carl Morency, Milwaukee Area Technical College*

Audience: Undergraduate Lower Division

The Covid-19 pandemic resulted in long-lasting financial burden on our students. OER has a significant role in alleviating the challenges brought by the pandemic in higher education. The advantages of OER over the traditional textbook are they are ready for distance learning, adaptable to the need of individual courses and can be tailored towards the need of a specific student population, access to learning materials indefinitely that help lifelong learning, and above all reduce equity gap among the disadvantaged student population.

### Table #2

#### **Data science module using EJ screen**

*Alison Haupt, CSU Monterey Bay*

Audience: Undergraduate Lower & Upper Division

We are working to develop a data science module that uses storytelling to play data science skills in context using EPA Environmental Justice Screen tool.

### Table #3

#### **Understanding the evolutionary relationships of cool, parasitic flatworms.**

*Lori Tolley-Jordan, Jacksonville State University*

Audience: Undergraduate Lower, Upper, & Graduate

Scaling up and down the fractal curves of evolution using the interactive, online tool [onezoom.org](http://onezoom.org): applications from non-major's Introductory Biology to upper division/graduate Evolutionary biology courses.

### Table #4

#### **Promoting Research Among Undergraduate Students in Engineering and Computer Science**

*Sudarshan Kurwadkar, California State University*

Audience: Undergraduate Lower & Upper Division

Experiential learning through field demonstration of water quality

### Table #5

#### **Using Soil Fungi Next Generation Sequencing Data to Study Wildfire Resiliency**

*Savanah Senn, Los Angeles Pierce College*

Audience: Undergraduate Lower & Upper Division

This lab exercise is an active learning introduction to techniques used to analyze soil microbiome data. Students will also learn about forming hypotheses, what kind of questions can be answered with this data, and practice the scientific method.

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**Table #6****Laboratory activity to explore the functional diversity of fungi***Claudia Stein, Auburn University at Montgomery*

Audience: Undergraduate Lower &amp; Upper Division

Lab activity in which students are split in different groups and perform experiments that investigate different functions fungi fulfill: A) Decomposition, B) Plant symbionts, C) Disease agents. Students will present their results in a mini-symposium to the whole class.

**Table #7****Integrating Innovative Research Projects into Teaching Biostatistics***Qingxia Li, Fisk university*

Audience: Undergraduate: Upper Division

This project is intended to: 1) foster students' interest in pursuing STEM disciplines using the real-world applications of the course-embedded research; and 2) increase deeper student learning due to this piqued interest and application of skills in the context of the course.

## Networking Sessions

*Variants in Biology Education: What Can We Learn From Pandemics Saturday March 25, 10:45AM*

**This year's Networking Session will focus on three thematic conference tracks and two additional topics related to current challenges in teaching and learning:**

**N1) Adapting to and Teaching Disease Ecology**

1. What disease ecology examples have been most successful for you in the classroom?
2. Are there any classroom tools, such as computer software, that have helped your students learn about disease ecology?
3. Should disease ecology (and related fields, epidemiology, virology, etc.) be required for biology students these days? Discuss why or why not, and/or discuss suggestions given how the world responded to COVID-19.

**N2) Fake News, Real Science, or somewhere in between (Science Misinformation)**

1. How can we help students address and navigate the many different types of media they encounter?
2. How do you incorporate media into your ecology or environmental science classroom?
3. Scientific literacy is critical for identifying misinformation. What recommendations do you have to foster scientific literacy in your classroom?

**N3) Research innovations and careers**

1. What are your strategies for encouraging students to think broadly about career options?
2. What career options outside of academia are available for people with degrees in ecology or related fields, and how do you introduce those

career options to students?

**N4) Climate change education**

1. Climate change may facilitate new disease outbreaks or the range expansion of existing diseases. What are some successful ways you have connected disease ecology and climate change in the classroom?
2. How do we support "climate change" education that focuses less on the temperature and more on the ecosystem's consequences? Is this a more effective path forward?

**N5) Biodiversity Data and Literacy in the classroom**

1. How do you prepare students to evaluate and use large, openly available sources of ecologically relevant data?
2. What are the challenges you face in implementing biodiversity data literacy instruction and how did/can you overcome them?
3. How can we use biodiversity data as a resource to introduce students in ways of evaluating data, bias, and sources?
4. What recommendations do you have for preparing students for ecological data literacy needed for the 21st-century job market?

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