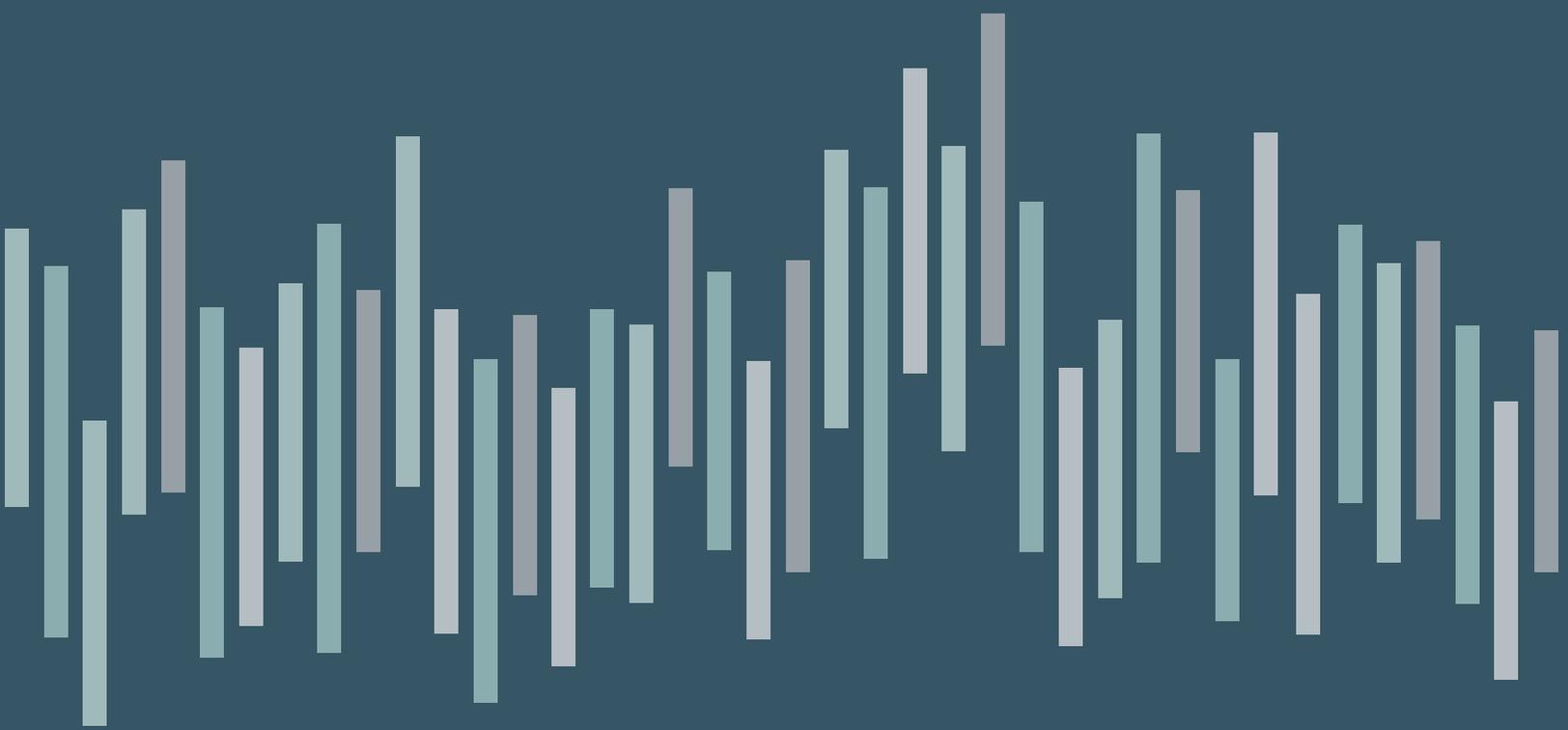


SATURDAY

NOV 16



ABBREVIATION KEY

- | | |
|-----------------------------|------------------------------|
| E: Elementary School | 2Y: Two-Year College |
| MS: Middle School | 4Y: Four-Year College |
| HS: High School | GA: General Audience |

AP® is a registered trademark.

7:30 AM – 8:45 AM

BioClub Breakfast**Sheraton Ballroom I** LEVEL 4 • Meal Function (Tickets Required) • GA

It's time to join the (Bio)Club! The NABT BioClub continues to grow, and both current and future BioClub Advisors are invited to share favorite resources and stories about their chapters.

Sponsored by **CAROLINA**
www.carolina.com

8:15 AM – 10:15 AM

NABT Biology Education Poster Session & Coffee Break**Sheraton Ballroom IV & V** LEVEL 4 • Poster Session (120 min) • GA

The NABT Poster Sessions features practices, programs, and research in three distinct categories: general strategies for teaching biology, the scholarship of teaching, and mentored student research. Posters presented by students are eligible for two competitions.

See full poster listing on page 46

9:00 AM – 10:15 AM

2433 Biological Inquiry on the "Rise" – Measuring Cellular Respiration with Yeast-Alginate Spheres**Arkansas** LEVEL 2 • AP Biology • Hands-on Workshop (75 min) • MS, HS, GA

We'll use yeast spheres to measure cellular respiration under different environmental conditions. An inquiry-based approach to experimental design will be emphasized throughout our session. You'll have time to work/play too!

Adam Bergeron, School District of Clayton/ Clayton High School, Clayton, MO and Lee Johnson, Parkway Central High School, Chesterfield, MO

9:00 AM – 10:15 AM

INVITED SPEAKER**Brian Couch**

See page 10 for biography.

Cultivating Active Learners: How Instructors Can Modify Their Activities to Improve Student Buy-in, Utilization, and Learning**Chicago Ballroom IX** LEVEL 4 • Special Speaker • GA

Active learning in the form of formative assessment (FA) represents an important way to improve student learning and persistence in STEM courses. While the use of FAs (e.g., Just-in-Time Teaching, Peer Instruction) has increased in recent years, it has also been accompanied by challenges such as students resisting them or using them in ways that may undermine learning. Student buy-in and utilization thus represent critical factors that potentially limit the adoption and efficacy of FAs. Dr. Couch's research group has conducted mixed-methods investigations to understand how instructor-based activity characteristics influence student perceptions and behaviors related to FA activities. Findings from open-ended interviews will be presented, highlighting how students perceive specific activity characteristics (e.g., content, grading policy) to affect their FA engagement. Dr. Couch also will show results from the closed-ended Formative Assessment Buy-in and Utilization Survey (FABUS), demonstrating quantitative connections between student buy-in, utilization, and performance. He will also share suggestions about how FABUS can be used by instructors to monitor and improve their FA implementation to help students succeed.

9:00 AM – 10:15 AM continued

Member Resources Committee**Bridgeport** LEVEL 3 • Committee Meeting (75 min) • GA

Catherine Ambros, Committee Chair

2664 Can Genetic Disorders be Cured? Exploring the Central Dogma and Genetic Medicine with HHMI BioInteractive**Chicago Ballroom X** LEVEL 4 • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Use BioInteractive resources on eukaryotic gene expression and genetic medicine to explore real-world applications of several technologies for treating genetic conditions like sickle cell disease and cystic fibrosis.

Holly Basta, Rocky Mountain College, Billings, MT; Ann Brokaw, Rocky River High School, Rocky River, OH; Laura Bonetta, HHMI, Chevy Chase, MD

SPECIAL PROGRAMMING PRESENTED BY 3D Molecular Designs**2686 Dynamic DNA – One Model to Teach It All****Colorado** LEVEL 2 • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Increase student engagement and deepen student understanding of the structure and function of DNA by critically evaluating different models of DNA, including models that demonstrate DNA flexibility, packaging and epigenetics.

Keri Shingleton, Holland Hall and 3D Molecular Designs, Tulsa, OK

NABT Conference Committee**Edgewater** LEVEL 3 • Committee Meeting (75 min) • GA

Planning to begin for NABT 2020 Conference in Baltimore.

**GENERAL
(NON-COMPETITION)
CATEGORY**

1. Two-week Cell Biology Laboratory Integrating Genetics, Biochemistry, and Cytology Using *Chlamydomonas reinhardtii*

Noveera Ahmed, St. John Fisher College, Rochester, NY

2. An Improved Protocol for *Drosophila* Polytene Chromosome Squashes: An Exciting Genetics Lab for Undergraduates and High School Students with Prior Experience using Both Stereo and Compound Microscopes

Beth Albrecht & Sarah Barrow, Stark State College, North Canton, OH

3. Medicines and Me: A Series of Hands-on Health Literacy Lessons for Adolescents

Danielle Alcena-Stiner & Susan Holt, University of Rochester, Rochester, NY; Guillermo Montes, St. John Fisher College, Rochester, NY; Dina Markowitz, University of Rochester, Rochester, NY

4. Faculty Views on Evolution at Several Campuses in the Mid-South

Mark Bland & Christie Birdsong, University of Central Arkansas, Conway, AR

5. Lesson Learned from the Development and Implementation of an Interprofessional Case Learning Project (ICLP)

Nalini Broadbelt & Michelle Young, MCPHS University, Boston, MA

6. An Explorative Teaching Approach to Learn Anatomy and Physiology by Writing a Targeted Case Study

Nalini Broadbelt & Michelle Young, MCPHS University, Boston, MA

7. Identifying the Unwritten Rules of Obtaining Undergraduate Research Experiences

Jacqueline Cala, Chandler-Gilbert Community College, Mesa, AZ; Katelyn Cooper, University of Central Florida, Orlando, FL; Sara Brownell, Arizona State University, Tempe, AZ

8. Using Student Collaborative Research in a Field Biology Course to Enhance Student Success

Larry Corpus, Misericordia University, Dallas, PA

9. Incorporating an Animal Behavior Research Project into a Non-majors Course

Elizabeth Davis-Berg & Michelle Rafacz, Columbia College Chicago, Chicago, IL

10. Organismal and Ecosystem Studies of the Red-Backed Salamander, Invertebrates and Vegetation in Tobyhanna State Park: Flaunting the Hierarchy of Matter for Vision and Change

John Drummond, Nancy McCreary Waters, Patrick Rikieta, & Zachary Whitney, Lafayette College, Easton, PA

11. Using the 10-2 Lecture Method and Active Learning to Improve Student Success in STEM

Lindsey Fields, Apryl Nenortas, & Susan Forrest, Butler Community College, El Dorado, KS

12. Science and Religion in Symbiosis: A Collaborative Learning Experience for Biology Majors in a Liberal Arts Undergraduate Setting

Darla French & James Browning, University of Pikeville, Pikeville, KY

13. Developing and Assessing an Environmental-Testing Education Module to Increase Scientific Literacy

Katelynn Fry & William Kroen, Wesley College, Dover, DE

14. Perspectives and Practices in Sharing Data-driven Adaptations in the Biology Classroom: How, Why, When, and Where are Instructors Sharing these High-impact Pedagogies?

Kristine Grayson, University of Richmond, Richmond, VA; Arietta Fleming-Davies, University of San Diego, San Diego, CA; Raisa Hernández-Pacheco, California State University – Long Beach, Long Beach, CA; X. Ben Wu, University of Texas A&M, College Station, TX

15. From Abstract to Concrete: Facilitating Student Learning with Models

Karen Groh, Good Samaritan College of Nursing and Health Science, Cincinnati, OH

16. YouTube Analytics Reveals Differences Between Majors and Genders in Viewership of Laboratory Educational Videos

Benjamin Harrison & Amanda Brosnahan, Concordia St. Paul, St. Paul, MN

17. Using HHMI “Scientists at Work” Videos in a Science Ethics Course

Melissa Haswell, Davenport University, Grand Rapids, MI

18. Case Study Pedagogy and Learning Outcomes: A Framework for Teaching Biology with Narratives

Ally Hunter, UMass Amherst, Amherst, MA & Melissa Zwick, Stockton University, Galloway, NJ

19. The Development of a Tablet-based Curriculum to Teach Inquiry-based Ecology to Incarcerated Youth

Ally Hunter, Jeremy Kelleher, Martina Nieswandt, & Michael Krezmien, UMass Amherst, Amherst, MA

20. Building Bridges Network for Integrating Biophysics into Life Science Education

Constance Jeffrey, University of Illinois at Chicago, Chicago, IL; Gundula Bosch, Johns Hopkins, Baltimore, MD; Yadilette Rivera-Colon, Bay Path University, Longmeadow, MA; Urszula Golebiewska, Queensborough Community College, Queens, NY; Randy Stockbridge, University of Michigan, Ann Arbor, MI

21. BiteScis: Teacher-Researcher Partnerships to Develop Engaging Research-Based Lessons

Stephanie Keep, Shannon Morey, & Erica Kimmerling, BiteScis, Boston, MA

22. The PULSE Midwest and Great Plains Regional Network: A Community of Practice for Implementation of Vision and Change Recommendations

Karen Klyczek, University of Wisconsin-River Falls, River Falls, WI; Caroline Breitenberger, The Ohio State University, Columbus, OH; Heather Seitz, Johnson County Community College, Overland Park, KS

23. Arriving Prepared, Who Is At Risk

Kimberly Loscko, Mount Carmel College of Nursing, Columbus, OH

24. Drawing to Learn Biology: Combining Content, Assessment, and Application

Rachel Lytle, Brentwood High School, Brentwood, TN; Kim Sadler, Middle Tennessee State University, Murfreesboro, TN

25. Biotechnology Pipeline from High School to Industry via Community College - Creating a Dual-Enrollment Culture of Excellence

Amrita Madabushi, James Epres, & Anil Malaki, Baltimore City Community College, Baltimore, MD

26. Molecular CaseNet: Developing Case Studies Using Molecular Representations for use in Introductory Chemistry, Biology, and Biochemistry Classes

David Marcey, California Lutheran University, Thousand Oaks, CA; Henry Jakubowski, St. John's University, St. Joseph, MN; Kimberly Linenberger Cortes, Kennesaw State University, Kennesaw, GA; Patricia Marsteller, Emory University, Atlanta, GA; Cassidy Terrell, University of Minnesota Rochester, Rochester, MN; Shuchismita Dutta, Rutgers University, New Brunswick, NJ

27. Reflection on and Analysis of Introductory Course Redesign at Pacific University

Leisl McCormick, Pacific University, Forest Grove, OR

28. Student Reported Benefits After Participating in Biology-based Student Organizations

Zach Nolen & Kristy Daniel, Texas State University, San Marcos, TX

29. Evaluation of the Effectiveness of Student Choice Laws and Policies Pertaining to Animal Dissection

Pamela Osenkowski, Marcia Kramer, & Ignas Karaliunas, National Anti-Vivisection Society (NAVS), Chicago, IL

30. Teaching Experimental Design with Computational Thinking

Amanda Peel, Northwestern University, Evanston, IL; Teresa Granito, Evanston Township High School, Evanston, IL; Sugat Dabholkar, Northwestern University, Evanston, IL

31. Using Audition as a Tool for Reinforcing Statistical Knowledge

Andrew Petzold & David Haines, University of Minnesota Rochester, Rochester, MN

32. Bridging Research and Teaching: How to Build Scenario-based Assessments from the Primary Literature

Rachel Pigg, University of Louisville, Louisville, KY; Suann Yang, SUNY Geneseo, Geneseo, NY; Emily Rauschert, Cleveland State University, Cleveland, OH

33. Effect of Phytohormones on the Growth and Development of *Setaria*

Kimberly Rex, Andrew Doust, Hoa Hu, & Julie Angle, Oklahoma State University, Stillwater, OK

34. Logic Model Conceptualization of Teacher Research in Chicago EYES on Cancer

Steven Rogg, Carthage College, Kenosha, WI; Megan Mekinda, University of Chicago Medicine Comprehensive Cancer Center, Chicago, IL

35. Using FRAMER as a Framework for Scaffold Development to Support Undergraduate Students in Learning and Understanding Biological Concepts

Jaime Sabel, University of Memphis, Memphis, TN

36. Student Performance in Critical Thinking Fluctuates in Biology Courses with a Better Performance in Microbiology vs. Non-biology Majors Students

Bara Sarraj, Harold Washington College, Chicago, IL

37. Crickets in the Classroom

Emily Schmidt, The Bronx High School of Science, Bronx, NY

continued on next page

38. Are We Our Own Worst Enemy: Can Faculty Pedagogical History and Professional Identity Undermine Programmatic Change?

Tarren Shaw, University of Oklahoma, Norman, OK; Jeff Grim, University of Tampa, Tampa, FL; Troy Nash, Mercer University, Macon, GA; Rachel Pigg, University of Louisville, Louisville, KY; Suann Yang, SUNY Geneseo, Geneseo, NY

39. Microscopic Communities: Interdisciplinary Exploration of Microbiota

Sandra Small, Jennifer Surtees, Jennifer Tripp, & Lynn Shanahan, University at Buffalo, Buffalo, NY

40. Inspiring Generation Z to Advocacy Through Immersive, Real-World Experiences

Vicki Stanavitch & Eric Johnson, Keystone College, La Plume, PA; Barbara Moss, Abington Heights High School, Clarks Summit, PA

41. Use of *Drosophila* S2 Cells as a Simple Cell Culture Model System in a Cell Biology Laboratory

Shannon Stevenson, University of Minnesota Duluth, Duluth, MN

42. Investigating Removal of Perfluorooctanoic Acid (PFOA) from Drinking Water

Andrew Taylor, Olathe Northwest High School, Olathe, KS; Candice Van Allen, Weskan High School, Weskan, KS; Noses Lor, Mark Shiflett, Ana Rita Morais, & David Corbin, University of Kansas, Lawrence, KS

43. Promoting Metacognition in STEM for First-year Students in a Hispanic Serving 2 yr Institution to Foster Student Learning

Sheela Vemu, Waubonsee Community College, Sugar Groove, IL; Deborah Cole, Indiana University-Purdue University, Indianapolis, IN; Youngha Oh, Texas Tech University, Lubbock, TX

44. Exploring Math Attitudes in a Science Classroom using Biomaap Interventions at a Hispanic Serving Community College to Improve Student Quantitative Skills

Sheela Vemu, Waubonsee Community College, Sugar Groove, IL; Deborah Cole, Indiana University-Purdue University, Indianapolis, IN; Youngha Oh, Texas Tech University, Lubbock, TX

45. The Red-Backed Salamander and Tobyhanna State Park: A Tale of Two (Cities?) Curricula

Nancy McCreary Waters, John Drummond, Vincenzo Olivett, & Sarah Pungitore, Lafayette College, Easton, PA

46. Concept Maps: Helping Students Learn the Language of Biology

Heather Minges Wols, Columbia College Chicago, Chicago, IL & Kirstin Parker, Michigan State University, East Lansing, MI

BIOLOGY EDUCATION RESEARCH POSTER COMPETITION – GRADUATE STUDENTS

47. Student Modeling Activities Correlate with Biology Expertise Gains over a Semester

Karly Ackermann, Anne-Marie Hoskinson, & Greg Heiberger, South Dakota State University, Brookings, SD

48. An Introvert's Perspective: Analyzing the Impact of Active Learning on Multiple Levels of Class Social Personalities in an Upper-level Biology Course

William Beckerson, Jennifer Anderson, John Perpich, & Debbie Yoder-Himes, University of Louisville, Louisville, KY

49. The Effect of Planning and Carrying Out Investigations Upon Student Content Knowledge and Perceptions of Science in a High School Science Classroom

Cheyenne Heath, Elizabeth Allan, & Mike Nelson, University of Central Oklahoma, Edmond, OK

50. The Effect of Phenomenon-based Instruction and Modeling upon Student Content Knowledge and Perceptions of Science in a High School Science Classroom

Jennifer Hofeld, Elizabeth Allan, & Mike Nelson, University of Central Oklahoma, Edmond, OK

51. A Comparison of Urban and Rural Student Performance in Introductory Science Courses

John Locke, Donald French, & John Stewart, Oklahoma State University, Stillwater, OK

52. Student Hormonal Responses in Two Learning Environments

Antonia MacCrossan, Kristy Daniel, Kafayat Oyejide, & Mar Huertas Pau, Texas State University, San Marcos, TX

53. A Research-based Design Approach to Creating a Citizen Science Household Spider Observation Activity

Bria Marty & Kristy Daniel, Texas State University, San Marcos, TX

54. Student Engagement in Direct Instruction, Undergraduate Microbiology Laboratories

Eva Nyutu, William Cobern, & Brandy Pleasants, Western Michigan University, Kalamazoo, MI

55. Validity and Reliability of the Plant Blindness Index (PBI) and the Botanical Literacy Inventory (BLI)

Kathryn Parsley, Bernie Daigle, & Jaime Sabel, University of Memphis, Memphis, TN

56. Peer Instruction, Active Learning, and Building a Learning Community in a Majors Community College Biology Course

Jon Reddick-Lau & Laura Briggs, Truckee Meadows Community College, Reno, NV; Elena Pravosudova, Pamela Sandstrom, & David Crowther, University of Nevada-Reno – Reno, NV

57. Exploring Students' Developing Awareness of Abiotic and Biotic Components of Biodiversity During an Outdoor Observation Activity

Sara Salisbury & Joshua Reid, Middle Tennessee State University, Murfreesboro, TN; Kathryn Parsley, University of Memphis, Memphis, TN; Brock Couch & Cindi Smith-Walters, Middle Tennessee State University, Murfreesboro, TN

58. The Professional Networks of Biology Graduate Students: A Social Network Comparison of Research and Teaching Universities

Joshua Reid & Grant Gardner, Middle Tennessee State University, Murfreesboro, TN

59. A Student Who Understands Evolution, Accepts Evolution: Evidence from a Systems Approach to Evolution Acceptance

Rachel Salter, Brent Hill, & Jennifer Momsen, North Dakota State University, Fargo, ND

60. What Makes You Unique?

Kathleen Stuck, Julie Angle, Angela Riley, & Jennifer Grindstaff, Oklahoma State University, Stillwater, OK

61. Science in the News: Engaging Non-Biology Majors in the World of STEM

Nicole Thomas & Tina Vo, University of Nevada-Las Vegas, Las Vegas, NV; Jaime Sabel, University of Memphis, Memphis, TN

BIOLOGY EDUCATION RESEARCH POSTER COMPETITION – UNDERGRADUATE STUDENTS

62. Community-Engaged Learning and STEM: How Initial Perceptions Vary Based on Course

Anna Babiak, Saint Mary's College, Notre Dame, IN; Danielle Condry & Kathryn Wissman, North Dakota State University, Fargo, ND; Luis Ibarra, University of California-Los Angeles, Los Angeles, CA

63. Evaluating Common Student Errors in an Undergraduate Ecology Course

Cooper Breed & Suann Yang, SUNY Geneseo, Geneseo, NY

64. Analyzing Plant and Animal Images in Undergraduate Biology Textbooks

Kristi Brownlee, Kathryn Parsley, & Jaime Sabel, University of Memphis, Memphis, TN

65. The Effect of Flipped Environment on Student Achievement in Life Sciences: Meta-Analysis

Anastasiia Gryshyna & Alexey Leontyev, North Dakota State University, Fargo, ND

66. Global Challenge of Mosquito Borne Disease: Adapting Cases & VALUE Rubrics for Associate's Level Using High-impact Practices

Nidia Leon-V, Sheela Vemu, & Jeanne McDonald, Waubonsee Community College, Sugar Grove, IL

67. Study Practices and Quizlet Use in Undergraduate Human Anatomy

Kehaulani Mankle, Chase Kruse, & Jennifer Mraz-Craig, Southern Utah University, Cedar City, UT

68. Students Choice of Group Mates: Avoiding Conflict to Enhance Learning

Aarati Shah & Peggy Brickman, University of Georgia, Athens, GA; Cynney Walters, Kennesaw State University, Kennesaw, GA; Sukhada Samudra, University of Georgia, Athens, GA

69. Comparison of Open Notes and Internet Access Exams to Traditional Exams in an Upper Level Biochemistry Class

Alex Sheldon, Alec Rhodes, Isabella Hendrickson, Andrew Nicholas, & John Coogan, The Ohio State University, Columbus, OH

70. University Outreach to Public High School Biology Students: Student-driven Research Laboratory Exercise in Antibiotic Discovery

Jesus Tamayo & Todd Kelson, Brigham Young University-Idaho, Rexburg, ID

71. How and Why Undergraduates Practice Public Science Communication

Jason Wack, Collin Jaeger, & Heather Bergan-Roller, Northern Illinois University, DeKalb, IL

72. Metacognition Development in Undergraduate Biology Majors

Kendra Wright & Jaime Sabel, University of Memphis, Memphis, TN

continued on next page

**MENTORED
UNDERGRADUATE
RESEARCH POSTER
COMPETITION**

73. The Assembly of the Metal Center of Photosynthetic Water Oxidation Requires Light: Developing In vitro Methods of Studying the Assembly of the Mn Catalytic Cluster of Photosystem II (PSII)

Derrick Chalifoux, Julie Angle, Anton Avramov, & Robert Burnap, Oklahoma State University, Stillwater, OK

74. Effects of Various Essential Oils on *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Streptococcus epidermidis*

Jacqueline Chavez, Nichole Giani, & Vicki Stanavitch, Keystone College, La Plume, PA

75. A Survey on Macro/Microplastic and Heavy Metal Pollution, Including Water and Soil pH in the Standing Bear Lake, Omaha, Nebraska

Katelyn Cook, Jeba Inbarasu, & Kaiguo Chang, Metropolitan Community College, Omaha, NE

76. *Escherichia coli* K-12 cells Bind In vitro Significantly Stronger to E-selectin than ICAM-1 Substrates Under Flow

Yasmin Dayeh, Tarannum Uddin, Junoo Tuladhar, & Bara Sarraj, Harold Washington College, Chicago, IL

77. Identifying Spiders Through PCR Analysis Using the Mitochondrial Cytochrome C Oxidase I (COI) Gene and the 16S Ribosomal RNA Gene

Chloe Dupleix & Aimee Thomas, Loyola University-New Orleans, New Orleans, LA

78. Microplastics Within Lake Pontchartrain

Sofia Giordano & Aimee Thomas, Loyola University-New Orleans, New Orleans, LA

79. Sensing Death: Predicting Drought Stress with Spectral Indices in Pinyon Pine

Medelin Kant, William Hammond, Julie Angle, & Henry Adams, Oklahoma State University, Stillwater, OK

80. The Effect of 2-4D on Aquatic Macroinvertebrate Communities

Mariana Kendall & Aimee Thomas, Loyola University-New Orleans, New Orleans, LA

81. Effects of Hormone Treatment on Seed Shattering in *Setaria viridis*

Heidi McIntyre, Kimberly Rex, Hao Hu, Andrew Doust, & Julie Angle, Oklahoma State University, Stillwater, OK

82. Optimizing Protocols for DNA Barcoding of Zooplankton to Support Biodiversity Research

Braylen Phelps, Rie Jen, & Donald French, Oklahoma State University, Stillwater, OK

83. The Natural History of *Latrodectus geometricus* in New Orleans

Katie Rompf & Aimee Thomas, Loyola University-New Orleans, New Orleans, LA

84. A 3D Model of Skin Used to Test Compounds or Methods to Improve Wound Healing

Niloufar Alsadat Hassan Tehrani, Derek Chen, Spencer Adkins, Alex Devlin, Miguel Virador, & Victoria Virador, Montgomery College, Rockville, MD

85. Vaxx Facts: The Need for Evidence-Based Decision Making

Nicholas Watkins, The Pennsylvania State University – State College, PA; Giovanni Adan, Birmingham Southern College, Birmingham, AL; Kimberly Booth & Jennifer Momsen, North Dakota State University, Fargo, ND

9:00 AM – 10:15 AM continued

2589 So Much Biology, So Little Time! Activities to Develop Both Science Skills and Content Knowledge

Erie **LEVEL 2** • Science Practices • Hands-on Workshop (75 min) • MS, HS

Concerned about changes to AP Biology? Standardized tests taking the joy out of teaching? Join us for a lively session where we demonstrate ways to “cover” less and teach more.

Theresa Holtzclaw and Fred Holtzclaw, Webb School of Knoxville, Clinton, TN

2499 Using the Lab Experience to Teach the AP Biology Science Practices

Fountainview **LEVEL 3** • AP Biology • Hands-on Workshop (75 min) • HS

This session will use a hands-on Genetics Lab to explore ideas for incorporating the six AP Biology Science Practices into the AP Biology classroom by using this fun hands-on experiment.

Allison Kittay, College Board, El Cerrito, CA

2650 Thirty Lessons, Demos, and Labs to Teach about Environmental Change

Gold Coast **LEVEL 3** • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Learn and experience new content as master educators share their ideas for teaching about environmental change. Activities will be made available through NABT.

Elizabeth A. Cowles, Eastern Connecticut State University, Willmantic, CT; Carol Kurth, Academy of Science and Entrepreneurship, Bloomington, IN; Kirsten Milks, Bloomington High School South, Bloomington, IN; Teddie Phillipson-Mower, Indiana University Bloomington, Bloomington, IN; Emily Weigel, Georgia Institute of Technology, Atlanta, GA

2455 Teaching Evolution in the Age of Molecular Data: Bioinformatics for Beginners!

Lakeview **LEVEL 3** • Evolution • Hands-on Workshop (75 min) • HS

Using Dolan DNA Learning Center, Purdue’s Apple Genomics, HHMI Bio-interactive, and Utah Genetics resources, teachers will gain skills to help students understand biological evolution using digital tools.

Dawn Norton, James Finch, Caitlin McWhirter, Alison Peterson, Robert Hoops, and Jessica Ronk, Minnetonka High School, Minnetonka, MN

2426 Algal and Yeast Spheres to Model Cellular Processes: Enzyme Catalysis, Photosynthesis, and Cellular Respiration

Mayfair **LEVEL 2** • Science Practices • Hands-on Workshop (75 min) • MS, HS, GA

Algal and Yeast spheres are an easy to prepare and economical way to explore cellular processes. Learn how to prepare spheres and different ways to use them in the classroom.

Kurt Kristensen, Hewitt Trussville High School, Trussville, AL

2556 GeneChat: Celebrating DNA Day with Social Learning

Michigan A **LEVEL 2** • Technology in the Classroom • Hands-on Workshop (75 min) • GA

Connect with HudsonAlpha to celebrate “DNA Day” through the use of social learning which enables students the opportunity to interact with pioneers and leading researchers in the field of genomics.

Madelene Loftin, HudsonAlpha Institute for Biotechnology, Huntsville, AL

2580 Tying Topics Together: Illuminating Relationships in AP Biology

Michigan B **LEVEL 2** • AP Biology • Hands-on Workshop (75 min) • HS

Do students struggle to see connections between topics in AP Biology? This session will demonstrate how relationships between topics can be illuminated in your course to maximize student understanding.

Lee Ferguson, Allen High School, Allen, TX

SPECIAL PROGRAMMING PRESENTED BY Vernier

2701 Simplify Your Lab Setup with Vernier

Missouri **LEVEL 2** • AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

In this hands-on workshop, use our new Go Direct sensors with our free Graphical Analysis 4 app to do biology laboratory activities such as “Enzyme Action” and “Photosynthesis and Respiration.”

Colleen McDaniel, Vernier Software & Technology, Beaverton, OR

2596 Invisible Forest: Use STEAM and Project-based Learning to Explore Phytoplankton and our Vast Ocean

Mississippi **LEVEL 2** • Science Practices • Hands-on Workshop (75 min) • MS, HS, 2Y

Learn how we study where we cannot see. This NGSS-aligned unit integrates STEAM while using real-world, big data to investigate how our “invisible forest” influences ocean and Earth systems.

Claudia Ludwig, Institute for Systems Biology, Seattle, WA

9:00 AM – 10:15 AM continued

2442 Storylining in the Integrated Classroom

Ohio LEVEL 2 • General Biology • Hands-on Workshop (75 min) • MS, HS

Explore strategies to modify storylining for the integrated classroom. Testimonies from biology and special education teachers who have implemented a storyline approach to bring NGSS to students with learning needs will be shared.

Lisa Pavic, Julia Navarro, Madeline Thomas, Lauren Baker, and Sarah Davis, Glenbrook South High School, Glenview, IL

SPECIAL PROGRAMMING PRESENTED BY Labster

2677 Virtual Lab Simulations: Designing, Implementing and Experimenting

Streeterville LEVEL 3 • Technology in the Classroom • Demonstration (75 min) • HS, 2Y, 4Y

Uncover the strategy behind building virtual lab simulations, including key principles and elements, and hear about one professor's experience using simulations as a supplemental tool in their biology course.

Kayla Nicholson, Labster, Somerville, MA

2545 Who Isn't Talking: Student Status and Increasing Participation in the Science Practices

Superior A LEVEL 2 • Instructional Strategies • Hands-on Workshop (75 min) • ES, MS, HS

Participants reflect on students' classroom participation patterns: identifying students who are active participants, those who are not, and impact on those students' learning. Strategies for increasing participation will be shared.

Michele Cheyne, Knowles Teacher Initiative, Moorestown, NJ; Camden Hanzlick-Burton, Summit Public Schools - Sierra, Seattle, WA; Bernice O'Brien, Bainbridge High School, Bainbridge Island, WA; Lauren Kline, Joliet Central High School, Joliet, IL

2582 Avoiding Teaching Genetic Determinism: Model-based Reasoning that helps Students Understand Multifactorial Models of Genetic Inheritance

Superior B LEVEL 2 • Genetics • Hands-on Workshop (75 min) • HS, 4Y, GA

Come discuss and practice how to use and modify gene-to-trait models to teach students about multifactorial genetics with

the goal to reduce belief in genetic determinism among your students.

Paul Strode, Fairview High School, Boulder, CO and Brian Donovan, BSCS Science Learning, Colorado Springs, CO

2601 Argumentation and Explanation with the KLEWS Chart and CER

Wrigleyville LEVEL 3 • Instructional Strategies • Hands-on Workshop (75 min) • MS

This session explores how to use different student supports (CER Framework and KLEWS Chart) to use argumentation and explanations in the Biology classroom to richly engage students in inquiry-based activities.

Kelly Moore, Tennessee Tech University, Cookeville, TN

10:30 AM – 11:00 AM

2462 Using Mindfulness Practices in the Classroom

Arkansas LEVEL 2 • Instructional Strategies • Paper (30 min) • MS, HS, GA

Will student attitudes and biology comprehension increase with mindfulness practices in the classroom? Results of a semester-long study will be discussed, as well as some practices modeled with participants.

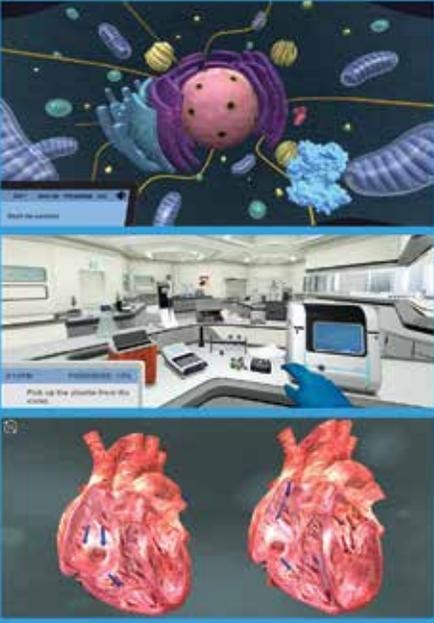
Erica Kosal, North Carolina Wesleyan College, Rocky Mount, NC

2673 HHMI BioInteractive Video Case Studies: Increasing Content Knowledge through Problem Solving

Chicago Ballroom X LEVEL 4 • Science Practices • Hands-on Workshop (30 min) • HS, 2Y, 4Y

BioInteractive's new interrupted video case studies engage learners in analyzing and interpreting data; obtaining, evaluating, and communicating information; and arguing from evidence in constructing explanations and solutions to real problems.

Katherine Ward, Aragon High School, San Mateo, CA



A million-dollar lab, one click away.

Labster virtual labs give students access to a realistic lab experience that will let them perform experiments and practice their skills in a fun and risk-free learning environment.

Visit our booth, or join one of our Saturday morning workshops, at the 2019 NABT Conference to learn more about Labster.

www.labster.com

Labster

10:30 AM – 11:00 AM continued

Professional Development Committee

Edgewater LEVEL 3 • Committee Meeting (30 min) • GA

Kristina Nicosia, Committee Chair

SPECIAL PROGRAMMING PRESENTED BY

3D Molecular Designs

2684 Amplify Your PCR Instruction with Hands-On Modeling

Colorado LEVEL 2 • Biotechnology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Work through cycles of PCR using engaging foam manipulatives that make an invisible process visible. Students demonstrate the role of Taq polymerase, primers and nucleotides as they copy target DNA.

Susan Auld, Sehome High School (3D Molecular Designs), Bellingham, WA

2533 Using “Darwin Cards” to Demonstrate the Amazing Power of Natural Selection

Erie LEVEL 2 • General Biology • Hands-on Workshop (30 min) • HS, 2Y

When students challenge evolution as being statistically impossible, this easy lab shows the power of natural selection and will make them revisit their statistics! Simple, low cost, and very effective.

Dave Sheldon, St. Clair County Community College, Port Huron, MI

2662 Open Forum: 2019 CED Questions Answered

Fountainview LEVEL 3 • AP Biology • Hands-on Workshop (30 min) • HS

After a couple months of using the 2019 CED, what questions do you still have? Come to this session for the opportunity to get your questions answered.

Catherine Walsh, College Board, New York, NY

2598 Science Con-Artists, Fake News, & the Credibility Game

Gold Coast LEVEL 3 • General Biology • Hands-on Workshop (30 min) • HS, GA

Efforts to usurp scientific authority abound. I present some strategies for teaching about the problem of credibility and expertise, and for developing skills in analyzing scientific claims in the media.

Douglas Allchin, University of Minnesota, St. Paul, MN

2599 Meeting Students Where They Are: Teaching Quantitative Biology in Community Colleges

Lakeview LEVEL 3 • General Biology • Demonstration (30 min) • 2Y

Interested in understanding where students need support in quantitative skills and what open education resources are available for faculty? Come learn about a project designed to explore these issues!

Vedham Karpakakunjaram, Montgomery College, Rockville, MD; Kristin Jenkins, BioQUEST, Boyds, MD; Stacey Kiser, Lane Community College, Eugene, OR

2495 Teaching Synaptic Neurotransmission Using Paper Models to Illustrate the Action of Dopamine, Opiates, and Narcan

Mayfair LEVEL 2 • Anatomy & Physiology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Teaching molecular pathways such as synaptic neurotransmission in A&P and AP Biology is challenging. This session provides a hands-on, paper model activity that illustrates the unfortunate, real-world application of opioid addiction.

Joe Krumm, Great Oaks Career Campuses, Milford, OH

2540 Biotechnology in American High Schools: Then and Now

Michigan A LEVEL 2 • Biotechnology • Paper (30 min) • HS, GA

This session will compare surveys of two generations of high school biology teachers, drawing insights from the data to map out future directions for biotechnology education.

Lindsay Barone, Cold Spring Harbor Laboratory - DNA Learning Center, Cold Spring Harbor, NY

Workshop Schedule
Saturday in Room Colorado

9:00-10:15	Dynamic DNA – One Model to Teach It All
10:30-11:00	Amplify Your PCR Instruction with Hands-On Modeling
2:00-3:15	A Microscopic to Molecular Perspective in Modeling Chromosomes

Exhibit Booth #420
3dmoleculardesigns.com

10:30 AM – 11:00 AM continued

2520 Proficiency Based Biology!

Michigan B LEVEL 2 • General Biology • Demonstration (30 min) • MS, HS

After completing one full year of a curriculum redesign, Stevenson High School biology teachers share the benefits and challenges in implementing proficiency-based assessments (4,3,2,1 scale) for the scientific practices.

Thomas Wolfe, Paige Lehman, Jenna Aronson, Kellie Dean, Kimberly Lubecke, and Abbie Lueken, Adlai E. Stevenson High School, Lincolnshire, IL

SPECIAL PROGRAMMING PRESENTED BY Vernier

2703 Speedy Spectroscopy

Missouri LEVEL 2 • General Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

We will demonstrate two quick and easy spectroscopy experiments that analyze plant pigment spectra and chlorophyll content in olive oil. Learn how to make spectroscopy easy and exciting for students.

John Melville, Vernier Software & Technology, Beaverton, OR

2503 Pacing Biological and Geological Time

Mississippi LEVEL 2 • Evolution • Demonstration (30 min) • HS, 2Y, 4Y

Get your students active and engaged by having them estimate how long ago major biological and geological events occurred over a 50 meter distance since the formation of the earth.

Tom Freeman, Esperanza High School, Anaheim, CA

2530 Statements Of Critical Significance (SOCS): Student Use and TA Perception of a Science Communication Tool

Ohio LEVEL 2 • Instructional Strategies • Paper (30 min) • 2Y, 4Y, GA

Do your students struggle extracting and using information from articles? This session describes instructor and students' perceptions of Statements Of Critical Significance, a technique to annotate references for lab reports.

Austin Leone and Donald French, Oklahoma State University, Stillwater, OK

SPECIAL PROGRAMMING PRESENTED BY Labster

2683 AR and VR Tool Utilization: A Pathway to Increase Access and Success in STEM Learning

Streeterville LEVEL 3 • Technology in the Classroom • Demonstration (30 min) • HS, 2Y, 4Y

Explore AR and VR lab simulations, including how this technology can mimic the laboratory environment and how simulations can be an effective tool to improve student access and learning outcomes.

Gina Marie Greco, Labster, Somerville, MA

2480 Sour to Sweet? Join a Flavor-Tripping Party for a Lesson on Cell Communication

Superior A LEVEL 2 • Instructional Strategies • Hands-on Workshop (30 min) • MS, HS, GA

Experience the magical properties of miracle berries firsthand and learn how to throw a flavor-tripping party for an engaging lab experience and lesson on cell communication, sensation, and perception.

Chris Chou, Longmont High School, Longmont, CO

2449 The Advantages of Teaching Evolution through a Misconception-Based Approach

Superior B LEVEL 2 • Evolution • Hands-on Workshop (30 min) • MS, HS

Interact with lessons that engage students with hands-on activities and real-world data so that they can construct their understanding of evolution in a way that inoculates them against misconceptions.

Brad Hoge, National Center for Science Education, Oakland, CA

2542 The Student Anxiety Experience: Clarifying the Causes and Modeling the Mediators

Wrigleyville LEVEL 3 • Instructional Strategies • Paper (30 min) • 2Y, 4Y

Many students report anxiety in large introductory biology classrooms. Come and see what students are saying causes them anxiety, and see how we are measuring factors that impact it.

Ben England, University of Tennessee, Knoxville, TN

11:15 AM – 12:30 PM

2586 Having a BLAST: Getting Comfortable Using Sequence Comparison Programs

Arkansas LEVEL 2 • AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Participants will go through exercises that will help them navigate with confidence various websites/software to compare DNA/protein sequences (such as BLAST) and determine evolutionary relationships based on sequence comparisons. BYOD

Dessislava Dimova, Franklin High School, Somerset, NJ and Pamela Close, D.H. Hickman High School, Columbia, MO

11:15 AM – 12:30 PM continued

2666 Teaching Population Dynamics with Data and HHMI BioInteractive

Chicago Ballroom X LEVEL 4 •

Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Use BioInteractive resources to teach concepts of exponential and logistic population growth. Students can apply this knowledge to a data-driven case study, demonstrating transfer of knowledge to a real-world scenario.

Abigail Kula, Mount St. Mary's University, Emmitsburg, MD and Kristine Grayson, University of Richmond, Richmond, VA

2631 March Mammal Madness: A Scientific Social Media Event Not To Miss!!

Gold Coast LEVEL 3 • Ecology / Environmental Science / Sustainability

• Hands-on Workshop (75 min) • MS, HS, GA

A behind-the-scenes look at the phenomena that promotes passion for placentals and models marsupial mania! Engage your students in exciting ways with March Mammal Madness! LET'S GET READY TO RUMBLE!

Todd Ryan, Westborough High School, Westborough, MA and Linda Correll, Kettle Run High School, Nokesville, VA

2466 Play with Complexity: Teaching the Patterns, System Dynamics, and Critical Experiments in Biology with Simulations

Lakeview LEVEL 3 • Science Practices • Hands-on Workshop (75 min) • HS, 2Y, GA

Come explore the dynamic systems found in biology, like logistic growth, feedback, self-regulation, and emergence. Learn how students can use simulations to investigate complex systems using illuminating cases.

Jon Darkow, Seneca East High School, Attica, OH

2657 Using Yeast Spheres to Explore the AP Biology Science Practices

Erie LEVEL 2 • AP Biology • Hands-on Workshop (75 min) • HS

Participants will engage in an instructional strategy that builds on AP Biology conceptual understanding and AP Biology science practices.

Ed Braddy, Saddlebrook Preparatory School, Wesley Chapel, FL and Mark Little, Broomfield High School (retired), Arvada, CO

2522 NGSS Practices: Engaging in Argument from Evidence

Fountainview LEVEL 3 • Instructional Strategies • Hands-on Workshop (75 min) • HS, 2Y, 4Y

How do you teach your students to defend the claims they make? Engage them in challenges, competitions, and debates!

Kristen Dotti, Verde Valley School, Sedona, AZ




MORE OBSERVATIONS INSTEAD OF CALIBRATIONS

Ideal for experiments in biology, ecology, and environmental science courses, the Go Direct® Optical Dissolved Oxygen Probe uses wireless and luminescent technologies to provide fast, easy, and accurate results.

ENTER TO WIN

Visit booth #511 for a chance to win a Go Direct Optical Dissolved Oxygen Probe

11:15 AM – 12:30 PM continued

2653 How Do Eggs Become Chickens or Other Living Things? A Cell and Developmental Biology NGSS-storyline

Mayfair **LEVEL 2** • General Biology • Hands-on Workshop (75 min) • ES, MS, HS

Explore the role of food, blood, and cells in embryo growth and development through a middle-school storyline focused on LS1 PEs. Experience how connections are made to other living things.

Barbara Hug, University of Illinois, Champaign, IL; Dawn Novak, Maple School, Northbrook, IL; Jamie Noll, Northwestern University, Evanston, IL

2531 Identification of Fresh Water Zooplankton Using DNA Barcoding

Michigan A **LEVEL 2** • Genetics • Demonstration (75 min) • HS, 2Y, 4Y

We will demonstrate how DNA barcoding can be embedded into undergraduate courses to generate publication quality data that contribute to faculty research and provide students with desirable laboratory skills.

Jie Ren, Donald French, Austin Leone, and Braylen Phelps, Oklahoma State University, Stillwater, OK

2643 Supporting AP Readiness with a Focus on Scientific Analytical Reading and Evidence-Based Writing

Michigan B **LEVEL 2** • AP Biology • Hands-on Workshop (75 min) • HS

Fuel AP readiness by learning how to engage students in authentic analytical reading and evidence-based writing opportunities. This will also include modeling of best practices for utilizing claim-evidence-reasoning instructional strategies.

Karen Lionberger, The College Board, Duluth, GA

SPECIAL PROGRAMMING PRESENTED BY Vernier

2702 Let's Get Physical: Human Physiology Experiments

Missouri **LEVEL 2** • Anatomy & Physiology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Get active and participate in hands-on experiments. Explore limb position, grip strength, spirometry, and EKGs/EMGs. Experiments are designed to encourage students to think about the physiology of human organ systems.

Sara Tallarovic, Vernier Software & Technology, Beaverton, OR

2581 Putting the Model in Modeling: Creating and Evaluating NGSS-driven Models for the Secondary Education Classroom

Mississippi **LEVEL 2** • Science Practices • Hands-on Workshop (75 min) • MS, HS, 2Y

Learn how to implement modeling as a means of authentic assessment. Participants will practice using a modeling rubric and leave with examples of model integration within a NGSS curriculum.

Amy Welch, Sonora High School, La Habra, CA and Ron Michelotti, Oxford Academy, Cypress, CA

2613 Using a Driving Question Board to Figure Out Phenomena in the Classroom

Ohio **LEVEL 2** • General Biology • Hands-on Workshop (75 min) • MS

I will share pictures, videos, and activities from my 9th grade biology class to illustrate how a driving question board can be used daily to support students in explaining phenomena.

Wendy Johnson, Kentwood Public Schools, Kentwood, MI

SPECIAL PROGRAMMING PRESENTED BY Labster

2682 Build Your Own Virtual Lab Simulation

Streeterville **LEVEL 3** • Technology in the Classroom • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Join Labster and be guided to create your own mini 3D learning simulation using an exciting prototype tool. Don't just listen, but create the future of learning with us.

Mark Fuller, Labster, Somerville, MA

2444 Teaching of Cell Respiration and Photosynthesis can be Energizing! Pun Intended.

Superior A **LEVEL 2** • Instructional Strategies • Demonstration (75 min) • HS, 2Y, 4Y

The teaching of bioenergetics processes should be tied to overarching principles that can help lead to understanding of biochemical processes that are found in the mitochondria and chloroplasts.

John Moore, Taylor University, Upland, IN

2463 Exploring Genetics Through Genetic Disorders

Superior B **LEVEL 2** • Genetics • Hands-on Workshop (75 min) • HS

In this new NGSS-designed unit, students apply concepts from basic genetics to understand how DNA variations lead to different phenotypes at the molecular, cellular, tissue, and organism levels. Free at <https://teach.genetics.utah.edu/>

Louisa Stark, Genetic Science Learning Center at the University of Utah, Salt Lake City, UT

2571 Empowering Teachers Through Flexibility: Remixing Digital Content in the Classroom

Wrigleyville **LEVEL 3** • Technology in the Classroom • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Give your students the opportunity to engage in the scientific process! The free LabXchange platform developed by Harvard allows teachers to remix content and increase flexibility in the classroom.

Tara Bennett Bristow, Mary Liu, Alia Qatarneh, Carlos Romero, and Jessica Silverman, LabXchange/Harvard University, Cambridge, MA

11:30 AM – 2:00 PM

NABT Honors Luncheon

Sheraton Ballroom III LEVEL 4 • Special Event (Tickets Required) • GA

Join us as we recognize the 2019 NABT Award recipients. This celebration honors exceptional biology teachers from all levels, and everyone is welcome to help us applaud these remarkable individuals.

Lab Skills: The Escape Room!

Chicago Ballroom VIII LEVEL 4 • General Biology • Special Event (Tickets Required) • GA

Experience an escape room like no other. Space is limited.

Tickets available at the Bio-Rad booth (booth number 508).



2:00 PM – 3:15 PM

2625 Influenza Outbreak Investigation: Utilizing Molecular Methods and Bioinformatics to Understand Diagnostics and Epidemiology

Arkansas LEVEL 2 • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y

Following an overview of immunology and antibody structure, an “influenza outbreak” prompts students to use ELISA, PCR, and BLAST vaccine sequence analysis to determine which patients are infected with influenza.

Jan Chalupny, Shoreline Community College, Shoreline, WA

2669 Nutrients in the Serengeti: Quantifying and Modeling Biogeochemical Cycles

Chicago Ballroom X LEVEL 4 • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Participants will experience a new HHMI BioInteractive resource that engages students with biogeochemical data and modeling. Through this hands-on activity, students also explore natural and anthropogenic impacts on nutrient cycling.

Tara Jo Holmberg, Northwestern Connecticut Community College, Winsted, CT; Scott Sowell, Darnell-Cookman Middle/High School, Jacksonville, FL; Mark Nielsen, HHMI, Chevy Chase, MD



**EMPOWERING
PEOPLE TO SAVE THE
NATURAL WORLD.**

PROFESSIONAL DEVELOPMENT

Fellowships and experiential in-field training in citizen science and trip leadership

EXCLUSIVE SCHOOL GROUPS

Customizable, scientist-led research expeditions for teachers and their students with travel support and 24/7 risk management

SUMMER TEEN TEAMS

Safe, fun, educational travel options for adventurous high school students seeking real field research opportunities

LEARN MORE

info@earthwatch.org | 1.800.776.0188
www.earthwatch.org

2:00 PM – 3:15 PM continued

**SPECIAL PROGRAMMING
PRESENTED BY
3D Molecular Designs**

**2685 A Microscopic to
Molecular Perspective in
Modeling Chromosomes**

Colorado LEVEL 2 • General Biology
• Hands-on Workshop (75 min) •
HS, 2Y, 4Y

Engage in hands-on explorations connecting microscopic and molecular characteristics of chromatin, chromosomes, mutations and more. Uncover student misconceptions about independent assortment, crossing over and other mechanisms contributing to genetic variation.

Karen Avery, Pennsylvania College of
Technology (3D Molecular Designs),
Williamsport, PA

NABT AP Biology Section Meeting

Edgewater LEVEL 3 • Committee
Meeting (75 min) • GA

**2591 LABS ALIVE! Free and
Low-cost Activities to Engage
Students with the Natural World**

Erie LEVEL 2 • General Biology
• Hands-on Workshop (75 min) •
ES, MS, HS

Join us for an entertaining session packed with ideas for working with plants along with some easy animal favorites. Numerous handouts for immediate use!

Theresa Holtzclaw and Fred Holtzclaw, Webb
School of Knoxville, Clinton, TN

**2585 Elephant Conservation:
Adding Context to Population
Growth Concepts**

Gold Coast LEVEL 3 • Ecology / Environmental
Science / Sustainability •
Hands-on Workshop (75 min) • HS, 2Y, 4Y

Learn about an activity for small or large-enrollment courses that not only teaches about population dynamics, like population growth models, but adds context by applying these concepts to elephant conservation.

Andrea Bierema, Michigan State University,
East Lansing, MI

**2569 ConnectedBio: Integrated 3D
Learning Across Multiple Levels of
Biological Organization**

Lakeview LEVEL 3 • Evolution •
Hands-on Workshop (75 min) • HS

Engage students in sensemaking using technology-enhanced lessons and hands-on manipulatives to teach evolution around a deer mouse case study that explores evolution through molecular, cellular, organismal, and population lenses.

Rebecca Brewer, Troy High School, Troy, MI;
Jimi McCusker, Ridley High School, Folsom,
PA; Tim Newman, Bishop O'Dowd High School,
Oakland, CA

**2474 Make a Case for Case Studies
in A&P Teaching**

Mayfair LEVEL 2 • Anatomy & Physiology •
Hands-on Workshop (75 min) •
HS, 2Y, 4Y

Case studies are stories that apply a theory or concept to real situations. This interactive session will show instructors how develop active-learning case studies for reinforcing A&P content.

Brian Shmaefsky, Lone Star College - Kingwood,
Kingwood, TX

**2532 Caturday Microbiomes -
Thinking Outside the Litter Box
With Danny and Lil Bub**

Michigan A LEVEL 2 • Biotechnology •
Hands-on Workshop (75 min) • HS, 2Y, 4Y

Learn how to investigate and compare the microbiomes of Lil Bub, a YouTube celebrity cat with several genetic abnormalities, and Danny, a normal house cat, using genome DNA sequencing data.

Sandra Porter, Shoreline Community College,
Seattle, WA

**2527 Using Case Studies in
Secondary School Settings:
Aligning Practice with
Pedagogical Theory**

Michigan B LEVEL 2 • General Biology •
Hands-on Workshop (75 min) • HS

This workshop is to examines how case studies can align with content standards and goals, highlight the nature of science, and create inclusion in diverse classroom settings.

Ally Hunter, UMass Amherst, Amherst, MA and
Mika Hunter Twietmeyer, Riverside High School,
Durham, NC

**2519 Investigating “Humanity”:
A Holistic, Hands-on Guided
Inquiry Approach to
Reconstructing Human Evolution**

Mississippi LEVEL 2 • Evolution •
Hands-on Workshop (75 min) • HS, 2Y, 4Y

We'll model an engaging, active-learning lesson through which high school and college students practice science with real data, develop critical thinking skills, consider bias, and have fun exploring biology.

Kirstin Milks, Bloomington High School South,
Bloomington, IN and Armin Moczek, Indiana
University, Bloomington, IN

**2568 Anchored Inquiry: Designing
Meaningful Instruction to Explore
Phenomena**

Ohio LEVEL 2 • General Biology •
Hands-on Workshop (75 min) • GA

Experience firsthand how the Anchored Inquiry instructional model can be used to design learning experiences that motivate students to engage with significant, real world phenomena and problems in biology!

Cindy Gay, BSCS Science Learning, Steamboat
Springs, CO

2:00 PM – 3:15 PM continued

**SPECIAL PROGRAMMING
PRESENTED BY
miniPCR**

2720 BioBits: Hands-on Tools to Visualize Transcription and Translation in Real-time

Streeterville LEVEL 3 • Biotechnology • Hands-on (75 min) • HS, 2Y, 4Y

This fast, simple, and uniquely engaging activity allows students to investigate the central dogma of molecular biology in a single class period. Just add DNA to BioBits, then watch them glow. Bring the central dogma to life!

Ally Huang, Bruce Bryan, and Robert Dennison, miniPCR, Cambridge, MA

2546 Increasing Engagement for All Students with Inclusive Low Floor, High Ceiling Tasks in Biology

Superior A LEVEL 2 • Curriculum Development • Hands-on Workshop (75 min) • ES, MS, HS

This session will allow participants to identify and utilize features of inclusive low floor, high ceiling tasks that increase access for all students. Structures for task modification will be shared.

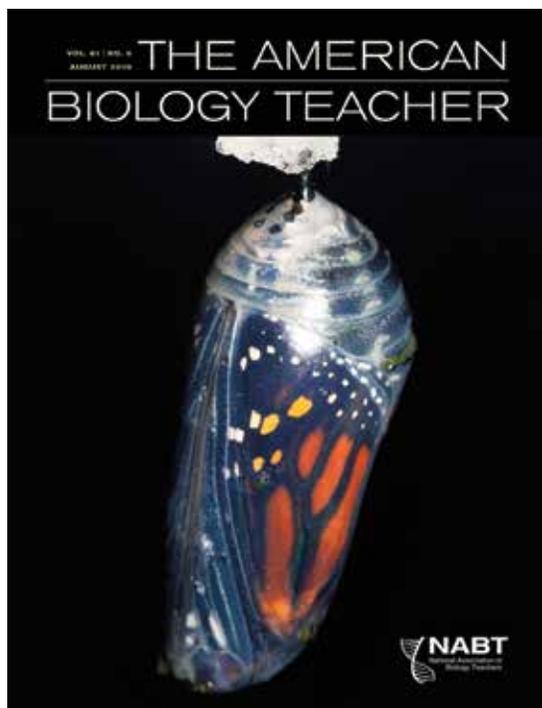
Michele Cheyne, Knowles Teacher Initiative, Moorestown, NJ; Camden Hanzlick-Burton, Summit Public Schools - Sierra, Seattle, WA; Bernice O'Brien, Bainbridge High School, Bainbridge Island, WA; Lauren Kline, Joliet Central High School, Joliet, IL

2488 Genetics and Ethics in the Age of CRISPR, Ancestry Testing, and Personalized Medicine

Superior B LEVEL 2 • Genetics • Hands-on Workshop (75 min) • HS, 2Y, 4Y

How might new advances in personal genetics impact our lives, our medical decisions, and society?

Robin Bowman and Dana Waring, Personal Genetics Education Project (pgEd), Boston, MA



University of California Press is proud to publish the official journal of the National Association of Biology Teachers

The American Biology Teacher is an award-winning, peer-refereed professional journal for K-16 biology teachers. Topics covered in the journal include modern biology content, teaching strategies for the classroom and laboratory, field activities, applications, professional development, social and ethical implications of biology and ways to incorporate such concerns into instructional programs, as well as reviews of books and classroom technology products.

ISSN: 0002-7685
eISSN: 1938-4211
Impact Factor: .276
Published: Monthly except June and July; combined Nov/Dec issue



abt.ucpress.edu

2:00 PM – 3:15 PM continued

2646 PlantingScience: Growing Students' Science Understanding Through Independent Investigations and Online Mentoring

Wrigleyville LEVEL 3 • Botany & Plant Biology • Hands-on Workshop (75 min) • MS, HS, 2Y

PlantingScience.org is a free online resource for teachers. Take part in activities showing how students' understanding of science grows using increasingly independent investigations supported by online mentoring by research scientists.

Catrina Adams, Botanical Society of America, St. Louis, MO and Aubrey Mikos, Ottawa Township High School, Ottawa, IL

3:30 PM – 4:00 PM

2549 Deadly Exposure

Arkansas LEVEL 2 • Microbiology & Cell Biology • Hands-on Workshop (30 min) • 2Y, 4Y, GA

The school has been exposed to a deadly pathogen. It is up to you to solve the microbiology puzzles and find the cure. Experience an "escape room" exercise in assessment!

Kathy Kresge and Sharon Lee-Bond, Northampton Community College, Bethlehem, PA

2667 Building System Models for Understanding Global Change

Chicago Ballroom X LEVEL 4 • Ecology / Environmental Science / Sustainability • Hands-on Workshop (30 min) • HS

Engage students with an interactive modeling tool from HHMI BioInteractive that illustrates how measurable changes to Earth system processes result from human and nonhuman activities.

David Hong, Diamond Bar High School, Diamond Bar, CA and Mark Nielsen, HHMI, Chevy Chase, MD

3:30 PM – 4:00 PM continued

Citizen Science & Informal Education Committee

Edgewater LEVEL 3 • Committee Meeting (30 min) • GA

Committee Chair TBD for 2020

2606 What I Learned in AP Biology: Prioritizing Science Practices to Support Students in Inclusion Classes

Erie LEVEL 2 • Instructional Strategies • Hands-on Workshop (30 min) • HS

The AP Biology redesign provides resources supporting student science practice--struggling students deserve the same experience. Come see strategies from advanced classes that work in inclusive, high-support classes for younger students.

Christina McKittrick, Oak Park and River Forest High School, Oak Park, IL

2725 Embracing Risks to Engage Students in an Increasingly Digital Learning Landscape

Gold Coast LEVEL 3 • Instructional Strategies • Paper (30 min) • 4Y

The winner of the *Four-Year Section's Biology Teaching Award* describes how he moved from interactive engagement to a blended/flipped course approach, and how student feedback was an integral part of the process.

Peter White, Michigan State University, East Lansing, MI

2453 Quantitative Electrophysiology with Invertebrates: A Student-led, Goal-directed Lab to Drive Problem-solving and Simulate Authentic Research

Lakeview LEVEL 3 • Neuroscience • Demonstration (30 min) • HS, 2Y, 4Y

Using off the shelf hardware and easily available software we will demonstrate how your students can design and conduct experiments generating quantitative neurophysiological data from many invertebrate species.

Jason Bruck and Donald French, Oklahoma State University, Stillwater, OK

2603 Using Mental Illness in Animals to Teach Evolution, Neurobiology, and Compassion

Mayfair LEVEL 2 • Evolution • Demonstration (30 min) • MS, HS, 4Y

This workshop will offer a species-spanning, comparative review of the disorders which commonly challenge the mental health of adolescents across the animal kingdom.

Barbara Natterson-Horowitz and Kathryn Bowers, Harvard University, Cambridge, MA

2448 Increase Engagement and Exam Scores in A&P

Michigan A LEVEL 2 • Anatomy & Physiology • Demonstration (30 min) • HS, 2Y, 4Y

We will show how we used freely available technology to increase engagement and exam scores in our A&P classes. These techniques could be used to help students learn anything.

Andrew Corless and Rene Lamontagna, Vincennes University, Vincennes, IN

2617 Come Draw Anatomy With Us! How You Can Implement Drawing into Your Anatomy Course!

Michigan B LEVEL 2 • Anatomy & Physiology • Hands-on Workshop (30 min) • 2Y, 4Y, GA

In this workshop, participants will learn how we have implemented drawing into our anatomy curriculum. Participants will draw their way through our workshop and leave with new ideas!

Lance Forshee and Nizhoni Marasco, Southern Utah University, Cedar City, UT

3:30 PM – 4:00 PM continued

**SPECIAL PROGRAMMING
PRESENTED BY
Packback**

**2700 The Power of Discussion
in Biology**

Missouri LEVEL 2 • Technology in the Classroom • Demonstration (30 min) • 2Y, 4Y

Bring discussion to your biology course with Packback! Packback delivers an easy-to-use and engaging discussion experience for students and instructors, with powerful support from automated moderation, sorting and scoring algorithms.

Jessica Gervais, Packback, Chicago, IL

**2437 You Don't Know It Until You
Can Explain It!**

Ohio LEVEL 2 • General Biology • Hands-on Workshop (30 min) • MS, HS, 4Y

Stevenson High School biology teachers share experiences of students constructing and generating their own understanding of DCI's through collaboratively explaining biological processes with cut-out pieces, video, and self-assessment.

Thomas Wolfe, Adlai E. Stevenson High School, Lincolnshire, IL

**2537 Equity & Access for All:
Developing a Life Science Course
for At-Risk Students**

Superior A LEVEL 2 • Instructional Strategies • Hands-on Workshop (30 min) • MS, HS, GA

This session will provide practical scaffolding strategies for an inclusion model Life Science Course that can be immediately implemented.

Ryan Lacson, Galena R2 Schools, Galena, MO and Catherine Walsh, The College Board, New York, NY

4:00 PM - 5:30 PM

**GENERAL SESSION
& PRESENTATION OF THE 2019 NABT DISTINGUISHED
SERVICE AWARD**

Bonnie Bassler

See page 9 for biography.

**A Conversation with Bonnie Bassler: Bacterial Communication
and Beyond**

Chicago Ballroom VI & VII LEVEL 4 • Special Speaker • GA

Dr. Bonnie Bassler is well known for her groundbreaking research on “quorum sensing,” the method in which bacteria communicate with each other using signal molecules. Quorum sensing allows bacteria to synchronize behavior on a population-wide scale, and this same mechanism holds the key to future medical therapies. Dr. Bassler is also an award-winning life science educator and dedicated advocate for promoting science to the public. In this interview-style presentation, Dr. Bassler will discuss the research conducted in her lab, while also sharing insights from her own classroom. You’ll learn what excites her and what she wishes everyone knew about science in their daily lives. Have your questions ready for this interactive – and sure to be engaging – session with Dr. Bassler.

NABT is proud to name Dr. Bonnie Bassler the recipient of the 2019 Distinguished Service Award for Enhancing Education through Biological Research.

A special thanks to Ms. Ann Brokaw for serving as the moderator for this session.

3:30 PM – 4:00 PM continued

**2523 Acceptance, Understanding
& Experience: Exploring Obstacles
to Evolution Education Among
Advanced Placement Teachers**

Superior B LEVEL 2 • Evolution • Paper (30 min) • HS, 2Y, 4Y

Where do AP teachers fall when it comes to expectations versus reality in teaching evolution? This study suggests assumptions about AP alignment to the science community sometimes miss the mark.

Amanda Glaze, Georgia Southern University, Statesboro, GA

**2539 Incorporating Sustainable
Development into the Biology
Classroom**

Wrigleyville LEVEL 3 • Ecology / Environmental Science / Sustainability • Hands-on Workshop (30 min) • HS, 2Y, 4Y

This session will introduce the U.N. Sustainable Development Goals and help attendees find ways to engage students in sustainable development in the biology classroom.

Tamrya d'Artenay, Penn State Shenango, Sharon, PA

4:15 PM – 4:30 PM

**Announcement of 2019 Poster
Competition Winners**

Chicago Ballroom VI & VIII LEVEL 4 • Special Event (15 min) • GA

Join us for this special announcement of the student winners of the *Biology Education Research* and *Mentored Undergraduate Research Competitions*.

5:30 PM – 8:30 PM

**Chicago City Lights Architecture
River Tour**

Offsite • Special Event (Tickets Required) • GA

Join us for one final evening in Chicago to experience the city's legendary architecture on a special evening cruise (operated by Wendella). This tour is Chicago's Original Architecture Tour®, focusing on Chicago's rich architectural heritage and history. Tickets include food, drinks, and a tour through the heart of the city with a professional architecture guide.

The cruise will depart promptly at 6:00 PM. Shuttle will depart from the lobby, or walk the short distance to the cruise departure location.