



THURSDAY
November 13

#MABT2014

7:00am – 8:15am

First Timers' Breakfast

T Room 26B • Special Program
Tickets Required • GA

NABT Conference **first timers** are invited to learn more about the association and the Professional Development Conference over a complimentary breakfast. Each table will have an NABT mentor available to answer your questions and help you make the most of your time in Cleveland.

The NABT First Timers' Breakfast is made possible through the generous support of



10:15am – 1:00pm

#557 Introducing and Exploring the Nature of Science

Room 25B • Hands-on Workshop
• Instructional Strategies/Tech-
nologies • HS 2Y 4Y

This session presents an overview of the nature of science (NOS) as featured in the NGSS and is designed as an introduction for teachers to this complex but generally neglected topic. We will briefly examine the role of NOS in the NGSS and then consider nine specific elements that should be featured in science teaching. In the second hour of this workshop we will shift to a more exploratory mode and examine some of these NOS principles from the perspective of how they might be included in classroom settings. Some of the strategies will be addressed using hands-on strategies that will be referred to and/or experienced firsthand. Participants are advised to attend both sections of this workshop since the two elements are

designed together to provide the most complete overview of this important topic.

William McComas (mccomas@uark.edu),
University of Arkansas, Fayetteville, AR
and John Moore (jhmoore@taylor.edu),
Taylor University, Upland, IN

8:30am – 9:30am

GENERAL SESSION

Stanley Prusiner, M.D.

See page 8 for biography.

Madness and Memory

Grand Ballroom A •
Special Speaker

Dr. Prusiner will discuss his book, *Madness and Memory: The Discovery of Prions—A New Biological Principle of Disease*. He tells the remarkable story of his discovery of prions – infectious proteins that replicate and cause disease but surprisingly contain no genetic material – and reveals how superb and meticulous science is actually practiced with talented teams of researchers who persevere. He recounts the frustrations and rewards of years of research and offers fascinating portraits of his peers as they raced to discover the causes of fatal brain diseases. Prusiner's hypothesis, once considered heresy, now stands as accepted science and the basis for developing diagnoses and eventual cures. He closes with a meditation on the legacy of his discovery: What will it take to cure Alzheimer's, Parkinson's, Lou Gehrig's and other devastating diseases of the brain?

Dr. Prusiner will be available to sign copies of *Madness and Memory: The Discovery of Prions—A New Biological Principle of Disease* immediately after his presentation.

10:15am – 11:30am

#ES1 BIO Principles – Innovation and Value: All in One Place

Room 3 • Demonstration (75 min)
• General Biology • HS 2Y 4Y GA

BIO Principles is a next-generation learning space that offers quality content in a dynamic and engaging format—all in one place and at an affordable price—made possible through partnership between Wiley and OpenStax College.

Bonnie Roth (broth@wiley.com), Wiley,
Hoboken, NJ

Committee Meeting: Finance Committee

Room 7

George Sellers
(georges1524@gmail.com),
Committee Chair

#586 AP Biology

Room 9 • Hands-on Workshop
(75 min) • AP Biology • HS

Join two experienced AP teachers for a lively session designed to help students incorporate Science Practices and learn more biology. We'll use modeling, mathematics and inquiry techniques, and share hints for resources, assessments, and test prep.

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

#689 Engaging Students in Thinking Like Scientists Jointly Presented by BSCS & Carolina Biological

Room 10 • Hands-on Workshop
(75 min) • General Biology • MS HS

Learn how science practices can engage students in thinking and working the way scientists do. Using an interactive experience, consider how to increase students'

abbrev.
key

- GA:** General Audience
- E:** Elementary
- JH:** Middle/Jr. High School
- HS:** High School
- 2C:** Two-Year College
- 4C:** Four-Year College
- ES:** Exhibitor Session

THURSDAY
November 13

THURSDAY
November 13

10:15am – 11:30am

continued

understanding of science through simple changes to activities you already do.

Paul Numedahl (pnumedahl@bscs.org),
BSCS, Colorado Springs, CO

#538 Which Way Did the DNA Go? Fun with Electrophoresis!

Room 11 • Hands-on Workshop (75 min) • Biotechnology • MS HS 2Y

Which Way Did the DNA Go? Fun with Electrophoresis! demonstrates biotechnology concepts and techniques in a hands-on way! In addition, we will share tips and resources to help implement biotechnology in the classroom. For middle and high school teachers and others.

Barbara Bielec (barbara.bielec@btci.org),
BTC Institute, Madison, WI

#514 Addressing the Unique Needs of Diverse Learners, Particularly Those with Learning Disabilities, in Biology Curricula.

Room 12 • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • HS 2Y 4Y

Every classroom across the world contains students who have a range of learning styles. A student may be an abstract or concrete learner; a visual or auditory learner; learn best in a tactile/kinesthetic manner; have strengths or weaknesses in reading comprehension and/or writing ability; the possibilities are as diverse as the students in the course. Meeting the needs of each learning style can be a particular challenge in a biology course. This presentation will introduce specific techniques that may be beneficial to all students, yet are essential for students with learning disabilities.

Abigail Littlefield (alittlefield@landmark.edu), Landmark College, Putney, VT

#512 Affordable Anatomy

Room 13 • Hands-on Workshop (75 min) • Anatomy & Physiology • MS HS GA

Participants will complete several hands-on, affordable anatomy activities. These engaging activities are student driven, and can be completed in classrooms of varying sizes and levels using common household materials.

Laura Woerner (laura_woerner@montgomeryacademy.org), The Montgomery Academy, Montgomery, AL

#506 Comparing Faculty Use of Clicker Technology Across the Disciplines: A Comparative Study

Room 14 (Session A) • Paper (30 min) • Instructional Strategies/Technologies • 2Y 4Y

Personal response devices (clickers) are one means through which undergraduate students can be engaged in large biology classrooms. We present data comparing faculty use of clickers in a variety of disciplines at a large SE university.

Grant Gardner (Grant.Gardner@mtsu.edu), Middle Tennessee State University, Murfreesboro, TN

#530 Research@PRISMS: Learning to Inquire = Inquiring to Learn

Room 14 (Session B) • Paper (30 min) • Instructional Strategies/Technologies • HS 2Y 4Y

The Princeton International School of Mathematics and Science (PRISMS) is founded with authentic research and global studies at the very core of its curriculum. We present our research-based design, distinct features of our model, and experiences.

Steven Rogg
(Steven.Rogg@PRISMSus.org),
Princeton International School of
Mathematics & Science, Princeton, NJ

#ES2 Comparative Vertebrate Anatomy with Carolina's Perfect Solution

Room 15 • Hands-on Workshop (75 min) • Anatomy & Physiology • HS 2Y 4Y

Participate in hands-on, guided dissections featuring 4 different vertebrates: a Carosafe® shark and Carolina's Perfect Solution® frog, rat, and pig. Participants will have the opportunity to dissect the vertebrate of their choice, compare it to other specimens, and then explore various similarities and differences. Great door prizes included!

Angela White
(ashley.faucette@carolina.com),
Carolina Biological Supply Company,
Burlington, NC

#ES3 Using Cell Modeling to Understand Cells and Microscopy

Room 16 • Hands-on Workshop (75 min) • Microbiology & Cell Biology • E MS HS 2Y 4Y GA

We will be viewing and then modeling specific cells. Teachers will get hands-on experience in how this active and inclusive approach leads to a better understanding of both cell structure and microscopy.

Dawn Tamarkin (dawn@cellzone.org),
Cell Zone, Springfield, MA

#ES4 Lend Some Color to Your Spectrometry Labs

Room 17 • Hands-on Workshop (75 min) • General Biology • HS 2Y 4Y

Perform these labs with flying colors: Emission spectra of light sources and effect on photosynthetic rates; Absorbance spectra of plant pigments; and Photosynthesis w/DPIP. Be tickled pink to learn how you can do all this and more with one apparatus!

Mark Little, PASCO scientific,
Roseville, CA

NABT Biology Education Research Symposium

Thursday, November 13 • 1:15pm – 4:00pm • Room 25A

SCHEDULED PRESENTATIONS:

Preservice Teachers' Use of Content Knowledge to Inform Formative Assessment Strategies in an Integrated Life Sciences Methods Course

Jaime Sabel, Cory Forbes & Laura Zangori, University of Nebraska, Lincoln, NE

Undergraduate students who are preservice elementary teachers need to learn essential science concepts as well as how to apply those concepts to elementary science learning environments. In order to effectively engage students in scientific practices and connect students' ideas about science to appropriate instructional strategies, teachers should learn and engage in high-leverage instructional practices such as formative assessment. However, teachers may not understand formative assessment or have enough science content knowledge to effectively engage in the practice. To address this concern, we developed an innovative course for elementary preservice teachers built upon two pillars – life science content and formative assessment. Students learned essential biological science content and learned to connect that content knowledge to essential concepts in the biological sciences as defined in the K-12 science standards. In addition, the focus on formative assessment allowed preservice teachers to engage in identifying and responding to students' ideas. Here, we will present results of an embedded mixed methods study designed to evaluate the effect of this intervention on preservice teachers' content knowledge and ability to engage in formative assessment for science.

Producing Learner-Centered Future Faculty: FIRST IV – A Uniquely Effective Program of Professional Development

D. Ebert-May, Michigan State University, East Lansing, MI; T.L. Derting, Murray State University, Murray, KY; T. Henkel, Valdosta State University, Valdosta, GA; J. Middlemis Maher, University of Wisconsin-Madison, Madison, WI; B. Arnold, Illinois College, Jacksonville, IL; H.A Passmore, Murray State University, Murray, KY; & J.L. Momsen, North Dakota University, Grand Forks, ND

Challenges in training faculty in inquiry-based, learner-centered instruction include empirically evaluating the efficacy of training in teaching and sustaining long-term support for change. *Faculty Institutes for Reforming Science Teaching* (FIRST IV) provided new approaches to professional development in biology instruction for postdoctoral scholars. The goal was to develop early-career faculty who value and implement evidence-based pedagogies that facilitate learning. We report the activities and outcomes of FIRST IV, using comprehensive evidence derived from expert reviews of participants' teaching, self-reported data from participants and students, and comparisons with non-project faculty. Participants completed a workshop twice in two years, followed by teaching an entire or partial course at their institution and sustained mentoring by STEM education experts. Postdocs showed belief in learner-centered teaching, and 74% taught using primarily learner-centered practices. We followed a subset of participants into their first faculty positions and quantified how their instructional design and student assessments differed from a colleague at the same institution. External review of teaching indicated that FIRST IV faculty practiced significantly more learner-centered instruction and used more collaborative learning than their colleagues. We conclude that the FIRST IV model offers significant and unique contributions to current challenges in professional development in STEM education.

To What Extent is the Established Conceptual Framework of Animal Behavior used in Textbooks and the Primary Literature?

Andrea M.-K. Bierema, Baker College, Flint, MI & Renee' S. Schwartz, Georgia State University, Atlanta, GA

In 1963, Tinbergen revolutionized the study of animal behavior in his paper *On Aims and Methods of Ethology* (*Zeitschrift Tierpsychologie*, 20, p.410) by revamping the conceptual framework of the discipline. His framework suggests an integration of four questions: causation, ontogeny, survival value, and evolution. AAAS (2010) stated in their *Vision and Change in Undergraduate Biology Education* report that alignment between biological undergraduate education and current research should exist. Unfortunately, alignment has been rarely studied in college biology. The purpose of this study, therefore, is to determine if the conceptual framework used by animal behavior scientists, as presented in current primary literature, aligns with what students are exposed to in undergraduate biology education. Four popular textbooks and primary literature articles underwent

content analysis in order to determine the extent that each of Tinbergen's four questions. It was discovered that both textbooks and articles covered primarily only two of Tinbergen's questions (survival value and causation). Therefore, neither textbooks nor current primary literature uses the conceptual framework as intended. Utilizing an integrated framework within textbooks and teaching this framework is recommended in order to increase the number of scientists in the next generation that study evolution and ontogeny of behavior.

Using Concept Maps to Measure Undergraduates' Nature of Science Conceptions During a Biology Course

Leah J. Cook, Renee Schwartz, Andrea Bierema & Sarah Krajewski, Western Michigan University, Kalamazoo, MI

This study explored changes in undergraduates' cognitive structures of nature of science, as represented through concept maps, during a non-majors biology course. Understanding nature of science is part of being scientifically literate. We target the following aspects of nature of science: tentative, creative, subjective, empirical, observations and inferences, theories and laws, socio/cultural influences. Also targeted is the notion that there are multiple methods of scientific investigations. These aspects are related to each other, yet students often struggle to see and describe such connections. Explicit/reflective nature of science instruction was taught within an undergraduate biology course focused on cells, genetics, and molecular processes. A series of four concept-mapping tasks was used through the semester to determine what concepts were integrated into students' cognitive structure about nature of science. The concepts maps allowed the researchers to identify the progression of how participants represented nature of science and relationships among aspects throughout the course. Students increased the nature of science concepts they included in their maps, but the overall structures did not change significantly. By tracking the progression of student understanding from this study, the nature of science conceptual understanding of undergraduate, non-majors may impact future classrooms and future curriculum needs.

Effects on Self-Efficacy and Self-Regulated Learning

Michele J. Mann & Christopher Golubski, University of Texas, Austin, TX

Using the *Motivated Strategies for Learning Questionnaire* (MSLQ), scores were evaluated at the beginning and end of the semester in an entry-level biology course for biology majors comparing if the students had taken the Advanced Placement (AP) Biology test. The students that scored a 2 or 4 on the AP Biology test had a statistically significant decrease in MSLQ pre and post test scores than the students that did not take the AP Biology test, even though there was a trend upward in MSLQ for increasing AP scores in general. Students that took AP test in biology, calculus and/or chemistry had a higher GPA and better performance in the first term biology course for majors. The higher the students scored on the AP tests the higher their self-efficacy and their overall MSLQ scores. Knowing which students will potentially have MSLQ scores that will decrease during a semester helps professors identify students needing more encouragement and support. Students that are capable and interested in biology should have access to the degree.

Faculty and Student Perceptions of Learning in an Inquiry-Based Introductory Biology Course

Susann Yang, Presbyterian College, Clinton, SC & Tarren Shaw, University of Oklahoma, Norman, OK

The benefits of active learning and inquiry-based instruction are well documented, though adoption of these practices face opposition from both faculty and students. We recently implemented a multi-section inquiry introductory biology curriculum at a small liberal arts college. The course utilized common instructional and assessment tools, and was taught by multiple instructors of varying experience with active learning strategies. These changes were met with some resistance; in particular, major concerns among faculty were that common assessments would not be fair to all students, and that students perceive the increased difficulty of the course as undesirable. Faculty and student perceptions of the course were both positive and negative. We found that negative perceptions of the course during implementation do not fully match the learning gains and perception of learning gains at the completion of the course. We did not find evidence that common assessments were unfair. Furthermore, we found that students did recognize progress in their abilities to think critically. We use our findings to propose interventions tailored to improve faculty and student experiences in the future.

Special Guest Presenter:

Ellen Goldey, Wofford College, Spartanburg, SC
Recipient of the 2014 NABT Four-Year College & University Section Research in Biology Teaching Award

10:15am – 11:30am

continued

**#ES5 Mixing It Up:
Combining Digital and
Hands-On Biology Lesson**

Room 18 • Hands-on Workshop
(75 min) • General Biology •
MS HS 2Y 4Y

In this workshop, teachers will experience digital simulations and connected hands-on activities related to a fundamental biological concepts like diffusion and osmosis and cell signaling.

Chris Nutting (chris.nutting@vwr.com),
Ward's Science, Rochester, NY

**#653 20 in 20...The Next
Generation**

Room 19 • Hands-on Workshop
(75 min) • General Biology • MS
HS GA

The next generation of 20 exciting, informative 20-minute activities to enhance Biology courses. New and exciting activities to help make your classes more student centered and inquiry based.

Whitney Hagins
(whitney.hagins@massbio.org),
Massachusetts Biotechnology
Foundation, Cambridge, MA

**#540 Inspired by Nature:
Exploring Renewable Energy
Solutions Based on Biological
Principles**

Room 20 • Hands-on Workshop
(75 min) • General Biology • HS
2Y GA

Learn about energy technologies such as artificial photosynthesis and solar fuel production, anaerobic respiration and electricity generation, and the use of biomimicry in the design of renewable energy technologies.

Dana Haine (dhaine@unc.edu), UNC-
Chapel Hill, Chapel Hill, NC

**#619 Teaching Fundamental
Neuroscience Concepts
Through an Interactive,
Problem-Solving Approach**

Room 21 • Hands-on Workshop
(75 min) • General Biology •
HS, GA, 2Y

Experience neuroscience education materials developed by a multi-disciplinary team of software developers, teachers, scientists, and educational researchers. (Please bring a tablet to experience the software.)

Jared Jackson (jared@is3d-online.com), IS3D, Athens, GA, Georgia
Hodges (georgiahodges@uga.edu) and
Tom Robertson (tomrob@uga.edu),
University of Georgia, Athens, GA

**#601 Analysis of NGSS
for Genetics Concepts:
Implications for
Implementation**

Room 22 (Session A) • Paper
(30 min) • Genetics • GA

A comprehensive analysis of the Next Generation Science Standards for coverage of genetics reveals strengths and weaknesses in the NGSS and raises concerns about fidelity of implementation.

Katherine Lontok (klontok@ashg.org)
and Michael Dougherty (mdougherty@ashg.org), American Society for Human
Genetics, Bethesda, MD

**#636 Geniverse: Science
Practices in a Web-Based
Game Environment for
Genetics**

Room 22 (Session B) • Paper
(30 min) • Genetics • MS HS 2Y

Geniverse is a game-like environment for immersive learning of genetics. We will report on our analyses of argumentation assessments compared to control classrooms, and on how teachers support learning, persistence and engagement with *Geniverse*.

Frieda Reichsman
(freichsman@concord.org), The Concord
Consortium, Concord, MA

**#ES6 The MiniOne:
A Complete Electrophoresis
Experience**

Room 23 • Hands-on Workshop
(75 min) • Biotechnology • MS HS
2Y GA

The MiniOne™ delivers the complete, real-time electrophoresis experience in the palm of your hand. Separate, view and even take a picture of DNA bands within a single class period. It is a game-changer for teaching molecular biology in the classroom.

Richard Chan (info@theminione.com),
The MiniOne Electrophoresis,
San Diego, CA

**#543 Tree-Thinking:
A Models-Based Approach to
Teaching Evolution**

Room 24 • Hands-on Workshop
(75 min) • Evolution • HS GA

Evolution is an important, but frequently misunderstood process. This session will present a "tree-thinking" approach to teaching evolution that addresses misconceptions, and engages students in data analysis, scientific modeling, and discussion.

Samuel Holloway
(holloway_samuel@svvsd.org), Lyons
Middle / Senior High School, Lyons, CO
and Isaac Stewart
(stewarti@fisher.k12.il.us)
Fisher High School, Fisher, IL

**#555 NCSE Presents: Being
a Science Advocate in Your
Classroom and Community**

Room 25A • Hands-on Workshop
(75 min) • Evolution • E MS HS

Controversy in the classroom? What can you do when evolution, climate change, or other scientific topics are under attack? The National Center for Science Education (NSCE) has practical advice, hands-on activities, and resources to help you.

Ann Reid (reid@ncse.com),
National Center for Science Education,
Oakland, CA

10:15am – 11:30am

continued

#701 The Blended Learning Cycle

Room 25C • Demonstration (75 min) • Instructional Strategies & Technologies • MS HS 2Y 4Y GA

Blending instruction in a lab-based classroom is difficult but not impossible. I'll show you how to make the shift by combining elements of the learning cycle with blended instruction by sharing several tools I have used to shift from a passive, teacher-centered learning environment to an active, student-centered learning environment.

Paul Andersen
(paul@bozemanscience.com),
Bozeman High School, Bozeman, MT

#696 HHMI Presents: Fossil and Genetic Evidence of Human Evolution

Room 26B • Hands-On Workshop (75 min) • Evolution • HS 2Y 4Y

Discover free classroom-ready activities, animations, and interactives for teaching about the origin of humans and how our species continues to evolve in changing environments. Be among the first to learn about our latest short films and videos.

David Knuffke, Deer Park High School,
Deer Park, NY and Laura Bonetta,
Howard Hughes Medical Institute, Chevy
Chase, MD

#642 PULSE Programs & Products for Facilitating Implementation of Vision and Change Recommendations

Room 26C • Symposium • General Biology • 2Y 4Y

Updates on PULSE projects include online professional development workshops, virtual resource toolbox, departmental self-study rubrics and certification, Ambassadors who assist departments with implementation, and regional networks for collaboration.

Karen Klyczek (karen.k.klyczek@uwrf.edu), University of Wisconsin-River Falls, River Falls, WI; Sharon Gusky (sgusky@nwcc.edu), Northwestern Connecticut Community College, Winsted, CT; and Taylor Allen (taylor.allen@oberlin.edu), Oberlin College, Oberlin, OH

11:45am – 4:00pm

NABT AP Biology Symposium

Room 25C • Special Program • Instructional Strategies/Technologies • HS 2Y 4Y

Learn short activities that use Wisconsin Fast Plants to teach selection and phenotypic variation that occurs through sexual reproduction. Then use resampling and simulation to help students develop statistical skills to address the increased emphasis on quantitative skills and their application throughout biology education. Designed for AP Biology, this symposium will enhance your teaching in other courses as well.

Designing and Conducting Selection Experiments with Wisconsin Fast Plants

(11:45am – 1:00pm)

In this interactive session, we will explore considerations for effectively conducting selection inquiries with Fast Plants. You will compare a variety of data collected from investigations that involved manipulating environmental variables and selectively breeding (artificial selection). We will take an in-depth look at types of data students can generate — using Fast Plants — to build evidence-based explanations for core concepts linked to variation, natural selection, and evolution.

Hedi Baxter Lauffer
(hfbaxter@wisc.edu) and Dan Lauffer (dlauffer@wisc.edu),
University of Wisconsin-Madison, Madison, WI

Developing Quantitative Skills for Artificial Selection Experiments

(2:00pm - 4:00pm)

Bring your own computer with a spreadsheet application. We will explore strategies and ideas for helping our students develop quantitative analysis skills specific to artificial selection experiments. Using data from actual experiments we will explore data presentation, data analysis, and hypothesis testing. In addition to regular statistical tests such as t-tests we will also explore the use of computer based resampling and simulation which students often find to be more intuitive than statistical formulae. This presentation is particularly suited for *AP Biology Laboratory 1 - Artificial Selection*.

Brad Williamson, University of Kansas, Lawrence, KS

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

11:45am – 1:00pm

#E57 BIO Concepts—Innovation and Value in Biology

Room 3 • Demonstration (75 min) • General Biology • HS 2Y 4Y

BIO Concepts is a next-generation learning space for non-majors Biology that

offers quality content in a dynamic and engaging format—all in one place and at an affordable price—made possible through partnership between Wiley and OpenStax College.

Clay Stone (cstone@wiley.com),
Wiley, Hoboken, NJ

11:45am – 1:00pm

continued

#578 Co-Evolution in the High School Classroom: Constructing and Applying Phylogenies to Interpret Plant and Pollinator Interactions

Room 9 (Session A) • Paper (30 min) • AP Biology • HS 2Y

Incorporating phylogenetics facilitates student understanding of evolutionary relationships. Using flowering plants, participants construct morphological and molecular phylogenetic trees. Modifications for differing classroom contexts are shared.

Jacob Landis (jblandis@ufl.edu), University of Florida, Gainesville, FL; Jennifer Broo (jsunderman@saintursula.org), St. Ursula Academy, Cincinnati, OH; Jessica Mahoney (jessica.mahoney@ocps.net), Edgewater High School, Orlando, FL; and Julie Bokor, (julie@cpet.ufl.edu), University of Florida, Gainesville, FL

#552 Teaching the Big Ideas with Models of Operons

Room 9 (Session B) • Demonstration (30 min) • AP Biology • HS 2Y 4Y

An activity will be presented that engages students in model-based reasoning, requiring them to predict the behavior of the *trp* and *lac* operons under different conditions. Students apply the AP Framework's Big Ideas to account for operon behavior.

Robert A. Cooper, Pennsbury High School, Fairless Hills, PA

#690 BSCS and The Botanical Society of America Presents: Engaging Students in STEM-oriented Investigations with *PlantingScience*

Room 10 • Demonstration (75 min) • Plant Biology • MS HS 4Y

This session will explore www.plantingscience.org, a free research-based online opportunity for students and scientists to collaborate on original student-led projects.

Jane Larson (jlarson@bscs.org), BSCS, Colorado Springs, CO and Catrina Adams (cadams@botany.org), Botanical Society of America, St. Louis, MO

#664 "Build a Baby—What Will My Baby Look Like?"

Room 11 • Hands-on Workshop (75 min) • Genetics • HS MS

This inquiry based activity allows students to visualize the difficult concept of gene expression, inheritance and mutations. These abstract concepts can be intertwined in one activity making it student centered and engaging students in a great co-operative learning experience.

Shubhada Bhamre, Plum School District, Oakmont, PA

#588 Flipping Out! How Far We've Come and How Far We Have Left to Go

Room 12 • Paper (75 min) • Instructional Strategies/Technologies • 2Y 4Y GA

We present our ongoing quest to modify a student-centered, inquiry based introductory biology class using the flipped method. The data collected and compiled over three semesters includes: observations, student reflections, and assessments.

Michael Moore (michael.e.moore@okstate.edu) and Donald French (dfrench@okstate.edu), Oklahoma State University, Stillwater, OK

#502 Simulate STEM Online Through Virtual Clinical Trials

Room 13 (Session A) • Demonstration (30 min) • Anatomy & Physiology • MS HS GA

Expose high school students to scientific and biomedical engineering practices using FREE online simulations that engage students in technology while designing authentic neuroscience-based clinical trials. Built in assessment notebook.

Kristi Bowling (kristi.bowling@rice.edu), Rice University Center for Technology in Teaching and Learning, Houston, TX

#618 Using Interactive Simulations to Engage and Immerse Students in the Molecular World of Biology

Room 13 (Session B) • Demonstration (30 Min) • General Biology • HS 2Y GA

Learn how to integrate interactive simulations in your classroom to engage students in their learning. This new software enables students to learn biological processes by applying key concepts to build biological systems. Bring a tablet.

Jared Jackson (jared@is3d-online.com) and David Ducrest (david@is3d.com), IS3D, Athens, GA, and Georgia Hodges, (georghodges@uga.edu) University of Georgia, Athens, GA

#602 Finding Out What Your Students Know...Literacy in the Science Classroom

Room 14 • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • MS HS

What do your students know? How can you find out? Lets talk about how to better practice reading, writing, and talking about science every day. Reading comprehension; scientific reasoning, and citing evidence from data practice included.

Mary Busbee (mary.busbee@sccboe.org), St. Clair County High School, Odenville, AL

#ES8 Adaptations for Lab-Based Online Biology Courses

Room 15 • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • 2Y 4Y

Science education has been challenged by the demands and rapid growth of online education. The use of lab kits as part of a hands-on, inquiry approach to online courses will accomplish the essential skills and learning outcomes. This session explores prospective ideas for a hands-on, inquiry model for online labs.

Norma Hollebeke (ashley.faucette@carolina.com), Carolina Biological Supply Company, Burlington, NC

Cutting-edge Technology for Biology Experiments



NEW Go Wireless™ Temp

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- Great for use with iPad® and iPhone®
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- Indoor and outdoor use

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Vernier Optical DO Probe

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- Submersible

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- Measures photosynthetic light in air and water
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- Submersible

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| FRIDAY, NOVEMBER 14 – ROOM #15 | |
|--------------------------------|--|
| 10:15 – 11:30 am | Inquiry-Based Biology with Vernier |
| 1:00 – 2:15 pm | Field Biology with Vernier |
| 2:30 – 3:45 pm | Introduction to Biofuels with Vernier and Bio-Rad Laboratories |

Visit us at Booth **409** and **ENTER TO WIN**
a LabQuest 2 interface!



11:45am – 1:00pm

continued

#ES9 Driving Change in Biology Education

Room 16 • Demonstration (75 min) • General Biology • HS 2Y 4Y

Discover and discuss an affordable textbook alternative for college level biology that increases access, engagement, and effectiveness for students and supports you in teaching the way you want to—without adding to your workload.

Lydia LeStar (lydia.lestar@macmillan.com), Nature Education, Cambridge, MA

#ES10 Get Pumped Up with Human Physiology using PASCO Probeware

Room 17 • Hands-on Workshop (75 min) • Anatomy & Physiology • 2Y 4Y

Get your finger on the pulse of Physiology with PASCO's SPARKvue software. Your heart will race with excitement when you collect data with our EKG, blood pressure, heart rate and other sensors. You're a heartbeat away from making class come alive!

Mark Little, PASCO scientific, Roseville, CA

#ES11 Inquiry Tips for AP Bio

Room 18 • Hands-on Workshop (75 min) • AP Biology • HS

During this workshop, we'll present a typical "tried and true" AP Bio lab activity and discuss some possible ways to incorporate inquiry into the lesson.

Michelle Pagani (michelle.pagani@vwr.com), Ward's Science, Rochester, NY

#646 Organelle of the Day

Room 19 • Hands-on Workshop (75 min) • General Biology • MS HS

An innovative approach to teaching and learning about cell structure and function while using proper microscope technique. Digital cameras and iPads are used to document student work.

Whitney Hagins, Massachusetts Biotechnology Foundation, Cambridge, MA

#583 Wading Into Water Chemistry and Biology

Room 20 • Symposium • General Biology • HS 2Y 4Y

Join us in a hands-on exploration of the chemical and physical properties of water, and how water influences the way proteins fold into their final tertiary structure.

Tim Herman (herman@msoe.edu) and Diane Munzenmaier, Milwaukee School of Engineering Center for BioMolecular Modeling, Milwaukee, WI

#639 "Speak Up!" — Incorporating Discourse into Your Life Science Classroom Instruction

Room 21 • Demonstration (75 min) • General Biology • MS HS 2Y

Discourse tools allow teachers to assess scientific thinking both formatively and summatively. We will model strategies that build confidence, deepen student partnerships, and foster risk-taking as we promote scientific argumentation from evidence.

Cheryl Hach (chach@kamsc.k12.mi.us), Kalamazoo Area Math and Science Center, Kalamazoo, MI and Roberta Cramer (robby_cramer@msta-mich.org), Michigan Science Teachers Association, Grand Haven, MI

#563 Top 10: Genetics and Biotechnology Discoveries 2014

Room 22 • Paper (75 min) • Biotechnology • MS HS

Want to use cool new science to engage your students? This discussion based on the 2013 Biotechnology Guidebook is designed to make recent findings in biotechnology both understandable and applicable. Findings are presented in brief vignettes.

Neil Lamb, HudsonAlpha Institute for Biotechnology, Huntsville, AL

#ES12 Effortlessly Integrate Inquiry with Glowing Bacteria

Room 23 • Hands-on Workshop (75 min) • Biotechnology • HS 2Y

Learn new ways to advance inquiry from guided to open. Establish a strategy

that integrates essential and real-world scientific practices that will encourage your students to direct the scientific investigation using the glowing bacteria from pGLO™.

Leigh Brown (Leigh_brown@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

#621 Telling Short Stories: Bring Science in the News to Life

Room 24 (Session A) • Demonstration (30 min) • General Biology • 2Y 4Y GA

Vignettes about new science discoveries brings the curriculum alive for students. The stories spark interest in topics, stimulate student creativity and imagination, and foster critical thinking. Stories introduce students to the wonders of science.

Elizabeth Cowles (cowlese@easternct.edu), Eastern Connecticut State University, Willimantic, CT

#603 Understanding Evidence for Evolution – Create a Rotating Lab

Room 24 (Session B) • Demonstration (30 min) • Evolution • MS HS 4Y

Students explore fossils, bones, DNA sequences and more! In this activity students observe multiple lines of evidence that all converge to support the theory of evolution by natural selection. This lab is flexible based on materials that you have.

Jennifer Katcher (jkatcher@pima.edu), Pima Community College, Tucson, AZ

#695 HHMI Presents: Great Transitions in Evolution

Room 26B • Hands-on Workshop (75 min) • Evolution • HS 2Y 4Y

Learn what transitional fossils reveal about the evolutionary history of life on our planet with free ready-to-use resources from BiolInteractive. They include new online interactives, hands-on activities, and a brand new short documentary film.

Mark Eberhard, St. Clair High School, St. Clair, MI and Laura Bonetta, Howard Hughes Medical Institute, Chevy Chase, MD

11:45am – 1:00pm

continued

**#656 ASM Presents:
Microbiology Testing in the
Pharmaceutical Industry**

Room 26C • Paper (75 min) •
Microbiology & Cell Biology • HS,
2Y, 4Y

This presentation will describe the role of microbiologists in the pharmaceutical industry and how STEM education prepares students for diverse careers. Attendees will learn how microbiologists help ensure pharmaceutical products meet regulatory requirements for sterility, endotoxin, and non-viable particulates. The presenter will describe test methods, environmental monitoring of production, investigation of procedural deviations, and what happens when results are out of specification.

Jon Kallay, Ben Venue Laboratories,
Bedford, OH

Presented as part of the
American Society of Microbiology's
Symposium *Stem and the Clinical
Microbiologist*

1:15pm – 4:00pm

**NABT Biology Education
Research Symposium**

Room 25A • Special Program
(150 min) • Instructional Strategies/
Technologies • HS 2Y 4Y GA

You are invited to the *6th Annual Biology Education Research Symposium*. Presentations were accepted through a double blind review process that was open to biology educators and researchers at all levels. Full abstracts are available in the program and proceedings will be posted online.

See page 27 for abstracts.

**NABT Global Perspectives
Committee 2014 Poster
Session & Discussion Panel**

Room 25B • Special Program (150
min) • Global Perspective • GA

The NABT Global Perspectives Committee is proud to present this year's conference session focused on *Promoting Global Sustainability in the Teaching and Learning of Biology*.

See the following page for more details.

1:15pm – 2:30pm

**#ES13 Adaptive Practice
for Better Assessments in
Human Biology**

Room 3 • Demonstration (75
min) • Instructional Strategies/
Technologies • HS 2Y 4Y GA

WileyPLUS with ORION tracks aggregate and individual student proficiency at the objective or chapter level. With these analytics, you can see where your students excel and where they need reinforcement so that you can tailor instruction accordingly.

Bonnie Roth (broth@wiley.com), Wiley,
Hoboken, NJ

**Committee Meeting:
Awards Committee**

Room 7

Priya DasSarma (PDasSarma@som.
umaryland.edu), Committee Chair

OBTA Directors Meeting

Room 7

Mark Little (mark.little@bvsvd.edu),
Committee Chair

#568 Biology by the Numbers

Room 9 • Hands-on Workshop (75
min) • Instructional Strategies/
Technologies • HS 2Y 4Y

This session focuses on helping students master quantitative skills for biology. We will explore inquiry activities that use real data, tools for graphing, and modeling

to increase student confidence and skills. This workshop is offered by BioQUEST.

Kristin Jenkins, Sam Donovan, and
Stacey Kiser, BioQUEST, Madison, WI

**#648 Case Studies for
Teaching about Ecosystem
Services and Biodiversity
Conservation**

Room 10 (Session A) • Paper
(30 min) • Environment/Ecology •
2Y 4Y GA

Students often do not connect biodiversity decline with loss of ecosystem services. Case studies will be explored to provide examples of how protecting ecosystems and their services are vital to human health and material needs.

Kathy Gallucci, Elon University, Elon, NC

**#546 Engaging Activities for
Introductory Biology**

Room 10 (Session B) •
Demonstration (30 min) • General
Biology • MS HS

An interactive session sharing activities and formative assessments that appeal to reluctant, unengaged learners. Use easily obtainable materials to reinforce key concepts and keep students active.

Joe Evans (jevans@kent.k12.md.us),
Kent County High School, Worton, MD

**#561 They Come in Pairs:
Using Socks to Identify
and Address Student
Misconceptions about
Chromosomes**

Room 11 • Hands-on Workshop
(75 min) • General Biology •
MS HS

Misconceptions about chromosome behavior make grasping genetics concepts challenging. Dig into how to identify and address many of those misconceptions utilizing socks.

Madelene Loftin and Jennifer
Garden, HudsonAlpha Institute for
Biotechnology, Huntsville, AL

*Presented in partnership with
Carolina Biological Supply Company*

**THURSDAY
November 13**



THURSDAY
November 13

**NABT Global Perspective Committee's 2nd Annual
POSTER SESSION & PANEL DISCUSSION**
Promoting Global Sustainability in the Teaching and Learning of Biology

Room 25B

1:15pm – 1:45pm Poster Introductions (1 minute presentations)

1:45pm – 3:00pm Poster Viewing and Conversation

3:00pm – 4:00pm PANEL DISCUSSION

Moderator:

Dr. Kathleen Fadigan – Assistant Professor of Science Education, The Pennsylvania State University, Abington

Panel Members:

Dr. Carlos de la Rosa – Director, La Selva Biological Station, Organization for Tropical Studies (OTS), Costa Rica

Dr. Martin Linder – Professor, Biology and Geography Education, Martin-Luther University, Germany

Dr. Jacqueline McLaughlin – Associate Professor of Biology; Founding Director, CHANCE, The Pennsylvania State University, Lehigh Valley

POSTER PRESENTATIONS

Climate Change and Student Research: Real Data, Real Science, Real Actions

Carlos de la Rosa, La Selva Biological Station, Organization for Tropical Studies (OTS), La Selva, Costa Rica

Global Sustainability Leadership for Future Teachers

Kathleen Fadigan, The Pennsylvania State University, Abington, PA

Epistemological Shift: Teaching a Well-Rounded Person

Gus Gregorutti, Andrews University, Berrien Springs, MI & Humboldt University, Berlin, Germany

Foliar Bacteria Decrease Tree Seedling Performance in a Tropical Rain Forest: Research in Tandem with the CHANCE Undergraduate Program in Panama

Eric Griffin, J. N. Pruitt, and W. P. Carson, University of Pittsburgh, Pittsburgh, PA and S. J. Wright, Smithsonian Tropical Research Institute, Balboa, Panama

Buen Vivir - Implications and Perspectives of a New Trend in Teaching Sustainability?

Martin Linder, Anne Lindau, and Anna V. Gruenewaldt, Martin-Luther University, Halle-Wittenberg, Germany

Using Active Learning in an International Field Experience to Develop Global Sustainability Awareness

Karen Kackley, Eileen Grodziak, and Vinod Jeyaretnam, The Pennsylvania State University, Lehigh Valley, PA

THE COMMONS: A Multi-Year Program to Engage All Students in Global Sustainability

Sarah Mallory, Nickie Cauthen, and Melinda Pomeroy-Black, LaGrange College, La Grange, GA

Penn State CHANCE: Impacting Student Learning, Attitudes, Behaviors, and Career Choices through Real-World Conservation Experiences

Jacqueline McLaughlin, CHANCE and The Pennsylvania State University, Lehigh Valley, PA

Living Like a Black Bear: Teaching for Sustainability

Peter McLean, St. Andrew's School, Middletown, DE

EPICS - Developing a Living Laboratory Model for Sustainability at Penn State Schuylkill

Darcy Medica, The Pennsylvania State University, Schuylkill Valley, PA

Field Experience in Costa Rica Creates a Phenological Monitoring Project

Cinda Murray, Northwestern High School, Albion, PA

Authentic Conservation Experiences at San San Beach Create Depth of Knowledge About Sea Turtle Conservation

Cinda Murray, Northwestern High School, Albion, PA

Teaching, Research, and Industry Partnerships to Advance Global Scientific Understanding in Chile through the National Science Foundation GK-12 Program

Kim Cleary Sadler, Rachel Lytle, Tony Farone, and Mary Farone, Middle Tennessee State University, Murfreesboro, TN

1:15pm – 2:30pm

continued

#675 Get Out of Your Seat and Learn on Your Feet!

Room 12 • Paper (75 min)
• Instructional Strategies/
Technologies • HS 2Y 4Y

Join us as we demonstrate role-playing activities designed to get your students out of their seats and actively engaged in learning key concepts and processes in biology!

Caroline McNutt (cmcnutt@schoolcraft.edu), Stacey Gray (sgray@schoolcraft.edu), Kristin Fruth (kfruth@schoolcraft.edu) and Patti Crowley-Harpenau (pcrowley@schoolcraft.edu), Schoolcraft College, Livonia, MI

#ES14 Flinn Scientific Favorite Biology Lab Activities and Games

Room 13 • Hands-on Workshop (75 min) • General Biology • MS HS

Students learn faster and better when involved in fun, hands-on activities that create learning opportunities. Join Flinn as we share biology-based inquiry labs, demonstrations and games you can use to motivate your students.

Jennifer Sternberg (djoness@flinnsci.com), Flinn Scientific, Batavia, IL

#ES15 CSI In the Classroom: STEM Approach to Biology

Room 14 • Hands-on Workshop (75 min) • General Biology • MS HS 2Y 4Y

Discover how STEM can be integrated into your biology curriculum to engage your students. Join a unique hands-on experience with Nasco's *Cause of Death Autopsy Kit*, incorporating forensic science and biology to learn about mammalian structure.

Jordan Nelson (jnelson@enasco.com), Nasco, Fort Atkinson, WI

#ES16 Evolving Enzymes: Bioinformatics, Enzymes, and Inquiry in Your AP Biology® Classroom

Room 15 • Hands-on Workshop (75 min) • AP Biology • HS 2Y 4Y

Looking for inquiry activities for AP® Biology? Enrich your students' experience with unique solutions from Carolina designed to align with the College Board curriculum. As you go hands-on with our new *Evolving Enzymes* activity, you'll also have an opportunity to discuss other laboratory activities and best practices with your peers.

Angela White (ashley.faucette@carolina.com), Carolina Biological Supply Company, Burlington, NC

#ES17 Driving Change in Biology Education

Room 16 • Demonstration (75 min) • General Biology • HS 2Y 4Y

Discover and discuss an affordable textbook alternative for college level biology that increases access, engagement, and effectiveness for students and supports you in teaching the way you want to - without adding to your workload.

Lydia LeStar (lydia.lestar@macmillan.com), Nature Education, Cambridge, MA

#ES18 How To Turn Your iPad® into a Mobile Science Lab

Room 17 • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • GA

Turn the tables on your tablet in (or out of) your lab with PASCO sensors and SPARKvue HD software. Transform lessons with this practical session using a SPARKlab to show how easy it is to integrate technology into hands-on, inquiry investigations.

Ryan Reardon (droofner@pasco.com), PASCO scientific, Roseville, CA

#ES19 Maximize Your Biotech Budget and Simplify Your Prep

Room 18 • Hands-on Workshop (75 min) • Biotechnology • MS HS 2Y 4Y GA

Learn how to prep gels months in advance, teach genotype/phenotype with dyes, and analyze gels in minutes not hours. We'll do it all with the context of a real human disease that will help make it more meaningful for your students.

Liam Casey (liam_casey@vwr.com), Ward's Science, Rochester, NY

#638 Integrating Math in a Biology Classroom

Room 19 • Hands-on Workshop (75 min) • General Biology • MS HS GA

Explore student-driven activities that cover key biological concepts and integrate math practices identified in the NGSS and CCSS. Students practice data analysis, graphing, and scale through an experiment, a series dilution, and a microbe mural.

Sahid Rosado Lausell, Chandana Jasti, and Barbara Hug, Project NEURON, Champaign, IL

#613 Real Time Assessment of Critical Thinking and Problem-Solving Skills in the Biology Classroom

Room 21 • Hands-on Workshop • General Biology • HS 4Y GA

Attendees will use software that presents fundamental biology concepts in the context of solving real-world problems, and see how student performance can be assessed in real time by teachers. Please bring your own device (laptop or tablet).

David Ducrest (david@is3D.com), IS3D, Athens, GA, Tom Robertson (tomrob@uga.edu) and Georgia Hodges (georgiahodges@uga.edu), University of Georgia, Athens, GA

THURSDAY
November 13

1:15pm – 2:30pm

continued

#625 How Are Genes Moved?

Room 22 • Hands-on Workshop (75 min) • Biotechnology • HS

Do you need strategies to make complicated biotechnology techniques more understandable to high school students? Join us for activities that help explain the concepts behind genetic engineering. FREE materials.

Pam Snyder (PSnyder5396@gmail.com), Columbus City Schools/Ft. Hayes Career Center, Columbus, OH

Sponsored by the Ohio Soybean Council

#ES20 Bats, iPads And Citizen Science in the Classroom

Room 23 • Hands-on Workshop (75 min) • Environment/Ecology • E MS HS 2Y 4Y GA

See how the Echo Meter Touch, an iPad®/ iPhone®-powered bat detector/recorder/ analyzer can open the amazing world of bats and bioacoustics. Learn how Bat Conservation International's *Discover Bats!* curriculum guide is used with the Echo Meter Touch.

Sherwood Snyder (sherwood@wildlifeacoustics.com), Wildlife Acoustics, Inc., Maynard, MA

#630 Engaging in Argumentation: Why GREEN is Green

Room 24 • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • HS 4Y GA

Participants will be engaged in the process of argumentation and constructing arguments while understanding the basis for color recognition using both simple devices and spectrometers.

Jay Meyers (jay.meyers@sjsd.k12.mo.us), St. Joseph School District, Saint Joseph, MO

#694 HHMI Presents: Implementing Statistics in the Biology Classroom

Room 26B • Hands-on Workshop • Instructional Strategies/ Technologies • HS 2Y 4Y

This workshop will provide participants with free classroom-ready resources and strategies for incorporating math and statistics into their biology classroom in line with AP and IB Biology, NGSS, the Common Core, and Vision-and-Change.

Ann Brokaw (abrokaw44@gmail.com), Rocky River High School, Rocky River, OH and Sandra Blumenrath (blumenraths@hhmi.org), Howard Hughes Medical Institute, Chevy Chase, MD

#655 ASM Presents: Antimicrobial Resistance Detection in the Clinical Laboratory

Room 26C • Paper • Microbiology & Cell Biology • HS 2Y 4Y

This presentation will describe ongoing research efforts in the detection of microorganisms resistant to antimicrobial agents. The presentation will focus on development of methods to improve detection and testing sensitivity.

Sandra Richter, Cleveland Clinic, Cleveland, OH

Presented as part of the American Society of Microbiology's Symposium *Stem and the Clinical Microbiologist*

2:45pm – 4:00pm

#ES21 Spot Test for BPA in Store Receipts

Room 3 • Hands-on Workshop (75 min) • Biotechnology • MS HS 2Y

BPA (bisphenol A) is an estrogen mimic that appears in plastic and epoxy-lined food and drink containers. But, ordinary store receipts may have 200,000 X that level. Our "BPAAssay" is a teal to lavender spot test for BPA ideal for classroom use.

William Ward (wward@brighterideasinc.com), Brighter Ideas, Inc. and Rutgers University, North Brunswick, NJ

Committee Meeting: ABT Advisory Committee

Room 7

William McComas (ABTeditor@nabt.org), Committee Chair

#549 Free Online Stem Cell Curriculum: A Menu of Options for Any Class

Room 9 • Demonstration (75 min) • General Biology • HS 2Y

California's stem cell agency, a UC Berkeley team and high school teachers created a five-module stem cell curriculum. This workshop will walk through how the menu of activities can be fit into the existing standards, and two new modules fit the NGSS.

Don Gibbons, California Institute for Regenerative Medicine, San Francisco, CA

#ES22 Skeletons in the Classroom: Basics of Osteology

Room 10 • Hands-on Workshop (75 min) • Anatomy & Physiology • HS 2Y

In this hands-on workshop, you will learn the basics of osteology using Bone Clones® skeletal reproductions. Attendees will gain knowledge of human and mammalian osteology and ideas of lessons that may be created using Bone Clones® replicas.

Michelle Tabencki (michelle@bone-clones.com), Bone Clones, Canoga Park, CA

#669 Genes, the Environment, and Me: Glucose Balance and Type 2 Diabetes

Room 11 • Demonstration (75 min) • General Biology • MS HS GA

Type 2 Diabetes provides a context for learning concepts like homeostasis and how genes and environment determine

Biotechnology Explorer™

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New Fish DNA Barcoding Kit

Visit Us at Booth #505

Free hands-on workshops!

Having a hard time infusing student-driven inquiry and STEM into your labs? Join us for rich discussion and **hands-on learning** around **student-centered learning experiences** in the biology classroom. We have the tools and support to help you make it happen. Check out our fun new workshops!

For more information on workshop descriptions and schedules, visit us at explorer.bio-rad.com/workshops.

NABT Cleveland Workshop Schedule

Join us and our partners for these great workshops.

Thursday November 13

11:45 AM – 1:00 PM Room 23

Effortlessly Integrate Inquiry with Glowing Bacteria (AP Big Idea 3)

Friday November 14

10:15 – 11:30 AM Room 24

Investigating Animal Behavior with C. elegans (AP Big Ideas 1, 2, 3, and 4)

A special presentation by Cindy Gay of Steamboat Springs High School, Colorado

2:30 – 3:45 PM Room 15

Introduction to Biofuels with Vernier and Bio-Rad Laboratories

Saturday November 15

11:30 AM – 12:45 PM Room 24

Fixing the Need for a Nicotine Fix: Exploring Novel Methods in Treating Drug Addiction!

A special presentation by Tamica Stubbs of Phillip O. Berry Academy of Technology High School, North Carolina



Visit us on the Web at explorer.bio-rad.com
Call toll free at 1-800-424-6723;
outside the U.S., contact your local sales office.

BIO-RAD

2:45pm – 4:00pm

continued

our traits. This new curriculum explores physiological, behavioral, and social factors that affect glucose balance and diabetes risk.

Joan Griswold (jcgriez@uw.edu) and Maureen Munn (mmunn@uw.edu), University of Washington, Seattle, WA

#612 NGSS and Standards Based Grading: The Perfect Match

Room 12 (Session A) • Paper (30 min) • Instructional Strategies/Technologies • MS HS

Assessing NGSS performance expectations will require that students have multiple assessment opportunities to demonstrate their understanding of these expectations. Come and see how formative assessments and SBG can be the perfect fit to NGSS.

Jim Clark (healthandmedicinejclark@yahoo.com) and Samantha Johnson (Samantha.johnson2@gmail.com), Arroyo High School, San Lorenzo, CA

#585 Fun with Formative Assessment (Yes, We Said Fun!)

Room 12 (Session B) • Paper (30 min) • Instructional Strategies/Technologies • 2Y GA

How do you know if your students understand the concepts you are teaching? How do you assess their skills and understanding before an exam? We will provide you with some quick and fun ways to assess learning in your classroom.

Sharon Lee-Bond (slee-bond@northampton.edu) and Kathy Kresge (kkresge@northampton.edu), Northampton Community College, Bethlehem, PA

#ES23 Biology for the Informed Citizen

Room 13 • Hands-on Workshop (75 min) • General Biology • HS 2Y 4Y

Oxford University Press author Donna Bozzone will be discussing her recently published non-majors Biology textbook *Biology For The Informed Citizen*.

Donna Bozzone (dbozzone@smcvt.edu), St. Michael's College, Colchester, VT

#ES24 Backyard Brains: Revealing the Body's Electrical Signals

Room 14 • Demonstration (75 min) • Neuroscience • MS HS 2Y 4Y

Do you want to bring neuroscience experiments into your classroom but cannot figure how or why? We are here to help with our experiments on insects and humans. See the signals of neurons, muscles, and your heart.

Timothy Marzullo (tim@backyardbrains.com), Backyard Brains, Ann Arbor, MI

#ES25 DNA Barcoding: Independent Student-Driven Inquiry

Room 15 • Hands-on Workshop (75 min) • AP Biology • HS 2Y 4Y

Need a new activity for AP® Biology, genetics, or molecular biology? Unlock the power of DNA barcodes right in your classroom and take student research to a new level. Using a simple protocol, students investigate the biodiversity of plants, mammals, fish, insects, and fungi.

Bruce Nash, Cold Spring Harbor Laboratory DNA Learning Center, Cold Spring Harbor, NY

Presented in partnership with Carolina Biological Supply Company

#ES26 Capturing Student Interest with Digital Interactivity

Room 16 • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • 2Y 4Y

Join an exploration of digital activities in biology courses by viewing interactives created by biology educators and designing your own interactive within a small group. Interactives will be shared prior to a brief conclusion and parting message.

Hannah Robus (hannah.robus@saplinglearning.com), Sapling Learning, Austin, TX

#ES27 The Struggle to Feed the World

Room 17 • Hands-on Workshop (75 min) • Environment/Ecology • MS HS 2Y

Participants complete lessons found on GrowNextGen.org that challenge students to analyze insect populations in real world applications. A panel of experts discuss soybeans and potential threats to their growth. Additional web curriculum explored.

Carol Warkentien (carol@educationprojects.org), Education Projects & Partnerships, Worthington, OH

#ES28 Simple Straight-Forward Probeware for Biology

Room 18 • Hands-on Workshop (75 min) • General Biology • MS HS

Come experience our new Ward's DataHub, a multi-functional probeware solution for Biology and Environmental Science. You'll find that data collection can be smart and simple with the right equipment.

Kelly Smith (kelly.smith@vwr.com), Ward's Science, Rochester, NY

2:45pm – 4:00pm

continued

#626 Integrating Biology and Physics: Lessons on Light and Sight

Room 19 • Hands-on Workshop (75 min) • General Biology • MS HS 2Y

Our workshop engages participants in several activities that could be integrated into a course map organized by conceptual ideas (as suggested in NGSS). Here we show an interdisciplinary example of color perception within biology and physics.

Hillary Lauren (lauren1@illinois.edu), Chandana Jasti (cjasti@illinois.edu), and Barbara Hug (bhug@illinois.edu), University of Illinois at Urbana-Champaign, Champaign, IL

#573 Teach Marine Biology Instead of Biology to NGSS Standards & Ocean Principles

Room 20 • Hands-on Workshop (75 min) • Marine Biology • MS HS 2Y

Comprehensive biology course focusing on marine life; teaching all required, various state/national biology standards! Includes lesson plans, labs, activities, games, web inter-actives/web-quests. Course components tried & test scores were exemplary.

Mark Friedman (Marklewisfriedman@gmail.com), Animo Leadership/Green Dot Public Schools, Inglewood, CA

#580 The ABCD's of Modeling: An NGSS Authentic Practice of Science

Room 21 • Hands-on Workshop (75 min) • General Biology • GA

Teachers will be introduced to four different modeling activities to engage students in an exploration of how models are used as an authentic practice of science.

Tim Herman (herman@msoe.edu) and Diane Munzenmaier, Milwaukee School of Engineering Center for BioMolecular Modeling, Milwaukee, WI

#593 Introduction to Epigenetics

Room 22 • Hands-on Workshop (75 min) • Genetics • HS 2Y GA

Experience an activity that promotes student learning about epigenetics and the role of diet, lifestyle and the environment in influencing gene expression within an individual and in some cases across generations.

Dana Haine (dhaine@unc.edu), UNC-Chapel Hill, Chapel Hill, NC

#ES29 Molecular Evolution: What Can Dogs Teach Us?

Room 23 • Hands-on Workshop (75 min) • Evolution • HS 2Y 4Y

FOTODYNE makes it possible to demonstrate the principles of evolution by looking at the DNA. Use electrophoresis to count the number of DNA differences of seven modern dog breeds and the gray wolf, their wild ancestor, then build a phylogenetic tree.

Theresa Dlugi (t.dlugi@fotodyne.com), FOTODYNE Inc., Hartland, WI

#681 SSE Presents: Say Hello to the Junco! Learning Evolution & Science with a Remarkable Backyard Bird

Room 24 • Demonstration (75 min) • Evolution • 4Y, HS, GA

Introduce yourself to one of North America's most common & abundant—yet amazing & diverse—groups of songbirds. Our science film brings students along on an international quest to understand evolution, behavior, ecology, & genetics. www.juncoproject.org.

Jonathan Atwell (jwatwell@indiana.edu), Indiana University, Bloomington, IN

#693 HHMI Presents: Good Cells Gone Bad: The Genetics of Cancer

Room 26B • Hands-on Workshop (75 min) • Genetics • HS 2Y 4Y

Learn how to use cancer to teach core cell biology and genetics concepts including genetic mutations, gene regulation, the cell cycle, and cell signaling pathways. Receive

HHMI's free, classroom-ready resources for high schools and college courses.

Melissa Csikari (csikarimm@staffordschools.net), Colonial Forge High School, Stafford, VA and Megan Stine (stinem@hhmi.org), Howard Hughes Medical Institute, Chevy Chase, MD

#654 ASM Presents: Lab Safety and Bioterrorism Readiness Curricula

Room 26C • Paper • Microbiology & Cell Biology • HS 2Y 4Y

Laboratory personnel need continuing education training to be well prepared for emergency situations ranging from bioterrorism to pandemics. This presentation will discuss hands-on and active learning strategies for training clinical staff.

Christopher Woolverton, Kent State University, Kent, OH

Presented as part of the American Society of Microbiology's Symposium *Stem and the Clinical Microbiologist*

4:00pm – 7:00pm

Exhibit Hall Opening Reception

Hall A • Special Event

You are the guest of honor at this special opening reception showcasing the NABT exhibitor community. The NABT Exhibit Hall is the place to enhance your teaching with the latest and greatest tools and technologies, programs and resources. Mix business with pleasure by scoping out products, visiting with your favorite partners and meeting some new ones! The Exhibit Hall is all about exploration, and with a treasure hunt and special display from the Greater Cleveland Aquarium, this is not an event you want to miss!

Reception Sponsored by

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EDUCATION



THURSDAY
November 13

4:00pm – 7:00pm

**Undergraduate Education
Poster Session**

Hall A • Special Event

See the following page for full listing of poster titles and authors.

7:00pm – 9:00pm

**Four-Year College &
University Section Reception**

Room 4 • Special Event

Join faculty, education researchers, graduate students, and others who make four-year colleges and universities their professional home. Network with colleagues and friends (and make new ones) at this popular reception.

Sponsored by

WILEY

**Two-Year College Section
Reception**

Room 5 • Special Event

Two-year college students are only as unique as their instructors. Share your challenges, epiphenies, and best practices with other two-year and community college teachers who “get it.” The winner of the *Two-Year College Biology Teaching* and *Prof. Chan Teaching Award* will also be announced.

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AP Biology Section Reception
Room 6 • Special Event

You know the big ideas and your students are learning the enduring understandings. But what about that exam? And the labs? Meet other AP Biology teachers in this informal reception to network, share questions, and insight. You may even finally meet some of your favorite fellow AP teachers in person.



AMERICAN
SOCIETY FOR
MICROBIOLOGY

ASM PRESENTS

**Microbiology Testing in the Pharmaceutical
Industry**

Jon Kallay, Ben Venue Laboratories, Bedford, OH

THURS NOV 13, 11:45 AM-1:00 PM | ROOM TWENTY-SIX C

**Antimicrobial Resistance Detection in the Clinical
Laboratory**

Sandra Richter, Cleveland Clinic, Cleveland, OH

THURS NOV 13, 1:15-2:30 PM | ROOM TWENTY-SIX C

Lab Safety and the Bioterrorism Readiness Curricula

Christopher Woolverton, Kent State University, Kent, OH

THURS NOV 13, 2:45-4:00 PM | ROOM TWENTY-SIX C

www.asm.org/educators

Visit booth #518 to learn about
our latest K-12 Outreach Activities!

POSTER TITLES AND AUTHORS

1. An Authentic Undergraduate Research Experience: Development and Maintenance of Student Identities

Jennifer A. Mraz, Chandrani Mishra, Kristy L. Halverson, Carrie J. Boyce, and Laila Ali, The University of Southern Mississippi, Hattiesburg, MS

2. A Biology Module for the Integrative STEM Classroom: Nucleotide Base Colorimetric Detection using Silver Nanoparticles

Jennifer Schablik, Joyce Seifried, Manuel Figueroa, The College of New Jersey, Ewing, NJ

3. Developing A Standards-Based Lesson that Aligns with NGSS on Photosynthetic Feedback Mechanisms using Data from a Research Experience for Undergraduate Pre-Service Science Teachers

Kaytlyn Goodwin, Julie Angle, Andrew Doust, and John Stewart, Oklahoma State University, Stillwater, OK

4. High School Students' Understanding of Basic Scientific Concepts

Patrick Ward, Mark W. Bland, University of Central Arkansas, Conway, AR

5. The Impact of GK-12 Biology Graduate Fellow Classroom Interactions on High School Students' Attitudes Toward Science

Rachel Lytle, Kim Sadler, Anthony Farone, Mary Farone, and Ginger Rowell, Middle Tennessee State University, Murfreesboro, TN

6. An Integrative STEM Approach to Teaching about Hydrophobic Interactions using Self Assembled Monolayers

Joyce Seifried, Jennifer Schablik, and Manuel Figueroa, The College of New Jersey, Ewing, NJ

7. Investigating the Impacts of an International STEM Service-Learning Course on College Students

Chandrani Mishra, Kristy L. Halverson, and Brian T. Gearity, The University of Southern Mississippi, Hattiesburg, MS

8. Quantitative Assessment of Mobile Technology Efficacy on Student Achievement

Adam Lehnig, Steven Nagel, Cynthia Dassler, Rob Denton, and Roman Lanno,

The Ohio State University, Columbus, OH

9. Teaching and Assessing Student Awareness of Biodiversity

Steven Nagel, Steve Rissing, The Ohio State University, Columbus, OH

10. What Chemistry Do Faculty Think Biology Students Have to Know to Understand Cellular Respiration?

Jay Lance Forshee II and Donald P French, Oklahoma State University, Stillwater, OK

ENTRIES NOT IN THE COMPETITION**11. Class Generated Community Clicker Cases: Applying a Novel Pedagogic Approach to a Non-Major's Introductory Biology Class**

Tamar L. Goulet, Lainy Day, Kristen A. Byler, and Kathleen Sullivan, University of Mississippi, University, MS

12. Culturally Relevant Pedagogy to Increase Interest in Science for Non-Science Majors

Andrea L. Moore, Savannah State University, Savannah, GA

13. Engaging Non-Science Majors in Biology, One Disease at a Time

Janette Klein and Rebecca Garcia, Hunter College, New York, NY

14. Exploring Drivers of Variation in Marine Ecosystems: A Dynamic Ocean Lesson Plan

Jessica R. Bean and Lisa D. White, University of California-Berkeley, Berkeley, CA

15. Growing a Thicker Skin: Organismal Adaptations for Terrestrial Habitats

Troy Nash, Suann Yang, and John Inman, Presbyterian College, Clinton, SC

16. Improving Course Coherence and Refining Assessments: Using Understanding by Design in an Undergraduate Course

Julie E. Minbiole, Columbia College, Chicago, IL

17. In-Class Meta-Analysis to Teach Scientific Consensus

Emily Rauschert, Cleveland State University, Cleveland, OH

18. Instrument Development to Assess Student Conceptual Understanding in Biology

Tawnya Cary, Caroline Jakuba, and Janet Branchaw, University of Wisconsin-Madison Madison, WI

19. Integrating Statistics and Biology in the AP Biology Classroom

Kari Clase, Loran Carleton Parker, Georgia Everett, Kathy Daniels, Kerry Quillen, and Joe Ruhl, Purdue University, West Lafayette, IN

20. New Dimensions in Lab Course Assessment

Lisa Corwin Auchincloss, Aspen Robinson, Sarah Merkel, and Erin Dolan, University of Texas, Austin, TX

21. Non-Majors Intro Biology: A Student Survey of Biology Topics

Anna Hiatt, Jane Ellis, Amanda Orenstein, Kim Sadler, and Margaret Carroll, East Tennessee State University, Johnson City, TN

22. Professional Development for Naturalists-in-Training

Aimee K. Thomas, Marks McWhorter, and Kristy L. Daniel, Loyola University, New Orleans, LA

23. Seeing the Forest by Interpreting the Trees: An Assessment Instrument for Evaluating Undergraduate Student Understanding of Evolutionary Trees

Kristin Jenkins, Louise Mead, Kristy Halverson, David Baum, and Carrie Boyce, BioQUEST, Madison, WI

24. A Time- and Cost-Effective Lab Activity for Exploring Lysozyme

Jessica Habashi and Grant Wilson, Utah State University-Brigham City Regional Campus, Brigham City, UT

25. Too Quick to Flip?

William H. Heyborne, Southern Utah University, Cedar City, UT

26. Using Authentic Environmental Data to Enhance Biology Understanding

William Kroen, Wesley College, Dover, DE

27. Using Contract Grading to Improve Performance of At-Risk Students in an Introductory Biology Course

Angela Hodgson, North Dakota State University, Fargo, ND

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