

ABBREVIATION KEY  
E: Elementary School  
MS: Middle School  
HS: High School  
2Y: Two-Year College  
4Y: Four-Year College  
GA: General Audience  
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# THURSDAY NOVEMBER 12



**7:00AM – 8:15AM****NABT First Timers' Breakfast**

Ballroom D &amp; E • Meal Function • Tickets Required • GA

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

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

**8:30AM – 9:45AM****GENERAL SESSION SPEAKERS****Jacquelyn L. Gill, Kenneth R. Miller, and Seth Mnookin**

See page 8 for full biographies of the speakers.

**Eye of the Storm: Teachers, Science & Societal Controversy**

Ballroom A • Special Speaker • General Audience

Sometimes established scientific findings run smack into deeply held religious or political views, leading to societal debate. Such debate inevitably spills over into the classroom, and science teachers find themselves in the position of having to mediate misunderstandings and misconceptions. Topics like evolution have recently been joined by climate change, vaccination and GMO-food safety, where scientific consensus is similarly at odds with sincere value judgments.

While it's easy to say that teachers should just "stick to the science", these thorny topics require teachers be aware of, and comfortable addressing, the non-scientific preconceptions that students bring with them to class. The ability to think scientifically is a powerful skill and addressing these controversies effectively offers an opportunity to help students understand the nature of science – what counts as evidence, how scientific disagreements are resolved, and why debate in science is so different from political and other kinds of debate.

In this session, three experts in scientifically established, but societally controversial topics – evolution, climate change, and vaccine safety – will present how they navigate these choppy waters.



The panel is presented by The National Center for Science Education in partnership with NABT.

**#ES1 Bio-Rad Session: Eat+Learn. 3D Learning aligned to NGSS (Breakfast provided)**

553B • General Biology • Hands-on Workshop • HS, 2Y, 4Y, GA

See full description on next page.

**10:30AM – 11:45AM****#755 NCSE Presents: Dealing with Doubt & Denial in the Classroom**

550A &amp; 550B • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • MS, HS

In this hands-on workshop we will address how to comfortably teach socially and politically controversial scientific topics in the classroom, creating

teachable moments out of tense interactions and de-escalating challenges when they arise.

Minda Berbeco and Stephanie Keep, National Center for Science Education (NCSE), Oakland, CA

**#773 Having Fun With Symbiosis!**

551A • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • MS, HS, 2Y

In this workshop, participants will be part of a lesson strand for teaching ecological interactions in a way that engages students in several ways and allows for some natural creativity. Topics will include mutualism, commensalism, and five more.

Thomas Hinckley, Landmark College, Putney, VT

**#876 Primate and Hominin Phylogeny Construction Using Skulls – Students Using Past Generations to Learn the Next Generation Science Standards!**

552A • Evolution • Hands-on Workshop (75 min) • MS, HS, 2Y

Observe and measure skulls to create phylogenetic trees and the evolution of primates and hominins. Michigan teachers with support from the MSU Museum and BEACON will share hands-on & virtual labs that guide students through the dimensions of NGSS.

Heather Peterson and William Hodges, Holt High School, Holt, MI and Fred Hingst, DeWitt High School, DeWitt, MI

**#780 Little Critters – Big Ideas: An Ecology Unit Based on Stream Macroinvertebrates**

552B • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • MS

Macroinvertebrates can be used to teach big ideas in ecology. We will present one lesson from a unit developed to extend students' experiences at a stream field trip into the Ecology classroom. Insight into student learning will be shared.

Alan Berkowitz, Cary Institute of Ecosystem Studies, Millbrook, NY

7:00AM – 3:45PM

## #ES1 Special Programming Presented by Bio-Rad Laboratories

All sessions are in Room 553B

7:00AM – 8:15AM

### Eat+Learn. 3D Learning Aligned to NGSS (Breakfast provided)

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

Engage in an interactive NGSS-aligned 3D learning experience. This includes practical measures and insights for encouraging 3D learning and assessment in your classroom while focusing on understanding the mechanism underlying chromatography.

Nicole Shea, Bio-Rad Laboratories, Hercules, CA

10:30AM – 11:45AM

### Photosynthesis(PS) + Cell Respiration(CR) with Algae Beads

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

Bring inquiry into a PS and CR lab (Big Idea 2: Labs 5, 6). Use algae beads to examine light intensity and color effects on PS while studying CR in the dark. See the clear connection of the consumption and release of CO<sub>2</sub> that occurs during PS and CR.

Sherri Andrews, Bio-Rad Laboratories, Hercules, CA

12:00PM – 1:15PM

### Lunch and Learn with Bio-Rad! The GMO Debate Rages On! (Lunch provided)

Bioethics • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Do you feel that GMs create Frankenfoods or do they help produce safe food to feed the growing population? Learn more about GMOs, how to test for the presence of GM content in foods, join a debate and learn how to bring this experience to your class.

Sherri Andrews, Bio-Rad Laboratories, Hercules, CA

1:45PM – 3:00PM

### Easily Integrate Inquiry with Glowing Bacteria - Big Idea 3

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

Learn new ways to advance inquiry in the classroom – by integrating real-world scientific practices that will encourage your students to direct their own scientific investigation. This is so much more than your typical transformation lab!

Sherri Andrews, Bio-Rad Laboratories, Hercules, CA

3:15PM – 3:45PM

### The Lionfish Project

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

Lionfish have greatly impacted biodiversity in coral ecosystems from North Carolina and beyond. Learn about a project utilizing DNA barcoding to engage students in collecting and analyzing data about the lionfish diet at sites in the US and Caribbean.

Sherri Andrews, Bio-Rad Laboratories, Hercules, CA

10:30AM – 11:45AM *continued*

### #786 The Exposome: Making Chemical Exposures Relevant to Biology Instruction

555A • AP Biology • Demonstration (75 min) • HS, 2Y, 4Y

Conduct a graphing/data interpretation activity that introduces the concept of the exposome while reinforcing learning about DNA damage and repair and cancer formation in response to exposure to cancer causing chemicals such as vinyl chloride.

Dana Haine, UNC-Chapel Hill Superfund Research Program, Chapel Hill, NC

### #740 Data-based Inquiry in the Classroom Using Authentic Research Data from the Dryad Digital Repository

555B • Curriculum Development • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Looking for real datasets to use in the classroom? DryadLab has what you are looking for! Appropriate for introductory to advanced quantitative skill development – come learn how to use these materials in your classroom!

Kristin Jenkins, BioQUEST Curriculum Consortium, Madison, WI and Samantha Swauger, DryadLab, Chapel Hill, NC

### #767 Teaching DNA Replication in Context: From Mutations to Errors to Cancer

556A • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • HS, 2Y

This workshop will demonstrate how the teaching of DNA replication can be enhanced by relating it to a molecular story of replication errors, redundant DNA repair systems and cancer – in such a way that students practice their critical thinking skills.

Diane Munzenmaier and Margaret Franzen, MSOE CBM, Milwaukee, WI

### #920 Next Generation Digital Curriculum

556B • Instructional Strategies & Technologies • Partner Presentations (75 min) • GA

In this session, we will share our current thinking about digital curriculum and ask participants to share your own thoughts concerning digital curriculum features and characteristics.

Brooke Bourdélát-Parks, BSCS, Colorado Springs, CO

### #777 Students Reading Real Science: Tools for Success

557 • Instructional Strategies & Technologies • Demonstration (75 min) • HS, 2Y, 4Y

Introduce primary literature and professional scientific research to students using “Science in the Classroom” (<http://scienceintheclassroom.org>). Use C.R.E.A.T.E. strategies (<http://teachcreate.org>) to design activities and assessments.

Melissa McCartney, AAAS Education and Human Resources, Washington, D.C.; Sally Hoskins, The City College of New York, New York, NY; Sherri Story, King’s Fork High School, Suffolk, VA; Kathy Kresge and Sharon Lee-Bond, Northampton Community College, Bethlehem, PA

### #910 Mapping Genes to Traits using SNPs

Ballroom B • Biotechnology • Hands-on Workshop (75 min) • 2Y, 4Y

Analyzing SNP data from genome-wide association studies (GWAS) is increasingly important in the biological sciences. Explore free activities and materials to help you bring gene mapping and statistical analysis into your introductory biology course.

Melissa Csikari, Germanna Community College, Stafford, VA; Elinor Karlsson, University of Massachusetts Medical School, Boston, MA; Megan Stine, HHMI BioInteractive, Chevy Chase, MD

10:30AM – 3:45PM

### #ES2 Special Programming Presented by Carolina Biological Supply Company

All sessions are in Room 553A

10:30AM – 11:45AM

#### Getting to the Root of Artificial Selection with Wisconsin Fast Plants®

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

In this highly interactive session, we will explore the range of selection experiments made possible by using Wisconsin Fast Plants to teach core evolution and ecology concepts. Come learn about effective experimental designs and their implementation.

Hedi Baxter Lauffer, Wisconsin Fast Plants, Madison, WI

12:00PM – 12:30PM

#### 30 Minutes to New: AP Biology New Products Primer

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

Looking for unique resources to enrich your students’ AP Biology experience? Join us for an overview of Carolina Biological’s exclusive supplementary products and ideas about how to integrate them into your curriculum.

Sarah Bottorff, Carolina Biological Supply Company, Burlington, NC

1:45PM – 3:00PM

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

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

Understanding meiosis and chromosome behavior has always been a challenge. What if it were as easy as folding laundry? This workshop will help you identify and address student misconceptions using ChromoSocks. In partnership with HudsonAlpha.

Jennifer Carden, Carolina Biological Supply Company, Burlington, NC

3:15PM – 3:45PM

#### Renovating Science Courses for Distance Learning

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

Distance learning hands-on lab activities achieve essential learning outcomes for online courses. This inquiry-based model emphasizes using legitimate lab materials, acquiring critical lab skills and actively engaging students in their own learning.

Shannon McGurk, Carolina Biological Supply Company, Elon, NC

**10:30AM – 3:45PM****#ES3 Special Programming Presented by Macmillan New Ventures****All sessions in Room 554A**

10:30AM – 11:45AM

**Redesigning Biology Courses with Lab Simulation Technology**

Instructional Strategies & Technologies • Demonstration (75 min) • HS, 2Y, 4Y  
Faculty across the country are rethinking their general education biology courses and labs. Course redesigns with technology as the centerpiece are the most cost-effective and outcome-driven approach.

Matthew Nelson, Late Nite Labs, New York, NY

1:45PM – 3:00PM

**Empowering Educators and Engaging Students**

General Biology • Demonstration (75 min) • 2Y, 4Y

Sapling Learning is an instructional online homework system combining passionately crafted content, targeted feedback, and a personal relationship with a dedicated Tech TA. Come to learn how we engage students and empower educators like you.

Hannah Robus, Sapling Learning, Austin, TX

3:15PM – 3:45PM

**Custom Digital Solutions for the Biology Lab**

General Biology • Demonstration (30 min) • 4Y

Learn about Hayden-McNeil's custom services that go well beyond the printed lab manual. Demonstrations will include pre-lab and post-lab online resources, full online course solutions, and digital interactives that support your printed manual.

Katy Trionfi, Hayden-McNeil Publishing, Plymouth, MI

**10:30AM – 11:45AM** *continued***#877 Traditional Labs Transformed for NGSS Science Practices**

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

Science practices are necessary so traditional labs need to be transformed. We will share labs and activities that are now inquiry focused requiring data analysis and explanations. We will also share how we use our lab notebooks. Come try it with us!

Patti Richardson and Kristy Butler, Forest Hills Central High School, Grand Rapids, MI

**#ES25 Enhance Critical Thinking with Interactive Case Studies**

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

Hear from fellow teachers how these cases engage students in critical thinking and problem solving, and then experience a case on your device. Developed in partnership with teachers, the cases are proven to increase learning in NIH and NSF research.

Tom Robertson, Cogent Education, Athens, GA

**NABT Committee Meeting: Finance Committee**

Blackstone • Committee (75 min) • GA

Harry McDonald, NABT Secretary / Treasurer, Olathe, KS

**10:30AM – 12:30PM****#761 Answering the Call for Life Science Transformation**

Providence Ballroom I &amp; IV • Curriculum Development • Hands-on Workshop (120 min) • 2Y, 4Y

Participants will use the PULSE Snapshot Rubrics to gauge their department's progress toward Vision and Change and PULSE resources to develop a plan to better align their department with the Vision and Change recommendations.

Sharon Gusky and Tara Jo Holmberg, Northwestern Connecticut Community College, Winsted, CT; Thomas Jack, Dartmouth College, Hanover, NH; Gina Sembrebon, Bay Path University, Longmeadow, MA; Patrice Boily, Western Connecticut State University, Danbury, CT; Barbara Nicholson, Central Connecticut State University, New Britain, CT; Dustin Vale-Cruz, Springfield College, Springfield, MA

**#886 Exploring the Floating Disk Photosynthesis Technique in an AP Biology and NGSS Context**

Providence Ballroom II &amp; III • AP Biology • Hands-on Workshop (120 min) • HS

Join us as we explore and troubleshoot photosynthesis using the Floating Leaf Disk assay featured in the *AP Biology Lab Manual*. The session will go from design, to data collecting, to analysis, to scientific argumentation.

Brad Williamson, University of Kansas, Lawrence, KS and Camden Hanzlick-Burton, Olathe Northwest High School, Olathe, KS

12:00PM – 12:30PM

**#801 Relationship between Instructional Strategies and Student Focus in a Flipped, Introductory Biology Classroom**

550A &amp; 550B • Instructional Strategies &amp; Technologies • Paper (30 min) • HS, 2Y, 4Y

Which active learning strategies maintain student focus in a flipped, introductory biology classroom? Based on quantitative observations of student behavior, we will report on optimal activity length for questioning, class discussion, and group work.

Cara Stephens, Donald French, and Michael Moore, Oklahoma State University, Stillwater, OK

**#887 Teaching Fundamental Concepts of Neuroscience for Meaningful Learning: Lessons Learned from Teachers in the Field**

551A • Neuroscience • Hands-on Workshop (30 min) • HS, 2Y, 4Y

We have created a suite of interactive case studies that addresses the most difficult to teach neuroscience concepts. Join us to discuss findings from a study of eight brilliant science teachers and over 400 students to see what we learned.

Sophia Jeong and Georgia Hodges, University of Georgia, Athens, GA; Holly Amerman, Rome City High School, Rome, GA; Anna Scott and Richard Patterson, The Athens Academy, Athens, GA

**#781 The Tree Room: A New Tool for Teaching Evolutionary Relationships**

552A • Evolution • Demonstration (30 min) • HS, 2Y, 4Y

Berkeley's landmark *Understanding Evolution* website just got even better with *The Tree Room*. This freely available companion site brings evolutionary relationships to life for students and teachers with interactives, vetted lessons, and more.

Anastasia Thanukos, University of California Berkeley, Berkeley, CA; Teresa MacDonald, University of Kansas, Lawrence, KS; David Heiser, Yale Peabody Museum of Natural History, New Haven, CT; Chris Willems, Metropolitan Business Academy, New Haven, CT

**#872 The Power of Data in River Ecology**

552B • Ecology / Environmental Science / Sustainability • Demonstration (30 min) • HS

Students use the powerful *National Geological Survey* database to answer questions about water quality. After collecting their own data, students look for patterns and trends and make predictions about DO, nitrates, temp, and precipitation among others.

Kate Henson, Miss Porter's School, Farmington, CT

**#855 Meeting the NGSS with Blended Learning by Teaching and Assessing Genetically Modified Crops**

555A • Biotechnology • Paper (30 min) • HS, 2Y, 4Y

GMO crops provide a context for NGSS blended learning and assessment. We illustrate how to blend practices, disciplinary core content, and crosscutting concepts with this complex issue.

Shannon Burcks and Marcelle Siegel, University of Missouri, Columbia, MO

**#892 Making the Flip with Genes**

555B • General Biology • Demonstration (30 min) • HS, 2Y, 4Y

The genes concepts were flipped for non-biology students in an integrated lab lecture undergraduate course. The design incorporated script writing for original videos and construction of web lessons. Internet resources were also used.

Kathy Gallucci, Elon University, Elon, NC

**#905 Using a Computer Game to Teach Scientific Argumentation**

556A • Instructional Strategies &amp; Technologies • Paper (30 min) • HS

We will present a case study of how a teacher used a computer game to support students' construction of scientific arguments and how different levels of scaffolding available through student sheets may impact the quality of students' arguments.

Chandana Jasti, Robert Wallon, Hillary Lauren, and Barbara Hug, University of Illinois, Champaign, IL

**#858 Recycling and Building Rigorous AP Biology Questions**

556B • AP Biology • Demonstration (30 min) • HS

This seminar will focus on creating challenging and rigorous AP biology questions. Focus will be on deconstructing multiple choice into short answer questions, visual data questioning and peer analysis of deconstructed free response with whiteboards.

Bob Kuhn, Centennial High School, Roswell, GA

10:30AM – 3:45PM

**#ES4 Special Programming Presented by OpenStax College Rice University Inc**

All sessions in Room 554B

10:30AM – 11:30AM

**Capturing Student Interest with Digital Interactivity**

General Biology • Demonstration (60 min) • 2Y, 4Y

This session covers Sapling Learning's interactive, open-ended, and inquiry-based digital resources. These resources, coupled with OpenStax College's Biology, are a low-cost online homework and textbook solution.

Todd Pearson, Sapling Learning &amp; OpenStax College, Houston, TX

12:00PM – 12:30PM

**AP Biology: CONQUER THE FRAMEWORK!**

AP Biology • Demonstration (30 min) • HS

College Board framework lead Julianne Zedalis presents on the new AP Biology framework and how to prepare your students for success on the AP Biology exam, all with the help of a free, peer-reviewed textbook by Rice University's OpenStax College.

Julie Zedalis, OpenStax College, Houston, TX

1:45PM – 2:45PM

**Wiley's Affordable Solutions to Learning Challenges**

General Biology • Demonstration (60 min) • 2Y, 4Y

Through a partnership between Wiley and OpenStax College, BIO Principles and BIO Concepts with WileyPLUS Learning Space is a next-generation adaptive learning, etext and course stream, with key resources all in one place and at an affordable price.

Clay Stone, Wiley &amp; OpenStax College, Houston, TX

3:15PM – 3:45PM

**OpenStax College's Biology – Enhanced!**

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

SimBio has partnered with OpenStax College to offer a complete set of introductory Biology chapters you can mix and match with SimBio's popular virtual labs. Free evaluation software will be provided to workshop participants.

Ellie Steinberg, SimBio &amp; OpenStax College, Houston, TX

12:00PM – 12:30PM *continued***#857 Biology Best Bets XVI: Teacher to Teacher**

557 • General Biology • Demonstration (30 min) • HS

Biology Best Bets is back after a 4-year hiatus. Explore our latest collection of biology learning experiences in context – student prior knowledge, logistics, cost, assessments, & extensions. Adapt them for your needs!

Suzanne Black, Inglemoor High School, Kenmore, WA; Nancy Monson, West Linn High School, West Linn, OR; Jennifer Lockwood, Newbury Park High School, Newbury Park, CA

**#875 Teaching The Big Ideas by Investigating Mitochondrial Genetics**

Washington • AP Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Mitochondrial genetics are complex, however looking at the connections between point mutations in mitochondrial DNA, proteins of the electron transport chain, and human health and disease is a powerful way to teach students essential content.

Ryan Reardon, Jefferson County International Baccalaureate School (JCIB), Birmingham, AL

**NABT Committee Meeting: Archival Committee**

Blackstone • Committee (30 min) • GA

Carrie Boyce, University of Southern Mississippi, Hattiesburg, MS and Jill Maroo, University of Southern Iowa, Waterloo, IA

## NABT BIOLOGY EDUCATION RESEARCH SYMPOSIUM

1:00PM – 3:45PM • SOUTH COUNTRY

### SCHEDULED PRESENTATIONS:

#### Exploring Third-Grade Students' Model-based Explanations about Plant Processes

**Laura Zangori, University of Missouri-Columbia and Cory Forbes, University of Nebraska-Lincoln, Lincoln, NE**

To develop understanding about plant growth and development, a fundamental concept throughout elementary curriculum, elementary students should engage in knowledge-building about plant processes through scientific practice (NGSS Lead States, 2013). Scientific modeling, a core scientific practice, is underemphasized in elementary science learning environments and little past research has explored the ways in which early learners' engage in discipline-specific modeling practices. Scientific modeling provides an opportunity for students to construct models that make "hidden" processes, such as seed origin, explicit and visible. Students then use their models to scientifically reason about how and why plant processes work and propose model-based explanations. Here we report on a design-based study to investigate the ways in which 3rd-grade students' (n = 73) constructed models and generated model-based explanations about plant structure/function and plant life cycles. Results indicate that elementary students considered hidden elements and generated mechanism-based explanations about both plant processes. However, findings from this study highlight the range of ideas evident in students' understanding about seed origination and how and why plant structures function to support the plant. Implications from this research include suggestions for model-centered plant curriculum in elementary science learning environments to support 3rd-grade students in conceptualizing hidden plant processes.

#### The Effects of Introducing E-texts and E-materials in 100 and 200-level Biology Courses on Teaching Pedagogy

**Rebecca Garrison, Kerrie McDaniel, and Jerry Daday, Western Kentucky University, Bowling Green, KY**

A new generation has entered higher education that learns differently from generations before. To meet the changing needs of this generation, a Biology Department at a four year university introduced e-textbooks and e-materials in the fall of 2013 to most low-level classes. An unforeseen product of this shift was a change in the way that some faculty taught and assessed their classes. This study examines the changes in pedagogical techniques among professors of 100- and 200-level biology classes due to introduction of new e-text and e-materials. Syllabi were collected from these classes pre- and post-implementation and common characteristics were inductively coded and statistically analyzed to identify changes in pedagogy. Interviews were conducted of faculty teaching these classes. It was found that biology professors increased their average number of homework assignments by 23%. There was also a 289% increase in the number of courses that offered homework assignments as a means of assessment, indicating a shift from traditional summative assessments to more formative assessments after the implementation of the e-materials. This work provides insight into simple strategies that affect pedagogy in higher education STEM disciplines.

#### Case Studies in Teaching Evolution: The Intersection of Dilemmas in Practice

**Rachel Fisher, University of Arizona, Tucson, AZ**

Despite recent science education reform documents citing evolution as a core concept to be taught in grades K-12, research shows problems with how it is currently taught. Evolution is often avoided, teachers minimize its importance within biology, infuse misconceptions, and/or interject non-scientific ideologies into lessons. My research focused on how teachers in two geographically and culturally distinct school districts in the southwestern U.S. negotiate dilemmas during an evolution unit. One school district was rural and had a large population of Mormon students, while the other district was urban, with a large majority of Mexican/Mexican-American students. Using a case study approach, I observed three biology teachers during their evolution lessons, interviewed them throughout the unit, co-planned lessons with them, and collected artifacts from this unit, including anonymous student work. Findings showed teachers' backgrounds and comfort levels with evolution, in addition to the community context, affected how they negotiated pedagogical, conceptual, political, and cultural dilemmas. This study's findings will inform in-service and pre-service teachers' future practice and professional development tools to aid with their teaching – this may include methods to negotiate some of the political (e.g. state standards) or cultural (e.g. religious resistance) issues inherent to teaching evolution.

#### Pre-service Teachers' Engagement with Life Science Concepts within Structured Formative Assessment Assignments

**Jamie L. Sabel and Cory Forbes, University of Nebraska-Lincoln, Lincoln, NE, and Laura Zangori, University of Missouri-Columbia, Columbia, MO**

Undergraduate students preparing to become elementary teachers (i.e., pre-service teachers) often have limited science subject matter knowledge. In order to effectively engage students in scientific practices and connect students' ideas about science to appropriate instructional strategies, teachers should learn disciplinary concepts and how to apply their content knowledge to elementary classroom environments with proven instructional practices, such as formative assessment. However, the use of formative assessment practices is not widespread in part because 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 pre-service teachers built upon two pillars—life science content and formative assessment. As a part of the course, pre-service teachers engaged in formative assessment assignments that provided structure to engage them in each step of the formative assessment process and to support them in considering their own and elementary students' life science understanding. Here, we will present results of an embedded mixed methods study designed to evaluate how engaging in these assignments provided opportunities for pre-service teachers to gain content knowledge and the ability to productively engage in formative assessment for science.

#### The Role of Sense-making in Undergraduate Modeling Activities

**Andrea M.-K. Bierema, Jon R. Stoltzfus and Christina V. Schwarz, Michigan State University, East Lansing, MI**

Recent national calls for improving science education (e.g., Vision and Change, AAAS, 2011) emphasize the need to focus on core disciplinary concepts and incorporate scientific practices during instruction. To address this need, we introduced modeling activities to the curriculum of two undergraduate, large-enrollment, introductory biology courses. During these activities, students work in groups of three to create scientific models of biological phenomena. To assess how these activities engage students in sense-making, we analyzed group discussion and students' concurrent diagrammatic modeling recorded on digital tablets and interviewed a subset of the participants. We found evidence that students were engaged in the activity and worked to make sense of the phenomena. However, we also found that students tend to agree with one another without argument, which suggests engagement in everyday discussion norms that do not necessarily foster explicit scientific thinking. Therefore, these group modeling activities may foster understanding of core concepts, but need further modification, such as asking students to develop written explanations of the phenomenon before working on the model in a group. This might lead to improvement in scientific thinking. In conclusion, we found that these modeling activities in large enrollment classrooms helped foster sense-making of biological phenomena.

#### Misunderstanding of the Hypothesis in Biology

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

Helping students understand and generate appropriate hypotheses and test their subsequent predictions in science in general and biology in particular should be at the core of teaching the nature of science. However, there is much confusion among students and teachers about the difference between hypotheses and predictions. Here I present evidence of the problem and describe steps scientists actually follow when employing scientific reasoning strategies. This is followed by a proposed solution for helping students effectively explore this important aspect of the nature of science.

#### SPECIAL GUEST PRESENTER:

**René Schwartz, Georgia State University, Atlanta, GA**

*Recipient of the 2015 NABT Four-Year Section Research in Biology Education Award*

**12:30PM – 1:30PM**

**NABT Energy Break**

Exhibit Hall • Special Program (60 min) • GA  
You took in some sessions, now you can take a break. Stop by for a snack and a sneak peek of what the Exhibit Hall has to offer.



**1:00PM – 3:45PM**

**NABT Biology Education Research Symposium**

South Country • Special Program • Symposium (165 min) • GA  
NABT is proud to present the 7th Annual Biology Education Research Symposium. Presentations were accepted through a double-blind review process that was open to biology instructors and researchers at all levels.

Full abstracts are available on page 31 and proceedings will be posted at [www.NABT.org](http://www.NABT.org).

**1:45PM – 3:00PM**

**#866 Top 10: Genetics and Biotechnology Discoveries 2015**

550A & 550B • General Biology • Biotechnology (75 min) • MS, HS, GA  
The 2014 *Biotechnology Guidebook* contains current research findings in brief vignettes that are seamless additions into your content area course or for a personal update on your genetics and biotechnology content. This free resource is available for download on the HudsonAlpha website: [www.hudsonalpha.org](http://www.hudsonalpha.org)

Neil Lamb, HudsonAlpha institute for Biotechnology, Huntsville, AL

**#765 Engaging in Close Reading of a Text – How to Meet the CCSS while Teaching NGSS Content & Skills**

551A • Science Practices • Hands-on Workshop (75 min) • MS, HS  
NGSS & CCSS keeping you awake? Help your students meet the standards. Learn strategies for integrating CCSS-Literacy standards with the NGSS Science and Engineering Practices of evaluating information and engaging in argument from evidence.

Lesley Shapiro, Classical High School, Providence, RI and Audrey Armstrong, St. Rocco School, Johnston, RI

**#792 Chewing on Change – Exploring the Evolution of Horses in Response to Climate Change**

552A • Evolution • Hands-on Workshop (75 min) • MS, HS, 2Y  
This four-lesson curriculum investigates the evolution of the horse in response to climate change using authentic paleontology methods to study fossilized horse teeth. Attendees will preview the lessons and receive free curriculum materials.

Jennifer Broo, St. Ursula Academy, Cincinnati, OH; Jessica Mahoney, Edgewater High School, Orlando, FL; Sean Moran, University of Florida, Gainesville, FL

**#846 Smithsonian’s Teaching Evolution through Human Examples (TEtHE): Cultural and Religious Sensitivity (CRS) Teaching Strategies Resource**

552B • Evolution • Hands-on Workshop (75 min) • HS, 4Y, GA  
The CRS resource and the instructional approach it adopts will be described. Session participants will have an opportunity to explore an example exercise from each of the two classroom activities presented in the resource.

Connie Bertka, Science and Society Resources, LLC, Potomac, MD and Briana Pobiner, Smithsonian Institution, National Museum of Natural History, Washington, D.C.

**#770 MIT BLOSSOMS Video Lessons: A Teaching Resource to Support NGSS**

555A • Instructional Strategies & Technologies • Partner Presentations (75 min) • MS, HS  
Session introduces MIT BLOSSOMS, featuring biology lessons aligned with NGSS. These lessons, developed by university-HS educators, are designed to encourage active student learning. Session will announce contest for NABT biology teachers.

Richard Larson and Elizabeth Murray, Massachusetts Institute of Technology, Cambridge, MA

**#914 Transform Those Cookbook Labs**

555B • Curriculum Development • Hands-on Workshop (75 min) • HS, 2Y  
Learn to transform “cookbook” labs into ones that 1) actively engage students in developing hypotheses and methods and exploring concepts; 2) address a wide variety of learning styles and cultures; and 3) effectively integrate Internet resources.

Margaret Shain-Stieben, American Physiological Society, Bethesda, AL

**#862 Don’t Just Punt It... Punnett! An Interactive Model for Helping Students Understand What the Punnett Square Really Represents**

556A • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • MS, HS, GA  
Learn about a set of NGSS-aligned lessons and an interactive demonstration to teach middle school students genetics. Participate in an analysis of video from our lessons, developed as part of our videocase-based professional learning community.

Paul Beardsley, Cal Poly Pomona, Pomona, CA; Julie Allender, Elizabeth Mercado, and Mary Timassy-Nelson, Ontario Montclair School District, Ontario, CA



**1:45PM – 3:00PM** *continued*

**#856 Socratic Seminars in Science: From Texts to Data**

556B • General Biology • Hands-on Workshop (75 min) • MS, HS, 2Y

Learn how to use this group discussion strategy, in which students work together to achieve deeper understanding of a text, graph, or reading. Participate in an actual seminar which focuses on analyzing and interpreting scientific data.

Maureen Munn and Joan Griswold, University of Washington, Seattle, WA

**#841 Marine Science Mania VII**

557 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • MS, HS

Marine Science Mania will share best practices, labs and activities used to engage, excite and instill passion in students for Marine Science. Will discuss 1 to 1 instructional devices and their role in the classroom. Will include giveaways and CDs with materials.

Tom Froats, Prospect High School, Mount Prospect, IL

**#909 Teach Inquiry-Based Ecology with a Citizen Science Trail Camera Project**

Ballroom B • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS

HHMI BioInteractive presents a new online citizen science platform where students identify animals in trail camera images to help scientists in Gorongosa National Park. Workshop participants will do hands-on activities using trail camera photos.

Amanda Briody, Frederick Douglass High School, Baltimore, MD; Kim Parfitt, Central High School, Cheyenne, WY; Bridget Conneely, HHMI BioInteractive, Chevy Chase, MD

**1:45PM – 3:45PM**

**ASM Presents: A Constructive Approach to Biology**

Providence Ballroom I & IV • Microbiology & Cell Biology • Symposium (120 min) • HS, 2Y, 4Y

The classical mode of studying and teaching Biology uses deconstructive methods to tease apart the operation of living systems. An alternative approach relies on assembling functional biological systems from individual parts. This session will present both current academic research and innovative modes of teaching the biological sciences through this constructive framework of Synthetic Biology.

Kristala L. J. Prather and Natalie Kuldell, Massachusetts Institute of Technology, Cambridge, MA

**NABT AP Biology Symposium: Using Data to Tell a Biological Story – A Focus on AP Biology Science Practice 2**

Providence Ballroom II & III • AP Biology • Symposium (120 min) • HS

The revision of the AP Biology course and exam addressed an increasing need for students in AP Biology to have a strong foundation in quantitative approaches to data analysis. In this session, participants will be provided with tools for the practical application of statistics in the AP Biology classroom. Participants will also be provided with activities for manipulating data, performing statistical analyses and constructing graphical representations of data specific to the AP Biology Course and Exam in short, medium, and long blocks of class time. Participants will be encouraged to share their challenges and best practices on how to incorporate quantitative skills in the classroom.

Jennifer Pfannerstill, North Shore Country Day School, Winnetka, IL

**#ES26 Revolutionizing Biotechnology in Real-Time**

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

Do an electrophoresis experiment in 30 minutes. The revolutionary MiniOne Electrophoresis System features a safe 42V low voltage power supply, non-UV illuminator and uses non-hazardous reagents. Have results on your phone by the end of class.

Richard Chan, The MiniOne Electrophoresis, San Diego, CA

**NABT Committee Meeting: Nominating Committee**

Blackstone • Committee (75 min) • GA

Betsy Ott, Tyler Community College, Tyler, TX

**3:15PM – 3:45PM**

**#772 The Microbiome of a High School: Student Population = 1250, Microbial Population = ?**

550A & 550B • General Biology • Paper (30 min) • HS, 2Y, 4Y

Join us as we share the findings from a student-driven study of the microbiome. Environmental swabs were collected with the help of researchers from HudsonAlpha. Learn how students uncovered microbial populations in this cross curricular project.

Dasi Price, HudsonAlpha Institute for Biotechnology, Huntsville, AL

**#754 How Prepared are First-Year College Students to Learn about Cellular Respiration in Introductory Biology?**

551A • General Biology • Paper (30 min) • 2Y, 4Y, GA

Come listen to our progress in creating the chemistry in cellular respiration CI, and the factors that affect incoming student preparation on cellular respiration. Our results will help attendees plan their approaches to teaching this topic.

Jay Forshee II, Chelsea Fortenberry, and Donald French, Oklahoma State University, Stillwater, OK

**#865 Zoo Genetics: Newly Updated and Designed Classroom Activities**

552A • General Biology • Demonstration (30 min) • MS, HS, 2Y

Using real world storylines and data from the field, Zoo Genetics exposes students to problem solving and sense making in authentic and

interesting ways. This presentation highlights the benefits of a partnership between teacher and scientist.

Jason Crean, Lyons Township High School & St. Xavier University, Chicago, IL, and Kathy Van Hoeck, York Community High School, Elmhurst, IL

**#724 Integration of Science and Literacy**

552B • Instructional Strategies & Technologies • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Do you find your students struggling with vocabulary, reading textbooks and taking notes in your classroom? This NSF-funded project incorporates literacy strategies into the science content in an introductory biology course at a community college.

Marirose Ethington, Genesee Community College, Batavia, NY

**#725 Integrating Ecology in an Undergraduate Botany Course**

555A • Plant Biology • Paper (30 min) • 2Y, 4Y, GA

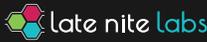
Learn about the redesign, implementation, and results of a botany course for upper undergraduate biology majors in which core botanical concepts were taught within ecological principles using primary literature, modeling tasks, and group discussion.

Laura Zangori, University of Missouri - Columbia, Columbia, MO and Jason Koontz, Augustana College, Rock Island, IL

# IGNITE YOUR STUDENTS' CURIOUS MINDS

Transform your biology courses with innovative solutions from Macmillan New Ventures (MNV)! As part of MNV, Hayden-McNeil, Sapling Learning, and Late Nite Labs offer customized lab manuals, digital lab simulations, online homework solutions, and lab prep questions with personalized feedback. Stop by booths 300, 301, and 303 to learn more.

Join us for demo sessions: **RICC Room 554A - Thursday, November 12**



**10:30am-11:45am**  
Redesigning Biology Courses with Lab Simulation Technology



**1:45pm-3:00pm**  
Empowering Educators and Engaging Students



**3:15pm-3:45pm**  
Custom Digital Solutions for the Biology Lab



## STUDENT POSTER COMPETITION Scholarship of Teaching and Learning

### 1. Assessment of the Peer-Assisted Learning Resource Center for Introductory Biology Students at Presbyterian College

Michael Harris, Troy Nash, and Suann Yang, Presbyterian College, Clinton, SC

### 2. Creating an Authentic Research Experience in a General Biology Lab: Publishing in the Journal of Introductory Biology Investigations

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

### 3. The Effect of Embryonic Exposure to Predation Risk on the Growth and Anti-predator Behavior of *Physa acuta*

Cassandra A. Dowds, Lynne E. Beaty, and Barney Luttbeg, Oklahoma State University, Stillwater, OK

### 4. The Engaged Undergraduate: A Conceptual Model

Marisa DeCollibus and Bryan Dewsbury, University of Rhode Island, Kingston, RI

### 5. Implementing In-Class Group Activities in a Non-Majors' Biology Class to Enhance Learning and Develop Positive Attitudes toward Biology

Trenton Pennington and Sandhya Baviskar, University of Arkansas, Fort Smith, AR

### 6. Influence of Peer-Led Team Learning on Recruitment and Retention in STEM

Jeremy D. Sloane, Julia J. Snyder, and Jason R. Wiles, Syracuse University, Syracuse, NY

### 7. Interpreting Models of Evolution – The Case of Phylogenetic Trees

Inga Ubben and Annette Upmeier zu Belzen, Humboldt-Universität, Berlin, Germany; Kristy Daniel, Texas State University, San Marcos, TX; and Sandra Nitz, Universität Koblenz-Landau, Mainz, Germany

### 8. Is Active Student Participation in the Flipped Biology Classroom an Accurate Predictor of Performance?

Michael E. Moore, Donald P. French, and Robert Evan Davis, Oklahoma State University, Stillwater, OK

### 9. Predictive Model For Student Success and Affect in an Introductory Biology Course

Danika Korpacz and Bryan Dewsbury, University of Rhode Island, Kingston, RI

### 10. Relationship between Instructional Strategies and Student Focus in a Flipped, Introductory-Biology Classroom

Cara Stephens, Michael E. Moore, and Donald P. French, Oklahoma State University, Stillwater, OK

### 11. The Role of Curiosity Practices in Classroom Discourse

Wendy R. Johnson and Charles W. Anderson, Michigan State University, East Lansing, MI

## STUDENT POSTER COMPETITION Mentored Undergraduate Research

### 12. 5-HTTLPR Gene

Juan Ruiz, SUNY Plattsburgh, Plattsburgh, NY

### 13. A Comparative Survey of Soil Invertebrate Diversity in Correlation with Soil Pollution

Liana Van Nostrand, Soledad Tejada, Rhys Manley, Ariadne Speliotis, Sam Willner, and Marah Birnbaum, Bard High School Early College, New York, NY

### 14. Diadema Dilemma: Coral and Algal Coverage as Related to *Diadema antillarum* Density

Abigail Treadwell, New England College, Henniker, NH; Tom Frazer, University of Florida, Gainesville, FL; and Kristi Foster, Central Caribbean Marine Institute, Princeton, NJ

### 15. Effects of Global System for Mobile Communication (GSM) Radiation on *Paramecia tetraurelia*

Samuele Weekes, SUNY Plattsburgh, Plattsburgh, NY

### 16. Functional Analysis $\beta$ -hemoglobin gene in *Paramecium tetraurelia*

Feyssel Shifa, SUNY Plattsburgh, Plattsburgh, NY

### 17. Methylenetetrahydrofolate Reductase Gene C677T Polymorphisms

Daniel Salatto, SUNY Plattsburgh, Plattsburgh, NY

### 18. Occurrence of Foodborne Pathogens in Grazed and Non-Grazed Native Pecan Orchards

Kacera Yoes, Alix Orr-Yates, and Li Maria Ma, Oklahoma State University, Stillwater, OK

### 19. Translating Research on Luminescence of GRAS Probes into Educational Tools in Photophysics

Alexia A. Ciarfella, Joseph M. Zuccaro, Maria G. Corradini, and Richard D. Ludescher, Rutgers, The State University of New Jersey, New Brunswick, NJ

### 20. Using DNA Barcoding to Survey Biodiversity in the East River

Alberta Devor, Lena Zinner, and Ayse Aydemir, Bard High School Early College, New York, NY

## Non-Competition Posters

### 21. Automated Analysis of Constructed Responses: Exploring Students' Ideas about the Processes of Genetic Information Flow in their Own Words

Andrea M.-K. Bierema, Michigan State University, East Lansing, MI

### 22. Cloning and Sequencing of the GAPC-2 Gene in Cilantro (*Coriandrum sativum*)

Idit Hazan, Brandi Sigmon, Sean Giza, and Mohamed Al-Hussein, Grand View University, Des Moines, IA

### 23. Cloning of the GAPC gene in *Abutilon theophrasti* (velvetleaf)

Idit Hazan, Brandi Sigmon, Elizabeth Kras, and Alyssa Douglas, Grand View University, Des Moines, IA

### 24. Community Engagement and STEM Outreach through the "Summer Science Fun" Program

Holly A. Little, Saginaw Valley State University, University Center, MI

### 25. Comparative Respiratory Systems in Terrestrial Arthropods: A Laboratory Exercise in Animal Physiology

Sara Tallarovic, Karly Brightwell, and Caitlin Schlagal, University of the Incarnate Word, San Antonio, TX

### 26. Creation and Modification of a Scientific Method Lab for an Online Non-majors Introductory Biology Course

Kristin Lenertz-Kersey, South Dakota State University, Brookings, SD

### 27. Developing Shared Vision: Community Change and Course Redesign in an Interdisciplinary Faculty Learning Community

Emily M. Walter and Ulrike Muller, California State University, Fresno, CA

### 28. The Development and Implementation of a Basic Physics Course with Life Science Applications

Jean DeSaix, Laurie E. McNeil, Alice D. Churukian, Duane L. Deardorff, and David P. Smith, University of North Carolina, Chapel Hill, NC

### 29. Evolutionary Perceptions across the Disciplines within a Religious Centered State

Alyssa Chrystine Brown, William H. Heyborne, and Emily Dean, Southern Utah University, Cedar City, UT

### 30. Greater Impacts of Summer Field Research in Central America

LaRoy Brandt, Truman State University, Kirksville, MO

### 31. HabitatNet: Connecting Community, Education, & Ecosystems through Biodiversity Field Research Projects

Daniel Bisaccio, Brown University, Providence, RI

### 32. An Historical Study of Teaching Biology to Science-Illiterate Students in Eighteenth-Century France

Trudy L. Witt, Germanna Community College, Fredericksburg, VA

### 33. How Can You Teach Biology Online? Designing Laboratory Courses for Online Learning Environments

Mary Mawn, SUNY Empire State College, Saratoga Springs, NY

### 34. How Early in Introductory Biology Courses Can Students Be Identified Who Are at Risk of Failing?

Randal Streck, Post University, Waterbury, CT

### 35. How Naturalists Use Mobile Technology to Support Participation during a Nature Hike

Aubin St.Clair, University of Southern Mississippi, Hattiesburg, MS; Kristy L. Daniel, Texas State University, San Marcos, TX; and Aimée K. Thomas, Loyola University, New Orleans, LA

### 36. An Inquiry-based Activity using Cancer Staging to Teach Students about Tissue Layers

Kurt Lucin and Alyssa Anderson, Eastern Connecticut State University, Willimantic, CT

### 37. Insights from Student-Driven Enrichment Activities

Clark Gedney, Isidore Julien, Purdue University, West Lafayette, IN; Katlin Hahm, University of Michigan, Ann Arbor, MI; Kaitlyn E. Gilland, Purdue University, West Lafayette, IN; and Melanie Johnston, Johns Hopkins University, Baltimore, MD

### 38. Introducing a Multi-component Mammalian Brain Anatomy and Histology Laboratory Associated with an Inquiry-based *Drosophila* Huntington's Disease Module

Lindsay Mehrmanesh, Kene Piasta, and Melissa S. Kosinski-Collins, Brandeis University, Waltham, MA

### 39. Let Them See Light!

Nancy Elwess, SUNY Plattsburgh, Plattsburgh, NY

### 40. Life Sciences Freshman Research Scholars: Integrating First-Year Students into the Research Community

John Stewart, Amy Martindale, Coral Rewasiewicz, and Donald French, Oklahoma State University, Stillwater, OK

### 41. Make it & Solve it! : 3D Modeling & Printing Based Problem Solving Activity with Bio-mimicry

Seung-Hyuk Kwon, Yong-Ju Kwon, Jeung-Tae Eom, Young-Ji Lee, and Jae-Young Oh, Korea National University of Education, Cheongju, North Chungcheong, South Korea

### 42. Natural Selection Verification Program using 3D Printing

Jeung-Tae Eom, Yong-Ju Kwon, Seung-Hyeok Kwon, Jae-Yeong Oh, and Young-Ji Lee, Korea National University of Education, Cheongju, North Chungcheong, South Korea

### 43. A New General-Education Science Course at Wesley College

William Kroen, Wesley College, Dover, DE

## NON-COMPETITION POSTERS *continued*

### **44. Non-Visual Laboratory Activities for Biology**

Deborah M. Fiore, Bridgewater State University, Bridgewater, MA

### **45. Novel GAPDH Gene Sequenced from *Mentha arvensis* (mint)**

Idit Hazan, Brandi Sigmon, Anai Perez, Ryan Starkman, and Haris Variz, Grand View University, Des Moines, IA

### **46. OUTSIDE Naturalist Development Workshop: Identities of Participants and their Relation to Volunteer Motives**

Jennifer A. Mraz, University of Southern Mississippi, Hattiesburg, MS; Kristy L. Daniel, Texas State University, San Marcos, TX; and Aimée K. Thomas, Loyola University, New Orleans, LA

### **47. Phylogenetic Word Associations**

Carrie Boyce, University of the Virgin Islands, USVI, and Kristy L. Daniel, Texas State University, San Marcos, TX

### **48. Plant-Centered Bioinformatics Lessons Engage High School Students in Authentic Science Practices**

Andrea Cobb, Thomas Jefferson High School for Science and Technology, Alexandria, VA; Margot Goldberg, Pittsburgh Milliones 6-12 School, Pittsburgh, PA; Jason Miller and Christopher Town, J. Craig Venter Institute, Rockville, MD

### **49. QUBES: Building a Community to Promote Undergraduate Quantitative Biology Education**

Alison Hale and Sam Donovan, University of Pittsburgh, Pittsburgh, PA, and Arietta Fleming-Davies, Radford University, Radford, VA

### **50. Re-Designing Principles of Genetics to Address the Vision and Change Recommendations**

John M. Moore, Taylor University, Upland, IN

### **51. Ready to Burst! Exploring the Effects of Lysozyme on Gram-Positive and -Negative Bacteria**

Ricki Burnett, Jessica Habashi, and Grant Wilson, Utah State University, Brigham City, UT

### **52. Role of Reflexivity on Students' Outcomes in a College Science Laboratory Course**

Chandrani Mishra, The University of Southern Mississippi, Hattiesburg, MS; Kristy L. Daniel, Texas State University, San Marcos, TX; and Kari L. Clase, Purdue University, West Lafayette, IN

### **53. Students, Students, Students. All We Ever Hear about Are the Students!**

Meshagae Hunte-Brown, Drexel University, Philadelphia, PA

### **54. Teaching the Genome Generation: Teacher Professional Development in Genomics Instruction for Rural and Urban High Schools**

Charles Wray, Michael McKernan, and Kelly LaRue, The Jackson Laboratory, Mount Desert Island, ME and Dana Waring, Harvard Medical School, Cambridge, MA

### **55. The Thermic Effect of Food in Scorpions: a Laboratory Exercise in Animal Physiology**

Sara Tallarovic, Karly Brightwell, Caitlin Schlagal, University of the Incarnate Word, San Antonio, TX

### **56. The Use of Student-Led Supplemental Instruction (SI) to Enhance Learning in First-year Biology Courses**

Kerry Cheesman, Kimberly Heym, and Bruce Epps, Capital University, Columbus, OH

### **57. Using a Trade Book to Show How Change Influences Society**

Sandra Latourelle and Karen Case, SUNY Plattsburgh, Plattsburgh, NY

### **58. Using an Evidence-based Argumentation Skill Progression to Improve Teacher Practice and Increase Student Learning in the (AP) Science Classroom**

Malcolm S. Pringle, E M Kennedy Academy, Boston, MA; Gregory Banks, Urban Science Academy, Boston, MA; Sarah Mayper and Marisa Suescun, Evidence-Based Argumentation Initiative – Boston Debate League, Boston, MA

### **59. Using Mainstream General Audience Science Books to Help Increase Nutrition-Related Learning Outcomes in an Anatomy and Physiology Nursing Course**

Todd M. Linscott, Black Hawk College, Moline, IL

**3:15PM – 3:45PM** *continued*  
**#880 Using Case Studies with Elementary Students to Learn the Body Systems**

555B • Curriculum Development • Hands-on Workshop (30 min) • ES

During this session, researchers will share findings from an elementary STEM camp where students, grades 3–5, explored 3–D interactive case studies that address diabetes and obesity. We will explore the game as well as curricular supports created.

Georgia Hodges, University of Georgia, Athens, GA

**#827 eBio: How the Use of ePortfolios Improved Assessment and Engagement in Non-majors Biology**

556A • Instructional Strategies & Technologies • Paper (30 min) • 2Y, 4Y

This session showcases how intentional use of ePortfolio in a non-majors biology course

provides an efficient instructional model built on the use of technology that increases student engagement, persistence and success for students in the course.

Karla Fuller, Guttman Community College (CUNY), New York, NY

**#883 Learning Reinforcement Activities - One Way We Updated an Already Inquiry-based Course**

556B • Science Practices • Paper (30 min) • 2Y, 4Y

This presentation will summarize how we organized our new combined introductory biology courses using Vision and Change as a conceptual framework. We will outline the significant change we made in how we assess students and provide specific examples.

Connie Russell Heimann, Amaris Guardiola, and Russell Wilke, Angelo State University, San Angelo, TX

**#733 Learning about Biodiversity**

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

Try out classroom activities for students to learn about biodiversity and human effects. Activities include wildlife history, climate data and biomes, an invasive species board game and bird island. Participants will receive full instructions.

Linda Sigismondi, University of Rio Grande, Rio Grande, OH

**NABT Committee Meeting: Global Perspectives Committee**

Blackstone • Committee (75 min) • GA

Jacqueline McLaughlin, Penn State Lehigh Valley, Center Valley, PA



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**4:00PM – 6:30PM**

**NABT Poster Sessions**

Exhibit Hall • Special Program •  
Poster Session • GA

NABT posters highlight research, programs and techniques in three different categories: general strategies to teach biology, scholarship of teaching and learning, and mentored undergraduate research.

Complete poster information is available on page 36.

**Exhibit Hall Opening Reception**

Exhibit Hall • Special Program • GA

You are the guest of honor at this special opening reception of the 2015 NABT Exhibit Hall. Showcasing the NABT sponsor and exhibitor Community, the exhibit hall is the place to enhance your teaching and explore the latest and greatest in tools, technologies, programs, and resources. Join us for complimentary appetizers and beverages. All attendees are invited to observe the poster sessions and to enjoy the special experiences provided by our sponsors.

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**6:30PM – 8:00PM**

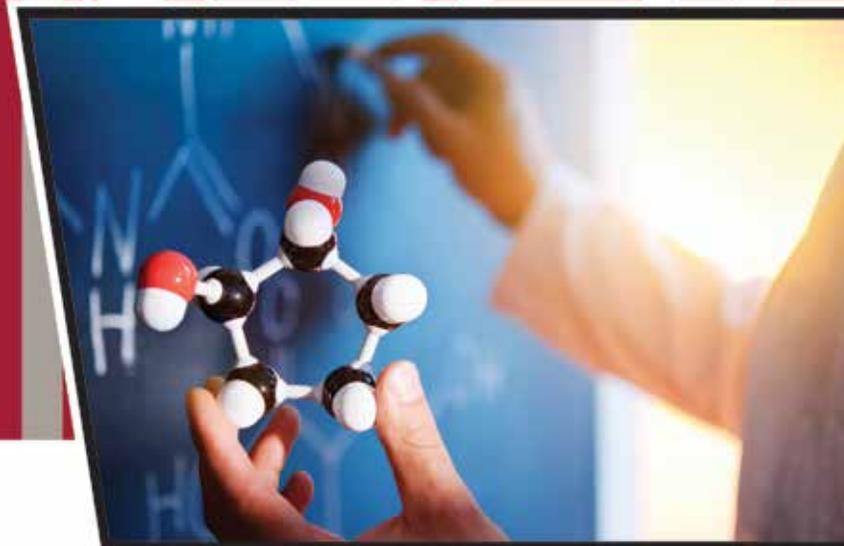
**HHMI Night at the Movies with Sean Carroll**

Ballroom A • Special Event (Tickets Required) • GA

Join Dr. Sean Carroll and special guest Dr. Zalfa Abdel-Malek for the 5th Annual *HHMI Night at the Movies* and the premiere of the new short film "The Biology of Skin Color", a highly engaging case study in recent human evolution, focusing on the interaction between biology and the environment. This FREE red-carpet event will begin with a reception including pizzas, beer, wine and popcorn. Don't miss your chance to attend this exclusive preview.

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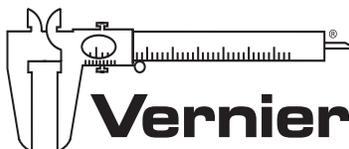
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RICC Room 553A

9:30 – 10:00 am	Imaging and Microscopy with Vernier
10:15 – 11:30 am	Biology with Vernier
1:00 – 2:15 pm	Environmental Science with Vernier
2:30 – 3:45 pm	Human Physiology with Vernier





**THANKS**  
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**2015 Conference a success.**

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International School of Minnesota, Eden Prairie, MN  
Iowa City West High, Iowa City, IA  
John Overton High School, Nashville, TN  
KC Distance Learning, Bloomsburg, PA  
Lake Metro Parks, Concord, OH  
Lincoln High School, Esko, MN  
Marysville High School, Marysville, KS  
Midland Park High School, Midland Park, NJ  
MLK Magnet High School, Nashville, TN  
Mount Saint Mary Academy, Watchung, NJ  
Nashville State Community College, Nashville, TN  
Nassau Community College, Garden City, NY  
Naugatuck Valley Community College, Waterbury, CT  
Newport High School, Bellevue, WA  
North Pitt High School, Bethel, NC  
Parkland Magnet Middle School, Rockville, MD  
Philip O. Berry Academy of Technology High School, Charlotte, NC

Pikeview High School, Princeton, WV  
Rickover Naval Academy, Chicago, IL  
Riverside City College, Riverside, CA  
Ronald Reagan College Prep School, Milwaukee, WI  
Salem High School, Salem, IN  
Saltsburg High School, Saltsburg, PA  
Skyline High School, Sammamish, WA  
Southern Vermont College, Bennington, VT  
Southern Wells High School, Poneto, IN  
St. Clair High School, St. Clair, MI  
Steamboat Springs High School, Steamboat Springs, CO  
The Summit County Day School, Cincinnati, OH  
Sycamore High School, Cincinnati, OH  
T. Wingate Andrews HS Center for Sci & Tech, High Point, NC  
The Barstow School, Kansas City, MO  
Tiffin Columbian High School, Tiffin, OH  
Tower Hill School, Wilmington, DE  
Unionville High School, Kennett Square, PA  
Vincennes University, Vincennes, IN  
Visitation Academy - Saint Louis, St. Louis, MO  
West Island College, Calgary, AB  
West Mifflin Area High School, West Mifflin, PA  
Western Sierra Collegiate Academy, Rocklin, CA  
Whiting High School, Laramie, WY  
Windsor High School, Windsor, CO  
Wise County Alternative Education Center, Wise, VA  
Woodrow Wilson High School, Portsmouth, VA  
Woodstock High School, Woodstock, IL  
York Community High School, Elmhurst, IL

*The mission of the NABT BioClub is to recruit, support, nurture, and promote students who have an interest in biological sciences for personal reasons, academic preparation, the betterment of society, and possible career opportunities by providing guidance, resources, and activities to meet these goals.*

Look for the BioClub logo to indicate recommended articles for NABT BioClub members. If you are interested in forming a chapter of the NABT BioClub, contact NABT at [office@nabt.org](mailto:office@nabt.org).

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