

THURSDAY

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7:00am – 8:15am

First Timers' Breakfast

Regency VI • Special Event • Invitation Only

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 Atlanta.

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

8:30am – 9:30am

GENERAL SESSION

Rita R. Colwell, Ph.D.

Recipient of the 2013 NABT Distinguished Service Award

Bio appears on page 8.

Climate Change, Oceans, and Waterborne Infectious Diseases: Prediction and Prevention

Centennial III & IV • Special Speaker

Since the mid-1980's, when utilization of satellite sensors to monitor land and oceans for purposes of understanding climate, weather, and vegetation distribution and seasonal variations became possible, refinement of the inter-relationships of the environment and infectious diseases was accomplished, both qualitatively and quantitatively. Seasonality of diseases like malaria and cholera had been documented years earlier by epidemiologists, but the new research yielded knowledge of the very close interaction of the environment and many infectious diseases. With satellite sensors, these relationships could be quantified and comparatively analyzed.

Recent studies of epidemic diseases provide models, both retrospective and prospective, for understanding and predicting disease epidemics, notably those that are vector borne, the best examples of which are malaria, plague, and many viral diseases. Cholera can be predicted by monitoring environmental parameters, including sea surface temperature, salinity, rainfall, and chlorophyll (the latter as a tag for phytoplankton that precede zooplankton in abundance in coastal and river waters. Zooplankton carry cholera bacteria as a component of their natural flora). Recent studies of the cholera epidemic in Haiti provide evidence that an early warning system can be developed for public health, and more importantly, for measuring effects of climate change on human health.

10:15am – 11:30am

INVITED SPEAKER

Paul Andersen

Bio appears on page 9.

Lessons of a Half Life

Regency VII • Special Speaker

Paul Andersen has spent half of his life teaching science in Montana, and will describe the obstacles he has faced and the lessons he has learned along the way. Paul is currently an AP Biology teacher at Bozeman High School, where he uses technology and guided inquiry to differentiate instruction for his students. He has created hundreds of science podcasts that have been viewed millions of times by students around the world. Paul's videos cover the topics of biology, chemistry, physics, earth science and education. Paul was the Montana Teacher of the Year and he was a finalist for National Teacher of the Year. Learn more about Paul and watch some of his videos at his website: www.bozeman.science.com

#ES3 Bring Inquiry Into Your Classroom with pGLO

Chicago A & B • Exhibitor Session • Hands-on Workshop (75 min) • Biotechnology • HS 2C 4C

Using pGLO as an example, learn how to ask simple questions about labs you already do to make them inquiry based instead of cookbook. Infuse elements of STEM to expand your students' horizons.

Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

#ES4 Genes and conSEQUENCES

Chicago C & D • Exhibitor Session • Hands-on Workshop (75 min) • Biotechnology • 2C 4C

Help your students understand the central dogma of biology using real-world examples and modern research tools. Utilize a hands-on tool to help your student master these concepts.

Madelene Loftin (mloftin@hudsonalpha.org) and Jennifer Carden (jcarden@hudsonalpha.org), HudsonAlpha Institute for Biotechnology, Huntsville, AL

Presented in partnership with Carolina Biological Supply Company.

#ES1 Using Probeware to Effectively Conduct Inquiry in AP® Biology

Hanover A • Exhibitor Session • Hands-on Workshop (75 min) • AP Biology • HS GA

Explore PASCO's biology products and see how they can help you deliver content and inquiry in the new AP® Biology labs. See how SPARKvue® software can help students through the sense-making process while building their quantitative analysis skills.

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

highlighted speakers

Read their bios on pages 8-10.

abbrev. key



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

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#ES2 Inquiry-based Biology with Vernier

Hanover B • Exhibitor Session • Hands-on Workshop (75 min) • General Biology • MS HS 2C 4C

Need to add inquiry labs to your biology course? In this hands-on workshop, you will learn how to conduct inquiry investigations using LabQuest 2, Logger Pro on computers, and Graphical Analysis for iPad®.

Mike Collins (sales@vernier.com), Vernier Software & Technology, Beaverton, OR

#474 HHMI Presents: Enhance Your Teaching of the New AP Biology Curriculum Framework with Free Resources from HHMI

Hanover C • Hands-on Workshop (75 min) • AP Biology • HS

Teach ahead of the textbook with HHMI's free resources for AP Biology available at BioInteractive.org. Participants will

receive a free teacher guide organized according to the *Big Ideas* of the newly released AP Biology Curriculum Framework.

Ann Brokaw, Rocky River High School, Rocky River, OH

#456 LadyBug: Using an Evolutionary Game to Capture Young Students' Enthusiasm for Evolution-in-Action

Hanover D • Hands-on Workshop (75 min) • Evolution • E MS HS

LadyBug is an online resource that simulates predator-prey relationships between lady beetles and aphids to illustrate mechanisms behind natural selection. Participants will become lady beetles and play out evolutionary scenarios.

Melissa Kjelvik (kjelvikm@msu.edu) and Elizabeth Schultheis (eschultheis@gmail.com), Michigan State University – Kellogg Biological Station, Hickory Corners, MI and Louise Mead (lmead@msu.edu), BEACON, East Lansing, MI

#369 Partnership for Undergraduate Life Science Education (PULSE)

Hanover E • Symposium (75 min) • Curriculum Development • 2C 4C

Leadership Fellows will introduce the participants to the PULSE projects that support the incorporation of the *Vision and Change* recommendations for transforming undergraduate life science education into courses, programs and departments.

Sharon Gusky (sgusky@nwcc.edu), Northwestern Connecticut Community College, Winsted, CT; Gina Sempreb (gsempreb@baypath.edu), Bay Path College, Longmeadow, MA; Melanie Lee-Brown, (mleebro@guilford.edu), Guilford College, Greensboro, NC; Judy Awong-Taylor (jawangta@ggc.edu), Georgia Gwinnett College, Lawrenceville, GA; Karen Klyczek (karen.k.klyczek@uwrf.edu), University of Wisconsin-River Falls, River Falls, WI; and David Marcey (marcey@clunet.edu), California Lutheran University, Thousand Oaks, CA

ASM PRESENTS

Eliminating Polio in our Lifetime: What it Takes

Dr. Olen Kew, Centers for Disease Control and Prevention, Atlanta, GA

THURS NOV 21, 10:15-11:30 AM | HANOVER F & G

Learning from Catastrophe: Stopping Foodborne Illness

Dr. Robert Tauxe, Centers for Disease Control and Prevention, Atlanta, GA

THURS NOV 21, 11:45 AM-1:00 PM | HANOVER F & G

CDC Excite Program: Epidemiology in the Classroom

Dr. Ralph Cordell, Centers for Disease Control and Prevention, Atlanta, GA

THURS NOV 21, 1:15-2:30 PM | HANOVER F & G

ASM Laboratory Biosafety Guidelines

Dr. Cristina Bressler, Centers for Disease Control and Prevention, Atlanta, GA

THURS NOV 21, 2:45-4:00 PM | HANOVER F & G

Visit booth #403 to learn about our latest K-12 Outreach Activities!



AMERICAN SOCIETY FOR MICROBIOLOGY

www.asm.org/educators

10:15am – 11:30am

continued

#393 American Society for Microbiology Presents: Eliminating Polio in Our Lifetime - What it Takes

Hanover F & G • Paper (75 min) • Global Perspective • GA

The polio eradication story is a near-success. This session will describe the wide and deep partnerships of many, many stakeholders who have banded together to eliminate a disease globally.

Olen Kew, Centers for Disease Control and Prevention, Atlanta, GA and Dave Westenberg, Missouri S&T, Rolla, MO

Presented as part of ASM and the CDC: Partners in Safety

#409 Detecting Epigenetic DNA Methylation in *Arabidopsis thaliana*

Baker • Demonstration (75 min) • Genetics • 4C

Learn how to teach your students epigenetics by having them measure differences in DNA methylation that affect flowering time in *Arabidopsis*.

Jermel Watkins (jwatkins@cshl.edu), Cold Spring Harbor Laboratory, Cold Spring Harbor, NY

#359 Practice Makes Perfect! Modeling and NGSS Teaching Practices

Courtland • Hands-on Workshop (75 min) • General Biology • HS MS 2C

We will explore a variety of hands-on physical models of molecular structures – as an approach to make the molecular world “real” for students.

Tim Herman (herman@msoe.edu), MSOE CBM, Milwaukee, WI

#280 Turnips and Guaiacol: Your New Favorite Enzyme Lab

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

Hydrogenperoxidase is easily extracted from turnips. When reacted with a substrate of hydrogen peroxide in the presence of quaiacol, a brown product is

formed, perfect for a colorometric assay of enzyme kinetics and factors affecting enzyme activity.

William Anderson (golfanderson@gmail.com), Wilmington Friends School, Wilmington, DE and Sandra Litvin (slitvin@ucfsd.net), Unionville High School, Kennett Square, PA

#249 Beyond X and Y: Recent Discoveries about the Mechanisms Governing Sex Determination and Differentiation

Edgewood (Session I) • Paper (30 min) • AP Biology • HS 2C

Sex determination is no longer as simple as XX/XY chromosome identification! This presentation will explain the recent advances in research as well as effective classroom strategies for high school and college biology.

Terry Maksymowych (tmaksymowych@ndapa.org), Academy of Notre Dame de Namur, Villanova, PA

#311 Undergraduate Genetics: The Need for Backward Design

Edgewood (Session II) • Paper (30 min) • Genetics • 2C 4C

An analysis of undergraduate genetics reveals a mismatch between instructors' intentions and teaching practices. This suggests the need for greater attention to best practices in instruction, specifically, better use of backward design and validated assessments.

Michael Dougherty (mdougherty@ashg.org), American Society of Human Genetics (ASHG), Bethesda, MD

#241 Teach Marine Biology Instead of Biology to All Standards

Fairlie • Hands-on Workshop (75 min) • Marine Biology • HS, MS

Comprehensive biology course focusing on marine life teaching all required various state and national biology standards! Includes lesson plans, labs, activities, games, web inter-actives/web quests. Course components tested, scores phenomenal.

Mark Friedman (Marklewisfriedman@gmail.com), Animo High School, Inglewood, CA

#268 Nature in the Classroom: Inquiry and The Nature of Science

Greenbriar • Hands-on Workshop (75 min) • AP Biology • MS HS 2C

The greatest source of wonder and amazement is not in a textbook. It is the natural world. Learn how to incorporate simple inquiry based activities to inspire curiosity and awareness for the natural world in the context of your course content.

Jim Lane, Mahtomedi High School, Mahtomedi, MN and Isaac Stewart, Fisher Jr/Sr High School, Fisher, IL

#406 Exploring Rare Disease through Hands-on and Blended Settings

Harris (Session I) • Demonstration (30 min) • AP Biology • HS 2C

Students explore a rare disease (Pompe disease) through face-to-face collaborative learning groups and hands-on activities, as well as through virtual environments. Pilot results and sample lessons will be presented.

Julie Bokor (julie@cpet.ufl.edu), University of Florida Center for Precollegiate Education and Training and UF College of Education, Gainesville, FL and Houada Darwiche (houdad@cpet.ufl.edu), University of Florida Center for Precollegiate Education and Training, Gainesville, FL

#408 No More Mosquito!

Harris (Session II) • Demonstration (30 min) • General Biology • MS HS

Emerging pathogens are terrific interdisciplinary topics. This session highlights a high-school curriculum unit on Dengue fever, developed and classroom-tested by Florida teachers.

Julie Bokor (julie@cpet.ufl.edu), University of Florida Center for Precollegiate Education and Training and UF College of Education, Gainesville, FL and Houada Darwiche (houdad@cpet.ufl.edu), University of Florida Center for Precollegiate Education and Training, Gainesville, FL

Committee Meeting: Finance Committee

Heritage Boardroom

Bob Melton (bmelton@putnamcityschools.org), Committee Chair

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#271 Defusing Diffusion

Inman (Session I) • Demonstration (30 min) • General Biology • E MS HS

The ink drop experiment is often used to demonstrate diffusion, but some don't realize this is a misconception. Come share what you know and discover more about diffusion/convection experiments. (Based on the *ABT* article, *Defusing Diffusion*)

Remy Dou (dour@einsteinfellows.org), National Science Foundation, Arlington, VA and Zeke Kossover (kossoverz@einsteinfellows.org), The Jewish Community High School of the Bay, San Francisco, CA

#264 The Immortal Life: Science, Race, and Ethics

Inman (Session II) • Demonstration (30 min) • General Biology • HS MS GA

During this session, teachers will be given ideas and tools to use the book *The Immortal Life of Henrietta Lacks* in the classroom. Teachers will be provided with a study guide and other activities to explore the issues of science, race and ethics.

Chris Monsour (chris_monsour@tiffincityschools.org), Tiffin Columbian High School, Tiffin, OH

#468 BSCS Presents: Evolution and Medicine

Kennesaw • Hands-on Workshop (75 min) • Evolution • HS

Evolution and Medicine is a module for high school that illustrates how an understanding of evolution informs medicine. Participants will engage in an activity that relates natural selection to human health.

Mark Bloom, BSCS, Colorado Springs, CO

#E55 High School Biology: Digging Deeper than Dissection

Lenox • Exhibitor Session • Hands-on Workshop (75 min) • Anatomy & Physiology • HS 2C

Everyone knows about traditional dissection and standard specimens. But this workshop takes you beyond the traditional to exciting new specimens with modern preparations that take today's students, standards, and safety regulations into account.

Janet Holliday (janet.holliday@vwr.com), Ward's Science, Rochester, NY

#435 Dynamic Nature of Science: Discovering the Tree of Life

Piedmont • Hands-on Workshop (75 min) • Evolution • HS

Explore student activities linking NGSS to scientific research. Activities focus on the nature of science through the changing models of the tree of life and facilitate discussions about the controversial term "prokaryote". Free curriculum materials.

Chandana Jasti and Barbara Hug, University of Illinois, Champaign, IL

#279 Bringing Vision and Change to Our College

Rosewell • Hands-on Workshop (75 min) • General Biology • HS 2C 4C

Redesigning undergraduate biology curriculum at Tulsa Community College is a faculty collaborative effort. Faculty members will share student-centered learning activities in line with *Vision and Change*.

Melissa Gentry (melissa.gentry@tulsacc.edu), Jennifer Kneafsey (jennifer.kneafsey@tulsacc.edu), Constance Murray (constance.murray@tulsacc.edu), Mary Phillips (mary.phillips@tulsacc.edu) and Patty Smith (patty.smith@tulsacc.edu), Tulsa Community College, Tulsa, OK

#245 Infect Your Biology Classroom with Math!

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

Integrating biology and mathematics shouldn't just be a good idea – it should be the law! Come and learn how easy, important, and fun it is to collect and analyze data as a part of good, solid, responsible science education.

Jeff Lukens (jeffrey.lukens@k12.sd.us), Roosevelt High School, Sioux Falls, SD

#453 Oh Me! Oh My! Meiosis and Mitosis: Strategies to Teach

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

Conceptual understanding of cell division as a process by which cells can replicate or reduce chromosome number will be explored. Manipulatives and multiple approaches to teaching will engage participants using free or cheap materials.

Kim Sadler (kim.sadler@mtsu.edu), Cindi Smith-Walters (csmithwa@mtsu.edu) and Rachel Lytle (rrl2j@mtmail.mtsu.edu), Middle Tennessee State University, Murfreesboro, TN

#ES6 Meeting the New AP® Biology Requirements

Marietta • Exhibitor Session • Demonstration (75 min) • AP Biology • HS

This session reviews the College Board's redesigned Curriculum Framework for the AP Biology course and shows several curricular resources that ideally prepare students for success on the new exam.

Cindi Weiss (cweiss@bfpwpub.com), W.H. Freeman, New York, NY

11:45am – 4:00pm

NABT AP BIOLOGY SYMPOSIUM

Regency V • Special Program • AP Biology • HS 2C 4C

Join participants of the *NABT/BSCS AP Biology Leadership Academy* for sessions that highlight key practices and concepts from the Academy Program. Designed for AP Biology, this symposium will impact your teaching in other courses as well.

Constructing Meaningful Scientific Explanations in AP Biology

Constructing explanations is one of the practices of science in the new AP Biology Curriculum Framework. In this session, take part in an investigation and learn about a tool to help students link activities to science concepts as they construct good scientific explanations.

Presented by NABT/BSCS AP Biology Leadership Academy Participants

Bringing the Practices of Science to AP Biology

In this session, learn about the practices of science and levels of inquiry that are described in the new AP Biology Curriculum Framework. Consider how to engage students more fully in inquiry-based science and practice using a tool to analyze a laboratory experience.

Presented by NABT/BSCS AP Biology Leadership Academy Participants

Developing and Applying Quantitative Skills in AP Biology

Bring your computer with a spreadsheet application and together, let's explore strategies and examples to help our students develop and apply quantitative skills of statistical analysis. I will share examples that work in my Research Methods course.

Brad Williamson (ksbioteacher@gmail.com), University of Kansas Center for STEM Education, Lawrence, KS

Sponsored by 

11:45am – 1:00pm

#ES9 Worm and Squirm Your Way into Behavior Labs

Chicago A & B • Exhibitor Session • Hands-on Workshop (75 min) • AP Biology • HS 2C 4C

Use the model organism, *C. elegans* in an engaging activity that compares normal and mutant worm behaviors. Explore worm taste preferences in a simple and fast chemotaxis assay. Come see this great alternative AP fruit fly behavior lab!

Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

#ES10 What's in My Sushi? Unlocking the Power of DNA Barcoding

Chicago C & D • Exhibitor Session • Hands-on Workshop (75 min) • Biotechnology • HS 2C 4C

In 2008 a high school science project uncovered seafood mislabeling; a 2013 Oceana study showed 33% of fish sold in the US is incorrectly labeled. Give your students an opportunity to investigate this trend and other biological issues by using DNA barcoding.

Bruce Nash (nash@cshl.edu), Cold Spring Harbor Laboratory, Cold Spring Harbor, NY

Presented in partnership with Carolina Biological Supply Company.

#ES7 Fermentation and Bioprocessing of GFP

Hanover A • Exhibitor Session • Hands-on Workshop (75 min) • Biotechnology • HS 2C 4C

See how you can bring industrial processes to life in your biotechnology lab by expressing GFP protein using *Escherichia coli* in a small-scale fermentor monitored by PASCO probeware.

Mike Blasberg (sales@pasco.com) and Lucia Dussan, PASCO scientific, Roseville, CA

#ES8 Integrate iPad® and BYOD with Vernier Technology

Hanover B • Exhibitor Session • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • E MS HS 2C 4C

In this hands-on workshop, you will use Vernier's digital tools, such as probeware, to conduct an investigation with either Graphical Analysis for iPad®, or Vernier Data Share for tablets, Chromebooks, and BYOD environments.

Mike Collins (sales@vernier.com), Vernier Software & Technology, Beaverton, OR

#480 HHMI's *The Making of the Fittest: Got Lactase?* The Co-evolution of Genes and Culture Free Classroom Resources

Hanover C • Hands-on Workshop (75 min) • Evolution • HS

Combining archeological and genetic evidence, this film tells the fascinating story of why only a minority of human adults worldwide can digest milk. Bring this memorable example of human evolution into your classroom with our free resources.

Paul Strode, Fairview High School, Boulder, CO

#420 The EvoDevoCI: A New Measure of Evolutionary Understanding

Hanover D (Session I) • Paper (30 min) • Evolution • 4C

A recently developed concept inventory in evolutionary developmental biology (EvoDevoCI) can be used to improve evo-devo instruction. The EvoDevoCI targets six core evo-devo concepts you can incorporate into undergraduate biology courses.

Anna Hiatt (anna.hiatt@okstate.edu) and Donald French (dfrench@okstate.edu), Oklahoma State University, Stillwater, OK; Kathryn Perez (kperez@uwlax.edu), University of Wisconsin – LaCrosse, LaCrosse, WI; Becca Price

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NABT Biology Education Research Symposium

Thursday, November 21 • 1:15pm – 4:15pm • Learning Center

Join us for the 5th Annual NABT Biology Education Research Symposium.

Presentations were accepted through a double blind peer review process that was open to biology educators and researchers at all levels.

SCHEDULED PRESENTATIONS:

Self-efficacy and First Year Biology Majors

Michele J. Mann and Christopher Golubski, The University of Texas at Austin, Austin, TX

Using the Motivated Strategies for Learning Questionnaire (MSLQ), self-efficacy was evaluated at the beginning and end of the semester in an entry-level biology course for biology majors. There was a significant difference in self-efficacy from the pretest to posttest on two questions. The students' self-efficacy significantly decreased on questions "I expect to do well in this biology class" ($p=.06$) and "Considering the difficulty of this biology course, the teacher, and my skills, I think I will do well in this class" ($p=.033$). Moreover, even though the differences in the other six questions were not significant, they showed a downward trend between the beginning of the course and the end of the course in regard to student self-efficacy. We found a statistically significant difference in biology course grade and overall GPA, $t(.70) = -1.77$, $p=.082$, indicating that overall GPA was higher than the students' grade in their biology course. It appears that students have an inflated perception of their skill level in college level classes. Helping students develop metacognitive skills might help them transition from a high school setting to a competitive college environment and will help retain valuable students in STEM majors.

Lessons Learned from the First Year Implementation of a Two-Track, Reformed Introductory Biology Course

Dina L. Newman, Gary R. Skuse, Dawn Carter, F. Harvey Pough, and L. Kate Wright, Gosnell School of Life Sciences, Rochester Institute of Technology, Rochester, NY

The design, implementation and assessment of a novel, two-track, reformed introductory biology sequence are described in this paper. Course reform was based on recommendations from the 2009 *Vision and Change* report from AAAS. Both tracks were based on guided inquiry, with an emphasis on constructivist pedagogy. One track included only students who entered with Advanced Placement Biology credit ($N=24$), who were given a "content-free" course that focused for the entire year on the investigation of the phenomenon of vanishing amphibians, from molecules to ecosystems. The other track included the remaining students ($N=68$), who received more direct content instruction but through the use of numerous student-centered, active learning methods. Students in the "AP Scholars" section had higher and more consistent levels of prior knowledge, but both sections made identical normalized learning gains and expressed satisfaction with the course, particularly the reformed aspects. The "AP Scholars" identified strongly as scientists and enjoyed the investigative nature of the course. The two-track course is now in its second year, and changes are being made in accordance with the lessons learned from the first year. This two-track system could serve as a model for other institutions looking to change their introductory biology sequence.

Access Patterns and Learning Outcomes of Online Videos in Two Biology Courses

Anneke M. Metz, Southern Illinois University, Carbondale, IL

This study investigates the impacts of assigned online videos on student learning. In an introductory biology course, students watched 7 short (~17 min) online videos for a digestion unit, combined with active learning in class. By tracking access, one-third of students were found to be avid watchers, viewing each video twice, while two-thirds of students were poor video watchers, watching ~30% of video content. Test performance in this "flipped classroom" was only marginally better than in a previous cohort taught traditionally, and poor video watchers did not significantly perform worse than avid watchers (they appear to have used other resources). Nearly all surveyed students had very positive feelings about the flipped classroom. In a biochemistry class, students watched 8 short (~17 min) introductory

videos followed by a quiz, over one semester. Video watching was consistently ~100%, and, on a final exam, students performed equally well on pre-lecture video questions and questions on basic material taught in class. These data suggest videos work well to teach introductory material and free up class precious time, are generally well-received, but only utilized by about 1/3 of students if viewing burden is heavy or students are not incentivized.

How do Biology Majors Conceptualize the Concept of Animals?

Andrea M.K. Bierema and Renee' S. Schwartz, Western Michigan University, Kalamazoo, MI

Several terms commonly used in science have separate scientific and everyday meanings, such as 'animal.' Although by the third year in their program, biology majors should have a scientific concept of animals, they may also still have an everyday concept. The everyday concept typically refers to vertebrates, whereas the scientific concept includes vertebrates and invertebrates. In biology classrooms, upper-level biology majors were asked to list five types of animals. Then, students were given explicit direction to reflect on the diversity of the entire animal kingdom as they provided another list of animals. Immediately afterward, students were shown a series of photographs and terms and asked to identify each as an animal or non-animal. On their first list, students typically used an everyday concept of animal and listed mostly vertebrates, especially mammals. After explicit instruction, their lists became more diverse and commonly included invertebrates as well. When asked to identify examples as animals or non-animals, students also typically used a scientific concept. This study serves as an excellent example of the need to use explicit instruction in the science classroom. Although students knew the scientific concept, they still initially used their everyday concept, even though they were in a biology classroom.

Special Guest Presenter:

Demystifying and Humanizing Biology Through Intensive Analysis of Scientific Literature—The C.R.E.A.T.E Strategy

Sally G. Hoskins, Professor, Biology Dept. City College of the City University of New York, New York, NY
Recipient of the 2013 Four-Year College & University Section Research in Biology Education Award

Journal articles are a key method used by working biologists to communicate their findings, and undergraduates are capable of reading and gaining much from analysis of primary and other scientific literature. With collaborators Leslie Stevens (University of Texas—Austin) and Kristy Kenyon (Colleges of Hobart and William Smith), I have developed and tested a new learning/teaching strategy called C.R.E.A.T.E. (Consider, Read, Elucidate hypotheses, Analyze and interpret data, Think of the next Experiment), that uses scientific literature as the focus for understanding science. C.R.E.A.T.E. provides novel and adapted pedagogical tools (concept mapping, cartooning, figure annotation, sentence translation, data analysis templates, experimental design and grant panel activities) for students to use in decoding primary or popular-press scientific literature. Classes run lab-meeting-style with active discussions about what data mean, how conclusions were reached, possible alternative interpretations, and considerations of how a given study could be followed up. Late in the semester, classes develop single surveys of questions about "life as a scientist" that are emailed to all authors of papers analyzed in class. The varying responses of PIs, postdocs, and graduate student authors to the same questions provide students unique insight into the diversity of the lives and motivations of "the people behind the papers". Both in courses for first-year students and in upper-level capstone courses, C.R.E.A.T.E. produces (1) significant gains in students' ability to "think like scientists" (critical thinking, content integration, experimental design ability gains) and, equally important, (2) significant gains in students' understanding of what scientists do, why they do it, and "who" can become a scientist. I will discuss why I believe this approach is optimal for 21st century biology students, and outline ways to extend the C.R.E.A.T.E. strategy to high school students of biology.

11:45am – 1:00pm

continued

(beccap@uw.edu), University of Washington – Bothell, Bothell, WA; Greg Davis (gdavis@brynmaur.edu), Bryn Mawr College, Bryn Mawr, PA; and Mark Terry (mark.terry@northwestschool.edu), The Northwest School, Seattle, WA

#380 Students Who Do Not Accept Evolution and Climate Change

Hanover D (Session II) • Paper (30 min) • Environment/Ecology • HS 2C 4C

We report findings of a survey of undergraduate students, aiming to better understand students who do not accept anthropogenic climate change (ACC) and evolution. Participants will gain ideas of how to approach these topics in their classrooms.

Deena Wassenberg (deenaw@umn.edu) and Sehoya Cotner (harri054@umn.edu), University of Minnesota – Twin Cities Campus, St. Paul, MN

#391 American Society for Microbiology Presents: Learning from Catastrophe: Stopping Foodborne Illness

Hanover F & G • Paper (75 min) • Microbiology & Cell Biology • GA

Food safety and how we track them is so critical for ensuring public safety. Dr. Tauxe will present stories about outbreaks of foodborne illnesses and how scientists at the Centers for Disease Control monitor potential risks to our food supply.

Robert Tauxe, Centers for Disease Control and Prevention, Atlanta, GA and Dave Westenberg Missouri S&T, Rolla, MO

Presented as part of
ASM and the CDC: Partners in Safety

#392 Understanding Microarrays

Baker • Hands-on Workshop (75 min) • Biotechnology • HS

The session will demonstrate the entire process involved in creating a microarray

as well as the analysis of the finished product. The session will involve a computer driven virtual version, as well as a paper model that simplifies the microarray.

Leah McRae, James Clemens High School, Madison, AL

442 Using Systems Thinking to Understand Ocean Acidification

Courtland • Hands-on Workshop (75 min) • Marine Biology • MS HS 2C

Explore an NSF developed, systems biology, hands-on, and inquiry-based curriculum module. Students build STEM and systems thinking skills while learning about ocean acidification and its complex, interdisciplinary effects on ocean systems.

Claudia Ludwig (cludwig@systemsbiology.org), Institute for Systems Biology, Seattle, WA and Mari Knutson Herbert (KnutsonM@lynden.wednet.edu), Lynden High School, Lynden, WA

#427 Tiny Bubbles, Popcorn and More: Ecology Mini-lab Activities

Dunwoody • Hands-on Workshop (75 min) • AP Biology • HS 2C

Participants will model student learning activities which explore the concepts of logistic and exponential growth, carrying capacity, survivorship curves, and Batesian mimicry.

Pamela Close, D. H. Hickman High School, Columbia, MO

#316 Teaching A&P Through Authentic Case Studies

Edgewood • Paper (75 min) • Anatomy & Physiology • HS 2C

Make A&P teaching exciting and relevant by integrating case studies into your lectures and labs. Authentic case studies encourage critical thinking, reinforce terms and concepts, and are simple to apply learning outcomes.

Brian Shmaefsky (brian.r.shmaefsky@lonestar.edu), Lone Star College – Kingwood, Kingwood, TX

#289 Human Ecology Activities for Global Citizenship

Fairlie • Hands-on Workshop (75 min) • Environment/Ecology • MS HS

Discover interdisciplinary, hands-on activities to help students think critically and creatively about global challenges to the planet and human well-being, such as population growth, food and water availability, climate change and biodiversity.

Bonita Flournoy (bfLOURNOY@atlm.edu), Atlanta Metropolitan College, Atlanta, GA

#252 Exploring Bias and Data Analysis with Wisconsin Fast Plants

Greenbriar • Hands-on Workshop (75 min) • General Biology • MS HS 2C

In this hands-on workshop, participants will engage in and unpack a data analysis lesson using Wisconsin Fast Plants. This lesson can be used and modified for teaching introductory to advanced ecological, genetics, or growth and development concepts.

Hedi Baxter Lauffer (hfbaxter@wisc.edu), University of Wisconsin – Madison, Madison, WI

#331 Flipping the Classroom Without Getting Disoriented

Harris • Demonstration (75 min) • General Biology • HS 2C 4C

The flipped classroom is a new strategy that helps teachers focus on students, not content. Learn about resources and techniques for moving content delivery out of the classroom, as well as ideas for moving deeper learning activities into the classroom

Steven Christenson (christensons@byui.edu) and Abigail Blades (bladesa@byui.edu), Brigham Young University – Idaho, Rexburg, ID

Committee Meeting: Awards Committee Heritage Boardroom

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

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continued

#403 Hands-on Exposure: Authentic Research in the K-5 Classroom

Inman • Hands-on Workshop (75 min) • General Biology • E

Teachers will leave this workshop with materials and resources for lessons on genetics and communication in nature. The *ShowMe Nature GK12* program will demonstrate lessons that exemplify the integration of authentic research into the K-5 classroom.

Clayton Coffman (clayton.coffman@gmail.com), Logan Decker (Lmd0a2@mail.missouri.edu), Jessica Merricks (Jawfz2@mail.missouri.edu) and Stephanie Schuttler (schuttlers@missouri.edu), University of Missouri, Columbia, MO

#276 Simulating Science: “A Cholera Epidemic” and “Stem Cells”

Kennesaw • Symposium (75 min) • General Biology • HS

Use inexpensive “wet lab” simulations and models to enhance students’ understanding of the molecular evolution of Cholera and of stem cells and their potential to treat diseases. Teacher information and student handouts are available from <http://lifesciences.envmc.rochester.edu/>

Susan Holt (sholtbmn@aol.com) and Dina Markowitz (dina_markowitz@urm.c.rochester.edu), University of Rochester Life Sciences Learning Center, Rochester, NY

#ES11 Environmental Science: Exploring Ecosystems and Interdependent Relationships

Lenox • Exhibitor Session • Hands-on Workshop (75 min) • Environment/Ecology • HS

Examine a real-life example of pollution’s effect on an organism and its habitat with this interactive workshop. You’ll investigate water pollution using digital data collection, analyze the impact of pollution, and suggest a solution.

Jana Penders (jana.penders@vwr.com), Ward’s Science, Rochester, NY

#299 Literacy in the Biology Classroom

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

Challenged to integrate Common Core Standards into your classes? Come learn about several ways to merge literacy and inquiry into biology in order to engage and deepen learning. Many examples, resources, and assessment ideas will be provided.

George Sellers, Ware Shoals High School, Ware Shoals, SC and Judy Jones (jjonesae@gmail.com), Chapel Hill-Carboro Schools (retired), Chapel Hill, NC

#381 Next Generation Science Standards “Do It Yourself!”

Rosewell • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • E MS HS

The NGSS implementation process requires educators to change how we teach (our pedagogy) rather than what we teach. Enabling students to construct and demonstrate science understanding will require major shifts in how we frame and scaffold instruction.

Robby Cramer (robby.cramer@vai.org), Van Andel Education Institute, Grand Rapids, MI and Cheryl Hach (cherylhach@hotmail.com), Kalamazoo Area Math and Science Center, Kalamazoo, MI

#263 Using the “5 Practices Framework” to Facilitate Productive Classroom Discussions

Spring • Hands-on Workshop (75 min) • General Biology • HS

The “5 Practices Framework” allows teachers to prepare for and orchestrate rich learning and discussions around cognitively demanding tasks. Participants will explore and engage in the 5 practices using examples from high school classes across the United States.

Brittney Barickman (brittney.barickman@kstf.org), Cherry Cheek High School, Greenwood Village, CO, Rachel Packer (rachel.packer@kstf.org), Lee High School, Springfield, VA and Helen Snodgrass (helen.snodgrass@kstf.org), YES Prep North Forest, Houston, TX

#394 Herbarium in a Snap!

Techwood • Hands-on Workshop (75 min) • General Biology • MS, HS

Herbarium in a Snap is an engaging hands-on workshop that pairs technology with life science as a powerful vehicle in teaching students in grades 7-12 to investigate, model, and explain the organization of Kingdom Plantae while allowing its participants to enjoy the beauty and wonder of plants.

Sarah Lowman (Sarah.Lowman@lcsk12.org), Tanner High School, Tanner, AL

#ES12 AP® Environmental Science Resources

Marietta • Exhibitor Session • Demonstration (75 min) • Environment/Ecology • HS

This session will inform participants of available resources, both print and digital, to ideally address the requirements of College Board’s AP Environmental Science course. Complimentary copies and supporting documentation are available.

Cindi Weiss (cweiss@bfpwpub.com), W.H. Freeman, New York, NY

1:15pm – 4:00pm

NABT Biology Education Research Symposium

Learning Center • Special Program

You are invited to the 5th Annual Biology Education Research Symposium. Presentations were accepted through a double blind peer review process that was open to biology educators and researchers at all levels.

Please refer to page 30 for abstracts.

NABT Global Perspectives Committee Poster Session

Hanover E • Special Program

The NABT Global Perspectives Committee is proud to present its inaugural conference session entitled *Connecting Students to Planet Earth through the Study of Global Biological Knowledge*. This interactive

poster session highlights innovative learning environments to enhance biology education internationally.

Please see the following column for details.

1:15pm – 2:30pm

Continued: NABT AP Biology Symposium

Regency V • Special Program • AP Biology • HS 2C 4C

#ES15 Ecology to Enzymes to Industry (AP Big Idea 4)

Chicago A & B • Exhibitor Session • Hands-on Workshop (75 min) • AP Biology • HS 2C 4C

Use ecological knowledge and mushrooms to find and characterize novel cellobiase enzymes for application in cellulosic biofuel production. The enzyme is easy to extract from mushrooms and a colorimetric system will be used for assaying enzyme activity.

Sherrri Andrews (sherrri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

#ES16 Labs that Fit: Making Inquiry Work in your AP Biology Classroom

Chicago C & D • Exhibitor Session • Hands-on Workshop (75 min) • AP Biology • HS 2C 4C

Need an easier way to introduce inquiry? This hands-on workshop introduces you to resources designed for the AP Biology curriculum and gives you an opportunity to discuss success stories with your peers.

Bobbie Hinson (bobbie.hinson@providenceday.org), Providence Day School, Charlotte, NC, Theresa Holtzclaw and Fred Holtzclaw, Webb School of Knoxville, Knoxville, TN

Presented in partnership with Carolina Biological Supply Company.

NABT Global Perspectives Committee 2013 INAUGURAL POSTER SESSION: "Connecting Students to Planet Earth through the Study of Global Biological Knowledge"

1:15pm – 4:00pm

1:15pm – 2:00pm: Persuasive Poster Introductions
(3 minute presentations)

2:00pm – 3:30pm: A Tour of Posters

3:30pm – 4:00pm: Wrap-up: Thinking Out of the Box

Poster Session moderated by **Dr. Jacqueline McLaughlin**,
The Pennsylvania State University, Global Perspectives Committee Chair

Poster Presentations:

An Interdisciplinary Immersion Course about the Hawaiian Islands

Melinda Pomeroy-Black, Nicki Cauthen & Sarah Beth Mallory,
LaGrange College, LaGrange, GA

Biotechnology to Bioentrepreneurship

M. Quinto, B. Bolo, C. Mintu, B. Lansang, A. Alvarez, A. Pag-ong
& B. Laza, Far Eastern University, Manila, Philippines

CHANCE: Promoting Environmental Education in China through Research

Jacqueline McLaughlin, The Pennsylvania State University,
Center Valley, PA; Xiaoying Cheng & He Liu, Jiangnan University,
Wuxi, Jiangsu Province, China

Connecting The Dots: Penn State University and University of Guanajuato Students Collaborate to Investigate the Effects of Agriculture on the Ecology of Guanajuato, Mexico

Karen Kackley-Dutt & Mary Hutchinson, The Pennsylvania State
University, Center Valley, PA

Evolution of a Program of Faculty-Led International Field Experiences

Alan Stam, Kerry Cheesman & Nancy Swails, Capital University,
Columbus, OH

Hydroponic Greenhouse Bio-Sensor Curriculum Project

Christine Yukech, University of Akron, Akron, OH

Involving Students in Learning Biology through Faculty-Led International Field Experiences

Kerry Cheesman, Alan Stam & Nancy Swails, Capital University,
Columbus, OH

Malaysia Tropical Field School: Integrating Field Biology with Local Culture and Knowledge

Nurul Salmi, Universiti Sains Malaysia, Penang, Malaysia

Students as Ecological Scientists

Simon Buzzard, Ecology Project International, Missoula, MT

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

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

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*continued***#ES13 Human Physiology with PASCO Probeware**

Hanover A • Exhibitor Session • Hands-on Workshop (75 min) • Anatomy & Physiology • HS 2C 4C

Participate in innovative activities from PASCO's biology lab manuals and get hands on with EKG, blood pressure, heart rate, and skin temperature sensors. See how you can make lecture come alive using PASCO's intuitive SPARKvue® software.

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

#ES14 Field Biology with Vernier

Hanover B • Exhibitor Session • Hands-on Workshop (75 min) • Environment/Ecology • MS HS 2C 4C GA

Use LabQuest 2 to engage students in field biology and ecology. Learn how to use the Data Matrix mode, new Optical DO Probe, and internal GPS to get the most out of your field studies. Learn how to map your data on Google Maps™ using Logger Pro.

Mike Collins (sales@vernier.com), Vernier Software & Technology, Beaverton, OR

#478 HHMI's How and Why Species Multiply

Hanover C • Hands-on Workshop (75 min) • Evolution • HS GA

HHMI's latest short film journeys from the Galapagos to the Caribbean to discover the processes responsible for the diversity of species on our planet. Participants will learn about free multimedia resources to support key concepts in the film.

Paul Strode (paul.strode@bvsd.org), Fairview High School, Boulder, CO

#341 Free Online Stem Cell Curriculum with Five Units

Hanover D • Demonstration (75 min) • General Biology • 2C

California's stem cell funding agency has developed a FREE five-module curriculum

on stem cells, two basic biology and three AP level. Each online unit is pegged to state guidelines and is resource rich with materials for teachers and students.

Don Gibbons (dgibbons@cirm.ca.gov), California Institute for Regenerative Medicine, San Francisco, CA

#390 American Society for Microbiology Presents: CDC Excite Program – Epidemiology in the Classroom

Hanover F & G • Paper (75 min) • Microbiology & Cell Biology • HS 2C 4C

This presentation will introduce the attendee to the Centers for Disease Control and Prevention's EXCITE program. The EXCITE program introduces students to epidemiology through case studies and exciting hands-on activities.

Ralph Cordell, Centers for Disease Control and Prevention, Atlanta, GA and Dave Westenberg, Missouri S&T, Rolla, MO

Presented as part of ASM and the CDC: Partners in Safety

#314 How to Integrate NGSS using NASA Education Materials

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

Learn to incorporate the Next Generation Science Standards by using NASA Educational Resources that encourage critical thinking while integrating science and engineering practices and crosscutting ideas into the core discipline of life science.

Sandra Lampley (sal2j@mtmail.mtsu.edu), Chatoria Kent (cak2e@mtmail.mtsu.edu), and Ginger Rowell (rowell@mtsu.edu), Middle Tennessee State University, Murfreesboro, TN

#356 Which Frog is My Prince?

Courtland • Hands-on Workshop (75 min) • Evolution • HS

Come join us on a wild adventure in natural selection. Learn Alabama frog calls and determine your fitness. Will prezygotic isolation keep you from your

true love or will you find your prince?

Teresa Gregory (tgregory@jefcoed.com), Clay Chalkville High School, Pinson, AL, Joy Bates (jbates@jefcoed.com), McAdory High School, McCalla, AL and Kristen Self (kself@shelbyed.k12.al.us), Pelham High School, Pelham, AL

#295 Using Manipulatives to Teach Photosynthesis and Respiration

Dunwoody • Hands-on Workshop (75 min) • AP Biology • HS 2C 4C

Photosynthesis and respiration are two topics that are difficult to teach and misunderstood by students. In this module, manipulatives will be used to reinforce the basic concepts of energy, oxidation, reduction, ATP and reducing agents.

Umadevi Garimella (ugarimel@uca.edu), University of Central Arkansas, Conway, AR

#320 Pedagogy, Practice, and Partnership in the Biology Classroom

Edgewood (Session I) • Paper (30 min) • Anatomy & Physiology • HS 2C 4C

During this session, members of the IDEAL biology team will present findings from their NIH funded Science Education Partnership Award (SEPA) project that created, implemented, and assessed novel curricular materials in secondary biology classrooms.

Georgia Hodges (galee@uga.edu) and J. Steve Oliver (soliver@uga.edu), University of Georgia, Athens, GA

#338 Creating Motivating Environments for Biology Students

Edgewood (Session II) • Paper (30 min) • General Biology • 4C, 2C

We implemented a socioscientific issues-based laboratory curriculum in a university majors biology course. In order to assess the effectiveness of this curriculum, we conducted a mixed methods research study investigating student motivation.

Krissi Hewitt (hewittkr@onid.orst.edu) and Lori Kayes (Lori.Kayes@science.oregonstate.edu), Oregon State University, Corvallis, OR

1:15pm – 2:30pm

continued

#326 Know What They Know: Engaging, Hands-on Formative Assessment

Fairlie • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • E MS

If you teach elementary or middle level, join us for a session filled with hands-on, student-centered strategies that will enhance instruction and provide immediate feedback for students and teachers. Walk away with highly effective formative assessment activities.

Marianne Dobrovlny, Center for the Integration of STEM Education and Research at Texas Tech University, Nashville, TN and Tobi McMillan, Center for the Integration of STEM Education and Research at Texas Tech University, Lubbock, TX

#292 Population Ecology: Wolf vs. Moose

Greenbriar • Hands-on Workshop (75 min) • Environment/Ecology • MS HS

The wolf vs. moose, a predator/prey relationship, provides an excellent opportunity to study population ecology on an island, Isle Royale National Park. With the wolf population in peril, the 55+ year study may need to be altered.

Sylvia Tufts (stufts@ix.netcom.com), Thronridge High School (retired), Flossmoor, IL

#371 Teaching Nature of Science, Science Practices, and Biology

Harris • Paper (75 min) • General Biology • HS 2C 4C

This session presents practical strategies for integrating the teaching of nature of science and

scientific practices, while also teaching cellular and molecular biology concepts in an undergraduate course. Assessments are included.

Renee Schwartz (r.schwartz@wmich.edu), Brandy Skjold (b.skjold@wmich.edu) and Andrea Bierema (andrea.m.kryger@wmich.edu), Western Michigan University, Kalamazoo, MI

Committee Meeting: Professional Development Committee

Heritage Boardroom

Catherine Ambros (CAmbros@somervillenk12.org), Committee Chair

#244 Even Before STEM, Biology and Math Loved Each Other!

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

Integrating biology and math should be seamless, natural and painless. Come and see how the philosophy of STEM has really been alive (but not named) for a long time.

Jeff Lukens (jeffrey.lukens@k12.sd.us), Roosevelt High School, Sioux Falls, SD

#248 Using Bioethics Case Studies to Enhance a Biology Curriculum

Kennesaw • Hands-on Workshop (75 min) • Bioethics • MS HS 2C

Science teachers are often confronted with questions from their students about bioethical issues. Many teachers have concerns about time constraints or the controversial nature of the topics, but the study of bioethics can encourage important critical thinking.

Terry Maksymowych (tmaksymowych@ndapa.org), Academy of Notre Dame de Namur, Villanova, PA

#ES17 Guided and Student Lead Inquiry in AP Biology and Other Labs

Lenox • Exhibitor Session • Hands-on Workshop (75 min) • AP Biology • HS

Share ideas and get hands on practice with inquiry labs while reviewing the new *AP Biology Labs* from Ward's Science. We'll show you ways to get students started on developing their own experiments using our Inquiry Tool Kit.

Jana Penders (jana.penders@vwr.com), Ward's Science, Rochester, NY

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#266 Slither, Slide, Run, & Hide: Animals in the Classroom

Piedmont • Hands-on Workshop (75 min) • Environment/ Ecology • GA

Learn how to use snakes, salamanders, turtles, lizards and frogs to address the Next Generation Science Standards in your classroom. Discover how your school grounds can provide students with authentic research experiences in field biology.

Lacey Huffling (ldhuffli@uncg.edu) and Catherine Matthews (cematthews@uncg.edu), University of North Carolina at Greensboro, Greensboro, NC and Terry Tomasek (tomasek@elon.edu), Elon University, Elon, NC

#323 Connecting Phenotype to Genotype: FPsc Genetic Resources

Rosewell • Hands-on Workshop (75 min) • Genetics • HS 2C 4C

The FPsc suite of genetic and molecular resources enable you and your students to transition seamlessly from Mendelian genetic analysis to molecular biology and modern genomic sciences by using plants in your classroom.

Scott Woody (swoody@wisc.edu), University of Wisconsin – Madison, Madison, WI

#273 Writing for *The American Biology Teacher*

Spring (Session I) • Paper (30 min) • General Biology • HS 2C 4C

Learn techniques for writing a successful article for *The American Biology Teacher*. Included are author guidelines, sample articles and an opportunity to ask questions.

William Leonard (leonard@clmson.edu), Clemson University (emeritus), Mountain Rest, SC and William McComas, University of Arkansas, Fayetteville, AR

#290 Reviewing for *The American Biology Teacher*

Spring (Session II) • Demonstration (30 min) • General Biology • HS 2C 4C

The *ABT* depends upon expert blind reviews to judge the quality of manuscript submissions and we are always seeking reviewers. The Editor will share reviewing techniques for new and potential reviewers and show how you can contribute.

William Leonard (leonard@clmson.edu), Clemson University (emeritus), Mountain Rest, SC and William McComas, University of Arkansas, Fayetteville, AR

#466 AARK Presents: Amphibian Declines, Conservation, and Outreach Education

Techwood • Demonstration (75 min) • Global Perspective • HS 4C GA

IUCN Amphibian Ark will present an overview of the scientific and conservation challenges of global amphibian declines. Resources for educators will be reviewed and distributed to participants. Specific activities for educators will be suggested.

Joseph Mendelson (joe@amphibianark.org), Amphibian Ark, Atlanta, GA and Rachel Rommel (rachel@amphibianark.org), Amphibian Ark, St. John, NB, Canada

#ES18 *Delicate Arrangement: Alfred Russel Wallace, Charles Darwin*

Marietta • Exhibitor Session • Symposium • Evolution • HS 2C 4C GA

To mark the centenary this year of Wallace's death, we will celebrate the man and discuss why the theory of evolution was discovered not once but twice, who Wallace was, how he came to the idea, and why he remains in the shadow of Darwin to this day.

Andrew Berry, Harvard University, Cambridge, MA

Presented in partnership with W.H. Freeman

2:45pm – 4:00pm

Continued: NABT AP Biology Symposium

Regency V • Special Program • AP Biology • HS 2C 4C

Continued: NABT Biology Education Research Symposium

Learning Center • Special Program

#ES21 Explore Molecular Evolution Using Protein Electrophoresis

Chicago A & B • Exhibitor Session • Hands-on Workshop (75 min) • AP Biology • HS 2C 4C

Generate protein profiles from fish using protein gel electrophoresis. Test the hypothesis that these profiles are indicators of evolutionary relatedness and construct cladograms.

Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

#ES22 Science Video Journals to Increase Productivity in Education

Chicago C & D • Exhibitor Session • Demonstration (75 min) • Instructional Strategies/ Technologies • HS 2C 4C

This presentation will be an overview of the growing field of scientific video publication and educational resources and discuss the technical challenges, implications for scholarly communication and acceptance in the academic and library community.

Linda Evers (linda.evers@jove.com), JoVE (Journal of Visualized Experiments), Cambridge, MA

Continued: NABT Global Perspectives Committee Poster Session

Hanover E • Special Program

2:45pm – 4:00pm

continued

#ES19 CSI In the Classroom – STEM Approach to Biology

Hanover A • Exhibitor Session • Hands-on Workshop (75 min) • General Biology • HS 2C

Discover how STEM can be integrated into your biology curriculum. Get hands on training with Nasco's *Cause of Death Autopsy Kit*. This unique experience will take you through the steps used during a forensic investigation.

Deb Tipton (dtipton@enasco.com), NASCO, Fort Atkinson, WI

#ES20 Advanced Biology and Biotechnology with Vernier

Hanover B • Exhibitor Session • Hands-on Workshop (75 min) • Biotechnology • HS 2C 4C

Perform experiments from our *Advanced Biology with Vernier* lab book using LabQuest 2, Logger Pro on computers, and Graphical Analysis for iPad®. Learn how to perform Gel Analysis with Logger Pro and how to use the SpectroVis Plus spectrophotometer.

Mike Collins (sales@vernier.com), Vernier Software & Technology, Beaverton, OR

#476 HHMI's Free Classroom Resources for Teaching Evolution

Hanover C • Hands-on Workshop (75 min) • Evolution • HS

Discover free classroom-ready activities and multimedia resources to help you teach key concepts in evolution. Bring science to life with inquiry-based investigations, including data collection, analysis, and computation.

Mary Colvard, STANYS, Deposit, NY

#373 Igniting the Passion in Students in an Online Course

Hanover D (Session I) • Paper (30 min) • Instructional Strategies/Technologies • 2C 4C

The *Vision and Change* report recommends that we "ignite the passion

of students", but is this possible in a completely online course where we never see our students face-to-face? Come and find out!

Caroline McNutt (cmcnutt@schoolcraft.edu), Schoolcraft College, Livonia, MI

#451 Evolution's Footprints: Lessons from Biochemistry

Hanover D (Session II) • Paper (30 min) • Evolution • 2C 4C HS

Evolution first occurs at a chemical level. We will examine "molecular fossil" evidence including porphyrin rings, electron carriers, ATP synthase, and membrane lipids in the context of common ancestry and biochemical pathways.

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

#389 American Society for Microbiology Laboratory Biosafety Guidelines

Hanover F & G • Paper (75 min) • Microbiology & Cell Biology • HS 2C 4C

An introduction to the new *American Society for Microbiology Laboratory Biosafety Guidelines*. The presentation will include background on the potential risks in the teaching laboratory and how to minimize them.

Cristina Bressler, Centers for Disease Control and Prevention, Atlanta, GA and Dave Westenberg, Missouri S&T, Rolla, MO

Presented as part of ASM and the CDC: Partners in Safety

#440 Science Teaching Has Evolved & It Is Time to Get Online!

Harris • Demonstration (75 min) • Instructional Strategies/Technologies • 2C 4C

Demonstration of versatile online programs that have students reading the text & enhancing their comprehension before class. A report of student reactions documenting new understanding of how to take responsibility for learning will also be discussed.

Leslie Sandra Jones (lesliesj@valdosta.edu) and Rebekah Davis (rebdavis@valdosta.edu), Valdosta State University, Valdosta, GA

#352 DNA Subway: Cutting-Edge Bioinformatics for the Classroom

Baker • Demonstration (75 min) • Biotechnology • HS 2C 4C

Learn about *DNA Subway*, a free and easy-to-use online resource for teaching the bioinformatics of genomics and DNA barcoding.

Jason Williams (williams@cshl.edu), Cold Spring Harbor Laboratory, Cold Spring Harbor, NY

#358 From DNA to Genomics: What Should We Teach?

Courtland • Hands-on Workshop (75 min) • General Biology • HS 2C

Explore new instructional tools that will take your students beyond understanding DNA as a double helix – to understanding bioinformatics and its importance in genomics and personalized medicine.

Tim Herman (herman@msoe.edu) and Gina Vogt (vogt@msoe.edu), MSOE CBM, Milwaukee, WI

#407 What Makes Honey Bees Work Together?

Dunwoody • Hands-on Workshop (75 min) • AP Biology • HS 2C 4C

The intersection between genetics, environment and behavior will be investigated in the charismatic honey bee. Come explore hands-on activities addressing Next Generation Science Standards. Free NIH-SEPA curriculum materials will be distributed.

Claudia Lutz, Sara Patterson, and Barbara Hug, University of Illinois, Urbana, IL

#298 TOPIC Sense: Helping Students Start a Research Project

Edgewood • Paper (75 min) • General Biology • MS HS

Research is an excellent way to improve student understanding of the sciences. Students reach the first stumbling block

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very early on: picking a topic! Ideas and strategies will be discussed that will help educators guide students to success.

Karen Shepherd, Plano ISD, Plano, TX

#404 Nature Journals for Everyone

Greenbriar • Hands-on Workshop (75 min) • Environment/Ecology • 2C GA

Nature journaling is an accessible and inexpensive way to connect students with nature. In this workshop, a short lecture/demo on nature journaling basics is followed by going outside to practice the skills for a creative & engaging experience.

Beth Ann Krueger (beth.krueger@centralaz.edu), Central Arizona College – Aravaipa Campus, Winkelman, AZ

Committee Meeting: Long Range Planning Committee

Heritage Boardroom

Todd Carter (todd.carter@sccc.edu),
Committee Chair

#258 A Framework for Teaching of Protein Synthesis and DNA

Inman • Demonstration (75 min) • Instructional Strategies/Technologies • HS 2C 4C

Protein synthesis is a detailed process which students find difficult to grasp. Come see a framework for the teaching of protein synthesis and DNA that helps lead to an understanding and desire to study genetics. Free web-based materials provided.

John Moore (jhmoore@taylor.edu),
Taylor University, Upland, IN

#274 Disease Detectives – Meningitis

Kennesaw • Hands-on Workshop (75 min) • General Biology • HS

Conduct simulated lab tests to determine that a teen patient has bacterial meningitis. Use a pre-writing grid to organize information for writing a letter to inform parents about the importance of the meningitis vaccine. This activity, and other neurobiology activities, are available online at <http://lifesciences.envmed.rochester.edu/>

Susan Holt (sholtbmn@aol.com) and Dina Markowitz (dina_markowitz@urmc.rochester.edu), University of Rochester Life Sciences Learning Center, Rochester, NY

#ES23 Iron Teacher – Inquiry Lab Contest

Lenox • Exhibitor Session • Hands-on Workshop (75 min) • Environment/Ecology • E MS HS

You will be provided a variety of Ward's specimens and supplies to complete this challenge and compete against your peers in a fast paced, high energy, contest modeled after Food Network's *Iron Chef*. The winning team will get awesome prizes.

Janet Holliday (janet.holliday@vwr.com),
Ward's Science, Rochester, NY

#282 Low Cost, CCSS Standard-Based & Engaging Strategies

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

Hands-on activities to address the nature of science, heredity, and ecosystems. All are engaging, aligned to CCSS & real world processes and use low cost supplies. Complete lesson plans accessible online; free materials and prizes distributed.

Linda Fitzhugh (lfitzhugh@gulfcoast.edu), GCSC/PAEC, Panama City, FL; Tammy Stundon (stundtm@bay.k12.fl.us), Mosley High School, Lynn Haven, FL; Nancy Dow (downd@bay.k12.fl.us),

J.R. Arnold High School, Panama City Beach, FL; and Jill Hansen (hansejm@bay.k12.fl.us), Bay High School, Panama City, FL

#308 Model Systems and Methods for Independent Student Research

Rosewell • Paper (75 min) • Curriculum Development • HS 2C 4C

We run an independent research program in molecular and cellular biology for advanced seniors. Learn how model systems, including *C. elegans*, cell culture and bacteria, can be used in cutting edge student research – without breaking the budget.

Christine Marshall-Walker (cmarshallwalker@andover.edu), Phillips Academy, Andover, MA

#267 Vision and Change in Non-Majors Biology: A Data Driven Model

Spring (Session I) • Paper (30 min) • General Biology • 4C

An overview of efforts to bring Vision & Change to non-majors introductory biology at Western Oregon University. This session will share strategies, tools and templates for initiating and implementing curriculum revisions, with sample lessons and assessments.

Erin Baumgartner (baumgare@wou.edu), Western Oregon University, Monmouth, OR

#416 Group Motivation in Large Undergraduate Biology Classes

Spring (Session II) • Paper (30 min) • General Biology • 2C 4C

In this research to practice session, we discuss the implications of considering the motivational composition of small groups in a large introductory biology course. An outline of the class and impact on student learning outcomes will be provided.

Grant Gardner, Middle Tennessee State University, Murfreesboro, TN

2:45pm – 4:00pm

continued

#283 Photosynthesis: Bringing the Light Reactions to Life

Techwood • Hands-on Workshop
(75 min) • General Biology • HS

"The Light Reactions come to Life" with this role-playing activity that allows students to become part of Photosystem I and II. Students gain understanding of the light reactions by becoming the players as they pass e⁻, move H⁺, and split H₂O.

Cheryl Mangum, Fairview High School,
Cullman, AL

#ES24 Engaging Stories: Teaching Environmental Science in Context

Marietta • Exhibitor Session •
Demonstration (75 min) • Envi-
ronment/Ecology • HS 2C 4C

A variety of examples will be presented demonstrating how to use engaging stories about current environmental issues, paired with active learning class activities, to enhance learning and spark student interest.

Susan Karr, Carson-Newman University,
Jefferson City, TN

*Presented in partnership with
W.H. Freeman.*

4:00pm – 7:00pm

Exhibit Hall Opening Reception

Grand Hall • Special Event

You are the guest of honor at this special reception showcasing the NABT Exhibitors. The NABT Exhibit Hall is the place to learn about the latest and greatest in technologies, programs and resources. Meet new companies and visit your favorites. And make sure you are getting those freebies for your classroom and your colleagues back home!

Sponsored by **Vernier**
SOFTWARE & TECHNOLOGY

7:00pm – 9:00pm

AP Biology Section Reception

Regency V • Special Event

You've been working with the new curriculum and your students have taken their exams. Now it's your opportunity to discuss the changes with some "friends" from the AP Community, even if you haven't met them in person yet.

Sponsored by **PEARSON**

Four-Year College & University Section Reception

Regency VII • Special Event

Join us at this popular reception and poster session. This is a wonderful opportunity to grab some food, get a drink, network with colleagues, and peruse research in a relaxed setting. Well-known NABT scholars, new contributors and graduate students will all be featured.

Sponsored by **WILEY**

Undergraduate Education Poster Session

Regency VII • Special Event

*See the following column
for listing of poster titles
and authors.*

Two-Year College Section Reception

Regency VI • Special Event

Teaching at the community college level presents unique challenges and the NABT Two-Year College Section always has some great ideas (and stories) to share. The winner of the *Two-Year College Biology Teaching Award* will be honored and everyone is welcome to attend.

Sponsored by **HAYDEN** **FM** **MCNEIL**

Undergraduate Education Poster Session

POSTER TITLES AND AUTHORS

1. **Analysis of Eye-Tracking Characteristics from High Achievers and Underachievers in Middle School When Learning the Instructional Materials Containing Explanative or Nonexplanative Illustrations**

Kil Jae Lee, Ae Jin Jeong, and Hee Young Ju, Korea National University of Education, Cheongwon-kun, Chung-buk, Korea

2. **Animal Behavior and Invasive Species in a Socio-Scientific Issues-Based Laboratory Module***

David L. Hubert, Krissi M. Hewitt, and Lori Kayes, Oregon State University, Corvallis, OR

3. **Are We Educating New Teachers about Biological Evolution?***

Justyce Lanae Launa Lewis, Valdosta State University, Valdosta, GA

4. **Association of the 5-HTTLPR Polymorphism and Depressive Symptoms in College Students**

Casey Mohrien, SUNY Plattsburgh, Plattsburgh, NY

5. **Biology and Business Do Mix: Course-Embedded Travel Experience in Barbados**

William Kroen, Wesley College, Dover, DE

6. **Biology Teaching Assistant Project (BioTAP)**

Kristen Miller, University of Georgia, Athens, GA; Elisabeth Schussler and Sarah Dalrymple, University of Tennessee, Knoxville, TN

7. **Bringing Quantitative Data Alive in the AP Biology Classroom**

Kari L. Clase, Purdue University, West Lafayette, IN; Georgia Everett, Western High School, Russiaville, IN; Kathy Daniels, Mississenwa High School, Gas City, IN; Loran Carleton Parker, Purdue University, West Lafayette, IN

8. **Building Leadership Capacity for Transformational Change**

Susan Musante, American Institute of Biological Sciences, Reston, VA; Muriel Poston, Pitzer College, Claremont, CA; Teresa C. Balsler, University of Florida, Gainesville, FL

continued

THURSDAY

NOV.

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Undergraduate Education Poster Session
POSTER TITLES AND AUTHORS
continuation

9. **Characteristics of Students Retaking Introductory College Biology Courses at Angelo State University, TX**
Connie Russell, Angelo State University, San Angelo, TX, and Amanda Smiley, Oxford High School, Mission, TX
10. **Combinational PCR to Produce a Multi-functional Plasmid***
David Bates, Tess Rasmussen, and Steven Christenson, Brigham Young University-Idaho, Rexburg, ID
11. **COMT Gene Ratios and GPA Correlation***
Alexander Oliver Bender, Nancy Elwess, and Sandra Latourelle, SUNY Plattsburgh, Plattsburgh, NY
12. **Creating High-School Teaching Materials that Interweave Sea-Level Rise Research with High School Teaching Standards**
Joshua S. Reece, Valdosta State University, Valdosta, GA; Leah B. Reidenbach and Reed F. Noss, University of Central Florida, Orlando, FL
13. **Design and Implementation of a Socio-Scientific Issues-Based Curriculum***
Krisi M. Hewitt, Lori Kayes, and Robert Mason, Oregon State University, Corvallis, OR
14. **Design of an Integrated Teaching and Learning Biological Sciences Course for Prospective Elementary Teachers***
Jaime Sabel, Cory Forbes, and Laura Zangori, University of Iowa, Iowa City, IA
16. **Direct Display of Student Learning: Student-Made Teaching Videos**
Jennifer Guess and Robert Noyd, United States Air Force Academy, Colorado Springs, CO
17. **Do Genes Affect Altruism and Stress Reactivity: an Exploration of the OXTR Gene***
Gregg LaFleur, SUNY Plattsburgh, Plattsburgh, NY
18. **Does the 2D:4D Finger Ratio in Athletes Suggest a More Aggressive Behavior?***
Jenny Kistner, Nancy Elwess, and Sandra Latourelle, SUNY Plattsburgh, Plattsburgh, NY
19. **Environmental Lessons from Salt-Loving Microbes***
Folasade Ekulona, Priya DasSarma, and Karen M. Watson, Institute of Marine & Environmental Technology, Baltimore, MD
20. **Establishing a DNA Database for the Genus *Rana* in the New York Lake Champlain Basin***
Justin Andrews, SUNY Plattsburgh, Plattsburgh, NY
21. **Evolution: Verification of Emotional Response in Students**
Elizabeth Morrison and Mark W. Bland, University of Central Arkansas, Conway, AR
22. **Exploring Motivating Factors Engaging Undergraduates in Research***
Chandrani Mishra, Anna Goodman, and Shamekia Woods, University of Southern Mississippi, Hattiesburg, MS
23. **Finding Invasive Species in Lake Champlain and Its Basin with the Use of Environmental DNA***
Maxwell Marsh, SUNY Plattsburgh, Plattsburgh, NY
24. **Haplogroup Determination of Ancient Maya DNA***
Michael Haynes, Nancy Elwess, and Sandra Latourelle, SUNY Plattsburgh Plattsburgh, NY
25. **How Effective are Learning Objectives? A Study of Student Utilization of Learning Objectives in a Non-Majors Biology Course***
Jessica Merricks and Bethany Stone, University of Missouri, Columbia, MO
26. **Impact of I-70 and Freight Railroad Lines on Martin University Campus and Its Neighborhood in Indianapolis, Indiana**
Mamta Singh, Martin University, Indianapolis, IN
27. **Impacting Science and Environmental Attitudes through a Nature Center Day Camp***
Heather Barker and Cindi Smith-Walters, Middle Tennessee State University, Murfreesboro, TN
28. **Improving Students' Perceptions of the Scientific Method by Showing Them 'How Real Science Works'***
Robert D. Denton, Matthew L. Holding, and Kate Mollohan, Ohio State University, Columbus, OH
29. **Increasing Access to Rigor: Adaptation of a Majors Level Course for a Non-Majors Population.**
Julie E. Minbiole, Columbia College Chicago, Chicago, IL
30. **Investigating a Correlation Between the CD36 Genotype and a Preference for Fatty Foods***
Rebecca Robbins, Nancy Elwess, and Sandra Latourelle, SUNY Plattsburgh, Plattsburgh, NY
31. **Investigating Students' Use of Technology to Explore Nature***
Carrie J. Boyce, Chandrani Mishra, and Kristy L. Halverson, University of Southern Mississippi, Hattiesburg, MS
32. **An Investigation of Multiple Learning Platforms in an Introductory Biology Laboratory Class***
Amber J. Reece, Malcolm B. Butler, and Ken M. Fedorka, University of Central Florida, Orlando, FL
33. **Learning by Teaching – Creating Student-Centered & Interactive Teaching**
Cemile Turan, Georgia State University, Atlanta, GA
34. **A Qualitative Snapshot of Nursing Students' Attitudes toward Science**
Jill D Maroo, University of Northern Iowa, Cedar Falls, IA, and Kristy L. Halverson, University of Southern Mississippi, Hattiesburg, MS
35. **A Quantitative Analysis of a Hike in the Woods: Preliminary Results of What Students Learn O.U.T.S.I.D.E.***
Marks McWhorter, University of Southern Mississippi, Hattiesburg, MS; Aimee K. Thomas, Loyola University, New Orleans, LA; and Kristy L. Halverson, University of Southern Mississippi, Hattiesburg, MS
36. **Role of Virtual labs in Onsite Science Courses with Wet Lab Component**
Miti Shah, DeVry University, Phoenix, AZ
37. **SATURN Journal: Research as a Teaching Methodology in the Undergraduate Curriculum**
Louis Roccanova, James Remsen Jr., and Hector Sepulveda, Suffolk County Community College, Brentwood, NY
38. **Student Reflections on Using the Virtual Learning Environment 'Second Life' in Combination with Classroom Instruction***
Jennifer A. Mraz, Carrie J. Boyce, and Kristy L. Halverson, University of Southern Mississippi, Hattiesburg, MS
39. **Teaching Homeostasis and Its Related Concepts Using Computer Simulation**
Rasheeta Fateen, Vivien M. Chabalengula, and Frackson Mumba, Southern Illinois University, Carbondale, IL
40. **Unexpected Outcomes: Impacting University Genetics Instruction via Secondary School Outreach**
Michael Dougherty, American Society of Human Genetics, Bethesda, MD; Patti Bourexis and Joyce Kaser, The Study Group, Kill Devil Hills, NC
41. **Using the Pre-Health Collection within 'MedEdPortal's iCollaborative' to Prepare Students for the MCAT 2015 Exam**
Laurel Roberts, University of Pittsburgh, Pittsburgh, PA
42. **A Versatile, Inquiry-Based Enzyme Lab: Factors that Modulate the Inhibition of Acetylcholinesterase from Bean Beetles by an Organophosphate Insecticide***
Gurcharan Singh, Rahat Gul, Hector Fermin, and Fardad Firooznia, City College of New York, New York, NY
43. **Vision and Change in a Non-Science Major General Biology Course**
Wendy Jamison and Joyce Hardy, Chadron State College, Chadron, NE

* denotes entries for Student Poster Competition