

SATURDAY

NOV.

23

7:00am – 8:15am

Past President's Breakfast
Sway Restaurant • Invitation Only

Four-Year College and University Section Executive Meeting
Chicago A & B • Invitation Only

8:30am – 9:30am

GENERAL SESSION

David L. Nelson, Ph.D.

Bio appears on page 9.

Mutation and Fragile X Syndrome

Centennial III & IV • Special Speaker

Fragile X Syndrome is a common form of inherited intellectual disability caused by an unusual mutation involving expansion of a trinucleotide repeat in a gene that encodes an RNA binding protein involved in regulating synaptic function. Dr. Nelson will describe the peculiar genetics of the fragile X syndrome and the other disorders found in carriers of this mutation. He will also present efforts to define the function of the gene affected by the mutation (*FMR1*) and consequences of its loss of function in a variety of model organisms. These studies have led to clinical trials for fragile X syndrome, and findings from the trials will also be presented. Characterization of this disorder and its mutational basis is an example for ongoing similar efforts in many genetic disorders and provides an example of how biomedical investigators work to translate gene discovery to treatment.

Sponsored by the American Society for Human Genetics (ASHG)

9:45am – 12:30pm

College Board AP® Biology Workshop

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

The redesigned AP Biology course merges rigor with creativity, and offers students myriad opportunities for learning through scientific inquiry, development of laboratory skills, and assessment. Throughout this workshop, teachers will be fully engaged in becoming familiar with all aspects of the AP Biology Curriculum Framework.

Designing Instruction for the Revised AP Biology Course

In this session, participants will be actively engaged in sharing strategies and activities, and creating an outline for an instructional unit with activities using the AP Biology Curriculum Framework.

Understanding and Preparing for the Redesigned AP Biology Exam

Members of the AP Biology Development Committee will provide an overview of the updated exam, question writing techniques and exam related resources. Participants will be actively engaged in writing and sharing questions.

AP Biology Open Forum

Bring your questions and get them answered! This session will focus on the changes to the AP Biology Course and Exam. An overview of the course, exam, and labs will be presented. College Board instructional materials and professional development opportunities will be discussed.

Jennifer Pfannerstill, North Country Day School, Winnetka, IL, Sharon Radford, The Paideia School, Atlanta, GA, Brenda Alston-Mills, Michigan State University, East Lansing, MI and Tanya Sharpe, College Board, Duluth, GA

#SP2 Special Workshop: NGSS Practices, Assessment, and You

\$ Hanover F • Hands-on Workshop • Curriculum Development/Supervision
• MS HS • \$45

Assessing science practices and skills alongside content is difficult. This workshop will help you create your own diagnostic and unit assessments that will empower you to seamlessly integrate skills and content.

Cole Entress, The Lawrence Hall of Science, University of California Berkeley, Berkeley, CA and Aimee Wagner, West Charlotte High School (Project LIFT), Charlotte, NC

#SP3 Special Workshop: Developing a Naturalist Approach in the Teaching of Science Concepts and Inquiry

\$ Hanover G • Demonstration • General Biology • HS • \$65

Following their natural curiosity, students use creativity, problem solving skills and inquiry processes to comprehend science concepts inherent in life cycles, behavior, and structure/function of common organisms in their immediate surroundings. A wealth of materials including labs, teaching strategies, alternative methods of assessment and a CD are provided.

Bill Klein, Western Iowa Tech Community College, Sioux City, IA

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

9:45am – 6:00pm

Biology Directors Consortium Presents: Institutional Approaches to Improving Student Success in the Life Sciences

Hanover A & B • Special Program • General Biology • 2C 4C • Space is limited

In response to *Vision and Change*, biology faculty across the nation are working to structure their courses around learning outcomes based on core concepts and competencies. In this day-long workshop, members of the Biology Directors Consortium (BDC) will introduce models of student-centered learning activities, assessment, program development, and initiatives for student success. Participants will discuss these approaches and share their own challenges and best practices. A workshop summary will be made available to participants following the conference.

See page 62 for a full listing of workshop details.



Institutional Approaches to Improving Student Success in the Life Sciences

Presented by the: **Biology Directors' Consortium (BDC)**

The **BDC** is a consortium of biological sciences faculty and staff from over 30 different colleges and universities in the US and Canada.

We believe not only in our students' success but also in the success of our faculty, departments and campuses.

We believe that we can always do a better job educating our students.

We believe that reform is more than simply changing pedagogy.

We believe that trying to make this happen in isolation is inefficient and insufficient.

We believe that collaboration is the way to increase success overall.

What do we hope to accomplish today and over the coming years?

Our focus is on improving the introductory or core biology experience by providing a venue for collaboration and for beginning change at all administrative levels.

What is the plan for the sessions?

Vision and Change states that "faculty need to decide what they want their students to know or be able to do when they have completed a given topic, course, or program of study and then, once these learning goals have been clearly identified, develop assessments to evaluate whether students have achieved those stated goals. These learning outcomes and assessments can then serve as a guide for which teaching strategies will engage students and help them advance their understanding to the desired level of comprehension."

The question remains, how do we do this?

Over the course of the day, we will work in small discussion groups to address these areas and will provide some concrete examples of approaches that have worked.

SATURDAY	
9:45am – 10:45am	1a. Introduction to IBP — Gordon Uno, University of Oklahoma 1b. What is the BDC? — Melissa Michael, University of Illinois U-C 1c. Integrating Essential Learning Outcomes, <i>Vision and Change</i> and Next Generation Science Standards with your own institution's goals for students
10:45am – 12:30pm	2. Models of Program Development and Assessment Designed to Improve Student Learning a. Developing Longitudinal Goals and Learning Outcomes as a Basis for Overall Program Development and Assessment - The Wyoming Model — Mark Lyford, University of Wyoming b. Using Assessment to Design Instruction that Enhances Student Learning — Michelle Withers, West Virginia University
12:30pm – 1:15pm	LUNCH
1:15pm – 2:15pm	3. What good models are there for developing content-based and noncontent-based competencies? a. Teaching Core Biology 'Content' through student-centered active learning while engaging the principles of Scientific Teaching — Randall Phillis, University of Massachusetts - Amherst b. Using simple models to help students learn and overcome misconceptions — John Merrill, Michigan State University
2:15pm – 3:00pm	Discussion c. Developing inquiry-based labs in introductory biology — Ruth Buskirk, University of Texas - Austin and Jean Heitz, University of Wisconsin - Madison
3:30pm – 4:00pm	Small group discussion
4:00pm – 4:30pm	4. Engaging and retaining students: Student outcomes matter! a. The Biology Boot Camp and Retention in the major — Bill Wischusen, Louisiana State University b. Active Learning Can Reduce the Achievement Gap — David Haak, Indiana University
4:30pm – 5:00pm	Discussion
5:00pm – 6:00pm	5. Small group discussion and report out: Inviting the conversation — How can The BDC help? — Jim Morris, Brandeis University and Melissa Michael, University of Illinois U-C

Handbook materials will be on line at: <http://tinyurl.com/BDC-at-NABT-2013> or at https://mywebspace.wisc.edu/xythoswfs/webui/_xy-51185040_1-t_4kVUoJzi

9:45am – 11:00am

INVITED SPEAKER

Robert Farrell, Ph.D.

Bio appears on page 9.

Rapid Transcriptional Response in Apple to Fire Blight Disease

Regency VII • Special Speaker

Fire blight, caused by the bacterium *Erwinia amylovora*, is a destructive disease of certain types of apple, pear, and other plants in the Rosaceae, which are flowering members of the rose family. The goal of this study was to use an all-inclusive, i.e., global, analysis of gene expression to characterize the temporal response of apple to infection by *E. amylovora*. RNA, produced in the cell by transcription, is by far the most widely used parameter of gene expression, but its inherent chemical instability makes working with it something of a challenge. RNA, however, can be used as template material for the synthesis of complementary DNA (cDNA), which is a direct mirror of the original population of RNA molecules, albeit with much greater stability. A technique known as cDNA suppression subtractive hybridization (SSH) was used to compare control mRNA with mRNA from *E. amylovora*-infected 'Gala' apple leaves at time intervals after exposure in order to identify genes expressed in one population and not in another. By physically subtracting cDNA synthesized from mRNAs expressed in uninfected plant tissue (mock inoculated) from cDNAs derived from mRNAs expressed in another state (fire blight challenged) one can obtain a pool of gene sequences that are responsive to pathogen exposure because sequences common to both populations are removed by nucleic acid hybridization. Gel electrophoresis of PCR-amplified subtracted cDNAs and unsubtracted controls indicate a greater quantity and size diversity in reverse

subtracted samples (down-regulated genes) collected at 1h and 2h, compared to changes in gene expression at later time points. The resultant cDNA molecules were PCR-amplified and then identified by comparing their sequences against online databases.

#481 HHMI Presents: Deep Time Evolution & Extinctions

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

Throughout our planet's long history, Earth's environment and organisms have both changed dramatically, and often in concert. Come explore this biology-geology connection with our free multimedia resources, including the popular EarthViewer app!

Jeremy Conn, Goshen High School,
Goshen, OH

#415 How to Induce Better Learning Through Exercises in the Classroom

Hanover D (Session I) • Paper (30 min) • General Biology • 2C

This session will explore using short in-class assignments instead of assigned homework. Techniques used in the classroom that have resulted in the improvement of the reports students submit will be described. The classroom is shown to be the most important place for learning.

Mohamed Lakrim (mlakrim@aol.com),
Kingsborough Community College,
Brooklyn, NY

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continued

#402 Flipping an Inquiry-based Biology Course – Lessons Learned

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

This presentation describes an adventure in flipping the classroom in an introductory course already using a highly student-centered approach to increase self-reliance. We report data from students' reflections, observations, and assessments.

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

#297 The X Files: A Sample from ASHG's Lesson Plan Database

Hanover E • Hands-on Workshop (75 min) • Genetics • HS 2C

Experience a sample lesson on sex-linked inheritance from the American Society of Human Genetics' new database of lessons developed by geneticist-teacher teams and designed to target student misconceptions while using the BSCS 5Es learning cycle.

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

#330 Biology's Best Engaged!

Baker • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • MS HS 2C

Michigan's 2012 OBTA recipient shares engagement strategies, inquiry driven lessons and case studies to better teach content and scientific literacy. Want EVERY student engaged EVERY hour? Need more CCSS in science? Join us in this active session!

Heather Peterson (hpeterso@hpsk12.net), Holt High School, Holt, MI

#256 Teaching Genetics with Wisconsin Fast Plants

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

In this hands-on workshop, we will practice a variety of techniques and inquiry-based approaches for teaching genetics, using Fast Plants. We will show how – in as little as 36 hours – easily observable phenotypic evidence can be gathered for analysis.

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

#425 Case It! - Case-based Learning for Undergraduate Research

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

Case It is an award-winning project that provides molecular biology computer simulations and cases to educators free of charge. Cases will be demonstrated relating to undergraduate research, using colony collapse disorder in honeybees as an example.

Karen Klyczek (karen.k.klyczek@uwrf.edu) and Mark Bergland (mark.s.berglan@uwrf.edu), University of Wisconsin – River Falls, River Falls, WI

#262 Life After Poster Boards: Virtual Posters as Lab Assessment

Edgewood (Session I)
• Demonstration (30 min)
• Instructional Strategies/Technologies • MS HS GA

With more emphasis on virtual learning, teachers need new tools to assess. In this workshop, participants will learn how to convert a single PowerPoint slide into a virtual poster that can be posted and assessed.

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

#444 Using Citizen Science Projects in the Classroom

Edgewood (Session II) • Paper (30 min) • Instructional Strategies/Technologies • E MS HS

"Citizen Science" is scientific research in which anyone can participate in the collection of data that is analyzed by professional scientists. There are projects in which nonprofessionals can volunteer to monitor events and conduct experiments.

Nerissa DeRamus and Belinda Jolley, DeKalb County Schools, Geraldine, AL

#309 WOW Biology - XV

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

On a budget? Students don't know vocabulary? Need a review game? Join the Mississippi Association of Biology Educators as we share some of our most effective, inexpensive, hands-on, and literacy activities. Handouts! Door Prizes!

Sheila Smith (ssmith54@aol.com), Science Consultant, Ridgeland, MS; Tammy Cox (tamcox@jackson.k12.ms.us), Provine High School, Jackson, MS; Amber Moore (amoore1221@gmail.com), Humphreys County High School, Belzoni, MS; Mary Branson (mb11456@aol.com), Callaway High School, Jackson, MS; Ebonie Butler (ebbutler@jackson.k12.ms.us), Wingfield High School, Jackson, MS; and Angela Ellington (ellingtona@tunica.k12.ms.us), Rosa Fort High School, Tunica, MS

#387 Inspector Gadget: Detecting Genetic Disorders

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

Wowers! You never know what might happen with genetics! Take a ride on family trees through generations, discovering genetic disorders and treatments, using everything from researcher databases to biochemical tests, to summation "Go-Go-Science-Gadgets"

Monique Thomas, Central High School, Rockford, AL and Keshia Williams, Robert E. Lee High School, Montgomery, AL

9:45am – 11:00am

continued

#417 Carbon sequestration and Global Ecosystems

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

Description of an outdoor lab which allows students to investigate the role of forests and fossil fuel use in the carbon cycle and climate change. Highlights connection between organic and inorganic carbon in global ecosystems.

Mark Yates and Randall Colvin, LaGrange College, LaGrange, GA

#240 Publish or Perish: Learn the Art of Science Writing

Harris (Session II) • Paper (30 min)
• Instructional Strategies/
Technologies • MS HS

Writing and publishing original research is essential for success as a scientist; however, no opportunities exist for students to engage in this process. JEl provides a realistic science writing experience and engages youth with working scientists.

Sarah Fankhauser, Harvard GSAS Journal of Emerging Investigators, Boston, MA

Committee Meeting: Occasional Publications Committee

Heritage Boardroom

Richard Poole (poolerj@comcast.net),
Committee Chair

#272 Mapping the Process of Science: Setting the Stage for the NGSS

Inman • Hands-on Workshop (75 min) • Instructional Strategies/
Technologies • HS 2C 4C

The *Understanding Science* website (www.understandingscience.org), developed by the University of California Museum of Paleontology, is an engaging, freely accessible resource designed to communicate what science is and how it works.

Lisa White (ldwhite@berkeley.edu),
University of California Museum of
Paleontology, Berkeley, CA

#344 The War on Cancer: The Cell Cycle and Clinical Trials

Kennesaw • Hands-on Workshop
(75 min) • Microbiology & Cell
Biology • HS

This seven unit curriculum, designed for regular and AP Biology classes, incorporates biotechnology, the nature of science and translational medicine. Session attendees will preview the curriculum and receive materials for use in their own class.

Jennifer Broo (jsunderman@saintursula.org), St. Ursula Academy, Cincinnati, OH and Jessica Mahoney (Jessica.Mahoney@ocps.net), Edgewater High School, Orlando, FL

#313 DNA Barcoding: An Authentic BLAST Investigation

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

DNA Barcoding is an authentic laboratory for AP Investigation 3. In this hands-on

session, learn how your students can extract, amplify, and verify the CO1 gene. Using sequence data, students use BLAST to identify the species of their fish sample.

Cindy Gay (cgay@sssd.k12.co.us),
Steamboat Springs High School,
Steamboat Springs, CO

#433 Explore Human- microbe Interactions with Hands-on Activities

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

Take part in student activities focused on modeling microbial communities and their essential role in the human organism. Activities are designed to shift students' thinking about human-microbe interactions. Receive free NIH SEPA curriculum materials.

Chandana Jasti, Project NEURON,
Champaign, IL and Sean O'Connor,
Kristen Talbot and Barbara Hug,
University of Illinois, Champaign, IL

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continued

#411 Addressing Human Impacts on Natural Systems within the NGSS

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

How can teachers address new requirements of the NGSS to learn about human impacts on natural systems in an educational, scientific, and positive manner? We will address how to integrate these new standards into your biology classes.

Minda Berbeco (berbeco@ncse.com) and Eric Meikle (meikle@ncse.com), National Center for Science Education (NCSE), Oakland, CA

#376 Digital Biology

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

Come learn how to combine cellphones, digital cameras, iPads[®] and microscopes to record and document both the macro and micro learning in your classroom. Lab manual will be provided.

Whitney Hagins, Lexington High School, Lexington, MA

11:15am – 12:30pm

Continued: College Board AP[®] Biology Workshop

Regency VI • Special Program • AP Biology • HS 4C

Continued: #SP2 Special Workshop: NGSS Practices, Assessment, and You

 Hanover F • Hands-on Workshop • Curriculum Development/Supervision • MS HS • \$45

Continued: #SP3 Special Workshop: Developing a Naturalist Approach in the Teaching of Science Concepts and Inquiry

 Hanover G • Demonstration • General Biology • HS • \$65

Continued: Biology Directors Consortium Presents: Institutional Approaches to Improving Student Success in the Life Sciences

Hanover A & B • Special Program • General Biology • 2C 4C • Space is limited

#238 Integrating Epigenetics into Your Biology Curriculum

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

Receive lessons and resources for promoting student learning about epigenetics and the role of diet, lifestyle and the environment in influencing gene expression within an individual and in some cases, across generations.

Dana Haine (dhaine@unc.edu), University of North Carolina – Chapel Hill, Chapel Hill, NC

#395 BEACON/NESCent Evolution Workshop - Teaching Biogeography

Hanover D • Demonstration (75 min) • Evolution • MS HS 4C

Join us for resources, ideas and strategies to introduce concepts from yesterday's BEACON/NESCent Evolution Symposium (*Wallace, Islands, and Biogeography - 100 Years Later*) in your classroom.

Louise Mead (lsmead@msu.edu), BEACON, East Lansing, MI and Jory Weintraub (jory@nescent.org), NESCent, Durham, NC

#310 Teaching the Genomics of Complex Traits

Hanover E • Hands-on Workshop (75 min) • Genetics • HS 2C

Genomics increasingly focuses on complex traits such as autism and height, complementing studies of single-gene traits. Help your students learn the concept of polygenic inheritance using an inquiry-based activity that teaches complex trait genetics.

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

#378 20 in 20

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

This workshop will introduce participants to 20 exciting, informative 20-minute activities to enhance their AP Biology course. Handout provided.

Whitney Hagins, Lexington High School, Lexington, MA

#317 Scaffolding and Assessing Students' Scientific Explanations

Courtland • Hands-on Workshop (75 min) • Instructional Strategies/Technologies • MS HS 4C

Participants will gain experience using a scaffolding tool to develop students' ability to write scientific explanations supported by data. Analysis of student work as formative assessment to inform both teachers and students will be explored.

Wendy Johnson (johnson3062@msu.edu), Michigan State University, East Lansing, MI

#322 Same Genes, Different Fates

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

Having trouble explaining and demonstrating gene expression with cell signaling? A modeling activity, concept

11:15am – 12:30pm

continued

mapping, lab options and supplies will be provided for your classroom to help you!

Cathy Oakes, Amber Vogel, and Nichola Hoffmann, UNC – CH Morehead Planetarium & Science Center – External Programs, Chapel Hill, NC

#302 Active Learning Using Virtual Classes and Lecture Captures

Edgewood • Demonstration (75 min) • General Biology • 2C 4C GA

Attend this session to see how audio/video is used to incorporate live and recorded presentations to help traditional and online students become active participants in lecture/lab instruction. Active learning tools will be demonstrated or discussed.

Reggie Cobb (rcobb@nashcc.edu), Nash Community College, Rocky Mount, NC

#385 Service Learning to Enhance Elementary STEM Education

Fairlie • Demonstration (75 min) • Curriculum Development • E 4C GA

Georgia Gwinnett College offered a "Service Learning" course in collaboration with Gwinnett County's McKendree E to enhance elementary STEM education. We will present the activities and assessment data from this collaboration.

Allison D'Costa, Bernadette Peiffer, Judy Awong-Taylor and Clay Runck, Georgia Gwinnett College, Lawrenceville, GA

#285 Marine Science Mania VI

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

Marine Science Mania IV and how Next Generation Science Standards impact teaching Marine Science. Explore NGSS and apply them to activities designed to dovetail marine science concepts, math, and English. Receive many giveaways and a CD of activities, labs, presentations.

Tom Froats (tom.froats@d214.org), Prospect High School, Mount Prospect, IL

#261 From Double Helix to Whole-Genome Sequencing: Molecular Genetic Testing in the Age of Personalized Medicine

Harris • Paper (75 min)
• Genetics • HS 2C 4C

This session will review the science and technology of molecular genetic testing for the diagnosis and treatment of disease, and will cover some of the related ethical and policy issues.

Wayne Grody (wgrody@mednet.ucla.edu), Molecular Diagnostic Laboratories and Clinical Genomics Center, Los Angeles, LA

Committee Meeting: Global Perspectives Committee

Heritage Boardroom

Jacqueline McLaughlin (jshea@psu.edu), Committee Chair

#269 Simulating Science: "Diagnosing Diabetes" & "A Kidney Problem"

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

Experience two hands-on labs. Use inexpensive "wet lab" simulations and models to enhance students' understanding of diabetes and kidney function. Teacher information and student handouts are available online from the <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

#349 Seeing Cancer: An Active Approach to Teaching Human Biology

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

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BIOLOGICAL SCIENCES

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11:15am – 12:30pm

continued

Teach students about cancer using a hands-on activity that allows students to see and diagnose cancer. The lab comes from the St. Jude Cure4Kids program that provides free lessons, videos, and professional development for teaching about cancer.

Katherine Ayers (kate.ayers@stjude.org) and Yuri Quintana (yuri.quintana@stjude.org), St. Jude Children's Research Hospital, Memphis, TN

#428 Go Full Screen with NGSS: A Model for Teaching with Video

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

Practice integrating multimedia video into your lessons using a model based on instructional intent. Example videos will be used to show how instructional intent impacts the design of learning experiences. Free curriculum materials available.

Robert Wallon (rwallon2@illinois.edu) and Barbara Hug (bhug@illinois.edu), University of Illinois at Urbana – Champaign, Champaign, IL, and Chandana Jasti (cjasti@illinois.edu) and Hillary Lauren (lauren1@illinois.edu), Project NEURON, Champaign, IL

#413 Evo-Ed: Integrative Case-based Tools for Teaching Evolution

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

We will model an integrative case approach to evolution education. Based on this approach, participants will design a lesson plan and an assessment tool that they can use in their own classrooms.

Peter White (pwhite@msu.edu), Merle Heidemann (heidema2@msu.edu) and Jim Smith (jimsmith@msu.edu), Michigan State University, East Lansing, MI

#426 Scaling and Seeing our Invisible Universe with NASA

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

From the subatomic to astronomic, life on Earth lies somewhere in between. Help your students get a sense of size and scale in the Universe, plus visualize our "invisible" Universe of electromagnetic energy with free hands-on activities from NASA.

Tyson Harty (tharty@jasper.k12.ga.us), NASA Education & Public Outreach, Rohnert Park, CA

#328 Nature in the Classroom: The Power of Place

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

Life cannot exist without nature. Similarly, biology education cannot exist without a natural context. We will explore how place-based learning offers the opportunity to engage students in biology content with motivation from their natural surroundings.

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

1:00pm – 3:00pm

NABT Honors Luncheon

 Regency V • Special Event • \$60

End the conference with a celebration of excellence at the 2013 Honors Luncheon. Help us recognize the numerous 2013 NABT Award recipients, including the Outstanding Biology Teacher Award (OBTA) honorees.

Full listing of 2013 Award Recipients found on pages 12 and 13.

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