NABT PROFESSIONAL DEVELOPMENT CONFERENCE

NOVEMBER 3–6, 2016
DENVER SHERATON DOWNTOWN HOTEL
DENVER, CO

#NABT2016
What will I do with the money I saved?

Probably take more classes.

CHHEANG KHIM
Class of 2018

Over the last decade, textbook costs have more than doubled. And who pays the price? Enterprising students like Chheang Khim. At OpenStax, we don’t think that’s fair. That’s why we offer free textbooks that are professionally written, peer-reviewed, and available in both printed and digital format. Plus, they meet your scope and sequence requirements. So your students can open their minds, instead of their wallets.

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Open Sources. Open Minds.

Visit us in the exhibit hall any day or join us in Plaza Court 3 on Saturday, November 5. We’ll be presenting sessions with our partners to tell you about the many ancillary resources available with our openly licensed textbooks, featuring:

- CogBooks
- Lrnr
- NACSCORP / aerSelect
- Odigia
- OpenStax Tutor
- panOpen
- SimBio

Free, customizable, peer-reviewed texts. Join the revolution.

OpenStax and its philanthropic partners are changing education, with free, openly licensed, high-quality textbooks that make college more affordable and accessible for everyone. Stop by our booth and show us that you like us on Facebook or follow us on Twitter, and you’ll receive a special gift.

Access. The future of education.

OpenStax.org

Generous funding provided by Rice University, the Laura and John Arnold Foundation, the William and Flora Hewlett Foundation, the Bill & Melinda Gates Foundation, the Maxfield Foundation, the Calvin K. Kazanjian Economics Foundation, the Bill and Stephanie Sick Fund and the Michelson 20MM Foundation.

info@openstax.com


Booth 300/302
NABT thanks these organizations for their generous support of activities at the 2016 Professional Development Conference.

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NABT
National Association of Biology Teachers

PROFESSIONAL DEVELOPMENT CONFERENCE
NOVEMBER 3–6, 2016
DENVER SHERATON DOWNTOWN HOTEL
DENVER, CO
Welcome to the Mile High City and the 2016 NABT Professional Development Conference! It’s always a special time when the NABT “tribe” gets together and this meeting offers a wonderful opportunity to spend a few days sharing with and learning from the best life science teachers in the country and those that want to be like them. It is the networking, collaboration, and learning experiences found in this conference and in NABT’s full year of programming that makes this organization the “Leader in Life Science Education” and makes our members so exemplary.

Those who have attended this conference before will notice that we have shifted and compacted the calendar for this meeting, allowing you to be away from your charges one less day. The Opening General Session on Thursday afternoon thus begins a packed schedule of day and evening programming that continues through Sunday morning. You will be able to choose from more than 100 high-quality, carefully vetted workshops and seminars, plus a greatly expanded number of poster sessions.

There are some program highlights that you don’t want to miss:

- The Exhibit Hall Opening on Thursday
- The First Timers’ Breakfast on Friday (for first time conference attendees)
- HHMI Night at the Movies with Dr. Sean Carroll on Friday night
- The 2016 NABT Distinguished Service Award presentation to Dr. Temple Grandin at Saturday’s final General Session
- Saturday evening’s “The Biology of Brewing”

Details regarding these events are in this program.

Finally, I would like to acknowledge all of the hard work from the corps of dedicated volunteer leaders that work throughout the year on behalf of NABT. The work of the Professional Development Committee is front and center this week but our seventeen standing and ad hoc committees plus the Board of Directors work throughout the year to advance the mission and vision of NABT. All of this is managed under the very capable guidance of our executive director, Jacki Reeves-Pepin. Come meet these leaders at the NABT Open Forum on Thursday afternoon from 1:30pm–2:45pm. The forum is open to all NABT members and is an opportunity to learn about our association, its vision for the future, and how you can assume a personal role in implementing that vision.

Be sure to share your conference experiences through the NABT Facebook group and #NABT2016 on Twitter.

Have a great time in Denver this week and leave empowered, informed, and invigorated.

Bob Melton, NABT President 2016
## Schedule at a Glance

### Thursday

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<td>First Timers’ Breakfast</td>
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<td>General Session: David McConnell</td>
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**Denver 2016**
SCHEDULE AT A GLANCE

1:00:30 NABT Open Forum

2:00:30 Math and Stats in the Biology Classroom

3:00:30 Bringing Natural History Museum Collections into the Classroom

4:00:30 Special Workshop: Unpacking Common Competencies

5:00:30 Special Workshop: 20 in 20

6:00:30 AP Biology Section Luncheon

7:00:30 Two-Year Section Luncheon

8:00:30 Four-Year Section Luncheon

9:00:30 NABT Undergraduate Summit

EVENT KEY

- REGULAR SESSIONS
- EXHIBITOR SESSIONS
- SPECIAL EVENT
- SPECIAL PROGRAM
- COMMITTEE MEETINGS
- REGISTRATION
- TICKETS REQUIRED
- EXHIBIT HALL OPEN
FOR PERSONS WITH DISABILITIES
Careful thought is given when planning the NABT Conference to make it accessible to all persons. Should you require special services, please go to the registration area to contact an NABT representative. We will strive to meet your needs.

CERTIFICATE OF ATTENDANCE
See page 83.

REGISTRATION HOURS
The NABT registration desk is located on the concourse level of the Sheraton Denver Downtown. It will be open during the following hours.

WEDNESDAY, NOVEMBER 2
4:00PM – 6:00PM

THURSDAY, NOVEMBER 3
7:30AM – 5:30PM

FRIDAY, NOVEMBER 4
6:30AM – 7:30AM FIRST TIMER'S REGISTRATION
7:30AM – 5:30PM

SATURDAY, NOVEMBER 6
7:00AM – 5:30PM

SUNDAY, NOVEMBER 5
7:30AM – 9:30AM

FUTURE NABT CONFERENCE DATES & SITES
2017 PROFESSIONAL DEVELOPMENT CONFERENCE
November 9 – 12, 2017
St. Louis Union Station Hotel
St. Louis, MO

2018 PROFESSIONAL DEVELOPMENT CONFERENCE
November 8 – 11, 2018
Sheraton San Diego Hotel & Marina,
San Diego, CA

ABOUT NABT
The National Association of Biology Teachers (NABT) is the leader in life science education. Our association is the largest national organization dedicated exclusively to supporting biology and life science educators. Our members—representing all grade levels—teach more than one million students each year! Learn more by visiting www.NABT.org.

ABOUT THE PROFESSIONAL DEVELOPMENT CONFERENCE
All functions, meetings and exhibits will take place at Sheraton Denver Downtown Hotel. Please consult this guide and signage for room information.

SESSION FEEDBACK SURVEY
Help us ensure you see great sessions at the NABT Conference. Use the QR code or visit www.nabt.org/sessionsurvey16 to submit feedback.

VISITING THE EXHIBIT HALL
The NABT Exhibit Hall is your venue to interact with a variety of curriculum publishers, equipment manufacturers, software developers, non-profit partners, and other organization that have resources that can benefit you as a biology educator. Receptions, contests, poster sessions, and other special experiences will also be featured in the Exhibit Hall. Registration badges are required for admission to the Exhibit Hall.

Thursday, November 3 5:30PM – 7:00PM
Friday, November 4 8:00AM – 5:30PM (Closing Reception starts at 4:00pm)

TRANSPORTATION FOR FIELD TRIPS AND SPECIAL EVENTS
The NABT Conference will feature three programs that will be offsite. Tickets are required to attend. Please visit the registration desk for more details.

WiFi Log-in details
SSID
Sheraton Meeting Room
Password
NABT2016

Phone: (888) 501–NABT
E-mail: office@NABT.org
Website: www.NABT.org
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<tr>
<td>8:00–9:00 AM</td>
<td>Eat and Learn. Enzymes: Technology Inspired by Nature (continental breakfast provided)</td>
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<tr>
<td>10:30–11:45 AM</td>
<td>Investigate Photosynthesis and Cellular Respiration with Algae Beads</td>
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<td>Starting a Biotech Program, One Piece of Equipment at a Time</td>
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<td>2:00–3:15 PM</td>
<td>Contagion! Track the Spread of Dangerous Disease</td>
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<tr>
<td>3:30–4:00 PM</td>
<td>Get That Grant Money!</td>
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**Visit Us at Booth #207**
Take fun pictures with your friends at our photo booth during the opening reception!
GENERAL SESSION SPEAKERS

THURSDAY, NOVEMBER 3

ELAINE OSTRANDER, Ph.D.
Chief and Distinguished Investigator, Cancer Genetics and Comparative Genomics Branch
National Human Genome Research Institute
National Institutes of Health, Bethesda, MD

Elaine Ostrander is Chief of the Cancer Genetics and Comparative Genomics Branch at the National Human Genome Research Institute of NIH and head of the Section on Comparative Genetics. She received her Ph.D. from Oregon Health Sciences University in 1987, and did postdoctoral training at Harvard and UC Berkeley. She initiated the canine genome project in 1993, building maps to navigate the dog genome. Her current work focuses on finding genes controlling morphologic variation and disease susceptibility. She was a faculty member at the Fred Hutchinson Cancer Research Center in Seattle, WA for 12 years and moved to NIH in 2004. She has published over 300 papers and won several awards including the Genetic Society of American Medal in 2013.

For session details, see page 24.

FRIDAY, NOVEMBER 4

DAVID MCCONNELL, Ph.D.
Professor, Marine, Earth & Atmospheric Sciences
Geoscience Learning Process Research Group
North Carolina State University, Raleigh, NC

David McConnell grew up in Northern Ireland where he earned a BSc (Hons) from The Queen’s University in Belfast before attending graduate school in the United States. He earned a Ph.D. in Geology from Texas A&M University and taught for several years before deciding to change his research focus from basic geology to geoscience education. David’s teaching and research focus on learning in large introductory geoscience classes and his research group has created a variety of teaching resources for introductory courses including a collection of concept tests, a series of inquiry-based physical geology labs, and many short geoscience videos available on his team’s YouTube channel (https://www.youtube.com/c/GeoscienceVideos). David has been recognized with awards from North Carolina State University, the University of Akron, and Kansas State University, and he was featured as a case study in the book, Reaching Students: What Research says about Effective Instruction in Undergraduate Science and Engineering published by the National Academies Press.

For session details, see page 27.
TEMPLE GRANDIN, Ph.D.
Professor, Animal Sciences
Colorado State University
Fort Collins, CO

Temple Grandin is a designer of livestock handling facilities and a Professor of Animal Science at Colorado State University. Facilities she has designed are located in the United States, Canada, Europe, Mexico, Australia, New Zealand, and other countries worldwide. Temple obtained her B.A. at Franklin Pierce College and her M.S. in Animal Science at Arizona State University. She then received her Ph.D. in Animal Science from the University of Illinois in 1989. Today she teaches courses on livestock behavior and facility design at Colorado State University and consults with the livestock industry on facility design, livestock handling, and animal welfare. She has also authored over 400 articles in both scientific journals and livestock periodicals on animal handling, welfare, and facility design. Her work has been recognized by humane groups and she has received several awards. She is the author of Thinking in Pictures, Livestock Handling and Transport, Genetics and the Behavior of Domestic Animals, and Humane Livestock Handling. Her books Animals in Translation and Animals Make Us Human were both on the New York Times bestseller list. Her life story has been made into an HBO movie, which won seven Emmy awards, a Golden Globe, and a Peabody Award.

Temple frequently presents lectures to parents and teachers throughout the U.S. on her experiences with autism. Articles and interviews have appeared in the New York Times, People, Time, National Public Radio, 20/20, The View, and the BBC. She was also honored in Time Magazine’s 2010 The 100 Most Influential People in the World. In 2012, Temple was inducted into the Colorado Women’s Hall of Fame.

For session details, see page 58.
INVITED SPEAKERS

FRIDAY, NOVEMBER 4

W. LARRY KENNEY, Ph.D.
Professor, College of Health and Human Development
Noll Laboratory
Marie Underhill Noll Chair in Human Performance
The Pennsylvania State University
University Park, PA

W. Larry Kenney received his Ph.D. in Physiology from Penn State University, where he is currently the Marie Underhill Noll Chair in Human Performance as well as Professor of Physiology and Kinesiology. His research involves human physiological responses to extreme environments, heat and cold stress, and dehydration, with a focus on the impact of aging and disease states on those responses.

He received the Faculty Scholar medal from Penn State in 2001, as well as the College of Health and Human Development’s Pauline Schmitt Russell Distinguished Research Career Award and the Evan G. and Helen G. Pattishall Outstanding Research Career Award. He was recognized with the Citation Award from the American College of Sports Medicine in 2008. He has published over 200 journal articles and book chapters and is the lead author of *Physiology of Sport and Exercise*, a best-selling textbook in exercise physiology. He is also active in the American Physiological Society (APS), serves on the Nike Scientific Advisory Board, and the American Council on Exercise (ACE) Scientific Advisory Panel.

For session details, see page 37.

SATURDAY, NOVEMBER 5

SAM KEAN
Author
Washington, D.C.

Sam Kean is the author of the *New York Times* and *IndieBound* bestsellers *The Disappearing Spoon* and *The Violinist’s Thumb*. Both books were also named *Entertainment Weekly* books of the year and Amazon top-five science books of the year. *The Disappearing Spoon* was a runner-up for the 2011 Royal Society Winton Prize for Science Books, and *The Violinist’s Thumb* was nominated for the 2013 PEN/E. O. Wilson Literary Science Writing Award. His work has appeared in the *New York Times Magazine, Psychology Today, New Scientist, Slate, Mental Floss*, and other publications and websites, and he has been featured on NPR’s *Radiolab, All Things Considered*, and *Fresh Air*.

For session details, see page 54.
NABT BOARD OF DIRECTORS
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Introductory Biology Task Force Anna Hiatt

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Bethany Dixon
Region X (Canadian Provinces & Territories)
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AFFILIATE MEMBERS
Biology Teachers Association of New Jersey (BTANJ)
Colorado Biology Teachers Association (CBTA)
Cleveland Regional Association of Biologists (CRABS)
Connecticut Association of Biology Teachers (CTABT)
Delaware Association of Biology Teachers (DABT)
Empire State Association of Two-Year College Biologists (ESTYCB)
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Indiana Association of Biology Teachers (IABT)
Kansas Association of Biology Teachers (KABT)
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Massachusetts Association of Biology Teachers (MABT)
Michigan Association of Biology Teachers (MABT)
Mississippi Association of Biology Educators (MSABE)
Missouri Association of Biology Teachers (MOBTA)
New York Biology Teachers Association (NYBTA)
South Carolina Association of Biology Teachers (SCABT)
Texas Association of Biology Teachers (TABT)
Virginia Association of Biology Teachers (VABT)
BIOCLUB STUDENT AWARDS
Arely Joaly Parra Lopez
Windsor High School, Windsor, CO
Outstanding student members of a NABT BioClub are eligible for this textbook scholarship with one student from each BioClub high school chapter and one student from each community college chapter being named.
Sponsored by Carolina Biological Supply Company

BIOLOGY EDUCATOR LEADERSHIP SCHOLARSHIP (BELS)
Bethany Dixon
Western Sierra Collegiate Academy, Rocklin, CA
The Biology Educator Leadership Scholarship (BELS) supports teachers who are furthering their education in the life sciences or science education. The award recipient is a practicing educator who has been accepted into a graduate program at a Masters or Doctoral level.
Sponsored by NABT Member Donations and PASCO Scientific

DISTINGUISHED SERVICE AWARD
Temple Grandin
Colorado State University, Fort Collins, CO
Established in 1988 to commemorate the 50th anniversary of the NABT, the Distinguished Service Award is presented to a nationally recognized individual who has made major contributions to biology education through his or her research, writing, and teaching.
Sponsored by the National Association of Biology Teachers

ECOLOGY/ENVIRONMENTAL SCIENCE TEACHING AWARD
Douglas Anderson
Brentwood High School, Brentwood, TN
This award recognizes a middle or high school teacher who has successfully developed and demonstrated an innovative approach in the teaching of ecology/environmental science and has carried his/her commitment to the environment into the community.
Sponsored by Vernier Software and Technology

EVOLUTION EDUCATION AWARD
Jason R. Wiles
Syracuse University, Syracuse, NY
This award recognizes innovative classroom teachers and their efforts to promote the accurate understanding of biological evolution with the larger community.
Sponsored by BEACON and BSCS

FOUR-YEAR COLLEGE & UNIVERSITY SECTION BIOLOGY TEACHING AWARD
Sehoya Cotner
University of Minnesota, Minneapolis, MN
This award recognizes creativity and innovation in undergraduate biology teaching, including curriculum design, teaching strategies, and laboratory utilization that have been implemented and demonstrated to be effective.
Sponsored by NABT’s Four-Year College & University Section

FOUR-YEAR COLLEGE & UNIVERSITY SECTION RESEARCH IN BIOLOGY EDUCATION AWARD
Marcelle A. Siegel
University of Missouri, Columbia, MO
Recognizing innovation in research that furthers our understanding of undergraduate biology teaching, this award is given to an individual who displays creativity in scholarship and research in biology education.
Sponsored by NABT’s Four-Year College & University Section

GENETICS EDUCATION AWARD
Michael Ralph
Olathe East High School, Olathe, KS
This award recognizes innovative, student-centered classroom instruction that promotes the understanding of genetics and its impact on inheritance, health, and biological research.
Sponsored by ASHG and GSA

HONORARY MEMBERSHIP
Margaret (Betsy) Ott
Tyler Junior College, Tyler, TX
The highest honor from the association, the Honorary Membership recognizes those individuals who have achieved distinction in teaching, research, or service in the biological sciences and designates them lifetime members of NABT.
Sponsored by the National Association of Biology Teachers

OUTSTANDING BIOLOGY TEACHER AWARD (OBTA)
See the full OBTA listing for 2016 Honorees
For over 50 years, the Outstanding Biology Teacher Award (OBTA) honors outstanding biology educators from grades 7–12 who are judged on their teaching ability and experience, cooperativeness in the school and community, creativity, inventiveness, initiative, and student-teacher relationships.
Sponsored by Carolina Biological Supply Company, with special consideration from Flinn Scientific and Population Connection

OUTSTANDING NEW BIOLOGY TEACHER ACHIEVEMENT AWARD
Andrew Hulse
Blue Valley High School, Overland Park, KS
This award recognizes outstanding teaching in grades 7–12 by a “new” biology/life science instructor within his/her first three years of teaching biology who has developed an original and outstanding program or technique while also making a contribution to the profession at the start of his/her career.
Sponsored by the Neil A. Campbell Educational Trust and Pearson

PROF. CHAN TWO-YEAR COLLEGE AWARD FOR THE ENGAGED TEACHING OF BIOLOGY
Sharon Gusky
Northwestern Connecticut Community College, Winsted, CT
This award recognizes a two-year college faculty member who has successfully developed and demonstrated an innovative, hands-on approach in the teaching of biology and has carried his/her commitment into the community to promote biology education.
Sponsored by Sarah McBride and John Melville

THE RON MARDIGIAN BIOTECHNOLOGY TEACHING AWARD
David A. Mangus
Brockton High School, Brockton, MA
This award recognizes a secondary school teacher or undergraduate college biology instructor who demonstrates outstanding and creative teaching of biotechnology by incorporating active laboratory work in the classroom.
Sponsored by Bio-Rad Laboratories

TWO-YEAR COLLEGE BIOLOGY TEACHING AWARD
Karla Fuller
Guttman Community College (CUNY), New York, NY
This award recognizes a two-year college biology educator who employs new and creative techniques to demonstrate excellence in teaching and scholarship through publications, teaching strategies, curriculum design, or laboratory utilization.
Sponsored by NABT’s Two Year College Section

OUTSTANDING BIOLOGY TEACHER AWARD
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This award recognizes a two-year college biology educator who employs new and creative techniques to demonstrate excellence in teaching and scholarship through publications, teaching strategies, curriculum design, or laboratory utilization.
Sponsored by NABT’s Two Year College Section
For over 50 years the National Association of Biology Teachers has been committed to recognizing outstanding biology teachers.

OUTSTANDING BIOLOGY TEACHER AWARD | NABT AWARDS

OBTA HONOREES 2016

REGION I
Leanne Nolan
Plainville High School
Plainville, CT
Shelly Pagnotta
Dedham Middle School
Dedham, MA

REGION II
Eric Guise
Hopewell Valley Central High School
Pennington, NJ
Rosemary Catlin
Brookport High School
Brookport, NY
Cindy Kube
Salem High School
Virginia Beach, VA
Robert Puskas
Blackhawk High School
Beaver Falls, PA

REGION III
Deborah Calhoun
Pike High School Freshman Center
Indianapolis, IN

REGION IV
Cathy Farrar
Marquette High School
Chesterfield, MO
Kelly Kluthe
Wyandotte High School
Lawrence, KS
Tracy Moody
Sanborn Central High School
Forestdale, SD

REGION V
Teresa Barton
Pikeview High School
Princeton, WV
Robin Bulleri
Cariboo High School
Chapel Hill, NC

REGION VI
Billie Abney
Northwest Georgia College and Career Academy, Dalton, GA
Sherry Bergeron
Lockport Middle School
Raceland, LA
Shani Bourn
Hancock High School
Klin, MS
Ben Johnston
Bob Jones High School
Madison, AL

REGION VII
Aimee Brinkley
Northside High School
Ft. Smith, AR

REGION VIII
Chris Chou
Longmont High School
Longmont, CO
Rob Jensen
Hellgate High School
Missoula, MT

REGION IX
Jennifer Cullison
Woodland High School
Woodland, WA
Darshana Shah
Portola Highly Gifted Magnet Center
Tarzana, CA
Dianne Hope Torman-West
Okkodo High School
Tamuning, Guam

Other consideration provided by Flinn Scientific and Population Connection.

The Outstanding Biology Teacher Award is proudly sponsored by:

NABT would like to thank our OBTA Directors, whose ongoing commitment to this program has helped NABT present the award to thousands of outstanding teachers.
PAST PRESIDENTS & CONFERENCE LOCATIONS

2015 — Jane Ellis, Providence, RI
2014 — Stacey Kiser, Cleveland, OH
2013 — Mark Little, Atlanta, GA
2012 — Donald French, Dallas, TX
2011 — Dan Ward, Anaheim, CA
2010 — Bunny Jaskot, Minneapolis, MN
2009 — John M. Moore, Denver, CO
2008 — Todd Carter, Memphis, TN
2007 — Pat Waller, Atlanta, GA
2006 — Toby Horn, Albuquerque, NM
2005 — Rebecca E. Ross, Milwaukee, WI
2004 — Betsy Ott, Cincinnati, IL
2003 — Catherine W. Ueckert, Portland, OR
2002 — Brad Williamson, Cincinnati, OH
2001 — Ann S. Lumsden, Montreal, QC, Canada
2000 — Brad Williamson, Cincinnati, OH
1999 — Catherine W. Ueckert, Portland, OR
1998 — Ivo E. Lindauer, Boston, MA
1997 — ViviannLee Ward, Reno, NV
1996 — Elizabeth Carvellas, Minneapolis, MN
1995 — Alan McCormack, Minneapolis, MN
1994 — Elizabeth Carvellas, Charlotte, NC
1993 — Gordon E. Uno, Phoenix, AZ
1992 — Alton L. Biggs, Denver, CO
1991 — Joseph D. McInerney, Nashville, TN
1990 — Nancy V. Ridenour, Houston, TX
1989 — John Penick, San Diego, CA
1988 — Jane Abbott, Chicago, IL
1987 — Donald S. Emmelthu, Cincinnati, OH
1986 — George S. Zahrobsky, Baltimore, MD
1985 — Thomas R. Mertens, Orlando, FL
1984 — Marjorie King, Purdue University, IN
1983 — Jane Butler Kahle, Philadelphia, PA
1982 — Jerry Resnick, Detroit, MI
1981 — Edward J. Kormondy, Las Vegas, NV
1980 — Stanley D. Roth, Boston, MA
1979 — Manent Kennedy, New Orleans, LA
1978 — Jane E. Peterson, Philadelphia, PA
1977 — Jack L. Carter, Anaheim, CA
1976 — Haven Kolb, Denver, CO
1975 — Thomas J. Cleaver, Portland, OR
1974 — Barbara K. Hopper, New York, NY
1973 — Addison E. Lee, St. Louis, MO
1972 — Claude A. Welch, San Francisco, CA
1971 — H. Bentley Glass, Chicago, IL
1970 — Robert E. Yager, Denver, CO
1969 — Burton E. Voss, Philadelphia, PA
1968 — Jack Fishleder, Anaheim, CA
1967 — William V. Mayer, New York, NY
1966 — Arnold B. Grobman, Washington, D.C. w/AAAS
1965 — L. S. McClung, U of CA, Berkley w/AAAS
1964 — Ted F. Andrews, Boulder, CO w/AIBS
1963 — Philip R. Fordyce, U of MA, Amherst, MA w/AIBS
1962 — Muriel Beuschlein, Corvallis, OR w/AIBS

# HONORARY MEMBERS

2016 — Margaret (Betsy) Ott
2015 — Sharon Radford
2014 — Jay Labov
2013 — Todd Carter
2012 — Maura Flannery
2011 — Louisa Stark
2010 — Patricia Waller, Brad Williamson
2009 — NOT AWARDED
2008 — Donald Cronkite
2007 — William H. Leonard
2006 — Terry Hufford
2005 — Randy Moore, Eugenie Scott
2004 — John Penick
2003 — Donald Emmelthu
2002 — Leonard Blessing
2001 — Gordon E. Uno
2000 — Elizabeth Carvellas
1999 — NOT AWARDED
1998 — Ivo Lindauer
1997 — Sam Rhine
1996 — Kenneth S. House
1995 — Joseph D. Novak
1994 — Nancy V. Ridenour, Alton L. Biggs
1993 — George S. Zahrobsky
1992 — Jon R. Hendrix
1991 — Robert E. Yager
1990 — Jane Butler Kahle
1989 — Joseph D. McInerney
1988 — Thomas Mertens, Marjorie King
1987 — Floyd Nordland
1986 — Donald S. Dean
1985 — Stanley Weinberg
1984 — Jack Carter, Samuel Postlethwait
1983 — Manent Kennedy
1982 — Harold “Sandy” Wiper, Jerry P. Lightner
1981 — Sophie Wolfe
1980 — Sister M. Gabrielle, Ted F. Andrews
1979 — Ingrith Olsen
1978 — John A. Moore
1977 — Addison E. Lee
1976 — Paul DeHart Hurd
1975 — Garrett Hardin, Stanley E. Williamson
1974 — H. Seymour Fowler
1973 — William V. Mayer
1972 — Chester A. Lawson, Paul E. Kline, Robert L. Gantert
1971 — NOT AWARDED
1970 — NOT AWARDED
1969 — Arnold B. Grobman
1968 — NOT AWARDED
1967 — NOT AWARDED
1966 — NOT AWARDED
1965 — John Breukelman, H. Bentley Glass, George W. Beadle, Paul B. Sears, Brother H. Charles Severin
1964 — E. Laurence Palmer, Hermann J. Muller Roger Tory Peterson, Oscar Riddle, Helen Irene Battle
NABT DISTINGUISHED SERVICE AWARD RECIPIENTS

2016 — Temple Grandin, Colorado State University, Fort Collins, CO
2015 — Carl Zimmer, Yale University, New Haven, CT
2014 — The Lacks Family (descendants of Henrietta Lacks), Baltimore, MD
2013 — Rita R. Colwell, University of Maryland College Park and Johns Hopkins University Bloomberg School of Public Health, College Park, MD
2012 — Michael Pollan, UC Berkeley Graduate School of Journalism, Berkeley, CA
2011 — Neil Shubin, University of Chicago, Chicago, IL
2009 — Mario Capecchi, University of Utah, Salt Lake City, UT
2008 — Ken Miller, Brown University, Providence, RI
2007 — Sean Carroll, University of Wisconsin — Madison, Madison, WI
2006 — Shirley Malcom, AAAS, Washington, D.C.
2005 — James A. Thompson, University of Wisconsin — Madison, Madison, WI; and Nina Leopold Bradley, Aldo Leopold Foundation, Baraboo, WI
2004 — Barbara Bancroft, RN, CPP Associates, Inc., Chicago, IL
2003 — Roberta Pagon, M.D., Children’s Hospital & Regional Medical Center, Seattle, WA
2001 — E.O. Wilson, Harvard University, Cambridge, MA
2000 — Roger and Deborah Fouts, Chimpanzee and Human Communication Institute, Ellensburg, WA
1999 — Jack Horner, Museum of the Rockies, Bozeman, MT
1998 — Leroy Hood, University of Washington, Seattle, WA
1997 — Neal Lane, National Science Foundation, Washington, D.C.; and Donald Kennedy, Stanford University, Palo Alto, CA
1996 — Francis Collins, National Institutes of Health, Bethesda, MD
1995 — Carl Djerassi, Stanford University, Palo Alto, CA
1994 — Bruce Alberts, National Academy of Sciences, Washington, D.C.
1993 — Nancy S. Wexler, College of Physicians and Surgeons of Columbia University, New York State Psychiatric Institute, New York, NY
1992 — Paul R. Ehrlich, Stanford University, Palo Alto, CA
1991 — Stephen Jay Gould, Harvard University, Cambridge, MA
1990 — Peter Raven, Missouri Botanical Garden, St. Louis, MO
1989 — Stanley Cohen, Stanford University, Palo Alto, CA
1988 — Lynn Margulis, University of Massachusetts, Boston, MA; and James D. Watson, Cold Spring Laboratory, Cold Spring Harbor, NY

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<th>Room</th>
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<tr>
<td>Director’s Row</td>
<td>Lobby/Street Level</td>
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<tr>
<td>Rooms E–J</td>
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<tr>
<td>Governor’s Square</td>
<td>Concourse Level</td>
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<td>Rooms 6–17</td>
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<tr>
<td>Plaza Ballrooms A–F</td>
<td>Concourse Level</td>
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<tr>
<td>Plaza Court Rooms 1–5</td>
<td>Concourse Level</td>
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<tr>
<td>Not shown: Windows Room</td>
<td>IM Pei Tower Building - Second Level</td>
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THURSDAY, NOVEMBER 3, 2016
Math and Stats in the Biology Classroom With HHMI BioInteractive
11:15AM – 3:45PM
Science Practices • HS, 2Y • Free (Tickets Required) • (Lunch Included)
Participants will learn key mathematical/statistical concepts and methods used in biological research, including sampling distribution, and descriptive/inferential statistics. Free classroom-ready resources from HHMI BioInteractive will be used. See page 23 for details.

Sponsored by
HHMI BioInteractive

Unpacking Common Competencies and Science Practice Outcomes in K-18 Biology Education
1:00PM – 3:30PM
Curriculum Development • HS, 2Y, 4Y
Free (Tickets Required)
Biology educators will participate in group discussions and activities to evaluate commonalities across guiding policies like NGSS, AP Curriculum Framework, and Vision & Change. See page 23 for details.

20 in 20: The Next Chapter
1:30PM – 3:30PM
General Biology • MS, HS, GA
Free (Tickets Required)
Make your biology course more inquiry based and student centered with new 20-minute activities to engage students in hands-on learning. Topics include molecular biology, genetics, cells, cell processes, and scientific practices. See page 23 for details.

SATURDAY, NOVEMBER 5, 2016
Touching Triton Implementation Workshop
1:30PM – 3:30PM
General Science • HS, 2Y, 4Y
Free (Tickets Required)
Touching Triton is a serious game designed for grades 9-16 focused on common complex disease risk. This workshop will provide educators with the knowledge and tools needed to successfully implement Touching Triton in the classroom. See page 61 for details.

SUNDAY, NOVEMBER 6, 2016
Math and Stats in the Biology Classroom With HHMI BioInteractive
8:00AM – 12:30 PM
Science Practices • HS, 2Y • Free (Tickets Required) • (Breakfast Included)
Participants will learn key mathematical/statistical concepts and methods used in biological research, including sampling distribution, and descriptive/inferential statistics. Free classroom-ready resources from HHMI BioInteractive will be used. See page 65 for details.

Sponsored by
HHMI BioInteractive

INTRO BIO TASK FORCE

THURSDAY, NOVEMBER 3, 2016
Behind the Scenes at the Denver Zoo
11:30AM – 3:30 PM
(Tickets Required)
The Denver Zoo is a staple of the downtown area and popular among students and educators throughout Colorado. Don’t miss a chance to experience a behind the scenes tour of the zoo’s vet hospital, a tour of the nutrition center, an animal demonstration/encounter, and a guided tour of the Denver Zoo’s newest tiger exhibit, The Edge.

Field Trips

THURSDAY, NOVEMBER 3, 2016
Behind the Scenes at the Denver Zoo
11:30AM – 3:30PM
(Tickets Required)
The Denver Zoo is a staple of the downtown area and popular among students and educators throughout Colorado. Don’t miss a chance to experience a behind the scenes tour of the zoo’s vet hospital, a tour of the nutrition center, an animal demonstration/encounter, and a guided tour of the Denver Zoo’s newest tiger exhibit, The Edge.

SUNDAY, NOVEMBER 6, 2016
Rocky Mountain Arsenal Wildlife Refuge
8:00AM – 12:30PM
$60 onsite (Tickets Required)
You will adventure on your bus throughout the entire 9 mile Wildlife Drive to view many of the over 330 species of wildlife residing on the refuge including bison, raptors, songbirds, mule and white-tailed deer, and more. See page 65 for details.

You can learn more about the Refuge by visiting their website at www.fws.gov/rocky_mountain_arsenal.
FRIDAY, NOVEMBER 4, 2016
HHMI Night at the Movies with Sean Carroll
5:30PM – 8:00PM
Free (Tickets Required)
HHMI BioInteractive (www.biointeractive.org) and NABT are pleased to host the 6th Annual HHMI Night at the Movies with Sean Carroll. Join Dr. Carroll for the premiere of a new short film and discussion. This free red-carpet event will begin at 5:30pm with a reception including free food and drink. See page 41 for details.

SATURDAY, NOVEMBER 5, 2016
NABT Honors Luncheon
12:00PM – 2:00PM
$60 onsite (Tickets Required)
Join us as we recognize the accomplishments and professional contributions of the 2016 NABT Award recipients, including the Outstanding Biology Teacher Award (OBTA) honorees. This celebration honors exceptional biology teachers and everyone is welcome to attend! See page 54 for details.

Biology of Brewing
6:00PM – 8:00PM
(Tickets Required)
As the brewing industry grows, biology faculty are crossing departmental lines to offer undergraduate degrees and certificates in fermentation and brewing science. Learn more about the biology used by today's craft brewers at this special event at the Wynkoop Brewery. See page 62 for details.

Presented in Partnership with

MEAL FUNCTIONS

FRIDAY, NOVEMBER 4, 2016
First Timers' Breakfast
7:30AM – 8:45AM
FREE (Tickets Required)
NABT Conference “first timers” are invited to learn more about NABT and the Professional Development Conference over a complimentary breakfast. Each table will have an NABT leader available to answer your questions and help you make the most of your time in Denver. See page 27 for details.

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

AP Biology Section Luncheon
12:45PM - 1:45PM
(Tickets Required)

Four-Year Section Luncheon
12:45PM - 1:45PM
(Tickets Required)

SATURDAY, NOVEMBER 5, 2016
BioClub Breakfast
7:30AM – 8:45AM
FREE (Tickets Required)
The NABT BioClub keeps adding new clubs from middle schools to community colleges throughout the United States and Canada. Both current and future BioClub Advisors are invited to share resources, feedback, and stories about their chapters. Join the club (BioClub that is)! See page 43 for details.

The BioClub Breakfast is made possible through the generous support of

Touching Triton Breakfast
7:30AM – 8:45AM
FREE (Tickets Required)
You're invited to a special launch of Touching Triton, a new “serious game” that focuses on the interplay between genetics, the environment, and family history when determining risk for common complex diseases like diabetes and cancer set in a storyline of long term space flight. This event will include breakfast, an introduction to Touching Triton, a closer look at human space flight and modern genomics, and educator access to Touching Triton. See page 43 for details.

The Touching Triton Launch Breakfast is made possible through the generous support of

2016 NABT Professional Development Conference
Visit the PASCO Booth #201
Join us for one of our hands-on workshops

Unleash Inquiry in AP® Biology.
Location: Plaza Court 4
November 5 - 9:00am - 10:15am
Conduct quick & powerful inquiry labs—including enzyme activity & cellular respiration—using our wireless sensors & spectrometer with the full-featured, free SPARKvue app (compatible with tablets, Chromebooks & phones). Win an Advanced Biology Manual that includes 22 AP aligned labs!

Environmental Monitoring with PASCO with PASCO Wireless Sensors.
Location: Plaza Court 4
November 5 - 10:30am - 11:45am
PASCO’s affordable wireless sensors enable long-term, remote data collection, allowing for long-term trend analysis without repeat site visits for samples. Transform your labs to conduct water quality & environmental monitoring activities.

pasco.com/biology/nabt
Susan Finazzo

has captured some great shots.

Now it’s your shot to capture her in Denver!

Find Susan and enter to win some great prizes from PASCO.

The drawing will be on Friday, November 4th at NABT2016!
8:30AM – 3:30PM
NABT/BSCS AP Biology Academy Workshop
Governor’s Square 16 • Invitation Only

11:30AM – 3:30PM
Behind the Scenes at the Denver Zoo
Lobby • Field Trip (Tickets Required) • GA
The Denver Zoo is a staple of the downtown area and popular among students and educators throughout Colorado. Don’t miss a chance to experience a behind the scenes tour of the zoo’s vet hospital, a tour of the nutrition center, an animal demonstration/encounter, and a guided tour of the Denver Zoo’s newest tiger exhibit, The Edge. The focus of this field trip will be based on animal care — vet care, nutritional needs, and exhibit design to meet the needs of the animals.

1:00PM – 3:30PM
NABT Intro Bio Task Force

10:00AM – 12:30PM
NABT Board Meeting
Governor’s Square 9 • Committee Meeting • Invitation Only

11:00AM – 11:15AM
QUBES Math Anxiety Faculty Mentor Network
Governor’s Square 17 • Invitation Only

11:15AM – 3:45PM
Math and Stats in the Biology Classroom With HHMI BioInteractive
Governor’s Square 15 • Science Practices • Special Workshop (Tickets Required) • HS, 2Y
Participants will learn key mathematical/statistical concepts and methods used in biological research, including sampling distribution, and descriptive/inferential statistics. Free classroom-ready resources from HHMI BioInteractive will be used.

Ryan Reardon, Paul Strode, Satoshi Amagai, HHMI BioInteractive, Chevy Chase, MD

11:30AM – 12:30PM
1137 | Unpacking Common Competencies and Science Practice Outcomes in K-18 Biology Education
Governor’s Square 10 • Curriculum Development • Special Workshop (Tickets Required) • HS, 2Y, 4Y
Biology educators will participate in group discussions and activities to evaluate commonalities across guiding policies like NGSS, AP Curriculum Framework, and Vision and Change.

1:00PM – 3:30PM
NABT Open Forum
Governor’s Square 12 • Special Program
Engage with leaders and fellow NABT members in this interactive format that highlights “the state of the association.” Learn more about ongoing initiatives and upcoming projects. Help to continue to make NABT the “leader of life science education” with your insight, feedback, and leadership.

11:30AM – 12:30PM
968 | Bringing Natural History Museum Collections into the Classroom: Exploring 55 Million Years of Horse Evolution in Response to a Changing Climate
Governor’s Square 14 • Evolution • Special Workshop (Tickets Required) • MS, HS, GA
This teacher/scientist created and field-tested series of lessons addresses macro- and micro-evolutionary concepts. Workshop participants will use 3D printed fossil horse teeth study sets and engage in an investigation of the fossil horse record.

Sean Moran and Julie Bokor, University of Florida, Gainesville, FL; Jennifer Broo, St. Ursula Academy, Cincinnati, OH; and Jessica Mahoney, Edgewater HS, Orlando, FL

1:00PM – 3:30PM
20 in 20: The Next Chapter
Governor’s Square 11 • General Biology • Special Workshop (Tickets Required) • MS, HS, GA
Make your biology course more inquiry-based and student-centered with new 20-minute activities to engage students in hands-on learning. Topics include molecular biology, genetics, cells, cell processes, and scientific practices.

Whitney Hagins, Massachusetts Biotechnology Education, Cambridge, MA
3:00PM – 3:45PM
NABT/BSCS AP Biology Academy Reception
Governor’s Square 16 • Invitation Only

4:00PM – 5:15PM
GENERAL SESSION SPEAKER

Elaine Ostrander
See page 8 for biography.

Whole Genome Sequencing in Dogs: Facilities Studies of Breed Variation and Disease Susceptibility
Plaza Ballroom ABC • Special Speaker • GA
The Ostrander lab seeks to understand disease susceptibility, behavior, and morphologic variation that occur across domestic dog breeds. Working with dog owners, breeders and the American Kennel Club, the lab collects DNA samples from dogs of varying phenotypes and applies the most sophisticated of genomic technologies to understand variation in behavior, morphology and disease susceptibility across domestic dog breeds. This information inevitably helps us understand the genetic underpinnings of the same or similar phenotypes in humans, highlighting mutations, genes or pathways important to developmental and disease processes. Dogs are ideal for such studies since each dog breed represents an isolated and relatively pure breeding population, dog families are larger—much more so then humans, and dog owners ensure the health of their pets by vigilant screening on the part of a highly motivated veterinary community.

This presentation will highlight some of the morphologic phenotypes the Ostrander lab has and is pursuing and the large resources the lab is developing for the research community to tackle those questions. The origins of dog breeds and how canine populations are unique from those of other domestic mammals will also be discussed.

Get Involved at NABT
Charging Station • Exhibit Hall
Learn more about volunteer opportunities at NABT. Committee Chairs, Section Chairs, and Regional Coordinators will be on hand to highlight NABT programs and answer questions. Look for details in the Exhibit Hall.

Thursday, November 3
Committee & Section Chairs
5:30PM – 7:00PM

Friday, November 4
Regional Coordinators
4:00PM – 5:30PM
Expanding Wireless Possibilities for Biology Education

The NEW LabQuest Stream enables simultaneous data collection from multiple Vernier sensors using a mobile device. Connect directly to a Chromebook™ or computer using a USB cable.

www.vernier.com/lq-stream
7:30AM – 8:45AM
First Timers’ Breakfast
Plaza Ballroom E • Meal Function (Tickets Required) • GA
NABT Conference “first timers” are invited to learn more about NABT and the Professional Development Conference over a complimentary breakfast. Each table will have an NABT leader available to answer your questions and help you make the most of your time in Denver.

The NABT First Timers’ Breakfast in made possible through the generous support of

10:30AM – 11:45AM
NABT Committee Meeting: Global Perspectives Committee
Director’s Row F • Committee Meeting • GA
Jacqueline McLaughlin, Committee Chair

11:18 | Graduate Student Networking and Mentoring Workshop
Governor’s Square 9 • Instructional Strategies & Technologies • Symposium (75 minutes) • 4Y
Are you interested in networking, receiving tips from experienced mentors, or having professionals review your CV? Come to the graduate student mentoring and networking workshop!
NABT Graduate Student Committee

9:15AM – 10:15AM
GENERAL SESSION SPEAKER
David McConnell
See Page 8 for biography.

What Research Tells Us About Effective Strategies That We Will Actually Use
Plaza Ballroom ABC • Special Speaker • GA
Over the last three decades, discipline-based education research (DBER) in a variety of STEM fields has revealed a variety of empirically validated instructional practices that contribute to improvements in student learning and a reduction in attrition. Classes that support these teaching practices are often termed “active learning environments” and are characterized by small group work, ongoing monitoring of student learning, and lessons that challenge students to apply higher level thinking skills. Even the most dedicated instructor may be challenged to identify which combination of active learning strategies would be best suited to their class setting. Dr. McConnell will share what his research group observed when they visited more than two hundred college geoscience classes and the implications for instructors seeking to adopt or increase their use of active learning strategies. He will make the case that we should consider what research in educational psychology tells us about student learning processes when we make decisions about pedagogical changes. He will also demonstrate how instructors can foster an adaptable teaching approach that blends a mix of in-class and out-of-class activities that support student learning and can be readily applied regardless of situational factors such as class size, instructional support and course content.
10:30AM – 4:00PM

Special Programming Presented by Bio-Rad Laboratories

All sessions in Plaza Court 1
Damon Tighe

8:00AM – 9:15AM
Enzymes: Technology Inspired by Nature
AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
With rising greenhouse gases, scientists look to nature for a biofuel solution. In this hands-on workshop, extract a mushroom enzyme used for biofuel processing and design experiments to quantify its properties. Aligns with AP Biology Big Ideas 2, 4.

10:30AM – 11:45AM
Algae Beads: Study Photosynthesis and Cellular Respiration
General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Use algae beads in a single colorimetric inquiry investigation to study both photosynthesis and cellular respiration (AP Biology Big Idea 2). Also test the effects of light intensity, light color, temperature, and other organisms on these processes.

12:00PM – 12:30PM
Starting a Biotech Program one piece of equipment at a time
Biotechnology • Hands-on Workshop (30 min) • HS
Starting a biotech program doesn’t need to be a huge up-front investment. Many educators have started biotech programs one piece of equipment at a time. Learn the tips and tricks used to build the framework of a successful biotechnology course.

2:00PM – 3:15PM
Contagion! Track the Spread of Dangerous Disease
Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Disease can spread like wildfire through populations. In this hands-on lab workshop you will assume the role of an epidemiologist and use an ELISA assay to track viruses like HIV, Ebola, Zika, and SARS. See if you can find patient zero.

3:30PM – 4:00PM
Get that Grant Money!
Instructional Strategies/Technologies • Hands-on Workshop (30 min) • HS, 2Y, 4Y
Successful grant writing doesn’t need to be rocket science, and it can take your teaching to new heights. Get resources and learn some powerful tips for success from experienced grant writers to get you to the next level.

10:30AM – 11:45AM continued

1014 | SMART (Students Modeling a Research Topic) and MAPS (Modeling a Protein Story) Teams: Taking Teaching Protein Structure and Function to the Next Level
Governor’s Square 12 • General Biology • Symposium (75 minutes) • HS
SMART and MAPS teams are groups of students and teachers, that explore protein structure-function relationships and their relevance to current research by developing 3D physical protein models that allow them to present their “molecular story”.

Chris Chou, Longmont High School, Longmont, CO; and Diane Munzenmaier, Milwaukee School of Engineering, Milwaukee, WI

1004 | Genes, Genomes and Personalized Medicine: An NIH-SEPA Project
Governor’s Square 14 • Genetics • Hands-on Workshop (75 min) • HS, 2Y, MS
This workshop introduces new instructional tools that go beyond teaching the fundamentals of DNA structure and the flow of genetic information to teaching DNA as information. Materials will include DNA models, gene maps, and a genomic story.

Tim Herman and Gina Vogt, MSOE Center for BioMolecular Modeling, Milwaukee, WI

1127 | DNA Detectives: Applications of DNA Profiling
Governor’s Square 15 • Biotechnology • Hands-on Workshop (75 min) • MS, HS, 2Y
Have fun working through our new online interactive and hands-on activity that teach the science behind DNA profiling. Learn how this technique is being used to help stop the ivory trade and to solve crimes and mistaken paternity cases.

Mark Eberhard, Helen Snodgrass, and Laura Bonetta, HHMI BioInteractive, Chevy Chase, MD
997 | Discussion-Based Classrooms - Teaching Biology Without Direct Instruction
Governor's Square 16 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • HS
This session will follow the style of discussion-based teaching we use in our classrooms. The session will focus on modeling talk skills, giving feedback, and teaching students to hold each other accountable for using evidence to make arguments.
Rafael Quizon and Ivy McDaniel, Noble Street Charter Schools, Chicago, IL

1076 | Exploring and Teaching with Mathematical Models in the Biology Classroom - Meeting the Challenge
Governor's Square 17 • AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
An important part of The AP Biology Curriculum Framework is the development and use of mathematical models. This workshop will explore models and strategies to incorporate models from each of the Big Ideas in your classroom and lab.
Brad Williamson, University of Kansas, Lawrence, KS

1053 | Improving Science Practices Through Evaluating Scientific Journal Articles
Plaza Court 5 • AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Experimental design is at the forefront of the AP Science Practices. Reading and evaluating journal articles is one method to help students understand experimental design. This workshop provides a concrete, scaffolded method to teach this skill.
Christina Palffy, Adlai E. Stevenson High School, Arlington Heights, IL; and Karen O'Connor, Stevenson High School, Lincolnshire, IL

942 | It’s Statistics, Not Sadistics: Simply and Effectively Utilize Statistics in Science Classes to Teach the Scientific Method
Plaza Court 7 • Science Practices • Hands-on Workshop (75 min) • HS, 2Y, 4Y
The AAAS Vision and Change suggest we teach science the way scientists do science and to use statistics to test hypothesis. This session will equip teachers to use Student's t-test and Chi Squared test in their home classrooms to test inquiry labs.
Matthew Craig, Gillette College, Gillette, WY; and Dan Porter, Amarillo College, Amarillo, TX

10:30AM – 1:15PM
Special Programming Presented by Fisher Science Education/G-Biosciences
All sessions in Plaza Court 3
Ellyn Daugherty

10:30AM – 11:45AM
Proteins are the Cash of Biotech - The rAmylase Project
Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Proteins are usually colorless and always submicroscopic. How can scientists recognize and measure protein presence and activity? In this BS4NM hands-on workshop, participants conduct and study amylase with three protein assays (tests).

12:00PM – 1:15PM
Biotech is STEM - Molecular Modeling with Your Students
Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Biotechnology is STEM and easy to implement. In this workshop, teachers will learn how to use a free web-based molecular modeling program to study DNA and protein structure. STEM biotech curriculum implementation strategies will also be presented.

Special Programming Presented by University of Nebraska at Kearney

10:30AM – 11:45AM and 12:00PM – 1:15PM
Online Education for Biology and Science Teachers
Plaza Court 4 • General Biology • Symposium (75 min) • MS, HS, 2Y, 4Y
Join this session to learn about the University of Nebraska at Kearney's online Master of Science in Biology and Master of Science in Education Science/Math Education programs. UNK offers over 400+ online courses geared toward advancing teachers.
Brian Peterson

976 | Melanin: A Model NGSS Storyline
Plaza Court 6 • General Biology • Demonstration (75 min) • MS, HS
Using melanin and albinism as the driving phenomenon, this three-dimensional unit serves to integrate multiple concepts in a cohesive storyline. Concepts integrated into this storyline include genetics and evolution in a single unit.
Jason Crean, Lyons Township High School, Western Springs, IL; Kathy van Hoeck, York Community High School, Elmhurst, IL; and Michele Koehler, Riverside-Brookfield High School, Brookfield, IL
10:30AM – 12:30PM

NABT AP BIOLOGY SYMPOSIUM

All sessions in Plaza Ballroom F

10:30AM – 11:30AM
1089 | EK + SP = LO: Remodeling Legacy AP Biology Questions to Align with the Redesigned Exam
AP Biology • Symposium (60 min) • HS
Participants will investigate strategies for modifying legacy AP Biology questions that specifically align with objectives from the revised AP Biology curriculum and will use the Curriculum Framework to construct a full-length summative exam.

Jennifer Pfannerstill, North Shore Country Day School, Winnetka, IL; and Bob Kuhn, Centennial High School, Roswell, GA

1:30PM – 2:00PM
1006 | Measuring Learning Outcomes with Good Multiple-Choice Questions
AP Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y
Join ETS Test Developers to practice writing formative and summative questions to measure defined learning outcomes. Emphasis will be given to reverse-engineering questions to specifically align with instructional objectives and assessment goals.

Mitch Price and Chris Gentile, Educational Testing Services, Princeton, NJ

12:00PM – 12:30PM
NABT Committee Meeting: Archival Committee
Director’s Row F • Committee Meeting • GA
Carrie J. Bucklin and Jill Maroo, Committee Chairs

10:30AM – 11:45AM continued
1036 | Identifying Strengths and Problems: Using College Board Learning Objectives to Improve Assessment and Metacognition in AP Biology
Plaza Court 8 • AP Biology • Hands-on Workshop (75 min) • HS, GA
AP Biology requires both conceptual understanding and application of science practices. Come see how spiraling assessments aligned to the Curricular Framework support student growth and self-assessment while preparing them for success on the AP exam!

Kate Ingemunson and Stephen Traphagen, Rolling Meadows High School, Rolling Meadows, IL

10:30AM – 12:30PM
1141 | 2016 Evolution Symposium: Emerging Research in Evolutionary Biology
Plaza Ballroom D • Evolution • Symposium (120 min) • HS, 2Y, 4Y
Join us for a talk featuring new research in evolutionary biology and a workshop on using authentic data from this new research in your classroom! See page 33 for complete details.

Sponsored by the BEACON Center for the Study of Evolution and the American Society of Naturalists.

12:00PM – 12:30PM
1016 | Identifying Changes in Preservice Biology Teachers’ Science Teaching Efficacy After Facilitating an Authentic Biology Research Course
Governor’s Square 9 • Instructional Strategies & Technologies • Paper (30 min) • 2Y, 4Y
Come learn how our approach to preparing preservice science teachers (PSTs) to teach biology strengthens science teaching efficacy. We will share the pedagogical strategies to aid other teacher preparation programs who prepare PSTs.

Julie Angle, Lance Forshee, and Donald French, Oklahoma State University, Stillwater, OK
Want to enhance the way your students learn about the genetics of disease?

**TOUCHING TRITON**

With this online interactive game, your students work together to ensure the health and safety of a deep space crew while learning the genomics of common disease. **Touching Triton** teaches the complexity of common disease risks from family history, environment and individual genomic profiles. Students begin to understand how genetics and lifestyle choices affect their health. Learn more at [bit.ly/touching-triton](http://bit.ly/touching-triton).

**Made possible by:**

- **HudsonAlpha**
- **LOCKHEED MARTIN**

**Grant Number 8R25 OD010981-02**

*Touching Triton engages students in a longterm space flight storyline while helping them build an understanding of common complex disease risk.*

**FREE Digital Activity**

**Visit us at Booth #406**
FRIDAY, NOVEMBER 4

12:00PM – 12:30PM continued

1092 | Having a BLAST with Plants: Using Rubisco to Explore Evolutionary Relationships
Governor’s Square 10 • Evolution • Paper (30 min) • HS, 2Y, 4Y
The evolution of Rubisco, the enzyme which fixes carbon dioxide, is illustrated by comparing the sequences of the small subunit. We shall review a new BLAST activity using online data and discuss the evolution of plants and photosynthesis.

Elizabeth Cowles, Eastern Connecticut State University, Willimantic, CT

1015 | Investigating a Rare Disease through Hands-on and Blended Settings
Governor’s Square 14 • General Biology • Hands-on Workshop (30 min) • HS, GA
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 lessons will be shared. BYOD to try out the web-based WISE version!

Julie Bokor, University of Florida, Gainesville, FL

1026 | Bringing Professional Biological Research into the Classroom
Governor’s Square 17 • Instructional Strategies & Technologies • Demonstration (30 min) • HS
There are many benefits to sharing published biological studies with students, such as practicing analysis and interpretation of data that doesn’t seem to have a “right answer.” I’ll share specific examples and general tips for finding more.

Kim Failor, Stanford Online High School, Stanford, CA

1024 | Developing Student Thinking in the Biology Classroom Without Recreating Your Entire Year: Analysis of the Rigor of Your Lessons
Governor’s Square 11 • General Biology • Hands-on Workshop (30 min) • ES, MS, HS
Learn what increasing rigor means, how to quantify rigor in lessons, and how to incorporate strategies to develop student thinking. Quality time will be allotted for collaboration among participants. Bring your lessons to adapt!

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

1133 | Engaging Students with Authentic Scientific Literature
Governor’s Square 15 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Learn how to effectively introduce primary literature in your classroom by packaging an annotated science paper, HHMI BioInteractive multimedia, and an active learning piece to provide the necessary scaffolding while maintaining student engagement.

Chi Klein, Scott Sowell, and Melissa Csikari, HHMI BioInteractive, Chevy Chase, MD

1098 | Lessons Learned from a Flipped Classroom
Plaza Court 5 • Science Practices • Paper (30 min) • 2Y, 4Y, GA
The flipped class depends on the efficiency and quality of content-delivery materials and diverse and engaging student-centered learning activities to apply and assess understanding of that content. Failures and successes of flipping will be discussed.

Kathy Gallucci, Elon University, Elon, NC

1022 | Foolproof Gel Electrophoresis for Pennies Per Student
Governor’s Square 12 • General Biology • Paper (30 min) • HS, 2Y
Unable to purchase expensive DNA kits and micro-pipettes? Learn how to create samples containing a mixture of dyes of different molecular weights which result in interesting banding patterns that can be used in fragment and variation analysis.

Teresa Fulcher, Pellissippi State Community College, Knoxville, TN

1019 | Improving Student Success in Introductory Biology: The Use of Summative Assessment as an Inclusive Practice
Governor’s Square 16 • Curriculum Development • Paper (30 min) • 2Y, 4Y
The effect of the use of summative assessment on underrepresented minorities in Introductory Biology.

Oluwaseun Agboola and Anna Hiatt, East Tennessee State University, Johnson City, TN

1093 | Engaging Graduate Teaching Assistants in Lesson Study to Improve Instruction in an Introductory Biology Laboratory Course
Plaza Court 6 • General Biology • Paper (30 min) • 4Y
This session will discuss how lesson study, a type of professional development, advanced graduate teaching assistants’ pedagogical content knowledge (PCK) in order to improve the quality of instruction in an introductory biology laboratory course.

Sandra Lampley, University of Alabama in Huntsville, Huntsville, AL; and Grant Gardner, Middle Tennessee State University, Murfreesboro, TN
Why be blue in a swamp?
The evolution of color patterns and color vision in killifish

Dr. Rebecca (Becky) Fuller
Department of Animal Biology
School of Integrative Biology
University of Illinois

Data Nugget Workshop
The Determinants of Male Color Pattern: Nature, Nurture, and their Interaction
Drs. Rebecca Fuller, Melissa Kjelvik, Elizabeth Schultheis, Alexa Warwick, and Louise Mead
University of Illinois and BEACON Center for the Study of Evolution in Action at Michigan State University

10:00AM – 12:30PM
NABT 2016 Evolution Symposium: Emerging Research in Evolutionary Biology

Plaza Ballroom D • Evolution • GA
Join us to hear about new research in evolutionary biology and a workshop on using authentic data in your classroom.

Why Be Blue in a Swamp? The Evolution of Color Patterns and Color Vision in Killifish
Animal communication happens when one organism emits a signal, which then travels through the environment and is detected by the sensory system of another. The environment in which signaling occurs can dramatically alter signal transmission and result in selection where different signals are favored in different environments. The bluefin killifish provide a compelling example. Some populations are found in crystal clear springs (where UV and blue light are highly abundant) and others are found in tannin-stained swamps (where UV/blue light is depauperate). Paradoxically, males with blue color patterns are abundant in swamps and are rare in springs. The resolution to this paradox requires a consideration of how genetics and the environment influence trait expression, as well as the direction of natural and sexual selection in different habitat types, and the manner in which animals with different visual systems perceive the same color pattern.

Data Nugget Workshop: The Determinants of Male Color Pattern: Nature, Nurture, and their Interaction
Data Nuggets are hands-on activities designed to improve the scientific and quantitative skills of students by having them graph and interpret scientific data gathered by practicing scientists. This workshop will provide an overview of Data Nuggets and present a Data Nugget featuring data on the genetic and environmental basis of color pattern expression in killifish. This Data Nugget will allow students to determine whether color pattern expression is due to ‘nature’ (e.g., genetics), ‘nurture’ (e.g. environment), or the interaction of the two.

Rebecca Fuller, Melissa Kjelvik, Elizabeth Schultheis, Alexa Warwick, and Louise Mead
BEACON Center for the Study of Evolution in Action, Michigan State University

Rebecca Fuller, University of Illinois at Urbana-Champaign, Champaign, IL
12:00PM — 12:30PM continued

986 | Ecological Service Learning: Connecting Natural and Human Communities
Plaza Court 7 • Ecology/Environmental Science/Sustainability • Paper (30 min) • HS, 2Y, 4Y
We will explore NCCC’s ecological service-learning projects in life-science laboratory courses! Students’ reflections and outcomes will be included, and opportunities for funding and partnership building for similar projects will also be discussed.

Tara Jo Holmberg, Northwestern Connecticut Community College, Winsted, CT

954 | Introductory Biology Students’ Use of Rubrics and Reflection Questions as Scaffolds to Engage in Metacognition and Enhance Understanding
Plaza Court 8 • General Biology • Paper (30 min) • 2Y, 4Y
Learn about the design and use of scoring rubrics, reflection questions, and instruction on their use to support introductory biology students as they learn to engage in metacognition and consider their own understanding of biological concepts.

Jaime Sabel, University of Nebraska-Lincoln, Lincoln, NE

12:45PM — 1:45PM

AP Biology Section Luncheon
Director’s Row E • AP Biology • Meal Function (Tickets Required) • HS
You have the big ideas and enduring understandings covered. But what about the science practices and the labs? And that exam? Meet other AP Biology teachers in a friendly informal setting to share questions and insight. You may even finally get to meet some of your favorite fellow AP teachers in person.

Four-Year Section Luncheon
Director’s Row I • Meal Function (Tickets Required) • 4Y
Join faculty, education researchers, graduate students, and others who make four-year colleges and universities their professional home. Network with colleagues and friends (and make new ones) at this event. The lunch will include a special presentation of the Four-Year College and University Section Awards.

Two-Year Section Luncheon
Director’s Row J • Meal Function (Tickets Required) • 2Y
Students at two-year colleges are as diverse as their instructors. Share your challenges, epiphanies, and best practices with other two-year and community college educators who “get it.” The winners of the Two-Year College Biology Teaching and Prof. Chan Teaching Award will also be announced.

2:00PM — 3:15PM

NABT Committee Meeting: Nominating Committee
Director’s Row F • Committee Meeting • GA
Donald French, Committee Chair

Special Programming Presented by Bio-Link and AC2

How to Give Your Students the Best of Everything in Biotechnology
Plaza Court 4 • Biotechnology • Symposium (75 min) • GA
Biotechnology is exciting, but challenging to teach on your own. Bio-Link is a 20-year-old network of colleges and high schools that share information, curriculum, and experiences. In this session, learn where to find expert help.

Linnea Fletcher

12:45PM — 3:15PM

Special Programming Presented by BIOZONE

All sessions in Plaza Court 3

Richard Allan

12:45PM — 2:00PM

BIOZONE’s AP Biology: From Content Coverage to Understanding
AP Biology • Demonstration (75 min) • HS
BIOZONE presents innovative approaches for teaching AP Biology within the thematic framework of the four big ideas. Find out how BIOZONE’s pedagogical approach can improve student achievement in the current environment. Attendees receive free samples.

2:00PM — 3:15PM

Biology for NGSS: A New Approach for a New Program
General Biology • Demonstration (75 min) • HS
Successfully implement the high school life science component of the NGSS program with BIOZONE’s newest series. Strongly focused on student inquiry and written from first principles to address all aspects of NGSS. Attendees receive free review copy.
DISCOVER RESOURCES and OPPORTUNITIES with ASM

WHICH MICROBE ARE YOU?
Find out by taking our quick quiz, and receive a free microbe button! Check out our classroom resources and discover educator opportunities! Come to Booth #415 to find out more.

ASM Presents: Vectors of Disease
featuring Dr. Brian Foy of Colorado State University, the first researcher to document sexual transmission of the Zika virus.
Friday, Nov. 4, 2:00 – 4:00 pm, Plaza Ballroom D

Engage Your Students in Citizen Science
Do you want your students involved in science and to understand the role it plays in everyday life? The latest themed JMBE issue focuses on the interdisciplinary topic of scientific citizenship.
For more information, visit http://bit.ly/2bchLq4

Visit us at Booth #415!
asm.org
FRIDAY, NOVEMBER 4

2:00PM – 3:15PM
1066 | The Exposome: Making Chemical Exposures Relevant to Biology Instruction
Governor’s Square 9 • AP Biology • Demonstration (75 min) • HS, 2Y, 4Y
Conduct a graphing/data interpretation activity that introduces the concept of the exposome while reinforcing learning about DNA damage and repair and cancer formation in response to exposure to cancer-causing chemicals such as vinyl chloride.

Dana Haine, University of North Carolina, Chapel Hill, NC

1002 | Simple, Inexpensive Ways to Develop Understanding of the Most Difficult Biological Concepts
Governor’s Square 10 • General Biology • Hands-on Workshop (75 min) • MS, HS, 2Y
Addressing crowd-sourced feedback on the most difficult biological concepts to teach, participants will explore active, non-lecture content delivery with cheap materials. Student learning will focus on models, representations, and data analysis.

Chi Klein, Saint Stephen’s Episcopal School, Bradenton, FL

1105 | Simulating Genetic Drift with EXCEL
Governor’s Square 14 • Evolution • Hands-on Workshop (75 min) • HS, 2Y, 4Y
This workshop provides the necessary tools for a class to build a simulation of evolution with genetic drift and natural selection on more realistic spatial and temporal scales and learn as actual evolutionary biologists do.

Ryan Langendorf, University of Colorado, Boulder, CO; and Paul Strode, Fairview High School, Boulder, CO

979 | Using the 5E Instructional Model to Teach Life Science: An Immersive Learner Experience
Governor’s Square 16 • Science Practices • Hands-on Workshop (75 min) • MS, HS
Why do we sweat? Why do we shiver? These questions and more will be covered in our session, which will introduce participants to the New Visions Living Environment (Biology) Curriculum and its immersive, engaging 5E model of teaching.

Andrea Robinson, New Visions, New York City, NY

1096 | Now You See It, Now You Don’t - Patterns in Ecology
Governor’s Square 11 • Ecology/Environmental Science/Sustainability • Hands-on Workshop (75 min) • MS, HS, GA
The natural world presents an unlimited variety of patterns to explore. Participants will engage in activities that will bring to life the CCC of patterns and the role patterns play in biology. All participants will leave with goodie bags and lessons.

Jim Clark, San Lorenzo Unified School District, San Lorenzo, CA; and Jesse Stonewood, Armadillo Technical Institute, Phoenix, AZ

1094 | The AP Curriculum Meets Vision and Change: Incorporating Active Learning in Small Classrooms and in Large Lecture Halls
Plaza Ballroom F • AP Biology • Hands-On Workshop • HS, 2Y, 4Y
AP teachers and college professors will jointly learn how to transition from traditional lectures towards active classrooms that empower learners. Participants will design activities that meet the expectations of both AP and Vision and Change.

Jennifer Pfannerstill, North Shore Country Day School, Winnetka, IL; Brian Lazzaro, Cornell University, Ithica, NY; and Nancy Morvillo, Florida Southern University, Lakeland, FL

1018 | Modeling in the Pre-AP Biology Classroom
Governor’s Square 17 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • HS
Giving students opportunities to engage in “sense-making” through modeling is a core practice for AP and NGSS. Join the fun as we engage in modeling tasks and explore rubrics for assessing students’ modeling practices. We will also share best practices.

Jason Creen, Lyons Township High School, LaGrange, IL; and Karen Lionberger, College Board, AP Program, New York, NY

1071 | Temperature Conversions: Explaining y=mx+b
Plaza Court 5 • Science Practices • Hands-on Workshop (75 min) • HS, 2Y, 4Y
This activity is designed for teachers to learn how to explain and make sense of the linear equation to students. Participants will collect data, draw a graph, and identify each part of the slope equation to seamlessly integrate math and science.

Umadevi Garimella, University of Central Arkansas, Conway, AR

934 | Visualizing Student Thinking Using the NGSS Approach
Plaza Court 6 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • HS, MS
Get students to think beyond the story line to explaining “why”. The goal of this workshop is to provide teachers with examples of student work and rubrics in applying the Cross Cutting Concepts within the NGSS curriculum using visual modeling.

Elizabeth Gonzalez, Montclair High School, Montclair, CA; and Christine Yang, Chaffey High School, Ontario, CA
990 | GMO Detection Without PCR
Plaza Court 7 • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Explore hands-on, PCR-free ways to simulate GMO detection that mimic real life technology, including microarrays and immunochromatographic tests. Supplement your curriculum with relevant yet time and budget friendly activities. Lesson plans provided!

Summer Cortinas, BioNetwork, Asheville, NC

957 | Not Just Blowing Bubbles: Modeling Population Demographics
Plaza Court 8 • AP Biology • Hands-on Workshop (75 min) • HS, 2Y
Ecology is all about energy and relationships. In this encore workshop, participants will actively model ecological concepts such as logistic and exponential growth, carrying capacity, and survivorship curves and explore data analysis possibilities.

Pamela Close, Hickman High School, Columbia, MO; and Lee Ferguson, Allen High School, Allen, TX

2:00PM – 3:15PM
APS INVITED SPEAKER

W. Larry Kenney
See page 10 for biography.

Aging in a Changing Climate: Physiology in Context
Director’s Row H • Anatomy & Physiology • Special Speaker • GA
If current conditions continue, mean global temperature is projected to rise 1-2°C over the next 50 years. The effects of climate change on the environment are well known, but what does that mean for human health? Humans are tropical animals, evolved from tropical climates and well adapted to tolerate even extremely hot environmental conditions. This presentation will focus on the physiology of human aging in an ever-warming climate, how and why older men and women are at risk during episodic heat waves, and (potentially) what we can do about it.

2:00PM – 4:00PM

1043 | ASM Presents: Vectors of Disease
Plaza Ballroom D • Microbiology & Cell Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
New and emerging infectious diseases are filling the news headlines. Many of these diseases are associated with animal or insect vectors. Come hear what we know about vector-borne disease and transmission from the first researcher to report sexual transmission of Zika virus. This session will also feature a demonstration of a new classroom activity developed to help students understand human immune defenses and pathogen virulence strategies.

Brian Foy, Colorado State University, Fort Collins, CO; Katherine Lontok, American Society for Microbiology, Washington, D.C.; and Dave Westenberg, Missouri S&T, Rolla, MO

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2:00PM – 4:00PM continued
NABT Biology Education Research Symposium
Governor’s Square 12 • Symposium • GA

NABT is proud to present the 8th Annual Biology Education Symposium. Presentations were accepted through a double-blind review process that was open to biology instructors and researchers at all levels.

Full abstracts are available on page 40 and proceedings will be posted at www.NABT.org

1132 | Inquiry-based Ecology Using a Citizen Science Trail Camera Project
Governor’s Square 15 • Ecology/Environmental Science/Sustainability • Hands-on Workshop (120 min) • HS
HHMI BioInteractive presents a citizen science platform to identify animals in trail camera images from Gorongosa National Park, Mozambique. Participants will explore trail camera data, investigate ecological questions, and analyze data on computers.

Amy Fassler, David Hong, Takisha Reece, and Bridget Conneely, HHMI BioInteractive, Chevy Chase, MD

3:30PM – 4:00PM
NABT Committee Meeting: Professional Development Committee
Director’s Row F • Committee Meeting • GA

Catherine Ambos, Chair

967 | From Folklore to Herbal Medicines to Science
Governor’s Square 9 • General Biology • Demonstration (30 min) • HS, 2Y, 4Y

Many cultures have herbal medicines and some are related to folklore. Come learn how the effectiveness of these remedies can be tested in the lab using readily available supplies and organisms such as bacteria, yeast, C. elegans and brine shrimp.

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

1073 | Accessibility of Biology Lab for Students Who are Blind Increased by Making Novel Models and Tactile Items
Governor’s Square 16 • General Biology • Paper (30 min) • HS, 2Y
Attend this session and learn how to make inexpensive models and tactile items. These items can make a variety of organisms and structures observed in a General Biology lab accessible to students who are blind or vision impaired.

Linda Smith-Staton, Pellissippi State Community College, Knoxville, TN

921 | Breaking Down the Stages of Cellular Respiration
Governor’s Square 10 • General Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y
This session will provide instructors with worksheets they can use to help their students better understand the stages of cellular respiration.

Deborah Cardenas, Collin College, Plano, TX

1056 | Phylocards - A Plant Evolution Card Game
Governor’s Square 11 • Evolution • Hands-on Workshop (30 min) • MS, HS, 4Y

Plant diversification can be a challenging subject to teach, particularly if live plants are not available. Through a simple game-based approach called Phylocards, we put a new twist on teaching plant evolution that uses phylogenetic tree-thinking.

J. Phil Gibson, University of Oklahoma, Norman, OK

1030 | Authentic Research In The Classroom: Using Plant-Based Research To Explore Ecological Responses to Global Change
Governor’s Square 14 • Ecology/Environmental Science/Sustainability • Demonstration (30 min) • HS, 2Y, 4Y

Explore a series of modules spanning a range of organizational scales that utilize regional questions about global change to engage students in authentic research. Learn how to use large, public data sets to teach science practice skills and ecology.

Jennifer Ward, University of North Carolina-Asheville, Asheville, NC; Anna Hiatt, East Tennessee State University, Johnson City, TN; Alisa Hove, Warren Wilson College, Swannanoa, NC and Howard Neufeld, Appalachian State University, Boone, NC

1095 | Getting More Out of Less: Designing Short Homework Assignments that Focus on Application and Analysis
Governor’s Square 17 • Curriculum Development • Hands-on Workshop (30 min) • 2Y, 4Y, GA

Studies on student learning show work outside of class focusing on application and analysis produce higher achievement on course learning outcomes. See how shorter homework assignments incorporating higher order thinking improve student learning.

Julie Minbiole, Columbia College Chicago, Chicago, IL

958 | Introducing Bioinformatics Resources to Study Human Disease
Plaza Ballroom F • AP Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

The study of human disease using publicly available computational resources, such as databases of genetic sequence and protein structure, is explored through Green Fluorescent Protein (GFP) in this lesson from the American Society of Human Genetics.

Julie Nadel, American Society of Human Genetics, Bethesda, MD
Wouldn’t it be useful to know what chemistry knowledge concerning cellular respiration your students have? Come listen to our progress creating the Chemistry in Cellular Respiration Concept Inventory.

Lance Forshee and Donald French, Oklahoma State University, Stillwater, OK

Wanting to provide real-world and authentic experiences for your students while also maintaining a rigorous curriculum? Techniques, tips, and lessons-learned on how to infuse profession-based teaching and entrepreneurship into your bioscience program.

Joe Whalen, Blue Valley CAPS, Overland Park, KS

Participants complete an inheritance activity that will be used for demonstrating feedback models that are incorporated into the classroom. Self, peer, teacher, and whole class feedback strategies are illustrated. The NGSS in HS Genetics are targeted as the learning goals for this activity.

Donna Satterthwait, University of Tasmania, Hobart, Tasmania
but that they would continue to use the materials. Our work provides a model for curriculum.

Pilot testing the lessons via a treatment-only design revealed significant student learning gains.

Argument from Evidence, and (c) the Crosscutting Concepts of Patterns, and Cause and Effect.

to authentically integrate (a) the Life Science Disciplinary Core Ideas of Biological Evolution and
tests whether racial terminology in the biology curriculum causes adolescents to develop
biological textbook examples of genetic differences between races. This experi-
nce with the opportunity to experience scientific research in the manner in which professional research scientists conduct it through devising, designing, executing, interpreting, and communicating their experimental results. Student responses to the assessments utilized in this study showed improvements in students’ perceptions of their laboratory skills and knowl-
edge, and their interest in doing further research in the laboratory. The simplicity and flexibility involved in the four-step model allows it to be easily adapted for use within the unique infrastructure and resource environments at a variety of institutions and at different levels of biological study, effectively increasing student access to authentic scientific research.

Learned Inequality: Racial Labels in the Biology Curriculum can Affect the Development of Racial Prejudice by Affecting the Perception of Human Biological Variation

Brian M. Donovan, The Biological Sciences Curriculum Study (BSCS) and Stanford University

For over a century, genetic arguments for the existence of racial inequality have been used to oppose policies that promote racial equality. And, over that same time period, American biology textbooks have repeatedly discussed genetic differences between races. This experi-

ment tests whether racial terminology in the biology curriculum causes adolescents to develop
genealogical beliefs about racial difference, thereby affecting prejudice. Individual students (N =
135, grades 7–9) were randomly assigned within their classrooms to learn either from: (i) four text-based lessons discussing racial differences in skeletal structure and the prevalence of genetic disease (racial condition), or (ii) an identical curriculum lacking racial terminology (nonracial condition). Over three months that coincided with this learning, students in the racial condition grew significantly more in their perception of the amount of genetic variation between races relative to students in the nonracial condition. Furthermore, those in the racial condition grew in their belief that races differ in intelligence for genetic reasons significantly more than those in the nonracial condition. And, compared to the nonracial condition, students in the racial condition became significantly less interested in socializing across racial lines and less supportive of policies that reduce racial inequality in education. These findings show how biology education sustains racial inequality, and conversely, how human genetic education could be designed to reduce it.

A Curriculum Model for Integrating the Three NGSS Dimensions and Utilizing Published Biology Data

Louisa A. Stark and Nicola C. Barber, University of Utah, Salt Lake City, UT; Martin Fernandez and Jo Ellen Roseman, American Association for the Ad-

vancement of Science, Washington, D.C.

Realizing the vision for science education outlined in the Framework for K–12 Science Education and Next Generation Science Standards (NGSS) requires developing curricula that integrate disciplinary core ideas, science practices and crosscutting concepts. Addressing these three dimensions, we developed and tested high school biology lessons and closely-aligned assess-
ment items on natural selection. The curriculum leverages the use of published scientific data to authentically integrate (a) the Life Science Disciplinary Core Ideas of Biological Evolution and concepts from Heredity needed to understand evolution, (b) the Science Practices of Analyzing and Interpreting Data, Using Mathematics and Computational Thinking, and Engaging in Argument from Evidence, and (c) the Crosscutting Concepts of Patterns, and Cause and Effect. Pilot testing the lessons via a treatment-only design revealed significant student learning gains from pre-test to post-test (n = 308, t = 4.265, p < 0.001). Teachers reported on post-enactment surveys that the lessons differed greatly from how they typically taught natural selection but that they would continue to use the materials. Our work provides a model for curriculum development integrating the three dimensions of the NGSS with published scientific data and gives preliminary evidence of promise for this approach to increasing students’ understanding of natural selection.

Reducing College Biology Students’ Perceived Conflict between Religion and Evolution

M. Elizabeth Barnes, James Elser, and Sara E. Brownell, Arizona State University, Tempe, AZ

Up to sixty percent of students in college biology classes have been shown to reject evolution. The source of rejection most often stems from an interplay of students’ misconceptions about evolution and their perceptions that evolution is in conflict with their religious beliefs. While college evolution instructors are often versed on how to provide instruction on understanding of evolution, they are often unsure about how to reduce students’ perceptions that evolution is in conflict with religious beliefs. We asked how our evolution curriculum influences students’ perceptions of evolution and religion. Using an open ended survey, we analyzed students’ perceptions of conflict between evolution and religion before and after instruction. We found that over the course of the module, the number of students who perceived that evolution and religion are in conflict was reduced by half. Surprisingly, we saw this reduction among both reli-
gious and non-religious students. This study suggests that by incorporating explicit discussion of the perceived conflict between religion and evolution we may be able to ameliorate students’ perceived conflict and thus improve student attitudes towards evolution. In the session we will provide a detailed description of our curriculum as well as practical suggestions for how to implement our module.

Using Human Case Studies to Teach Evolution

Briana Pobiner, Smithsonian Institution, Washington, D.C.; Paul Beardsley, California State Polytechnic University, Pomona, CA; Connie Berlka, Science and Society Resources, Potomac, MD; and William Watson, Diocese of Camden Catholic Schools, Camden, NJ

Studies demonstrate that evolution is one of the most difficult aspects of biology to teach and learn due to cognitive and cultural barriers to understanding and accepting core concepts of evolution. Despite the potentially controversial topic of human evolution, research at the col-
lege level suggests that a pedagogical focus on human examples is a useful way to teach core concepts of evolutionary biology. Here we report on a project that developed and field tested (1) three curriculum units for high school Advanced Placement biology classes that teach core evolutionary concepts using case studies of human evolution (Adaptation to Altitude, Evolution of Human Skin Color, and Malaria), and (2) a Cultural and Religious Sensitivity (CRS) Teaching Strategies Resource to encourage and help equip high school teachers to promote positive dialogue around the topic of evolution in their classrooms. During the 2013-2014 school year 304 students field tested the curriculum units and 148 students also field tested one of the two CRS activities in 10 schools in 10 states. Feedback indicates that the materials align very well with the criteria established to guide the development process and assessments suggest that they generally increase both understanding and acceptance of evolution among students.

Fidelity of Implementation of Peer Instruction in High School Biology Classrooms

Jennifer Parrish, Grant Gardner, Leigh McNeil, and Tom Cheatham, Middle Tennessee State University, Murfreesboro, TN

This NSF-funded DRK-12 project, Promoting Active Learning in Science (PALS), sought to facilitate and evaluate the transfer of Peer Instruction (PI) from undergraduate physics to high school biology classrooms. Participating high school biology teachers (n = 22) used PI over the course of two semesters. Teacher self-report data, classroom observations, and open-ended questionnaires revealed the motivation for using pedagogically-critical aspects of PI varied by instructor. Teachers often chose not to use PI because of concerns that materials were at too high of a cognitive level for their students and numerous adaptations to the pedagogy were made that affected fidelity of the strategy. This presentation will focus on the adaptations necessary to successfully move PI into high school biology classrooms and how to help teachers differentiate PI without unknowingly omitting critical features that can lead to a reduction of pedagogical effectiveness.

SPECIAL GUEST PRESENTER:

Marcelle A. Siegel, University of Missouri, Columbia, MO

Recipient of the 2015 NABT Year-Four Section Research
in Biology Education Award
3:30PM – 4:00PM continued

1062 | DNA Sequencing in the High School Classroom
Plaza Court • Biotechnology • Demonstration (30 min) • HS, 2Y
We will introduce the Independent Research Project our students perform on bacterial species identification by way of DNA sequencing. This project has grown out of a collaboration with scientists at the Broad Institute of Harvard and MIT.

Julie Boehm and Ken Bateman, Wellesley High School, Wellesley, MA

4:00PM – 5:30PM
Exhibit Hall Closing Reception
Plaza Court • Special Program • GA
It’s last call in the Exhibit Hall. This is your last chance to talk with exhibitors and get those freebies for the classroom. Join us for a reception, drawings for prizes, and more.

Sponsored by:

5:30PM – 6:30PM
HHMI Night at the Movies Pre-Reception
Plaza Ballroom E • Special Event (Tickets Required)
This free red-carpet event will begin at 5:30pm with a reception including free food and drink.

6:30PM – 8:00PM
HHMI Night at the Movies with Sean Carroll
Plaza Ballroom ABC • Special Event (Tickets Required)
HHMI BioInteractive (www.biointeractive.org) and NABT are pleased to host the 6th Annual HHMI Night at the Movies with Sean Carroll. Join Dr. Carroll for the premiere of a new short film and discussion.

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

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

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abt.ucpress.edu
7:30AM – 8:45AM

**Touching Triton Breakfast**
Plaza Ballroom E • Meal Function (Tickets Required)
Join us for the special launch of *Touching Triton*, a new “serious game” that focuses on the interplay between genetics, the environment, and family history when determining risk for common complex diseases, like diabetes and cancer, set in a storyline of long term space flight. We’ll introduce *Touching Triton*, take a closer look at human space flight and modern genomics, and highlight educator resources for *Touching Triton*.

Neil Lamb and Adam Hott, HudsonAlpha Institute for Biotechnology, Huntsville, AL

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9:00AM – 11:45AM

**Special Programming Presented by Flinn Scientific**

All sessions in Director’s Row J

9:00AM – 10:15AM
**Flinn Favorite Biology Lab Activities and Games**
General Biology • Hands-on Workshop (75 min) • MS, HS
Students learn faster and better when involved in fun, hands-on activities that create learning opportunities. Join Flinn as we share biology-based inquiry labs, demonstrations, and games you can use to motivate your students.

10:30AM – 11:45AM
**Flipping AP Biology with Flinn Prep**
General Biology • Demonstration (75 min) • AP, HS
Flipping your AP Biology class will help create an engaging and active classroom. Learn how FlinnPrep, a supplemental digital curriculum with assessment solution, can ease your transition in a condensed form. Free teacher resources and door prizes.

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BioClub Breakfast
Plaza Ballroom F • Meal Function (Tickets Required)
The NABT BioClub keeps adding new clubs from middle schools to community colleges throughout the United States and Canada. Both current and future BioClub Advisors are invited to share resources, feedback, and stories about their chapters. Join the club (BioClub that is)!

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944 | Sustainable Earth Speed Dating – In a Hurry to Find a Solution?
Director's Row H • Ecology/Environmental Science/Sustainability • Symposium (75 minutes) • GA
This life-science sustainability focused “speed dating” event will feature educators and members of environmental and sustainability organizations sharing their best practices and resources for science-based sustainability education. Prepare to participate in this FAST show-and-go session.

Teddie Mower, Indiana University, Bloomington, IN

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1140 | Enhancing Student Quantitative Literacy and Reasoning in Introductory Classrooms. What is it? How Do I Teach it? And How Do I Measure it?
Director’s Row I • Curriculum Development • Hands-on Workshop (75 min) • HS, 2Y, 4Y
What is quantitative literacy and reasoning, and how is it measured? We will explore answers to these questions while also showing you how to integrate quantitative skills throughout your course.

Jennifer Pfannerstill, North Shore Country Day School, Winnetka, IL; Brad Williamson, University of Kansas, Lawrence, KS; and Stacey Kiser, Lane Community College, Eugene, OR
9:00AM – 2:45PM

Special Programming Presented by Carolina Biological Supply Company

Plaza Court 2

9:00AM – 10:15AM
Inheritance and Variation of Traits in Wisconsin Fast Plants
Plant Physiology • Hands-on Workshop (75 min) • ES, MS, HS
Explore new models to teach genetics with Wisconsin Fast Plants seeds. It is easy to germinate seedlings that display genetic traits in 72 hours and produce offspring with heritable traits that can be scored and analyzed using Chi-squared analyses. Carolina Teaching Partner

Ben Graves, Delta High School, Delta, CO

10:30AM – 11:15AM
Discovering DNA with a Novel Way to Perform PCR, Anywhere!
Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Experts who engineered miniPCR demonstrate and field questions on this innovation that inspired the national contest Genes in Space. Show students that DNA Science is interactive and tangible. Never has Biotechnology been such a personal experience! Dr. Sebastian Kraves

Jennifer Carden

1:30PM – 2:45PM
HudsonAlpha’s Collecting Cancer Causing Changes
Genetics • Hands-on Workshop (75 min) • MS, HS
Use digital vignettes, beads, and dice to simulate the fate of cells across multiple cell divisions. Illustrates how a population of cells become more varied over time and how those changes may lead a group of cells to become more cancerous. Jennifer Carden

984 | Creating Cognitive Models to Foster Connections Within the AP Biology Curriculum
Governor’s Square 11 • AP Biology • Hands-on Workshop (75 min) • HS, MS
Constructing cognitive models is essential for student success in AP Biology and similar courses. Come learn how two successful IB and AP Biology teachers develop and use cognitive models in their classes, and walk out having built one of your own.

Lee Ferguson, Allen High School, Allen, TX; and Ryan Reardon, Jefferson County International Baccalaureate, Irondale, AL

1108 | Design, Implementation, and Evaluation of Faculty Mentoring Networks: A Model for Promoting Faculty Teaching Scholarship
Governor’s Square 12 • Science Practices • Symposium (75 minutes) • 2Y, 4Y, HS
Teaching quantitative skills requires different pedagogical approaches and resources than teaching biology. Come learn about QUBES online faculty communities and how they support the implementation of effective teaching resources and practices.

Sam Donovan, University of Pittsburgh, Pittsburgh, PA; Kristin Jenkins, BioQUEST Curriculum Consortium, Germantown, MD; Alison Hale, University of Pittsburgh, Pittsburgh, PA; and Gabriela Hamerlinck, BioQUEST Curriculum Consortium, Madison, WI

970 | Of All The Nerve
Governor’s Square 14 • Anatomy & Physiology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Construct models of cholinergic, dopaminergic, and GABAergic synapses! Explore the role of various ions in action potential generation and neurotransmitter release. Visualize neurotransmitter synthesis using 3D printed models. Handouts provided!

Gina Vogt and Tim Herman, MSOE Center for BioMolecular Modeling, Milwaukee, WI
Molecular Wars: Using Simple Models To Understand Viruses, Drugs, and Disease
Governor’s Square 15 • Microbiology & Cell Biology • Hands-on Workshop (75 min) • HS
Learn about HHMI BioInteractive’s classroom resources that illustrate how understanding the molecular biology of viruses makes it possible to track and fight deadly diseases. We will share classroom-ready resources and tips for their implementation.

Ann Brokaw, Steve Rogg, and Javier Robalino, HHMI BioInteractive, Chevy Chase, MD

9:00AM – 11:45AM
Special Programming Presented by PASCO Scientific

All sessions in Plaza Court 1
Michael Blasberg

9:00AM – 10:15AM
Unleash Inquiry in AP Biology
AP Biology • Hands-on Workshop (75 min) • HS, 2Y
Conduct quick and powerful inquiry labs— including enzyme activity and cellular respiration— using wireless sensors and spectrometer and free full-featured app (compatible with tablets, Chromebooks and phones). Win an Advanced Biology Manual: 22 AP® aligned labs!

10:30AM – 11:45AM
Environmental Monitoring with PASCO Wireless Sensors
Environment/Ecology • Hands-on Workshop (75 min) • MS, HS, 2Y
PASCO’s affordable wireless sensors enable long-term, remote data collection, allowing for long-term trend analysis without repeat site visits for samples. Transform your labs to conduct H2O quality and environmental monitoring activities— starting at just $39.

LEARN HOW TO BECOME PART OF THE BIOTECH EDUCATION COMMUNITY!

LOCATION: Plaza Court 4
DATE: Friday, November 4, 2016
TIME SLOT: 2:00-3:15 p.m.
Bio-Link and the AC2 Bio-Link Regional Center at Austin Community College are helping college and high school biotechnology programs share information about best practices, new techniques, and the skills employers are looking for. With first-class professional development and connections to companies and educational institutions nationwide, Bio-Link and the AC2 Bio-Link Regional Center can help you figure out what to teach and how to do it.
Visit Biotech-Careers.org for career exploration resources and more.
9:00AM – 3:30PM

Special Programming Presented by OpenStax/Rice University

All sessions in Plaza Court 3
Instructional Strategies/Technologies • Demonstration (30 mins) • 2Y, 4Y, GA

9:00AM – 9:30AM
Integrating SimBio Virtual Labs with OpenStax’s Bio Textbook
SimBio Virtual Labs allow students to learn difficult biology concepts through doing their own simulated experiments. Come for demos of several SimBio labs and see how SimBio has enhanced the OpenStax Biology textbook within our SimUText system. SimBio

9:30AM – 10:00AM
Personalized Learning with OER, An Educator’s Best Friend
LRNR integrates content, homework, interactivity, assessment, and analytics into a single environment. Learn how our Course Positioning System® provides precise course control through level setting adaptivity, customized assignments, and more. LRNR

10:00AM – 10:30AM
Let’s Get Digital: Teaching Biology with Adaptive Courseware
Join our session to learn what’s behind the buzzword “adaptive learning” and take your content to the next level. Experience the benefits of adaptive technology for your teaching and the way it supports you in driving student success and retention. CogBooks

11:00AM – 11:30AM
An Easy-to-Use Platform for All Your Open Content Needs
Designed by educators, PanOpen offers customization, assessment, analytics, LMS integration, and more. Learn how our interactive OER radically reduces cost and delivers the quality, features, and ease-of-use faculty expect from their materials. PanOpen

1:30PM – 2:00PM
Future of the Textbook: Adaptive, Personalized Courseware
Join us to learn about OpenStax Tutor, our full-service digital courseware that incorporates proven cognitive science principles and machine learning to provide students with personalized learning paths, homework, and assessment. OpenStax Tutor

2:00PM – 2:30PM
Going Beyond the Biology Book with OpenStax and Odigia
Join us to experience how Odigia has enhanced OpenStax’s high-quality Biology content with powerful learning tools to create a more relevant and engaging learning experience that improves student engagement, outcomes, and retention. Odigia

3:00PM – 3:30PM
Custom-Build High-Quality Course Materials with aerSelect
Learn how NACSCORP’s online turn-key platform, aerSelect, allows faculty to create a book that is tailored to the needs of their classroom. The aerSelect platform empowers faculty with tools targeted at increasing student accessibility and success. NACSCORP

9:00AM – 10:15AM continued

1029 | Help Your Students Succeed in AP Biology
Governor’s Square 16 • AP Biology • Hands-on Workshop (75 min) • HS
Join two experienced AP teachers for a lively session designed to help you incorporate Science Practices to help students learn more biology. We’ll use modeling, mathematics, and inquiry techniques, and share resources and assessment hints.

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

1023 | Evolution the NGSS Way
Governor’s Square 17 • Evolution • Hands-on Workshop (75 min) • HS
Explore curriculum materials that integrate the NGSS three dimensions of learning with published scientific data to address core ideas in evolution such as common ancestry, heredity, natural selection, and speciation. Free: learn.genetics.utah.edu

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

Special Programming Presented by Monsanto

How STEM & Modern Agriculture Bridge: A Look at Technology
Plaza Court 4 • Biotechnology • Hands-on Workshop (75 min) • MS, HS, 2Y, GA
Monsanto wants to help you understand the science and technology behind its products. Monsanto scientists will give a brief overview of our history, explain techniques used to make products, answer questions, and share our education outreach resources.

Valerie Bayes
1046 | The DataBlitz: Student Presentation of Authentic Research  
Plaza Court 5 • Science Practices • Hands-on Workshop (75 min) • MS, HS  
The DataBlitz: an authentic scientific practice that emphasizes the SEP dimension of NGSS by having students deliver essential elements of their inquiry-driven research in cogent 60-second, single-slide (research poster-like) presentations.  
Amy Welch, Brea Olinda High School, Brea, CA; and Ron Michelotti, Savanna High School, Anaheim, CA

1087 | Making the Impossible Possible - Leveraging Active Learning in Class and On the Go  
Plaza Court 7 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • HS, 2Y, 4Y  
Busy schedules killing content acquisition? This hands-on workshop will help overcome such hurdles with a toolbox of quick and easy active strategies that leverage building hierarchies, cell phones, and seeing the world through biology-tinted glasses.  
Kara Lukin, Western Governors University, Denver, CO

964 | Activities for the Anthropocene  
Plaza Court 8 • Ecology/Environmental Science/Sustainability • Hands-on Workshop (75 min) • MS, HS  
Combine history and environmental science in this hands-on session exploring how humans have shaped the earth and atmosphere since the Industrial Revolution. Engage in simulations and problem-solving challenges.  
William Baird, Auburn University (Retired), Castle Rock, CO
9:00AM – 11:00AM
NABT Biology Education Poster Session
Plaza Court • Poster Session (120 min)
NABT posters highlight research, programs, and techniques in three distinct categories: general strategies for teaching biology, scholarship of teaching and learning, and mentored undergraduate research. Posters submitted by students are entered into two competitions.

See page 50 for complete listings.

10:30AM – 11:00AM
NABT Committee Meeting: Retired Member Committee
Director’s Row F • Committee Meeting • GA
Dennis Gathmann, Committee Chair

1123 | Getting Beyond the Obvious: Barriers to Teaching and Learning Evolution
Governor’s Square 9 • Evolution • Demonstration (30 min) • 4Y
Join the winner of this year’s Four-Year Section Biology Teaching Award as she discusses how Identity Protective Cognition (IPC) may play a role in teaching challenges while exploring appropriate interventions to help student’s overcome their resistance to scientific conclusions.

Sehoya Cotner, University of Minnesota-Twin Cities, Minneapolis, MN

1104 | Data, Ecology, and More Data
Governor’s Square 10 • Ecology/Environmental Science/Sustainability • Demonstration (30 min) • HS, 2Y, 4Y
In this session students will collect and analyze data using the resources available through the USGS data set online through the context of water quality. This exploration will engage students in scientific practices and descriptive statistics.

Kate Henson, University of Colorado, Boulder, CO

1145 | Join The American Biology Teacher Team: Writing and Reviewing for the ABT
Governor’s Square 12 • Curriculum Development • Hands-on Workshop (30 min) • GA
The editor of the ABT will discuss preparation, submission, and review of manuscripts for the journal. Prospective authors are especially encouraged to share manuscript ideas during this lively discussion.

William McComas, ABT Editor, University of Arkansas, Fayetteville, AR

1125 | Go Extinct! An NGSS-Aligned Board Game Engaging Players with the Most Radical Idea in Biology
Governor’s Square 17 • Evolution • Demonstration (30 min) • MS, HS, GA
Go Extinct! revitalizes classic Go Fish in a hilarious, easy-to-learn yet highly re-playable 30-45 minute activity that teaches players how to read evolutionary trees... and that all of these mind-bogglingly diverse animals share common ancestors.

Ariel Marcy, STEAM Galaxy Studios, North Ferrisburgh, VT

10:30AM – 11:45AM

1003 | Top 10: Genetics and Biotechnology Discoveries 2015
Director’s Row E • Biotechnology • Symposium (75 minutes) • HS
Want to include cutting-edge genetic research in your class? Ever wonder where all of this new science fits into your curriculum? Hear the top biotech discoveries of 2015 in student friendly language. Free resource from HudsonAlpha.

Neil Lamb, HudsonAlpha Institute for Biotechnology, Huntsville, AL

1138 | Enhancing Student Ability to Apply the Process of Science in Introductory Classrooms
Director’s Row I • Curriculum Development • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Presenters will share ways in which they integrate the process of science skills including data interpretation, experimental design, and collaborative work in introductory courses.

Cindy Gay, Steamboat Springs School District, Steamboat Springs, CO; Sharon Gusky, Northwestern Connecticut Community College, Winsted, CT; Susan Finazzo, Gordon State College, Barnesville, GA; and Gordon Uno, University of Oklahoma, Norman, OK

1042 | Using Workshop in the Biology Classroom to Get Students to Think Like Scientists
Governor’s Square 11 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • HS, 4Y, GA
We often teach biology content well but science research is inherently inquiry-based. The biology classroom workshop model can expose students, over the course of a curriculum, to real metacognition, which is much more than the simple “scientific method.”

Paul Strode and Dylan Muzny, Fairview High School, Boulder, CO

1106 | Hands-on DNA Forensics Activity for the College Classroom
Governor’s Square 14 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • HS, 2Y, 4Y
This hands-on workshop demonstrates how to use a crime scene investigation case study to promote active learning. Participants will learn to conduct DNA extraction, simulated STR DNA fingerprints, and calculation of allele frequencies without a lab.

Kevin Bonney and Lori Nicholas, New York University, New York, NY
Please visit us in Booth 217 to see how W. W. Norton helps you reach every student, in and out of class.

**Biology Now**  
ANNE HOUTMAN, MEGAN SCUDELLARI, CINDY MALONE, ANU SINGH-CUNDY  
A balance of science and story, with a focus on the people doing biology now.

**Discover Biology**  
SIXTH EDITION  
ANU SINGH-CUNDY, GARY SHIN  
Developing scientific literacy through active learning.

**Microbiology: The Human Experience**  
JOHN W. FOSTER, ZARRINTAJ ALIABADI, JOAN L. SLONCZEWSKI  
A case history approach that helps students master concepts and apply them in a clinical context.

**Microbiology: The Laboratory Experience**  
STEVE KEATING  
The manual that helps students get the most out of their lab experience.

**Interactive resources for engaging and assessing students**

- **InQuizitive**, Norton’s formative, adaptive quiz system, helps students build knowledge and come better prepared for class through a personalized set of questions. Engaging, gamelike elements and a wide variety of question types motivate students to complete their assignments.

- **Smartworks** is a powerful, customizable platform designed to assess students’ understanding, provide answer-specific feedback that guides their mastery of the material, and give instructors the actionable student performance data they need to do what they do best: teach.

- **The Ultimate Guide to Teaching Biology** includes curated collections of in-class activities from dozens of biology and microbiology instructors across the country; suggested online videos and other media with discussion questions; clicker questions; sample syllabi; and sample lecture plans.
STUDENT POSTER COMPETITION

Scholarship of Teaching and Learning

1. Aisles of Confusion: A Case Study Exploration of Food Production and Labeling Practices
   Enya Granados, Kaylee Wilburn, Justin Pruneski, Heidelberg University, Tiffin, OH

2. Are We Engaged In Evidence-Based Practice? A Cluster Analysis of Faculty Instructional Practices
   Emily M. Walter, Mireya Lemus, Evelin Muñoz, California State University, Fresno, CA

3. Beginning to Explore the Effect of a Relevance Intervention to Reduce Achievement Gaps in Introductory Biology
   Sy Truong, Paul M. Beardsley, California State Polytechnic University, Pomona, CA; Stephen Getty, Colorado College, Colorado Springs, CO; Chris S. Hulleman, University of Virginia, Charlottesville, VA

4. Bringing Invasive Species into the College Classroom
   Kathryn M. Parsley, Tina Marie Waliczek, Paula S. Williamson, Texas State University, San Marcos, TX; Florence M. Oxley, Austin Community College, Austin, TX

5. Comparing Perspectives of Evolution Acceptance Between Students from the United States and Cambodia
   E. Austin Leone, Kristy L. Daniel, Texas State University, San Marcos, TX

6. Creating a Personal Connection in Online Biology with the Addition of Video Feedback Comments
   Julie A. Birt, Robin Hurst-March, University of Missouri, Columbia, MO

7. Do Active Learning Techniques Satisfy Student Psychological Needs?
   Michael Moore, Oklahoma State University, Stillwater, OK; Jennifer Parrish, Grant E. Gardner, Middle Tennessee State, Murfreesboro, TN; Donald French, Oklahoma State University, Stillwater, OK

8. Do Students Want to Use Social Media? Assessing Students’ Perceptions of Social Media in the Classroom
   Zachary L. Nolen, Kristy L. Daniel, Karina Salinas, Karen Alvarado Rodriguez, Texas State University, San Marcos, TX

9. Effective Instructional Design for Online Activities: Development of an Inquiry-Based Activity for Phylogenetics
   W. David Ford, Anna Hiatt, East Tennessee State University, Johnson City, TN

10. Epistemic Framing in Biology Classroom Discourse
    Wendy R. Johnson, Charles (Andy) Anderson, Michigan State University, East Lansing, MI

11. How Introductory Biology Courses Affect Student Perceptions Throughout College
    Kassandra Glover, Rachel Pigg, Troy Nash, Presbyterian College, Camden, SC; Suann Yang, State University of New York, Geneseo, NY

12. An Investigation on How Social Media Use Impacts Undergraduate Interest in Science Careers
    Karen Alvarado Rodriguez, Karina Salinas, Zachary L. Nolen, Kristy L. Daniel, Texas State University, San Marcos, TX

13. Microbial Murders: An Infectious Disease Project Where Students Implement Active and Team-Based Learning Principles to Create and Identify Disease-Causing Pathogens in a Crime Scene Investigation
    Kelcie Smith, Jordan Steel, Colorado State University, Pueblo, CO

    Ryan Dunk, Syracuse University, Syracuse, NY; Andrew Petto, Benjamin Campbell, University of Wisconsin, Milwaukee, WI

15. PLTL Enhances Retention in STEM Majors Among Women and First-Generation College Students
    Jeremy D. Sloane, Julia J. Snyder, Ryan Dunk, Christiina I. Winterton, Jason R. Wiles, Syracuse University, Syracuse, NY

16. The Survey Matters: Instructors Using Different Surveys to Measure Acceptance of Evolution May Be Reaching Different Conclusions about Their Students
    Elizabeth Barnes, Sara E. Brownell, Arizona State University, Tempe, AZ

17. Using Social Media in Biology in Effort to Increase Student Interest in Science
    Karina Salinas, Karen Alvarado Rodriguez, Zachary L. Nolen, Kristy L. Daniel, Texas State University, San Marcos, TX
STUDENT POSTER COMPETITION

Mentored Research

18. Assessing Misconceptions of Evolution Among Students Enrolled in Freshman Biology Courses at a Mid-Sized University in the Mid South
Shonqualla West, Mark W. Bland, University of Central Arkansas, Conway, AR

19. Effect of Photoperiod on Setaria Viridis Flowering
Caitlin Snider, Oklahoma State University, Stillwater, OK; Tammy Will, Morrison Public Schools, Morrison, OK; Julie Angle, Andrew Doust, Oklahoma State University, Stillwater, OK

20. Effects of White-Tailed Deer on Southeast Louisiana Spider Populations
Michael Pashkevich, Aimée K. Thomas, Loyola University, New Orleans, LA

21. An Exploration of Evolution Acceptance Profiles as Measured by the Measure of Acceptance of the Theory of Evolution (MATE)
Ephiram Bosse, Emily M. Walter, California State University, Fresno, CA

22. From Virgins to Fathers: Onset of Paternal Behavior in Algerian Mice Mus spretus
Danielle Foster, Dineesha Premathilake, Polly Campbell, Julie Angle, Oklahoma State University, Stillwater, OK

23. Hard Mast Production and Food Availability for Oklahoma Black Bears
Payton Walters, Julie Angle, Danielle Techtent, Sue Fairbanks, Oklahoma State University, Stillwater, OK

24. Manipulation of Host Cell Metabolism Affects Sindbis Virus Replication
Jessica L. Costlow, Jordan Steel, Colorado State University, Pueblo, CO

25. Student versus Faculty Impressions of Concept Coverage in Biology Courses
Erin Kirkelie, Amy S. Beadles-Bohling, University of Portland, Portland, OR

26. The Painted Predicament: The Interaction Between Temperature and Food Limitation in Painted Ladies
Shannon Beck, Kristen Baum, Kelsey Deal, Julie Angle, Oklahoma State University, Stillwater, OK

27. The Relationship between Religiosity and Acceptance of Evolutionary Theory Among Students in an Introductory Zoology Course
Austin Wilkes, Donald French, Oklahoma State University, Stillwater, OK; Kristy Daniel, Texas State University, San Marcos, TX; Michael Moore, Oklahoma State University, Stillwater, OK

28. Use of Invasive Plants by Honeybees in an Urban Setting
Melanie Sferrazza, Aimée K. Thomas, Loyola University, New Orleans, LA

Non-Competition Posters

Adam Kleinschmit, Adams State University, Alamosa, CO; Carol Bascom-Slack, Tufts University, Medford, MA

30. A Biology Placement Test for Introductory Majors Biology
Sarah Boomer, Michael Baltzley, Kristin Latham, Angela Poole, Jesse Poole, Western Oregon University, Monmouth, OR

31. BLAST It! Begin Learning About Scientific Tests
William Beachly, Amy Morris, Hastings College, Hastings, NE

32. Bringing Hands-On Science to the Elementary School Classroom: An Overview of the Science Partners Course at the University of Nevada-Reno
Julie A. Stoughton, University of Nevada, Reno, NV

33. Confronting the Challenges of Bringing Research Data into Undergraduate Classrooms Using Online Faculty Mentoring Networks
Arietta Fleming-Davies, QUBES, Radford University, Radford, VA; Gabriela Hamerlinck, BioQUEST Curriculum Consortium; Alison Hale, University of Pittsburgh, Pittsburgh, PA; Tom A. Langen, Clarkson University, Potsdam, NY; Teresa Mourad, Ecological Society of America, Washington, D.C.; Sam Donovan, University of Pittsburgh, Pittsburgh, PA

34. Connecting Undergraduate Classroom Knowledge to Real World Biology Experiences Through Student Travel to Ecuador
Kerry Cheesman, Nancy Swails, Alan Stam, Maryann Cheesman, Capital University, Columbus, OH

35. Differential Effect of Active-Based-Learning on Exam Performance of Different Student Populations
Judith Maloney, Khadijah Makky, Marquette University, Milwaukee, WI

36. Examining the Relationship Between Overall Motivation for Learning Biology and Learner Acceptance and Understanding of Evolution
Lilian Shabani, Paul M. Beardsley, California State Polytechnic University, Pomona, CA
37. Examining the Relationship Between Students’ Perception of the Flipped-Learning and Their Academic Performance in an Undergraduate Genetics Course  
Judith L. Leatherman, University of Northern Colorado, Greeley, CO

38. A Format to Develop Students’ Higher Bloom’s Thinking - Does It Work?  
Melanie Sanchez-Dimwiddie, University of New Mexico-Valencia Campus, Los Lunas, NM

39. Helping Elementary Teachers Uncover Misconceptions in Science through Connections to Non-Fiction Texts  
Kerry Cheesman, Alan Stam, Nancy Swails, Terry Shiverdecker, Capital University, Columbus, OH

40. IDEAS: Interdisciplinary Disease Ecology Across Scales  
B. Elijah Carter, University of Georgia, Athens, GA

41. Incorporating Bioenergy into the Curriculum - BioenergizeME Infographic Challenge  
Leslie Ovard, Idaho National Laboratory, Idaho Falls, ID; Maria Zeitlin, Smithtown High School East, St James, NY; Alexis Wolf, Zachary Peterson, Shannon Zaret, Sheila Dillard, Department of Energy - Bioenergy Technologies Office, Washington, D.C.

42. Incubators for Learning Resources: A Model to Support the Collaborative Development, Augmentation, and Customization of OER  
Sam Donovan, University of Pittsburgh, Pittsburgh, PA; Mark Pauley, University of Nebraska, Omaha, NE; William Morgan, The College of Wooster, Wooster, OH; Neal Grandgenett, University of Nebraska, Omaha, NE; Alison Hale, University of Pittsburgh, Pittsburgh, PA; Hayley Orndorf, University of Pittsburgh, Pittsburgh, PA

43. Lessons Learned from the Math/Science Student Preparation and Retention (M/S SPARC) Collaborative at Wesleyan College  
Holly Boettger-Tong, Vivia L. Fowler, Brooke Bennett-Day, Wesleyan College, Macon, GA

44. Online Homework Only Helps Students Who Do It  
William Kroen, Wesley College, Dover, DE

45. Project-Based Learning Programs Cultivate Mentoring Relationships Among Science Faculty that Improve the High School-to-College Transition  
Carly S. Lisenbee, Natalie Nailor, Arizona State University, Phoenix, AZ

46. A Redesign of Introductory Biology for Majors: Experimental Implementation of the Supplemental Model of Instruction  
Michael K. Moore, Virginia A. Young, Mercer University, Macon, GA

47. Redesigning Undergraduate Biology Lab with Vertical Scaffolding and Alignment  
John Moore, Taylor University, Upland, IN

48. Responsible Conduct of Research Workshop for a Summer Research Program: Helping Our Young and Future Researchers Stay in Check with Their Moral Judgment  
Khadijah Makky, Marquette University, Milwaukee, WI

49. Strategies to Improve Retention in Introductory Majors Biology  
Sarah Boomer, Michael Baltzley, Kristin Latham, Angela Poole, Jesse Poole, Western Oregon University, Monmouth, OR

50. Success of Active Learning Compared to Lecture in a Mid-Level Cell Biology Course  
Shannon Stevenson, University of Minnesota, Duluth, MN

51. Teaching Indigenous Knowledge in the Biology Classroom Using Problem-Based Approaches  
Neal Petersen, North-West University, Potchefstroom, North-West Province, NZ

52. Terrestrial Slugs as a Model Organism for Inquiry-Based Experimentation in a Majors General Biology Laboratory  
Brenda J. Peters, Amy C. Blair, St. Ambrose University, Davenport, IA

53. To Use a Virtual Lab or Not to Use a Virtual Lab  
Carrie J. Bucklin, Southern Utah University, Cedar City, UT; Kristy L. Daniel, Texas State University, San Marcos, TX

54. Use of Scaffolds to Support Undergraduate Students in Learning and Understanding Biological Concepts  
Jaime Sabel, University of Memphis, Memphis, TN

55. Using Remediation and Peer Mentoring to Increase Quantitative and Analytical Skills in At-Risk College Students  
Amy Morris, Hastings College, Hastings, NE

56. A Vision for Changing Introductory Biology with Mathematical Models  
Laurie J. Heyer, A. Malcolm Campbell, Christopher J. Paradise, Davidson College, Davidson, NC

57. Warning: Active Learning May Cause Anxiety  
Ben England, Elisabeth Schussler, The University of Tennessee, Knoxville, TN; Jennifer Brigati, Maryville College, Maryville, TN

58. What Will I Need to Know: Teaching Students to Navigate through a Tsunami of Information  
Joyce Hardy, Ann Buchmann, Wendy Jamison, Chadron State College, Chadron, NE
10:30AM – 11:45AM continued

1119 | Trophic Cascades: A Force of Nature
Governor’s Square 15 • Ecology/Environmental Science/Sustainability • Hands-on Workshop (75 min) • 4Y, HS, 2Y
Trophic cascades are a fundamental concept in ecology that describe the relationships between organisms. Discover the new BioInteractive film and supporting activities that describe the classic experiments that first illustrated trophic cascades.

Jim Clark, Samantha Johnson, and Mark Nielsen, HHMI BioInteractive, Chevy Chase, MD

1090 | Un-“covering” AP Biology: How “Doing Biology” Connects the Course to the Exam
Governor’s Square 16 • AP Biology • Partner Presentations (75 min): Reserved for non-profit organizations highlighting free teaching resources • HS
Participants will work in small groups with senior AP teachers to learn how “doing” instead of “covering” biology supports a great AP course and prepares students for the AP exam. Participants will share activities, syllabi, and assessment ideas.

Jennifer Pfannerstill, North Shore Country Day School, Winnetka, IL; Brad Williamson, University of Kansas, Lawrence, KS; Paula Phillips, Trinity Preparatory School, Orlando, FL; and Theresa Holtzclaw, Fred Holtzclaw, and Brenda Royal, The Webb School, Knoxville, TN

ES20 | The MiniOne Electrophoresis and Mass BioTeach Present: Molecular Scissors, Mission (Im)Possible, and PTC: Personal Genetics
Plaza Court 4 • Biotechnology • Hands-on Workshop (75 min) • HS, GA
Come try three new inquiry-based molecular biology labs that will challenge your students but not your budget!

Michelle Mischke and Whitney Hagins, Massachusetts Biotechnology Education, Cambridge, MA

CALL: 1.800.558.9595
Visit our website eNasco.com/dissection for more info
10:30AM – 11:45AM continued

939 | Authentic Modeling in Biology Class
Plaza Court 5 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • MS, HS, GA
The Next Generation Science Standards (2013) have redefined what intellectually honest science teaching looks like. Most teachers know that they are supposed to focus on developing causal explanations—but how? Explore one answer in this session!

Alisha Ragan, Relay Graduate School of Education, New York, NY

1041 | Finding the Genetic Basis of Diseases and Traits: RB, CF, and BMI
Plaza Court 6 • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Twin studies combined with genomics can reveal the causes of rare diseases and the genetic and environmental contributions to common traits such as diabetes and BMI. Teach these concepts using a lesson from the American Society of Human Genetics (ASHG).

Michael Dougherty and Kanika Pulliam, American Society of Human Genetics, Bethesda, MD

12:00PM – 2:00PM

NABT Honors Luncheon
Windows Room • Special Event (Tickets Required)
Join us as we recognize the accomplishments and professional contributions of the 2016 NABT Award recipients, including the Outstanding Biology Teacher Award (OBTA) honorees. This celebration honors exceptional biology teachers and everyone is welcome to attend!

1:30PM – 2:45PM

INVITED SPEAKER
Sam Kean
See page 10 for biography.

The Violinist’s Thumb
Plaza Ballroom E • Special Speaker • GA
Did the human race almost go extinct? Can genetics explain a crazy cat lady’s love for felines? How does DNA lead to people with no fingerprints, or humans born with tails? And how did the right combination of genes create the exceptionally flexible thumbs and fingers of a truly singular violinist? Unraveling the genetic code hasn’t always been easy—from its earliest days, genetics has been rife with infighting, backstabbing, and controversial theories—but scientists can now finally read the astounding stories about human history buried in our DNA.

Presented in partnership with The College Board.
**1107 | Integrating Undergraduate Research into the Curriculum of Introductory Biology Courses for Majors and Nonmajors**
Governor’s Square 12 • General Biology • Demonstration (75 min) • HS, 2Y, 4Y
The value of undergraduate research experiences for all types of students has been thoroughly documented, yet still remains challenging. This session will present feasible options to integrate research into the curriculum successfully.

Kristen Genet, Anoka-Ramsey Community College, Coon Rapids, MN

**987 | Using Interactive Notebooks to Improve Student Learning in AP Biology**
Governor’s Square 11 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • MS, HS
Participants will learn how the use of interactive notebooks has improved student learning in an AP Biology classroom. Participants will build a sample notebook and will receive resources for using this tool to maximize student learning.

Lee Ferguson, Allen High School, Allen, TX

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**1150 | BSCS Biology A Human Approach – An Inquiry-based, NGSS Aligned Curriculum**
Governor’s Square 9 • General Biology • Hands-on Workshop (75 min) • HS
Join this interactive session to experience an inquiry-based, constructivist high school biology curriculum. Come learn about the key features of the fifth edition, which was published this year and is aligned to NGSS.

Brooke Bourdelat-Parks, BSCS, Colorado Springs, CO

**965 | Using Data and Graphics to Stimulate Student Learning**
Governor’s Square 10 • Ecology/Environmental Science/Sustainability • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Learn how to use available data and graphics to generate activities that require students to observe, ask questions, and generate conclusions. Examples will include population growth, ozone depletion, global climate change, and energy use.

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

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**So, You Want to be a Biomedical Engineer!**

The MOOC will cover:
- Overview of this wildly popular and vast field
- How to chart your own career
- Advances going on in each of the areas of focus
- Earn a Certificate of Completion, Continuing Education Units (CEUs) or Professional Development Hours (PDHs)
- Great for HS students to include on college applications and undergraduates for CEUs

**Launch dates**
September 1 - November 30, 2016
Find this course at EdX:
https://www.edx.org/course
Local to Global: Citizen Science Across Borders

PLAZA BALLROOM F • 1:30PM – 2:45PM

This session will highlight innovative and successful citizen science projects that help teachers create collaborations between countries to explore and analyze real data, and enrich learning through the use of interdisciplinary content and global perspectives.

Moderator: Jacqueline McLaughlin
The Pennsylvania State University – Lehigh Valley, Center Valley, PA
Global Perspectives Committee, Chair

Poster Presentations

Monarch Waystation Network
• Matt Tucker, Education Coordinator, Monarch Watch, University of Kansas, Lawrence, KS
• Carol Williamson, UKan Teach Master Teacher, Center for STEM Learning, University of Kansas, Lawrence, KS

Site Platforms for Climate Change and Citizen Science Outreach in the Southwest United States and Northern Mexico
• Francisco Delgado, Biology Department, Pima Community College, Tucson, AZ
• Diana Elbirt, Landscape Architecture Department, University of Arizona, Tucson, AZ

Teaching Indigenous Knowledge in the Biology Classroom Using Problem-based Approaches
• Neal Petersen, Director: School of Natural Sciences and Technology for Education, North-West University, South Africa
• Josef de Beer, Research Professor, School of Natural Sciences and Technology for Education, North-West University, South Africa

Going from Local to Global: Students Training an International Citizen Science Community
• Brian R. Shmaefsky, Professor of Biology and Environmental Sciences, Lone Star College, Kingwood, TX

Citizen Science: Research and Conservation Project on Cottontails
• Juan C. Garcia, Early Undergraduate Research Student, Metropolitan Community College, South Omaha Campus, Elkhorn, NE
• Jeba Inbarasu, Professor of Biology, Metropolitan Community College, South Omaha Campus, Elkhorn, NE

Living Like a Black Bear Under an Oak Tree: Teaching for Sustainability
• Peter K. McLean, Life Science Teacher, St. Andrew’s School, Middletown, DE

What’s Bugging You: Using iNaturalist and Bioblitzes to Promote Citizen Science in our Parks
• Aimée K. Thomas, Department of Biological Sciences, Loyola University, New Orleans, LA
• Stacy Meyers, Park Ranger, Jean Lafitte National Historical Park and Preserve, New Orleans, LA
• Aleutia Scott, Interpretive Supervisor, Jean Lafitte National Historical Park and Preserve, New Orleans, LA

Shark Tooth Forensics: Using STEAM to Power 21st Century Citizen Science Curriculum
• Christopher Clark, Middle School Educator, Chicod School, Greenville, NC
• Nathaniel Bourne, Middle School Educator, Broadview Middle School, Burlington, NC
• Brittany Argall, Middle School Educator, Centennial Campus Magnet Middle School, Raleigh, NC
• Terry Gates, North Carolina State University, Raleigh, NC

Students Discover: ANTS - Connecting Science and Education
• Daniela Magdalena Sorger, Post-Doctoral Researcher, North Carolina Museum of Natural Sciences, Raleigh, NC
• Paige Derouin, Science Teacher, Wake Young Men’s Leadership Academy, Raleigh, NC
• Michelle Hafey, Science Teacher, Penderlea Middle School, Willard, NC
• Maggie McKinley, Science Teacher, Burgaw Middle School, Burgaw, NC

NABT GLOBAL PERSPECTIVES COMMITTEE’S 4th ANNUAL 2016 POSTER SESSION

SATURDAY, NOVEMBER 5
1:30PM – 2:45PM continued

**1128 | Coupling Case Studies And Multimedia To Increase Engagement In Introductory Biology Courses**
Governor’s Square 15 • Microbiology & Cell Biology • Hands-on Workshop (75 min) • MS, HS, 2Y
Capitalize on student interest in cancer to teach core biology concepts. This hands-on workshop pairs case studies and HHMI BioInteractive resources to teach enzymatic actions, mutations, the cell cycle, and cell signaling in an engaging way.

Rebecca Orr, Sarah Wojiski, and Melissa Csikari, HHMI BioInteractive, Chevy Chase, MD

**1008 | The Ins and Outs of Constructing and Crossing the Cell Membrane!**
Governor’s Square 16 • General Biology • Hands-on Workshop (75 min) • MS, HS, 2Y
Explore the unique properties of the phospholipids that comprise cell membranes in this hands-on workshop. Construct the cell membrane, investigate various transport proteins, and model active and passive transport of molecules. Handouts provided!

Gina Vogt and Tim Herman, MSOE Center for BioMolecular Modeling, Milwaukee, WI

**940 | Drowsy Drosophila: Rapid Evolution in the Face of Climate Change**
Governor’s Square 17 • Evolution • Hands-on Workshop (75 min) • HS, 2Y, GA
This three-lesson curriculum investigates real time effects of climate change, using genetic variation observed in the chill coma recovery trait in Drosophila as a model of inquiry. Attendees will preview the lessons and receive free curriculum materials.

Jessica Mahoney, Edgewater High School, Orlando, FL; and Jennifer Broo, St. Ursula Academy, Cincinnati, OH

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**Night at the Movies with Sean Carroll**
Friday, November 4, 2016
Reception 5:30–6:30 p.m.
Movie Event Starts at 6:30 p.m.
Food and Drink Provided
Plaza Ballroom
1:30PM – 2:45PM continued

**Special Programming**

**Presented by Cogent Education**

**Interactive Case Studies for Biology, AP Bio, & Anat-Phys**
Plaza Court 4 • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y
Students play the role of a scientist and apply standards-aligned scientific practices to solve a real world problem. Data is sent to teachers in real time, which is proven to improve student outcomes by NIH & NSF research – attendees can try a case!

Tom Robertson

**Special Programming**

**Presented by miniPCR**

**miniPCR and blueGel electrophoresis**
Transforming Biotech!
Plaza Court 1 • Biotechnology • Hands-on Workshop (75 min) • MS, HS, 2Y, 4Y
The DNA Discovery System is a portable biotech lab that includes a PCR, electrophoresis and a pipette. Teach hands-on Genetics, Food Safety, Forensics, and more with miniPCR Learning Labs. miniPCR puts DNA analysis entirely in the hands of students.

Zeke Alvarez Saavedra

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**1069 | Do You See What I See?**
Plaza Court 5 • Science Practices • Hands-on Workshop (75 min) • MS, HS, GA
We will demonstrate how students can use the SEP’s of modeling and data analysis to show their knowledge of various concepts in biology. All participants will leave with a goody bag and ready-made lesson plans that can be used immediately.

Jim Clark, San Lorenzo Unified School District, San Lorenzo, CA; and Nicole Fernandes, Northwood High School, Silver Spring, MD

**951 | Zoo Genetics: A Free, Phenomenon-driven Curriculum**
Plaza Court 6 • General Biology • Symposium (75 minutes) • MS, HS, 2Y
Zoo Genetics Plus is a free curriculum created through a collaboration of teacher and geneticist. The activities look at real world conservation issues that will increase student interest and explain how genetics helps to answer scientific questions.

Jason Crean, Lyons Township High School, Western Springs, IL; Kathy van Hoeck, York Community High School, Elmhurst, IL; and Jean Dubach, Wildlife Genetics Lab, Maywood, IL

**1101 | My Flippin’ Classroom**
Plaza Court 7 • Instructional Strategies & Technologies • Hands-on Workshop (75 min) • 2Y, 4Y, GA
Learn methods of implementing the flipped classroom in and outside class. Come prepared by watching a video on Flipped Learning (https://www.youtube.com/watch?v=BGz0k3vKrOM) and be prepared to play the role of a student. Active participation is expected.

Becky Kapley, Cuyahoga Community College, Parma, OH

**993 | Project-Based Learning in the Biology Classroom**
Plaza Court 8 • Curriculum Development • Hands-on Workshop (75 min) • MS, HS
What are the components of a Project-Based classroom? What can it look like in a variety of contexts? We’ll explore what PBL looks like in our classrooms, take a look at example projects, and find time to brainstorm driving questions and resources.

Camden Hanzlick-Burton, Summit Sierra High School, Seattle, WA

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**4:00PM – 5:00PM**

**GENERAL SESSION SPEAKER**

**Temple Grandin**
See page 9 for biography.

**Different Kinds of Minds Contribute to Science**
Plaza Ballroom ABC • Special Speaker • GA
To advance in science, people who approach problems in different ways need to work together. In a recent editorial in Nature, Assaf Zaritsky stated that when cross disciplinary research is being done it is a mistake for scientists to attempt to do both bench biology and computer analysis. Instead, a better approach is for two people who are specialists to collaborate. Scientists in different disciplines can complement each other’s skills. There are three types of specialized thinking: photo realistic visual, pattern/math, and verbal. Dr. Grandin will share her increasing concern about our current educational system and its potential to screen out some of the visual thinkers who have difficulty with quantitative skills like algebra. She reminds us that we need these visionaries to move biological science forward because they help solve problems with associative thinking.

This session includes a special presentation of the 2016 NABT Distinguished Service Award.
1:30PM – 1:40PM
Welcome and Introduction
Grant Gardner, Middle Tennessee State University, Murfreesboro, TN; and Emily Walter, California State University-Fresno, Fresno, CA. Co-Chairs, NABT Four-Year Section Professional Development Committee.

1:40PM – 2:10PM
Keynote Presentation
Stephanie Chasteen, University of Colorado, Boulder, CO

2:10PM – 2:25PM
Faculty Mentoring Networks: A Model for Promoting Teaching Scholarship in Quantitative Biology Education
Alison Hale, University of Pittsburgh, Pittsburgh, PA; Arietta Fleming-Davies, Radford University, Radford, VA; Gabriela Hamerlinck, BioQUEST Curriculum Consortium, Germantown, MD; Jeremy Wojdak, Radford University, Radford, VA; Kristin Jenkins, BioQUEST Curriculum Consortium, Germantown, MD; and Sam Donovan, University of Pittsburgh, Pittsburgh, PA

Summary: Faculty Mentoring Networks (FMNs) are designed to support the development of teaching scholarship by promoting teacher identity, self-efficacy, and knowledge/experience via four core design principles. We draw these principles from our experience developing and running 13 FMNs with over 200 participants.

2:25PM – 2:40PM
Removing the Hierarchy Structure from Within Faculty Ranks to Disseminate Wide-scale Pedagogy and Curriculum Reform
Kelly A. Hogan and Blaire J. Steinwand, University of North Carolina at Chapel Hill, Chapel Hill, NC

Summary: Faculty report one of the most significant barriers to change is time. We’ve transformed all introductory sections by pairing a mentor (often a term faculty member) with an apprentice (often a tenure-track or tenured faculty member) in an individual course. We’ll report our methods and initial findings.

2:40PM – 2:55PM
Integrating Biology and Inquiry Skills (IBIS) Spreads its Wings: Implementation Insights from Three Institutions
Troy N. Nash, Presbyterian College, Clinton, SC; Rachel M. Pigg, Presbyterian College, Clinton, SC; Suann Yang, State University of New York-Geneseo, Geneseo, NY; Tarren J. Shaw, University of Oklahoma, Norman, OK; and Jeffrey M. Grim, University of Tampa, Tampa, FL

Summary: We developed IBIS, an introductory course aligned with Vision and Change. We designed several strategies to support faculty and student engagement at a variety of institutions; here we demonstrate the program’s impact and scalability. Successful outcomes rely on a collaborative culture that recognizes that implementing curricular change can be turbulent.

2:55PM – 3:10PM
The Northwest Biosciences Consortium: Easing the Transfer from Introductory to Upper Division Coursework, Within and Between Institutions
Erin Baumgartner, Western Oregon University, Monmouth, OR; Amy Beadles-Bohling, University of Portland, Portland, OR; Jeffrey Brown, Whitman College, Walla Walla, WA; Jason Duncan, Willamette University, Salem, OR; Lori Kayes, Oregon State University, Corvallis, OR; Stacey Kiser, Lane Community College, Eugene, OR; Anne Krutchen, Linfield College, McMinnville, OR; Walter Shriner, Mt. Hood Community College, Gresham, OR; and Stasinos Stavrinas, Willamette University, Walla Walla, WA

Summary: The Northwest Biosciences Consortium brought together faculty from institutions across Oregon to examine barriers for students transferring from introductory to upper division coursework both across and within institutions. Our goal is a consistent, Vision and Change-aligned introductory biology experience, with development of modules that can be used to teach threshold concepts.

3:10PM – 3:30PM
Roundtables and Deliverable Share-Outs

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

Look for the BioClub logo to indicate recommended articles for NABT BioClub members. If you are interested in forming a chapter of the NABT BioClub, contact NABT at office@nabt.org.
1:30PM – 3:30PM  
1121 | Global Perspectives Committee Poster Session  
Plaza Ballroom F • Global Education • Poster Session (120 min) • GA  
Join the NABT GPC for an interactive poster session to learn about innovative and successful citizen science projects.  

See page 56 for complete poster listings.

1037 | Touching Triton Implementation Workshop  
Director’s Row E • General Biology • Special Workshop (Tickets Required) • HS, 2Y, 4Y  
*Touching Triton* is a serious game designed for grades 9-16 focused on common complex disease risk. This workshop will provide educators with the knowledge and tools needed to successfully implement *Touching Triton* in the classroom.

Madeleine Loftin, Adam Hott, and Kelly East, Hudson-Alpha Institute for Biotechnology, Huntsville, AL

NABT Undergraduate Biology Summit  
Director’s Row H • General Biology • Symposium (120 minutes) • HS, 2Y, 4Y  
This year’s symposium supports the sharing of projects that are currently undergoing scalable (group-level) and transferable change at the institutional, college, departmental, or working group levels (e.g. professional learning communities).

See page 59 for featured presentations.

1116 | Exploring the Violinist’s Thumb Study Guide  
Governor’s Square 11 • AP Biology • Demonstration (30 min) • HS  
Companion guide authors will describe how to incorporate *The Violinist’s Thumb* into the curriculum by highlighting a chapter-based reading guide that assesses comprehension and develops critical thinking.

Julianne Zedalis, The Bishop’s School, San Diego, CA; Sam Kean, Washington, D.C.; and Tanya Sharpe, College Board, Atlanta, GA

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3:00PM – 3:30PM continued

1091 | Testing the Testing Effect: Modifying Summative Assessments to Enhance Learning
Governor’s Square 12 • General Biology • Paper (30 min) • 2Y, 4Y, GA
Summative assessments strategies in a large, introductory biology course were compared over several semesters. Student performance and attitude data were collected in sections using three unit exams, and sections using five shorter, cumulative unit exams.

Tarren Shaw, University of Oklahoma, Norman, OK

1005 | Engaging Students with Literacy Strategies
Plaza Court 5 • Instructional Strategies & Technologies • Demonstration (30 min) • MS, HS
The audience will take away practical ways to engage students in text and be willing to try more challenging passages. It includes several examples of pre, during and post reading activities that will allow students to better access the information.

Kellie Dean and Christine Pfaffinger, Adlai E. Stevenson High School, Lincolnshire, IL

1063 | Utilizing Models in Biology
Plaza Court 6 • General Biology • Hands-on Workshop (30 min) • HS
Explore engagement strategies that incorporate models and enable students to gain a deeper understanding of biological concepts. Experience creative approaches to instruction that clarify complex processes while making the learning process enjoyable.

Rebecca Brewer, Troy High School, Troy, MI

1126 | The Red Queen’s Race: An Experimental Card Game to Teach Coevolution
Governor’s Square 17 • Evolution • Demonstration (30 min) • HS, 2Y, 4Y
I will present an educational tool to bring rapid evolution and parasites into the classroom. It is a simple, hands-on game in which students collaborate to generate data and test predictions of a core hypothesis of evolutionary biology.

Amanda Gibson, Indiana University, Indianapolis, IN

1134 | Using Primary Literature to Teach Data Literacy
Governor’s Square 15 • Science Practices • Hands-On Workshop (30 min) • HS, 2Y, 4Y
HHMI BioInteractive presents “Data Points”, a monthly series featuring a figure from primary literature to engage students in the process of interpreting graphs. Participants will analyze and interpret graphs and explain what the results mean.

Natalie Dutrow, Bob Kuhn, and Bridget Conneely, HHMI BioInteractive, Chevy Chase, MD

961 | What are My Students Thinking? Preparing for Your Flipped Biology Class.
Plaza Court 7 • Instructional Strategies & Technologies • Paper (30 min) • 2Y, 4Y, GA
How do students perceive flipped classes? Come hear us present on six semesters of student perception data. We use this data to show motivational trends of students walking into biology classrooms and offer practical advice on how to prepare for them.

Michael Moore, Rachel Hawkins, and Donald French, Oklahoma State University, Stillwater, OK

977 | Making Natural Phenomena Central in the Biology Classroom
Plaza Court 8 • Science Practices • Hands-on Workshop (30 min) • MS, HS
We will discuss the rationale and strategies for making natural phenomena central in science teaching and learning. Participants will engage in sample activities from a unit of Carbon TIME, a free, NSF-funded curriculum aligned to the NGSS.

Wendy Johnson, Michigan State University, East Lansing, MI

3:00PM – 4:00PM

Book Signing with Sam Kean and Temple Grandin
Plaza Court
Enjoy a meet and greet and book signing with two of our featured speakers. Multiple titles from each speaker will be available for sale and signing.

6:00PM – 8:00PM

The Biology of Brewing
Lobby to Wynkoop Brewery • Special Event (Tickets Required)
Colorado has long been known as a “beer” state, with giants like Coors sharing the scene with over 284 craft breweries. Colorado knows its beer, and it also knows that brewing means biology. As the industry grows, biology faculty are crossing departmental lines to offer undergraduate degrees and certificates in fermentation and brewing science. Learn more about the biology used by today’s craft brewers, and the educational programs that will support tomorrow’s, for a special event at the Wynkoop Brewery.

Special program presented with Metropolitan State University of Denver
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Watch the Go Pure Challenge at wardsci.com/gopure

*Check with your school or district for specific state disposal requirements. However, because there are no volatile organic compounds, you should be able to routinely dispose of specimens.
8:00AM – 10:00AM
Four-Year Section Committee Meeting
Governor’s Square 10 • Committee Meeting • 4Y

8:00AM – 12:30PM
Rocky Mountain Arsenal Wildlife Refuge
Lobby • Field Trip (Tickets Required) • GA
You will adventure on a bus throughout the entire 9-mile Wildlife Drive to view many of the over 330 species of wildlife residing on the refuge including bison, raptors, songbirds, mule and white-tailed deer, and more. Stop by the Visitor Center on your way out to enjoy exhibits that focus on the site’s history and prairie wildlife, and don’t miss the live black footed ferret exhibit, a short walk from the Visitor Center.

1131 | Math And Stats In The Biology Classroom With HHMI BioInteractive
Governor’s Square 15 • Science Practices • Special Workshop (Tickets Required) • HS, 2Y
Participants will learn key mathematical/statistical concepts and methods used in biological research, including sampling distribution, and descriptive/inferential statistics. Free classroom-ready resources from HHMI’s BioInteractive will be used.

Robert Cooper, Valerie May, Satoshi Amagai,
HHMI BioInteractive, Chevy Chase, MD

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2016 EXHIBIT HALL HOURS

THURSDAY
Exhibit hours: 5:30PM – 7:00PM
Exhibit Hall Opening Reception
Sponsored by

FRIDAY
Exhibit hours: 8:00AM – 5:30PM
Exhibit Hall Closing Reception:
4:00PM–5:30PM
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Santa Rosa, CA • www.speakeasies.biz
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The American Phytopathological Society (APS) is a 501(c) (3) nonprofit scientific organization dedicated to the study and control of plant diseases.

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Booth 418
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Booth 119
Washington, D.C. • www.energy.gov/eere/bioenergy/bioenergy-technologies-office
The Bioenergy Technologies Office (BETO) works with stakeholders on a balanced portfolio of research, development, demonstration, and deployment activities in feedstocks, conversion technologies, and integrated biorefineries. BETO helps transform renewable, abundant biomass resources into sustainable, cost-competitive, high-performance biofuels, value-added products, and biopower to reduce dependence on fossil fuels.

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Washington University
Booth 213
St. Louis, MO • ucollege.wustl.edu/msinbiology
Teachers earn their Master of Science in Biology degree in two years through this hybrid program that combines life science content knowledge with pedagogy & leadership projects. It consists of two, three week summer institutes in residence. The remaining coursework during the 2 academic years is completed through distance learning.
THANKS
to the many VOLUNTEERS

who worked so hard to make the 2016 Conference a success.

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