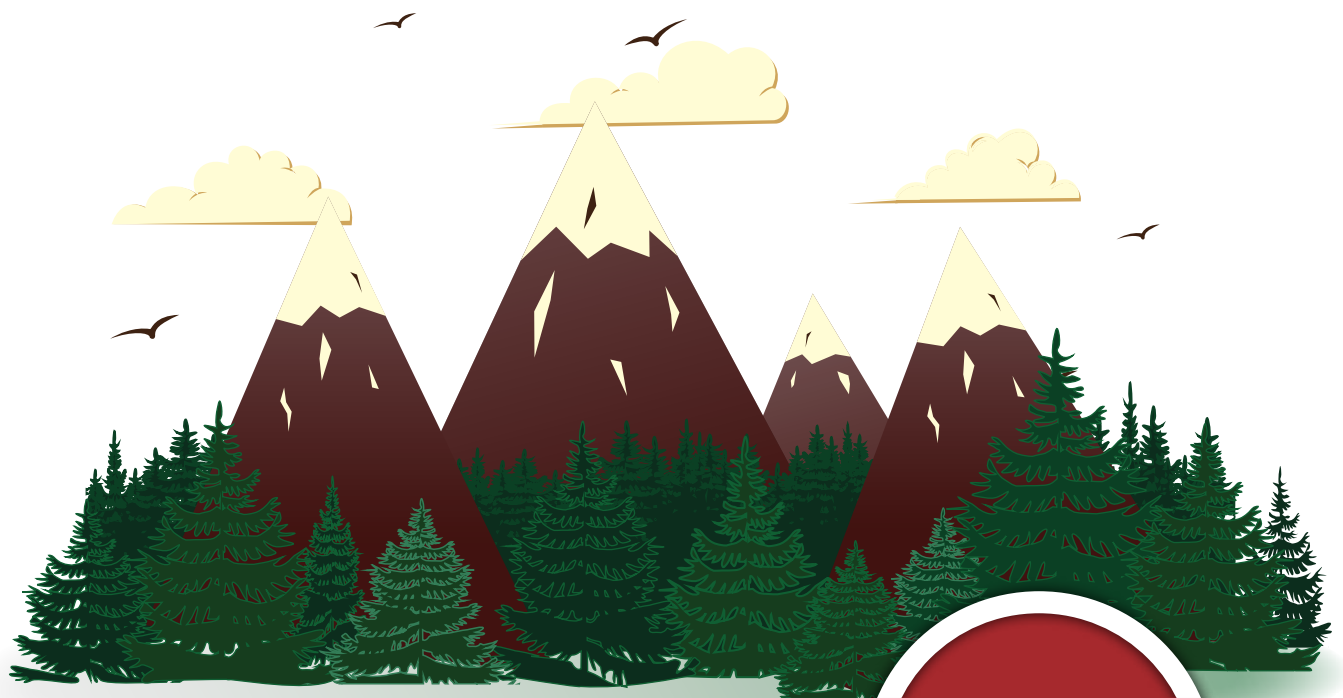


NABT PROFESSIONAL DEVELOPMENT CONFERENCE

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



DENVER

2016

 **#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.

Access. The future of education. **OpenStax.org**



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:

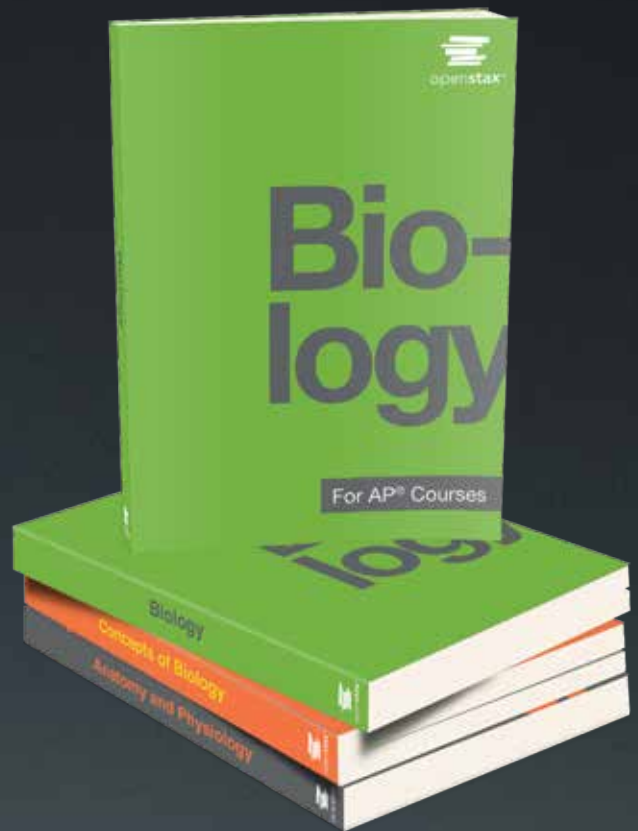
- CogBooks
- Lrnr
- NACSCORP / aerSelect
- Odigia
- OpenStax Tutor
- panOpen
- SimBio

**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



VISIT OUR BOOTH. GET SOCIABLE. GET A GIFT.

**BOOTH
300/302**



/openstax

@openstax



SPECIAL THANKS

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

DIAMOND SPONSORS



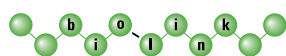
GOLD SPONSORS



PROGRAM PARTNER



SILVER SPONSORS



A LA CARTE SPONSORS



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

WHAT'S GOING ON

Schedule at a Glance	4-5
General Information	6
Meal Functions	19
Special Events	19
Thursday, November 3	22
Friday, November 4	26
Saturday, November 5	42
Sunday, November 6	64
Biology Education Research Symposium	40
Poster Sessions	50-52, 56
Undergraduate Biology Summit	59

WHO'S WHO

Conference Sponsors	2
Highlighted Speakers	8
Committees & Sections	11
Find Susan Finazzo Contest	21
Board of Directors & Regional Coordinators	11
Past Presidents & Conference Locations	14
Honorary Members	14
Exhibitors	66
Program Participants	74

GETTING AROUND

General Information	6
Convention Maps	16
Exhibit Hall Floor Plan	66

AWARDS

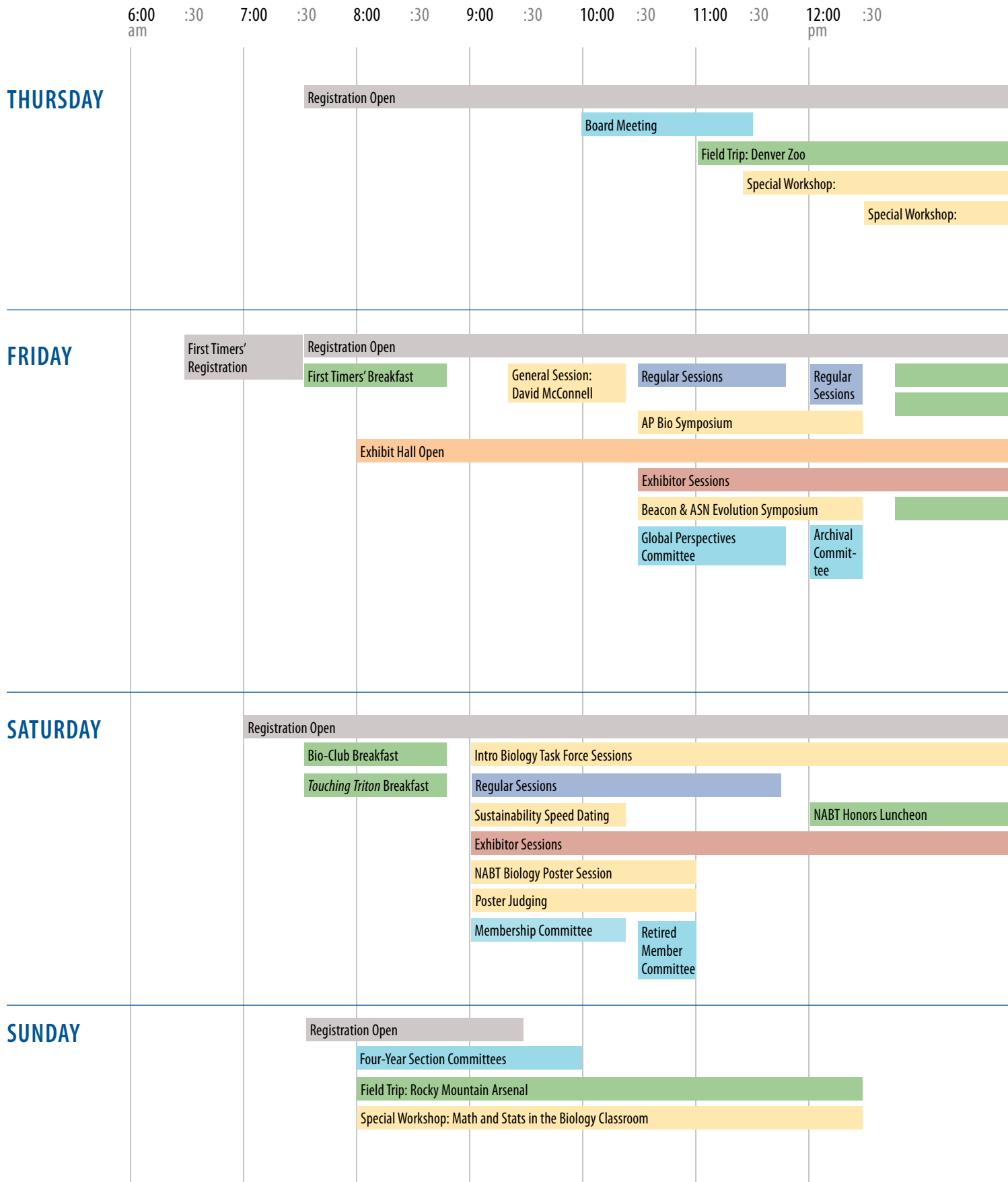
NABT Awards Program	12
OBTA Recipients	13
Distinguished Service Award Recipients	15

HELPFUL ITEMS

General Information	6
Certificate of Attendance	83
Index of Program Participants	74
Index of Sessions by Subject	78
Ad Index	82

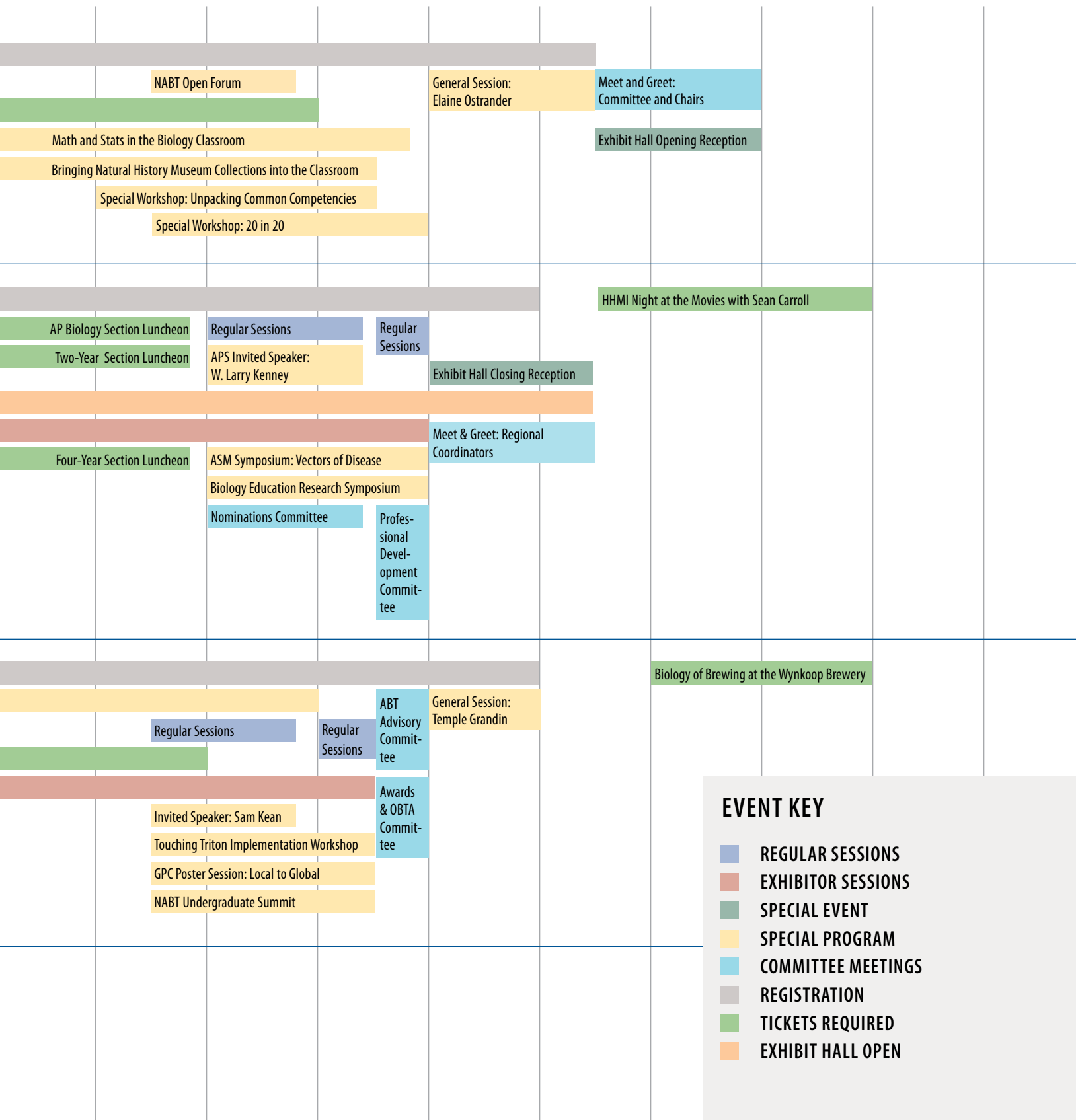


SCHEDULE AT A GLANCE





1:00 :30 2:00 :30 3:00 :30 4:00 :30 5:00 :30 6:00 :30 7:00 :30 8:00 :30 9:00



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 con-course 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



Use #NABT2016 to Tweet from Denver!

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)



WiFi Log-in details

SSID

Sheraton Meeting Room

Password

NABT2016

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.



Phone: (888) 501-NABT

E-mail: office@NABT.org

Website: www.NABT.org

BIO-RAD Explorer™

HANDS-ON INQUIRY-BASED SCIENCE EDUCATION



NABT Denver Workshop Schedule

Join us in Plaza Court 1 for these great free workshops.

Friday, November 4

Visit Us at Booth #207

Take fun
pictures
with your
friends at our
photo booth
during the
opening
reception!

- 8:00–9:00 AM **Eat and Learn. Enzymes: Technology Inspired by Nature** (continental breakfast provided) — 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.
- 10:30–11:45 AM **Investigate Photosynthesis and Cellular Respiration with Algae Beadss** — 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.
- 12:00–12:30 PM **Starting a Biotech Program, One Piece of Equipment at a Time** — Starting a biotech program at your school 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.
- 2:00–3:15 PM **Contagion! Track the Spread of Dangerous Disease** — 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.
- 3:30–4:00 PM **Get That Grant Money!** — 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.



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

BIO-RAD



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.



SATURDAY, NOVEMBER 5

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.



Photo Credit: Rosalie Winard

**NABT IS PROUD TO HONOR
THE WORK OF DR. TEMPLE
GRANDIN WITH THE 2016
NABT DISTINGUISHED
SERVICE AWARD.**





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



Photo Credit: Stephen Parezo

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

President **Bob Melton**
 President-Elect **Susan Finazzo**
 Past-President **Jane Ellis**
 Secretary/Treasurer **Steven D. Christenson**
 Director-at-Large **Elizabeth Cowles**
 Director-at-Large **Sherry Annee**
 Director-Coordinator **Margaret Carroll**
 Director-Coordinator **Brenda Royal**

REGIONAL COORDINATORS

Region I (CT, ME, MA, NH, RI, VT)
Margaret Carroll
 Region II (DE, DC, MD, NJ, NY, PA, VA)
Karen Lucci
 Region III (IL, IN, MI, OH, WI)
Chris Monsour
 Region IV (IA, KS, MN, MO, NE, ND, SD)
Harry McDonald
 Region V (KY, NC, SC, TN, WV)
Brenda Royal & Kim Sadler
 Region VI (AL, FL, GA, LA, MS, PR)
Madelene Loftin
 Region VII (AZ, AR, NM, OK, TX)
Julie Angle
 Region VIII (CO, ID, MT, NV, UT, WY)
Cindy Gay
 Region IX (AK, CA, HI, OR, WA, Pacific Territories)
Bethany Dixon
 Region X (Canadian Provinces & Territories)
Vacant

SECTION CHAIRS

AP Biology Section **Mark Little**
 NABT BioClub **Chris Monsour**
 Four-Year College & University Section **Anneke Metz**
 Two-Year College Biology Section **Mary Phillips**

NABT COMMITTEE CHAIRS

ABT Journal Advisory Committee **William McComas**
 Archival Committee **Carrie Boyce & Jill Maroo**
 Awards Committee **Priya DasSarma**
 Finance Committee **Harry McDonald**
 Global Perspectives Committee **Jacqueline McLaughlin**
 Honorary Membership Committee **Susan Finazzo**
 Membership Committee **Sherry Annee**
 Nominating Committee **Donald French**
 Past President Advisory Council **Susan Finazzo**
 Professional Development Committee **Catherine Ambos**
 Retired Member Committee **Dennis Gathmann**

BOARD APPOINTED REPRESENTATIVES

Outstanding Biology Teacher Award
 National Coordinator **Mark Little**
 Sustainability Education **Teddie Phillipson-Mower**
 Introductory Biology Task Force **Anna Hiatt**

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 (**ESATYCB**)
 Hong Kong Association of Biology Teachers (**HKABT**)
 Illinois Association of Biology Teachers (**IABT**)
 Illinois Association of Community College Biologists (**IACCB**)
 Indiana Association of Biology Teachers (**IABT**)

Kansas Association of Biology Teachers (**KABT**)
 Louisiana Association of Biology Teachers (**LABT**)
 Massachusetts Association of Biology Teachers (**MABT**)
 Michigan Association of Biology Teachers (**MABT**)
 Mississippi Association of Biology Educators (**MSABE**)
 Missouri Association of Biology Teachers (**MOBioTA**)
 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

THE KIM FOGLIA AP® BIOLOGY SERVICE AWARD

Robert Kuhn

Centennial High School, Roswell, GA

The Kim Foglia AP® Biology Service Award recognizes an AP® Biology teacher who displays a willingness to share materials, serves as a mentor to both students and professional colleagues, creates an innovative and student centered classroom environment, and exemplifies a personal philosophy that encourages professional growth as a teacher and member of the AP® community.

Sponsored by the Neil A. Campbell Educational Trust and Pearson

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



For over 50 years the National Association of Biology Teachers has been committed to recognizing outstanding biology teachers.

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

Brockport High School
Brockport, 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

Michelle Corlew

Meteva Valley High School
Aurora, IL

Jon Darkow

Seneca East High School
Attica, OH

Chad Janowski

Shawano Community High School
Shawano, WI

REGION IV

Cathy Farrar

Marquette High School
Chesterfield, MO

Kelly Kluthe

Wyandotte High School
Lawrence, KS

Tracy Moody

Sanborn Central High School
Forestburg, SD

REGION V

Teresa Barton

Pikeview High School
Princeton, WV

Robin Bulleri

Carrboro High School
Chapel Hill, NC

Elena Gaston

Camden High School
Camden, SC

Heleen Giesbers

Williamstown High School
Williamstown, KY

Robert Pruitt

Montgomery Bell Academy
Nashville, TN

REGION VI

Billie Abney

Northwest Georgia College
and Career Academy, Dalton, GA

Sherry Bergeron

Lockport Middle School
Raceland, LA

Shani Bourn

Hancock High School
Kiln, MS

Ben Johnston

Bob Jones High School
Madison, AL

REGION VII

Aimee Brinkley

Northside High School
Ft. Smith, AR

Karla Dean

Anahuac High School
Anahuac, TX

Michelle Landreville

Paradise Valley High School CREST
Phoenix, AZ

Traci Richardson

Stillwater High School
Stillwater, OK

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

The Outstanding Biology Teacher Award is proudly sponsored by:

CAROLINA®
www.carolina.com

Other consideration provided by Flinn Scientific and Population Connection.



NABT
National Association of
Biology Teachers

**THANK YOU
TO OUR OBTA DIRECTORS**

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

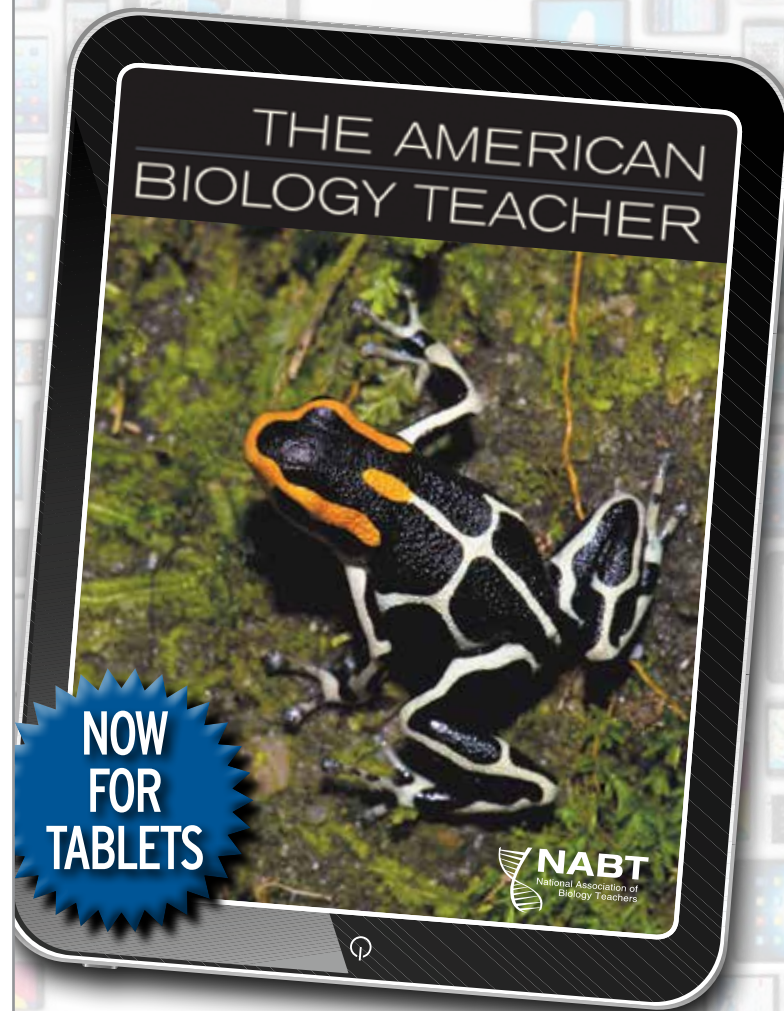
- 2015 — Jane Ellis, Providence, RI
2014 — Stacey Kiser, Cleveland, OH
2013 — Mark Little, Atlanta, GA
2012 — Donald French, Dallas, TX
2011 — Dan Ward, Anaheim, CA
2010 — Bunny Jaskot, Minneapolis, MN
2009 — John M. Moore, Denver, CO
2008 — Todd Carter, Memphis, TN
2007 — Pat Waller, Atlanta, GA
2006 — Toby Horn, Albuquerque, NM
2005 — Rebecca E. Ross, Milwaukee, WI
2004 — Betsy Ott, Chicago, IL
2003 — Catherine W. Ueckert, Portland, OR
2002 — Brad Williamson, Cincinnati, OH
2001 — Ann S. Lumsden, Montreal, QC, Canada
2000 — Phil McCrea, Orlando, FL
1999 — Richard D. Storey, Ft. Worth, TX
1998 — ViviannLee Ward, Reno, NV
1997 — Alan McCormack, Minneapolis, MN
1996 — Elizabeth Carvellas, Charlotte, NC
1995 — Gordon E. Uno, Phoenix, AZ
1994 — Barbara Schulz, St. Louis, MO
1993 — Ivo E. Lindauer, Boston, MA
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. Emmeluth, Cincinnati, OH
1986 — George S. Zahrobsky, Baltimore, MD
1985 — Thomas R. Mertens, Orlando, FL
1984 — Marjorie King, Purdue Univ., 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 — Manert Kennedy, New Orleans, LA
1978 — Glen E. Peterson, Chicago, IL
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. Bently 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 w/AAAS
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
1961 — Paul V. Webster, Denver, CO w/AAAS
1960 — Howard E. Weaver, New York City, NY w/AAAS
1959 — Paul Klinge, Chicago, IL w/AAAS
1958 — Irene Hollenbeck, Washington, D.C. w/AAAS
1957 — John Breukelman, Indianapolis, IN w/AAAS
1956 — John P. Harrold, New York City, NY w/AAAS
1955 — Bro. H. Charles Severin, Atlanta, GA w/AAAS
1954 — Arthur J. Baker, Berkeley, CA w/AAAS
1953 — Leo F. Hadsall, Boston, MA w/AAAS
1952 — Harvey E. Stork, St. Louis, MO w/AAAS
1951 — Richard L. Weaver, Philadelphia, PA w/AAAS
1950 — Betty L. Wheeler, Cleveland, OH w/AAAS
1949 — Ruth A. Dodge, New York City, NY w/AAAS
1948 — Howard A. Michaud, Washington, D.C. w/AAAS
1947 — E. Laurence Palmer, Chicago, IL w/AAAS
1946 — Prevo L. Whitaker, Boston, MA w/AAAS
1945 — Helen Trowbridge, St. Louis, MO w/AAAS
1944 — Merle A. Russell, No Meeting
1943 — Merle A. Russell, No Meeting
1942 — Homer A. Stephens, No Meeting
1941 — George W. Jeffers, Dallas, TX w/AAAS
1940 — Malcolm D. Campbell, Philadelphia, PA w/AAAS
1939 — Myrl C. Lichtenwalter, Columbus, OH w/AAAS
1938 — First Formal Meeting*, Richmond, VA w/ AAAS
* birth of NABT occurred on July 1, 1938 in New York City, NY

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 Emmeluth
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 — Manert Kennedy
1982 — Harold "Sandy" Wiper, Jerry P. Lightner
1981 — Sophie Wolfe
1980 — Sister M. Gabrielle, Ted F. Andrews
Sister Marian Catherine McGrann
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. Klinge, 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 (descendents 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
2010 — Richard Dawkins, The Richard Dawkins Foundation for Reason and Science, Falcon, CO
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
2002 — Thomas E. Lovejoy, The H. John Heinz III Center for Science, Economics and the Environment, Washington, D.C.
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



**Get your favorite
biology education
resource delivered
your favorite way.**

The American Biology Teacher
is now available on
your digital devices.

Visit www.NABT.org/publications
for more information, or
find the *ABT* on iTunes,
Google Play, and Amazon.



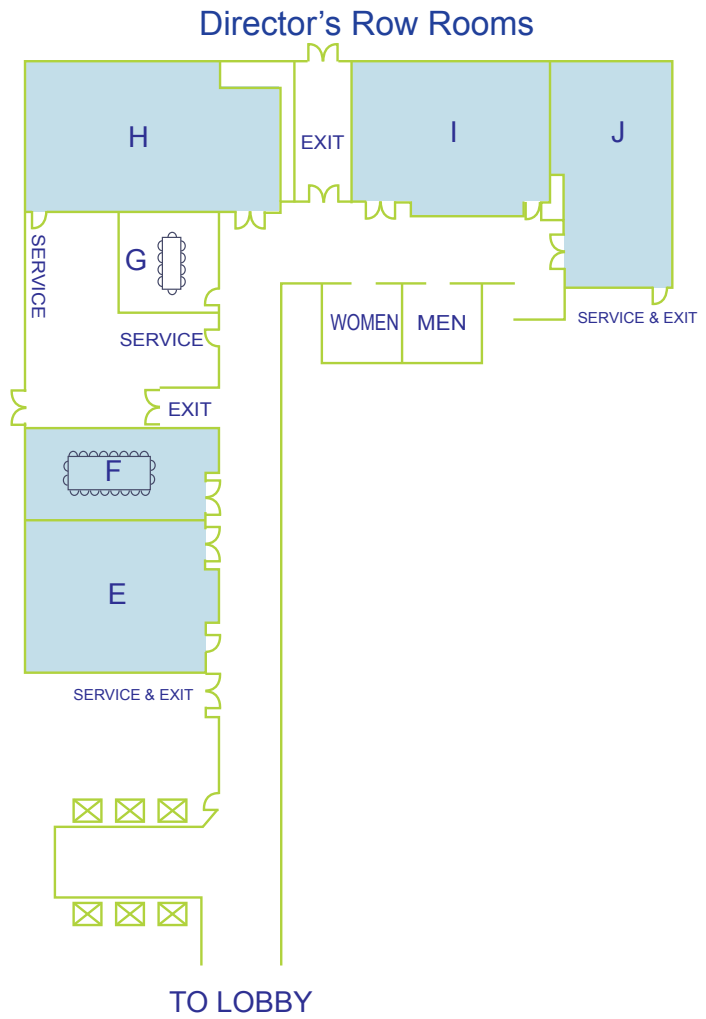


SHERATON DENVER DOWNTOWN HOTEL

Room	Level
Director's Row Rooms E-J	Lobby/Street Level
Governor's Square Rooms 6-17	Concourse Level
Plaza Ballrooms A-F	Concourse Level
Plaza Court Rooms 1-5	Concourse Level

Not shown: Windows Room, located in the IM Pei Tower Building - Second Level

PLAZA BUILDING LOBBY/STREET LEVEL



PLAZA BUILDING CONCOURSE LEVEL





SPECIAL WORKSHOPS

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



Bringing Natural History Museum Collections into the Classroom: Exploring 55 Million Years of Horse Evolution in Response to a Changing Climate

12:30PM – 3:30PM

Evolution • MS, HS, GA
Free (Tickets Required)

This teacher/scientist created and field-tested series of lessons addresses macro and microevolutionary concepts. Workshop participants will use 3D printed fossil horse teeth study sets and engage in an investigation of the fossil horse record. See page 23 for details.

△ INTRO BIO TASK FORCE

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 – 12:30PM

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



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.





SPECIAL EVENTS

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)

SOLD OUT

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)

SOLD OUT

Four-Year Section Luncheon

12:45PM – 1:45PM

(Tickets Required)

SOLD OUT

Two-Year Section Luncheon

12:45PM – 1:45PM

(Tickets Required)

SOLD OUT

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)

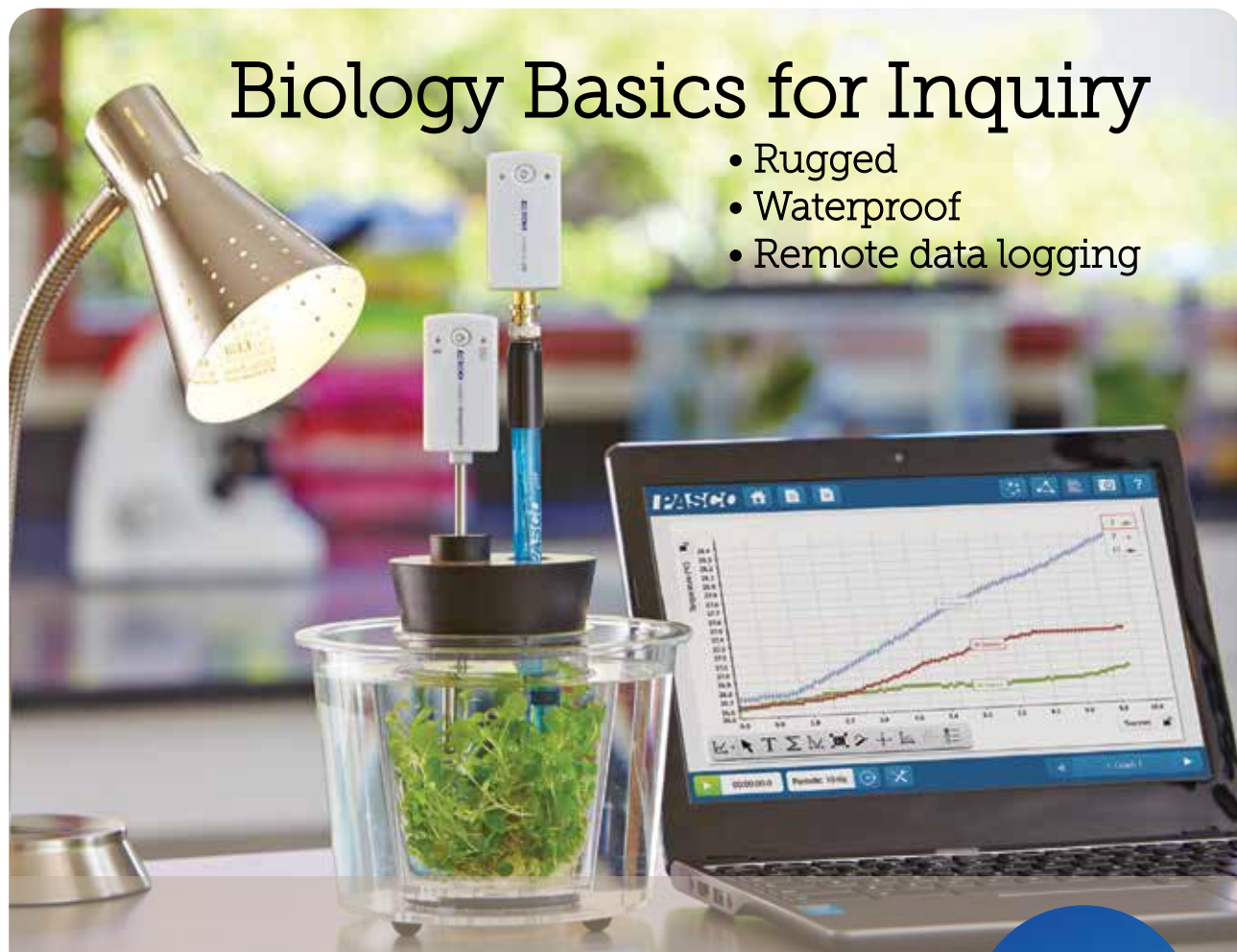
You're invited to a special launch of *Touching Triton*, a new "serious game" that focuses on the interplay between genetics, the environment, and family history when determining risk for common complex diseases like diabetes and cancer set in a storyline of long term space flight. This event will include 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



Biology Basics for Inquiry

- Rugged
- Waterproof
- Remote data logging



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.



Wireless pH \$59

Wireless Temperature \$39

Wireless Conductivity \$69

Wireless Pressure \$69

pasco.com/biology/nabt

10101 Foothills Blvd. Roseville CA 95747 • 1-800-772-8700 • © Copyright 2016. All rights reserved.

Chromebook is trademarks of Google Inc. AP is a trademark registered and/or owned by the College Board, which was not involved in the production of, and does not endorse, this product.

NABT
PRESIDENT-ELECT

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!



NABT
National Association of
Biology Teachers

THURSDAY
NOVEMBER 3

ABBREVIATION KEY

E: Elementary School

MS: Middle School

HS: High School

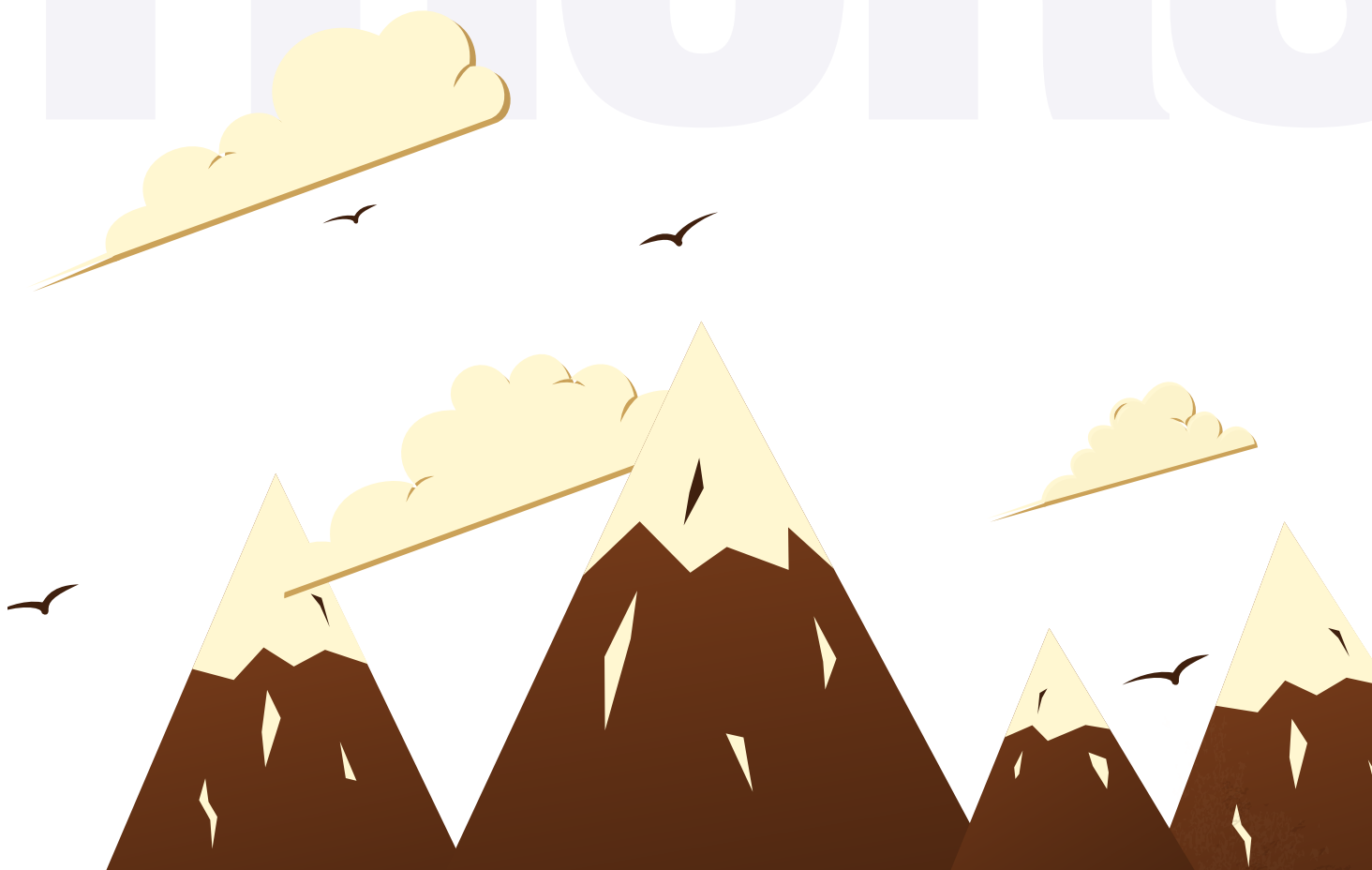
2Y: Two-Year College

4Y: Four-Year College

GA: General Audience

AP® is a registered trademark.

THURS



8:30AM – 3:30PM

NABT/BSCS AP Biology Academy Workshop

Governor's Square 16 • Invitation Only

QUBES Math Anxiety Faculty Mentor Network

Governor's Square 17 • Invitation Only

10:00AM – 12:30PM

NABT Board Meeting

Governor's Square 9 • Committee Meeting • Invitation Only

11:15AM – 3:45PM

1130 | 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 – 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.

12:30PM – 3:30PM

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

INTRO BIO TASK FORCE

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.

NABT Intro Bio Task Force

1:30PM – 2:45PM

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.

1:30PM – 3:30PM

994 | 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

Sponsored by



**Four-Year Section Executive
Committee Meeting**

Governor's Square 12 • Committee Meeting
• GA

Anneke Metz, Section Chair

5:30PM – 7:00PM

Exhibit Hall Opening Reception

Plaza Court • Special Program

You are the guest of honor at this special opening reception of the 2016 Exhibit Hall. Showcasing the NABT sponsors and exhibitor community, the exhibit hall is the place to get the tips and tools that will help you enhance your teaching and engage your students. Join us for complimentary appetizers and beverages, and help us kick off the NABT Conference in style.

Sponsored by



6:30PM – 7:30PM

Past Presidents Meeting

President's Suite • Special Event •
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 than 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

Charging station sponsored by





Enter to win a
LabQuest Stream™
at **Booth 106!**



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

FRIDAY

NOVEMBER 4

ABBREVIATION KEY

E: Elementary School

MS: Middle School

HS: High School

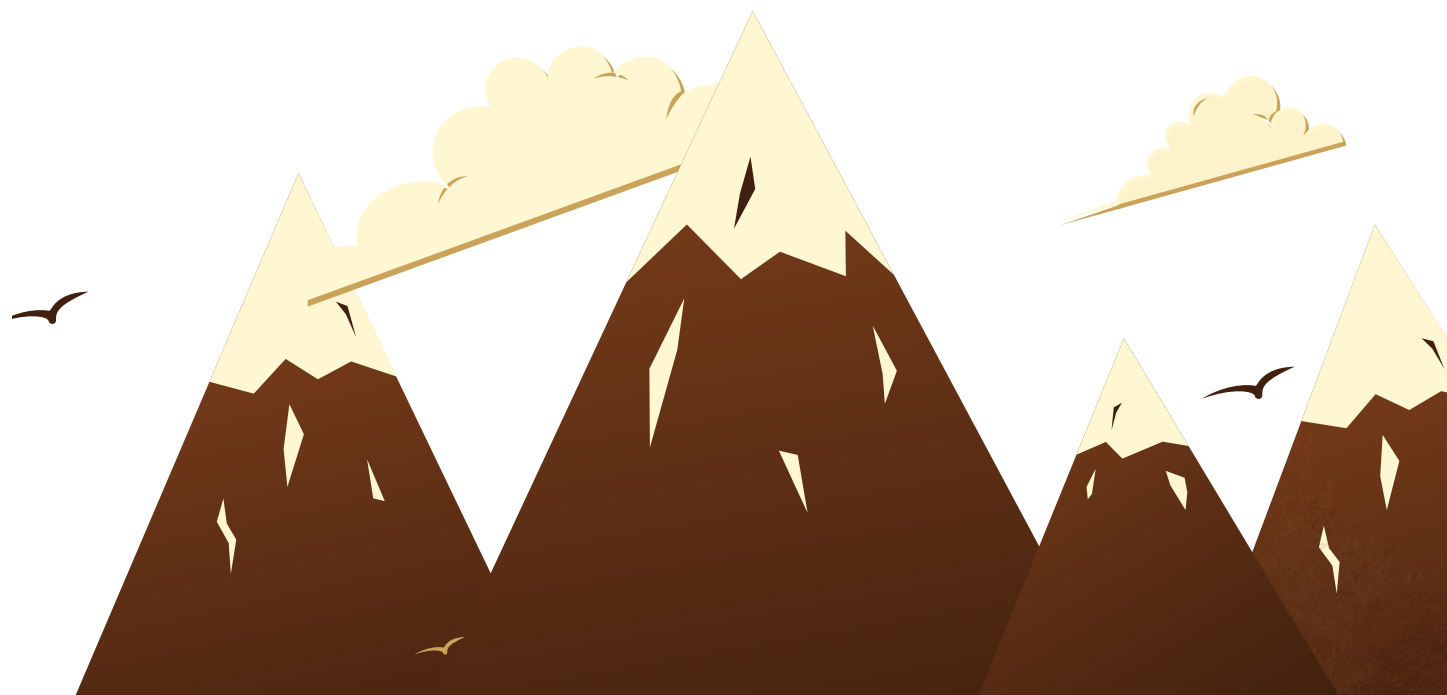
2Y: Two-Year College

4Y: Four-Year College

GA: General Audience

AP® is a registered trademark.

FRIDAY



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 is made possible through the generous support of

**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 – 11:45AM**NABT Committee Meeting: Global Perspectives Committee**

Director's Row F • Committee Meeting • GA

Jacqueline McLaughlin, Committee Chair

1118 | 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

1136 | Online Resources for Energy Concepts in High School Biology

Governor's Square 10 • General Biology • Hands-on Workshop (75 min) • HS

This session will feature free research-based online materials for teachers to enhance their understanding of energy crosscutting concepts as they teach biology. Session will emphasize energy inputs and outputs for the production and use of biofuels.

Susan Kowalski and Betty Stennett, BSCS, Colorado Springs, CO

1048 | Implementing Vision and Change at the Departmental Level with PULSE Rubrics: A Hands-on Workshop for College and University Faculty

Governor's Square 11 • Global Education • Hands-on Workshop (75 min) • 2Y, 4Y

Participants will engage with a sample of resources developed by the Partnership for Undergraduate Life Science Education (PULSE) for implementing Vision and Change recommendations at the department/institutional level.

David Marcey, California Lutheran University, Thousand Oaks, CA; Lisa Elfving, University of Arizona, Tucson, AZ; and Steven Robinow, California State University-Chico, Chico, CA

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

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

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.

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 Palfy, Adlai E. Stevenson High School, Arlington Heights, IL; and Karen O'Connor, Stevenson High School, Lincolnshire, IL

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

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 – 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

11:30AM – 12:00PM

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

1007 | Beyond the Mean: Using Data for Instruction and Assessment Curriculum Development • Hands-on Workshop (30 min) • HS, 2Y, 4Y

ETS Test Developers will discuss appropriate uses of data from different types of assessments and strategies that use data to drive learning and to inform teaching. Emphasis will be given to analysis of question performance on assessments.

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

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

NABT Committee Meeting: Archival Committee

Director's Row F • Committee Meeting • GA

Carrie J. Bucklin and Jill Maroo, Committee Chairs

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

10:30AM – 4:00PM

Special Programming Presented by HudsonAlpha

All sessions in Plaza Court 2

10:30AM – 11:45AM

The Making of and Science Behind *Touching Triton*

Instructional Strategies/Technologies • Symposium (75 min) • HS, 2Y, 4Y

The development of *Touching Triton* posed interesting challenges along the way. In this session, presenters will explain how *Touching Triton* was made from learning concepts to a serious game and dive into the scientific content covered in the game. **Adam Hott**

12:00PM – 12:30PM

Big Data, Big Science, Big Impact
Genetics • Symposium (30 min) • HS, 2Y, 4Y, GA

Today's Big Data projects (HapMap, ENCODE, etc.) were born out of our desire to know more about the human "Code of Life." Learn how these projects continue to expand our understanding of genetic variation present in the human genome. **Neil Lamb**

1:00PM – 2:00PM

What it Takes: Human in Deep Space

Anatomy & Physiology • Symposium (60 min) • MS, HS, 2Y, 4Y

Getting humans into space and maintaining their health is a truly interdisciplinary effort. Explore how engineering and human health are used to make space missions a success. HudsonAlpha and Lockheed Martin team up to discuss human spaceflight. **Adam Hott**

2:00PM – 3:15PM

My Patients Used to be Your Students

Genetics • Symposium (75 min) • MS, HS, 2Y, 4Y

Join a genetic counselor to discuss common genetics misconceptions encountered in the clinic. Learn about modern genomics and leave with strategies to bridge the gap between classroom and health care decisions. **Kelly East**

3:30PM – 4:00PM

Refocus

Instructional Strategies/Technologies • Symposium (30 min) • MS, HS, 2Y, 4Y

Avoid many of the pitfalls of traditional genetic disorder projects and learn new ways to create projects that focus on underlying genetic concepts. This session focuses on ways to get students thinking past "what does an affected person look like". **Madelene Loftin**

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.

Made possible by:

LOCKHEED MARTIN

SEPA SCIENCE EDUCATION PARTNERSHIP AWARD
Supported by National Institutes of Health
Grant Number 8R25 OD010981-02

HUDSONALPHA
INSTITUTE FOR BIOTECHNOLOGY

FREE Digital Activity

Visit us at
Booth #406



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

triton.hudsonalpha.org

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

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

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

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

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

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

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

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

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



NABT 2016 Evolution Symposium
Emerging Research in Evolutionary Biology



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.

Rebecca Fuller, University of Illinois at Urbana-Champaign, Champaign, IL

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, University of Illinois at Urbana-Champaign, Champaign, IL; and Melissa Kjelvik, Elizabeth Schultheis, Alexa Warwick, and Louise S. Mead, BEACON Center for the Study of Evolution in Action, Michigan State University, East Lansing, MI

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



AMERICAN
SOCIETY FOR
MICROBIOLOGY

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>



asmscience.org/jmbe

Visit us at Booth #415!

asm.org

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

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

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

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

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, Ithaca, NY; and Nancy Morvillo, Florida Southern University, Lakeland, FL

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 – 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

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.

**COSTA RICA**

**"Reading about it is good,
experiencing it is unforgettable"**

"Let your students do experiential learning in COSTA RICA"



Visit us:
www.rainforestandreefcr.com

Contact us:
carola.t@rainforestandreefcr.com
+506 2289-4411

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

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

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

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

978 | Assessing Students' Prior Knowledge of the Chemistry in Cellular Respiration

Plaza Court 5 • General Biology • Paper (30 min) • 2Y, 4Y, GA

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

1085 | Implementing Profession-Based Learning and Entrepreneurship in the Bioscience Classroom

Plaza Court 6 • Curriculum Development • Paper (30 min) • HS, 2Y

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

1039 | Feedback for Learning in Biology

Plaza Court 7 • Instructional Strategies & Technologies • Hands-on Workshop (30 min) • MS, HS

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

miniOne

ELECTROPHORESIS

ELECTROPHORESIS IN ONE CLASS PERIOD



After 5 minutes



20 minute run



Experiment done!



The MiniOne System
\$279

VISIT US
BOOTH #206

 858-684-3190

 info@theminione.com

 www.theminione.com

NABT BIOLOGY EDUCATION RESEARCH SYMPOSIUM

2:00PM – 4:00PM • GOVERNOR'S SQUARE 12

SCHEDULED PRESENTATIONS:

Authentic Research Experience in the Introductory Biology Laboratory Improves Student Perception of Laboratory Skills, Knowledge and Interest in Scientific Research

Jacqueline S. McLaughlin, David E. Favre, Suzanne Weinstein, The Pennsylvania State University, and Christine M. Goedhart, Citrus College

Authentic undergraduate research laboratory experiences are essential to aid in the implementation of science education reform mandates and to effectively train a new generation of biology students who can think critically. These types of experiences have been shown to improve student comfort with, and perceptions of, science and to increase student persistence within the discipline, particularly for underrepresented student populations. Here we present assessment data on a unique four-step pedagogical framework that allows students to develop scientific thinking and practices while authentically engaging in the scientific process. This framework was used to transform a sophomore-level introductory biology laboratory course for biology majors at a 4-year college branch campus and an honors introductory biology laboratory course for non-majors at a 2-year college. The goal of the transformation was to provide students 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 knowledge, 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 adopted 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 social equality. And, over that same time period, American biology textbooks have repeatedly discussed genetic differences between races. This experiment tests whether racial terminology in the biology curriculum causes adolescents to develop genetic 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 Advancement 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. Attending to these three dimensions, we developed and tested high school biology lessons and closely-aligned assessment 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 religious 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 Bertka, 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 college 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 Four-Year Section Research in Biology Education Award

3:30PM – 4:00PM continued
1062 | DNA Sequencing in the High School Classroom

Plaza Court 8 • 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

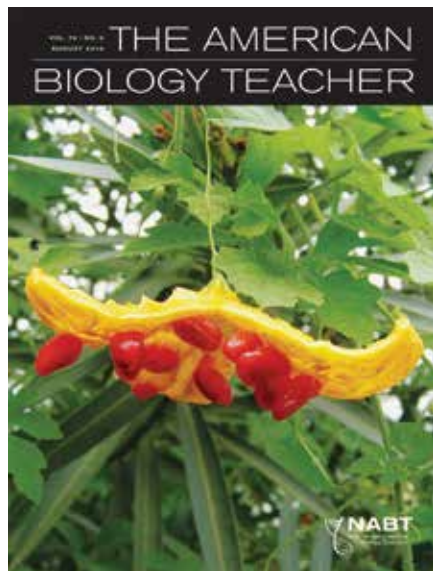
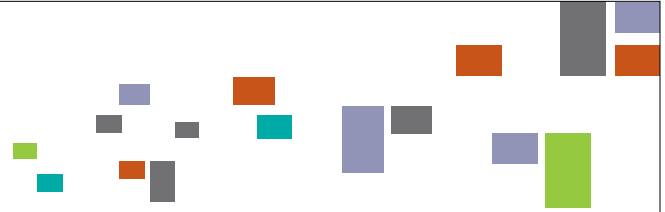
Plaza Ballroom ABC • Special Event (Tickets Required)

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

Advancing Knowledge
Driving Change



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.

ISSN: 0002-7685
eISSN: 1938-4211
Impact Factor: .229
Published: Monthly except June and July; combined Nov/Dec issue

abt.ucpress.edu

SATURDAY NOVEMBER 5

ABBREVIATION KEY

E: Elementary School

MS: Middle School

HS: High School

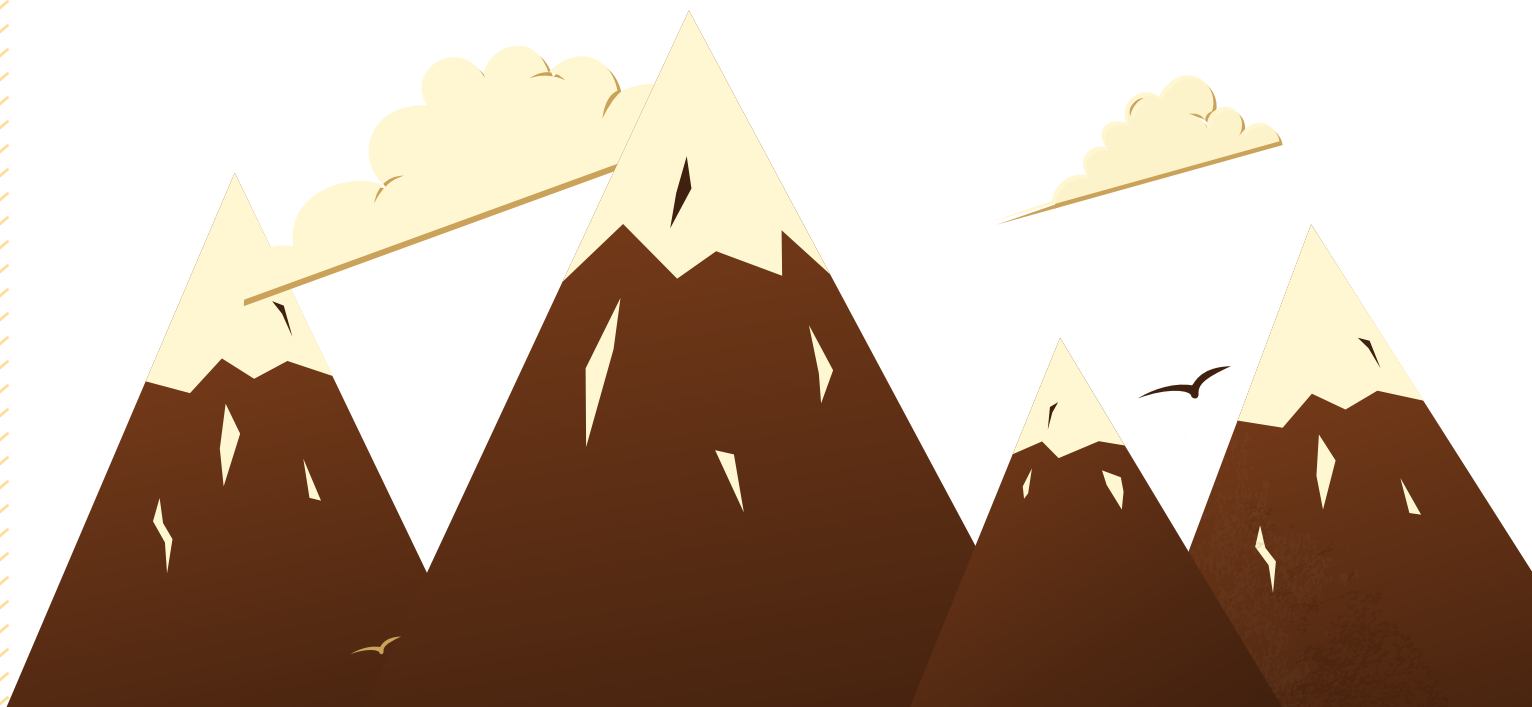
2Y: Two-Year College

4Y: Four-Year College

GA: General Audience

AP® is a registered trademark.

SATURDAY



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

**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)!

**9:00AM – 10:15AM****NABT Committee Meeting: Membership Committee**

Director's Row F • Committee Meeting • GA

Sherry Annee, Committee Chair

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

INTRO BIO TASK FORCE**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 – 11:45AM**Special Programming Presented by Flinn Scientific****All sessions in Director's Row J**

Meg Griffith

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.

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*

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*

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 Garden*

9:00AM – 10:15AM *continued*

963 | Come Create a Journal With Us! Providing an Authentic Research Experience through Publishing

Governor's Square 9 • Instructional Strategies & Technologies • Demonstration (75 min) • 2Y, 4Y, GA

In this session, participants will learn how to establish, manage, and publish a journal for their students. Participants will leave with information explaining how to connect their journal to the UndergradScienceJournals Network!

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

1086 | "Fracking? Here? Let's Talk About it!" A Hands-on Exploration of "Fracking" and Other Socio-Scientific Issues That Will Get Students to "Engage in Argumentation"

Governor's Square 10 • Ecology/Environmental Science/Sustainability • Hands-on Workshop (75 min) • MS, HS, 4Y

Millions of us now live alongside oil and gas development. This session will model a hands-on way for students to understand the environmental costs and benefits of "fracking", and how to "engage in argumentation" about other controversial science issues.

Ben Graves, Delta High School, Delta, CO

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. Hand-outs provided!

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

1129 | 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**

10:30AM – 11:00AM

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 about 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

1000 | Going Green With Algae: Algae as Energy

Plaza Court 6 • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Session participants will learn about the potential of algae as a biofuel and how to design inquiry-based labs using simple classroom algae photobioreactors made with water bottles.

Tom Freeman, Esperanza High School, Anaheim, CA; and Becky Sims, Boyce Thompson Institute, Ithaca, NY

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



We believe teachers are the real miracles of modern science.

Teachers get up every morning knowing they have the potential to change the world – just by showing up in the classroom and inspiring a love of science. Yes, they may feel overworked and even underappreciated. But by some miraculous feat, they remain true to their mission, touching the lives of students by imparting the gifts of knowledge and curiosity. We know. Because Carolina equips them for the task.

Learn more about our commitment at www.carolina.com/withyou

Carolina.
Right there with you.

CAROLINA[®]
www.carolina.com

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

△ INTRO BIO TASK FORCE

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, Winstead, 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

W. W. Norton Biology



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

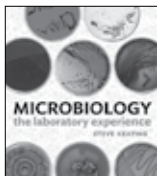
Developing scientific literacy through active learning.



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.
- **SMARTWORK5** 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

14. A Multifactorial Analysis of the Acceptance of Evolution in College Students

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

15. PTL Enhances Retention in STEM Majors Among Women and First-Generation College Students

Jeremy D. Sloane, Julia J. Snyder, Ryan Dunk, Christina 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

NABT POSTER SESSIONS | 9:00AM – 11:00AM • PLAZA COURT

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 Techentin, 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**29. Assessing the Prevalence of Antibiotic-Resistance in the Environment (PARE): Implementation of a Course-Based Undergraduate Research Experience in a Microbiology Course**

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

Non-Competition Posters *continued*

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-Dinwiddie, 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

Cayle 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
 Presenters***

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

Nasco **Dissection Materials**
 Contact Nasco for your FREE Catalog!

NASCOGuard
 HIGHEST QUALITY SPECIMENS

7% ON \$1000
10% ON \$2000
12% ON \$4000

FREE DELIVERY!
 STARTING AT \$500

ORDER MORE & SAVE!
 On Preserved (I.S.) Materials

USE COUPON #9800656MH. SOME EXCLUSIONS APPLY.

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

920 | Bringing a Pharmaceutical to Market

Plaza Court 7 • Biotechnology • Hands-on Workshop (75 min) • HS

This session looks at a course designed for a HS biotechnology class to show the upstream and downstream process of designing a pharmaceutical. Topics include aseptic techniques, biotechnology techniques, and the clinical trial component.

Ingrid Burke and Roxanne Puhalski, Northwestern Regional High School, Winsted, CT

1097 | Designing Authentic Field Studies for Secondary Students and Teachers

Plaza Court 8 • Ecology/Environmental Science/Sustainability • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Sue Arlidge from University of Calgary's Biogeoscience Institute and AP Biology teacher Mike Mckillop have run winter ecology field trips where students ask real science questions, gather real data, and analyze their results all in 1.5 days. Come see!

Sue Arlidge, University of Calgary, Biogeoscience Institute, Kananaskis, Alberta, Canada; and Mike Mckillop, Dr. E.P. Scarlett High School, Calgary, Alberta, Canada

**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

INTRO BIO TASK FORCE

1139 | Enhancing Student Ability to Model Complex Processes and Ideas in Introductory Classrooms

Director's Row I • Curriculum Development • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Presenters will share information on planning, developing, and carrying out integrated lessons on the ability to model biological processes like cellular respiration and physiological processes.

Steven Christenson, BYU Idaho, Rexburg, ID; Cindy Gay, Steamboat Springs School District, Steamboat Springs, CO; and Anna Hiatt, East Tennessee State University, Johnson City, TN

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.

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 Bourdélát-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

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

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



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>

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

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

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

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

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 Construct-
 ing 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 phospholip-
 ids 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

hhmi
*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

hhmi | **BioInteractive**

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

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=BGz0k3vfkOM>) 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

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*.

NABT UNDERGRADUATE BIOLOGY SUMMIT

Scalable Change in Undergraduate Biology Education

SATURDAY, NOVEMBER 5 • 1:30PM–3:30PM • Director's Row F

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 Stavrianaeas, 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.*

NABT

BioClub



MEMBERS

Ada High School, Ada, OK
Alcott High School for the Humanities, Chicago, IL
All Saints Studies Group, Cincinnati, OH
Alverno High School, Sierra Madre, CA
Anderson V Career Campus, Anderson, SC
Animo Leadership Charter High School, Inglewood, CA
Archbishop Curley High School, Baltimore, MD
Arroyo High School, San Lorenzo, CA
Athens Technical College, Athens, GA
Auburn High School, Rockford, IL
Barry Goldwater High School, Phoenix, AZ
Bethlehem High School, Bardstow, KY
Billings Senior High School, Billings, MT
Brandon Valley High School, Brandon, SD
Brooks Academy of Science & Engineering, San Antonio, TX
Broomfield High School, Broomfield, CO
Canyon Springs High School, Moreno Valley, CA
Cardinal Gibbons High School, Raleigh, NC
Carrboro High School, Carrboro, NC
Center for Advanced Professional Studies, Overland Park, KS
Central Falls High School, Central Falls, RI
Charleston High School, Charleston, IL
Collegiate School of Medicine and BioScience, St. Louis, MO
Colonia High School, Colonia, NJ
Convent of the Sacred Heart, New York, NY
Cuyahoga Community College, Parma, OH
Durant High School, Plant City, FL
Edgewater High School, Orlando, FL
El Centro College, Dallas, TX
Fayetteville High School, Fayetteville, AR
Florida SouthWestern State College, Naples, FL
Forsyth Central High School, Cumming, GA
Frankford High School, Philadelphia, PA
Freedom High School, Freedom, WI

George Mason High School, Falls Church, VA
Grafton High School, Grafton, WI
Grand View University, De Moines, IA
Grants Pass High School, Grants Pass, OR
Great Plains High School, Watertown, SD
Greensburg Salem High School, Greensburg, PA
Harnett Central High School, Angier, NC
Hazel Park High School, Hazel Park, MI
Heathwood Hall Episcopal School, Columbia, SC
Helena High School, Helena, MT
Hidden Valley High School, Roanoke, VA
Incarnate Word Academy, Houston, TX
International School of Minnesota, Eden Prairie, MN
Iowa City West High, Iowa City, IA
John Overton High School, Nashville, TN
KC Distance Learning, Bloomsburg, PA
Kenmore West High School, Buffalo, NY
Lake Metro Parks, Concord, OH
Lexington High School, Lexington, OH
Lincoln High School, Esko, MN
Marysville High School, Marysville, KS
Midland Park High School, Midland Park, NJ
MLK Magnet High School, Nashville, TN
Moscow High School, Moscow, ID
Mount Abraham Union High School, Bristol, VT
Mount Saint Mary Academy, Watchung, NJ
Nashville State Community College, Nashville, TN
Nassau Community College, Garden City, NY
Naugatuck Valley Community College, Waterbury, CT
Newport High School, Bellevue, WA
North Pitt High School, Bethel, NC
Packer Collegiate Institute, Brooklyn, NY
Parkland Magnet Middle School, Rockville, MD
Paul Cuffee Upper School, Providence, RI
Philip O. Berry Academy of Technology High School, Charlotte, NC

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

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

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

Sponsored by

CAROLINA
www.carolina.com

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.

Madelene 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.

3:00PM – 3:30PM

NABT Committee Meeting: ABT Advisory Committee

Director's Row F • Committee Meeting • GA

William McComas, Committee Chair

NABT Committee Meeting: Awards & OBTA Committees

Director's Row J • Committee Meeting • GA

Priya DasSarma and Mark Little, Committee Chairs

Special Programming Presented by The MiniOne

Twenty Minute Biotech

Plaza Court 1 • Biotechnology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

See how easy and engaging hands-on biotechnology can be. Come experience fast PCR and real-time electrophoresis techniques that will allow you to bring cutting-edge technology into the classroom and run a complete investigation in one class period.

Callen Hyland

1031 | Using an Active Learning Strategy To Impact Students' Acceptance of Evolutionary Theory

Governor's Square 9 • Evolution • Paper (30 min) • HS, 2Y, 4Y

This study explores the effectiveness of an active learning strategy aimed at reducing the threat university students' may perceive when studying evolutionary theory.

Mary Ellen Lohr, Middle Tennessee State University, Murfreesboro, TN

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


ENHANCE YOUR SKILLS WITH NYCC'S ONLINE **MASTER OF SCIENCE DEGREE IN Human Anatomy and Physiology Instruction**

NYCC's Master of Science in Human Anatomy and Physiology Instruction (MSHAPI) program is uniquely designed for those with science education, biology and professional healthcare degrees. The course of study builds on existing anatomy and physiology knowledge base, transforming the student into an exceptional A&P instructor for the undergraduate level of higher education.


This master's degree program is *offered online*, providing all the advantages of the online educational environment important to advanced learners including an asynchronous format to accommodate working professionals. It has components that:

- Assure competency over the entire spectrum of undergraduate anatomy and physiology instruction
- Provide a sound foundation in instructional theory and practices
- Allow for a measure of specialization through selection of elective courses

Contact the Admissions Office at **800-234-6922** or visit us at nycc.edu.




CLASSES STARTING IN JANUARY



NEW YORK
CHIROPRACTIC
COLLEGE

Finger Lakes School of Acupuncture & Oriental Medicine of New York Chiropractic College
 School of Health Sciences & Education

2360 Route 89
Seneca Falls, NY 13148



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

1134 | Using Primary Literature to Teach Data Literacy

Governor's Square 15 • Science Practices • Hands-On Workshop (30 min) • HS, 2Y, 4Y

HHMI BiolInteractive 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 BiolInteractive, Chevy Chase, MD

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

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

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

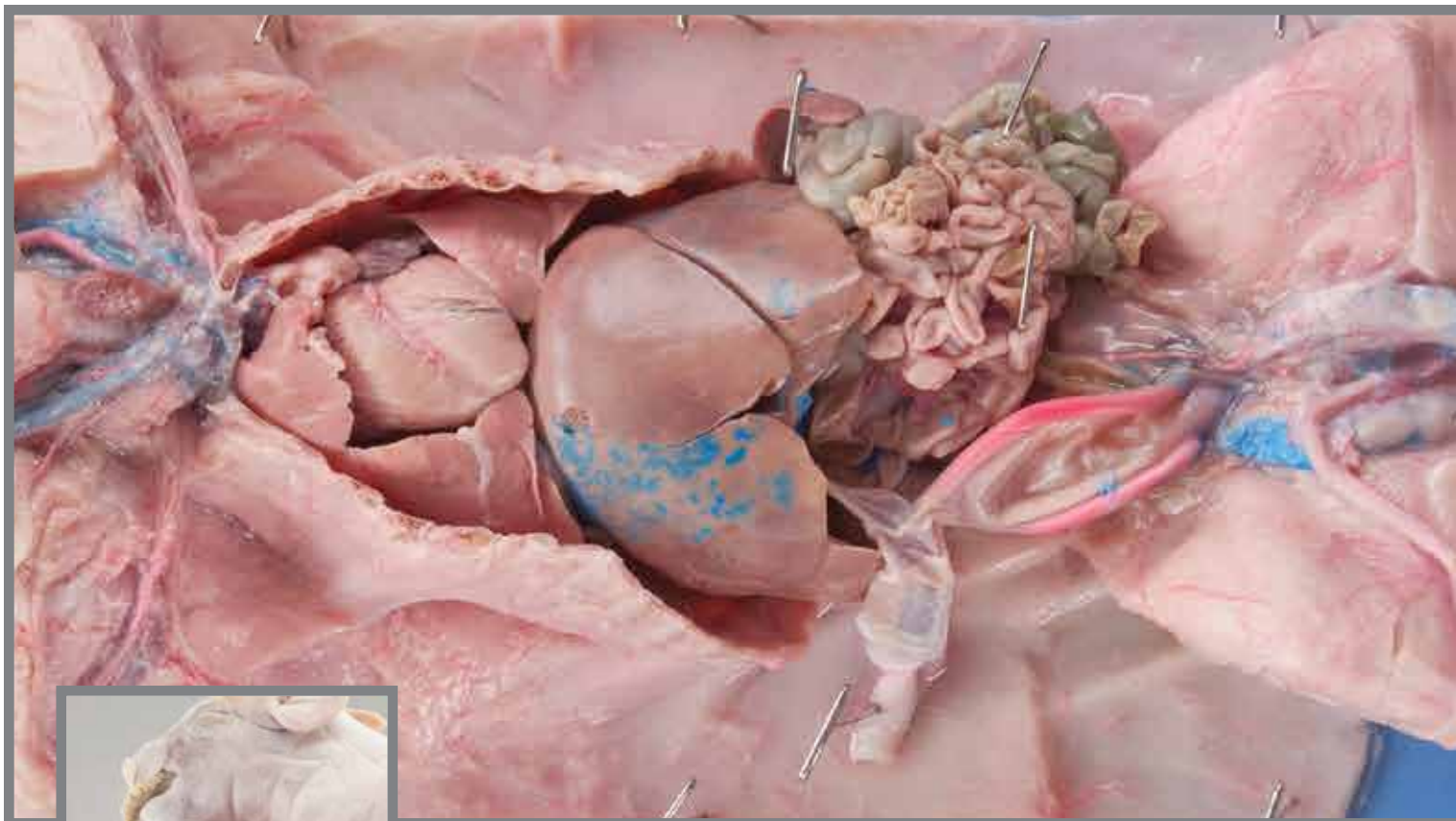
The Biology of Brewing

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





● **Ward's Pure Preserved**

The Ward's Pure Preserved specimen VOC content is barely detectable at a fraction above 0 parts per million.



● **Competitor Specimen**

The competitor's VOC level is off the sensor charts, at over 15–25 parts per million.

Purely the Best Dissection Experience

Introducing Ward's Pure Preserved™ Specimens

Give students a better hands-on understanding of living systems without compromising specimen quality or comfort in your classroom.

Ward's Pure Preserved™ Specimens deliver :

- **Superior preservation quality**
- **Zero formalin odor**
- **Safe and free of harmful volatile compounds**, like acetone and glutaraldehyde
- **Long lasting** for extended storage or month-long dissections
- **Easy disposal**; Simply dispose in your daily refuse container after dissection*
- Pre and post **product support**

See the Proof.

Watch the Ward's Pure Preserved Challenge.

We went head-to-head with the competition to measure disruptive chemicals such as acetone, formaldehyde, benzene, and more.

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.

SUNDAY NOVEMBER 6

ABBREVIATION KEY

E: Elementary School

MS: Middle School

HS: High School

2Y: Two-Year College

4Y: Four-Year College

GA: General Audience

AP® is a registered trademark.

SUNDAY



REMINDER: DAYLIGHT SAVING TIME ENDS ON SUNDAY AT 2AM.

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



Thank You NABT Sustaining Members!

PLATINUM LEVEL SUSTAINING MEMBERS	GOLD LEVEL SUSTAINING MEMBERS
<p>Bio-Rad Laboratories www.bio-rad.com</p> <p>Carolina Biological Supply Company www.carolina.com</p> <p>Howard Hughes Medical Institute www.hhmi.org</p> <p>Macmillan New Ventures www.macmillannewventures.com</p> <p>The MiniOne Electrophoresis www.theminione.com</p> <p>Pearson Education www.pearsoned.com</p> <p>Vernier Software & Technology www.vernier.com</p>	<p>PASCO Scientific www.pasco.com</p> <p>Seaworld Parks & Entertainment seaworldparks.com/teachers</p> <p>University of Nebraska at Kearney www.unk.edu</p>
SILVER LEVEL SUSTAINING MEMBERS	
<p style="text-align: center;">BSCS www.bsccs.org</p>	
<p>Sustaining Members share NABT’s mission to promote biology and life science education. Call NABT at (888) 501-NABT or visit www.NABT.org to learn more.</p>	

2016 EXHIBITORS

☉ 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

Sponsored by

3D Molecular Designs Booth 200

Milwaukee, WI • www.3dmoleculardesigns.com

Our innovative, hands-on kits and models focus on core ideas and cross-cutting concepts in biology, chemistry, physical and life sciences. We involve teachers in developing kits, writing materials and field testing. Kits meet STEM and Next Gen standards. Ask about Flow of Genetic Information and Phospholipid & Membrane Transport Kits.

Aidmics Biotechnology Booth 419

Taipei City, Taiwan • www.loveuhandy.com

μHandy is a bioscience tool designed for children. It turns your smartphones and tablets into mobile microscopes. With μHandy, kids can now explore the micro-world with ease.

American Physiological Society Booth 117

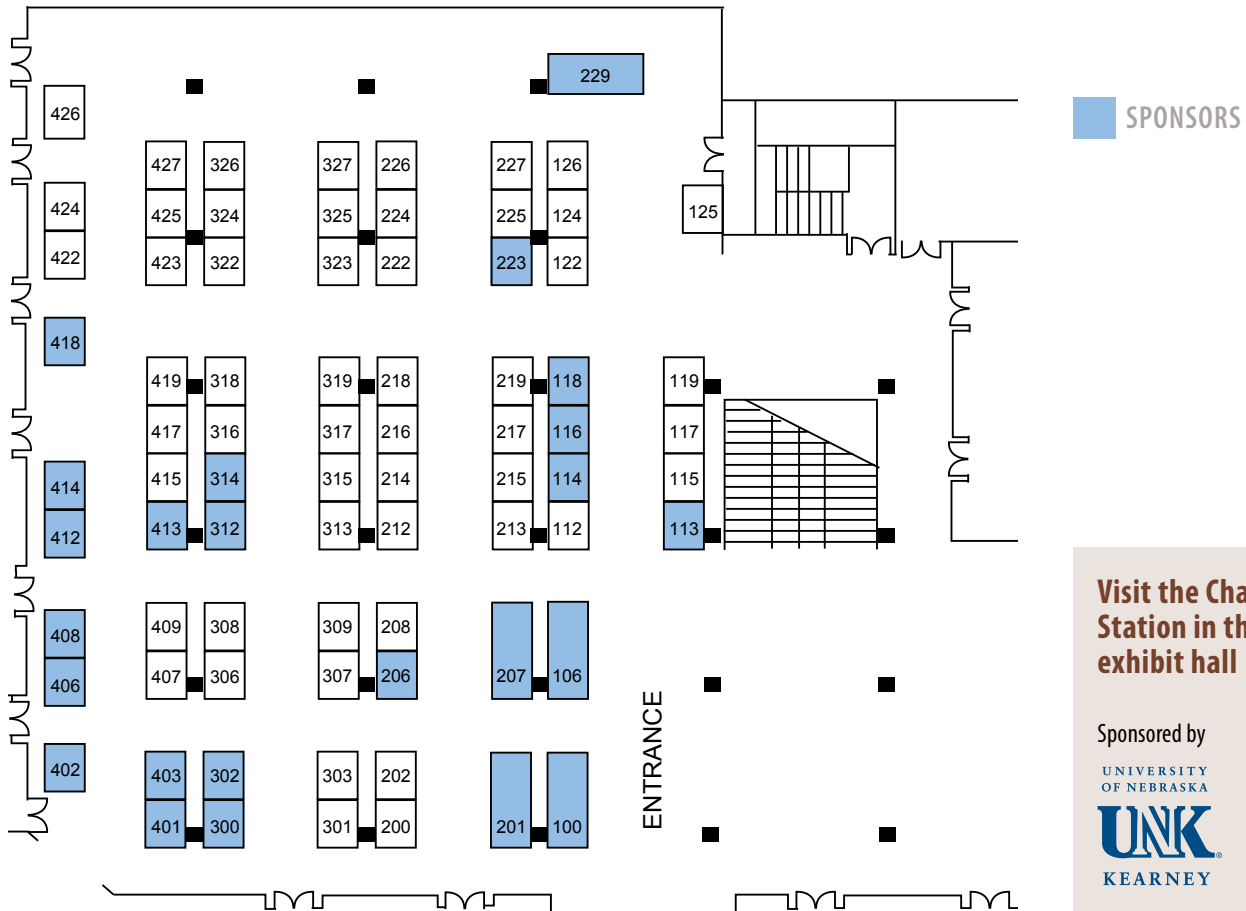
Bethesda, MD • www.the-aps.org

American Society for Microbiology Booth 415

Washington, D.C. • www.asm.org

The American Society for Microbiology is the largest single life science society, composed of over 47,000 scientists and health professionals. ASM's mission is to promote and advance the microbial sciences through conferences, publications, certifications and educational opportunities. Additionally, ASM promotes a deeper understanding of the microbial sciences to diverse audiences.

2016 EXHIBIT HALL FLOOR PLAN



Visit the Charging Station in the exhibit hall

Sponsored by

American Society of Plant Biologists Booth 317, 319

Rockville, MD • www.aspb.org

Anatomy in Clay Learning System Booth 124

Loveland, CO • www.anatomyinclay.com

ANATOMY IN CLAY® Learning System is an innovative, successful hands-on learning method used for anatomy education. By building body systems layer upon layer from the inside out using clay and specially-designed MANIKEN® models, students gain unique understanding and knowledge retention of how these systems work, inter-actively, together. Visit booth 124.

Animalearn Booth 325

Jenkintown, PA • www.thesciencebank.org

Looking for the latest non-animal teaching tools? Visit Animalearn, and learn how The Science Bank, our FREE loan program of humane science education products, can help your students understand life science without harming animals. Take the leap into the future of hands-on science teaching with Animalearn's The Science Bank today!

B.A.C.K. for Learning, L.L.C. Booth 409

Casa Grande, AZ • www.nabt.org

Biology Active Classroom Kits are designed by a Biology Educator with 15 years teaching experience. The kits are easy to manipulate and fun to use. They help students understand hard to visualize concepts.

Bedford, Freeman & Worth (BFW) Booth 306

Hamilton, NJ • highschool.bfwpub.com

At Bedford, Freeman and Worth, we've built our reputation on producing the highest quality materials for AP® courses, and we're proud to offer resources for a range of high school courses. Our groundbreaking books and media are based on changes in education, students populations, and accepted classroom best practices.

Bio Corporation Booth 412

Alexandria, MN • www.biologyproducts.com

Specimens done right. Priced for the now budgets. Bio Corporation specializes in preserved specimens and carry the dissection tools you will need to complete your labs. Check us out!

Bio-Link and AC2 Bio-Link Regional Center Booth 401

Austin, TX • www.ac2.bio-link.org

Austin Community College Bio-Link Regional Center (AC2) is a four year advanced technology education (ATE) center grant that will establish a distributed statewide leadership network focused on educational and industry based solutions using Communities of Practices (CoPs) to effectively establish networks supporting growth in Biotechnology industries in Texas and Kentucky.

Bio-Rad Laboratories Booth 207

Hercules, CA • explorer.bio-rad.com

Bio-Rad provides a completely supported life science experience. Starting with the highest quality curriculum and reagents, Bio-Rad provides peace of mind each time you spend your precious lab budget. We focus on providing teachers with the best resources possible so you can focus on what you do best – teach!

BIOZONE Corporation Booth 413

Parker, CO • www.thebiozone.com

BIOZONE publishes award-winning student resources for grades 9–12 biology (NGSS, AP, Honors, IB), anatomy & physiology, earth & space science, environmental science. Our successful 3-in-1 formula: textbook lite/study guide/activity book, along with impressive graphics and write-on format, fosters student engagement. Learn how these workbooks will revitalize your teaching program.

Bone Clones, Inc Booth 116, 118

Canoga Park, CA • www.boneclones.com

Bone Clones, Inc. manufactures detailed, high-quality osteological reproductions of skeletal elements. In addition to producing specimens exhibiting trauma and pathology, we have an extensive range of skulls and skeletons providing age, sex, and ancestry differences. Our durable replicas obviate the need for a dedicated teaching collection of real human remains.

Carolina Biological Supply Company Booth 312, 314

Burlington, NC • www.carolina.com

Carolina Biological Supply Company is a worldwide leader in providing top-quality, innovative science and math materials for educators. Carolina serves the K–16 market with everything needed to equip a science laboratory or classroom. A complete catalog, Carolina™ Science, is available free to educators and health professionals.

Cell Zone, Inc Booth 313

Springfield, MA • www.cellzone.org

Cell Zone offers learning products to transform your class into student-centered, active learning environments where more students achieve. Teachers report that our products help students move past memorization to understanding. Cells, mitosis, biological molecules, histology, diversity, and microscopy can all be taught with our products. Visit our booth and see.

EXHIBITOR KEY

SPONSORSHIP TIERS

● DIAMOND

● GOLD

● SILVER

● A LA CARTE

● TREASURE HUNT EXHIBITORS

2016 EXHIBITORS

Chill Expeditions Booth 222

Bala Cynwyd, PA • www.chillexpeditions.com

Chill Expeditions is a premier purveyor of student educational travel and eco-immersion in Central America, South America, Spain, and Greece. Owned and operated by former teachers, Chill Expeditions creates unparalleled experiential learning programs for middle school through university groups, customized to fit each teacher's educational goals.

Clemson University Booth 215

Clemson, SC •

www.clemson.edu/cafs/departments/biosci

The Department of Biological Sciences is proud to offer an online, non-thesis Master of Biological Sciences designed specifically for K-12 teachers. The curriculum consists 30 credit hours of relevant, rigorous, and challenging graduate courses that are specifically designed to improve science-content knowledge. This program is fully in a distance-learning format.

CogBooks Booth 427

Edinburgh, Scotland • www.cogbooks.com

CogBooks' massively scale-able Adaptive Learning system helps students learn more quickly and effectively. It learns from each individual's behavior, creating a unique profile and personalized path through the material. With the increased efficiency of adaptive, instructors save time, stop feeling overloaded and find time for more rewarding teaching experiences.

● Cogent Education Booth 100

Atlanta, GA • www.cogenteducation.com

Cogent Education offers Interactive Case Study software that allows students to explore a career in science, interact with the molecular world, and solve real-world problems. Designed by scientists, funded by NIH and NSF research, and proven to help students learn difficult biological concepts through inquiry and problem-solving.

Ecology Project International Booth 309

Missoula, MT • www.ecologyproject.org

Ecology Project International (EPI) connects teachers and classrooms with real conservation science in the field. At their field sites in Yellowstone, Costa Rica, Baja Mexico, Belize, and the Galapagos, teachers and students engage in critical research projects, study incredible ecosystems, and gain skills and knowledge to impact their own communities.

Educurious Booth 115

Seattle, WA • www.educurious.org

Educurious provides blended project-based courses that engage students in developing solutions to real-world challenges. Our blended learning approach leverages an online platform to deliver curriculum and provide a space for collaboration. Educators, students, and experts team up on project work and incorporate 21st-century learning with today's technology.

EDVOTEK Booth 303

Washington, D.C. • www.edvotek.com

Edvotek manufactures robust research-grade biotechnology education experiments, biologics, reagents, and equipment for high schools and colleges. Experiments include DNA fingerprinting, electrophoresis, forensics, PCR, molecular cloning, immunology, environmental science, and AP Biology. Products offer hands-on investigations with options for student participation in inquiry-based extensions that merge science and education.

E for Evolution Booth 122

Mexico DF, Mexico • www.evolution.com

E for Evolution is a small e-business dedicated to improving the public understanding of Evolutionary Biology. We offer attractive graphic material designed to complement course contents, presentations, lectures, and classroom decoration. All products reflect the point of view of the most renowned science writers and educators.

eScience Labs LLC Booth 407

Sheridan, CO • www.esciencelabs.com

eScience Labs collaborates with hundreds of higher education institutions to provide a traditional hands-on laboratory experience to students engaged in online and blended learning. Through a combination of hands-on lab kits, virtual learning tools and customized digital curriculum, eScience Labs helps higher education institutions expand and strengthen science comprehension.

● Fisher Science Education /G-Biosciences Booth 402

El Dorado Hills, CA •

www.gbiosciences.com/BTSNM.aspx

Fisher Science Education, working with G-Biosciences and Ellyn Daugherty, provides one-stop shopping for all Biotechnology: Science for the New Millennium (BS4NM) equipment, reagents, and supplies. The 2017 edition of the BS4NM curriculum includes a comprehensive textbook, lab manual, and lab kits, as well as an extensive set of teacher support materials.

● Flinn Scientific Inc. Booth 403

Batavia, IL • www.flinnsci.com

Flinn Scientific is the leader in science and laboratory chemical safety. Publisher of the world-renowned Flinn Science Catalog Reference Manual, Flinn develops and offers a full line of chemistry, biology, physics, life science, Earth science, physical science, and safety products for middle and high schools.

Genetics Society of America/American Society of Human Genetics Booth 214

Bethesda, MD • www.ashg.org/education/

ASHG is the world's leading professional society for genetics professionals of all types. As part of our mission to discover, educate, and advocate, we support high school and college faculty by providing free, inquiry-based lesson plans and professional development. We also host the national DNA Day Essay Contest for students

GIANTmicrobes Booth 424

Stamford, CT • www.giantmicrobes.com

Bring an interactive, memorable and engaging approach to your classroom with GIANTmicrobes plush cells, microorganisms and other life science themes. Educational hangtag cards have fun facts about each microbe or cell. A wonderful teaching tool to help your students think about the microscopic world in new ways!

Hands-On Labs Booth 208

Englewood, CO • www.holscience.com

Hands-On Labs is the leader in online science for higher education. For over 20 years, HOL has been producing high-quality physical lab kits that mirror the traditional campus science laboratory experience in a distance learning setting. Hands-On Labs has the most trusted materials, content, and latest cutting-edge technology.

HHMI BioInteractive Booth 229

Chevy Chase, MD • www.hhmi.org/biointeractive

HHMI's BioInteractive team develops free resources based on real data, highlighting research practices. Our short films, virtual labs, apps and print materials combine important science with engaging presentation. These multimedia resources are developed, vetted, and field-tested by educators and scientists – and are all tied to national curriculum standards.

Holbrook Travel Booth 218

Gainesville, FL • www.holbrooktravel.com/

Since 1974, Holbrook has offered engaging, inquiry-based educational travel across Latin America, Africa, and beyond. From teacher-led scientific expeditions for students to professional development for educators, Holbrook incorporates rich academic experiences with a focus on STEM learning. Plus, ask about our ecolodge and private rainforest reserve in Costa Rica!

HudsonAlpha Institute for Biotechnology Booth 406, 408

Huntsville, AL • www.hudsonalpha.org

HudsonAlpha Institute for Biotechnology is a nonprofit genomics and genetics research institute. Its mission is four-fold: sparking scientific discoveries that can impact human health and well-being; bringing genomic medicine into clinical care; fostering life sciences entrepreneurship and business growth; and encouraging the creation of a genomics-literate workforce and society.

Kendall Hunt Publishing Booth 223

Dubuque, IA • www.kendallhunt.com

Kendall Hunt is the exclusive publisher of BSCS Biology: A Human Approach. KH is proud to have partnered with BSCS for 20 years to develop curriculum materials that fully implement the 5E model and now the Next Generation Science Standards.

Macmillan Learning Booth 308

Plymouth, MI • www.macmillanlearning.com/

Macmillan Learning combines a proud tradition of textbook publishing with robust learning technology. Now representing Sapling Learning, Hayden-McNeil, and a suite of lab solutions, Macmillan Learning welcomes the opportunity to support outstanding teaching and learning endeavors in Biology. We invite you to visit us at Booth 308 for more information.

Maderas Rainforest Conservancy Booth 212

Miami, FL • www.maderasrfc.org

The Maderas Rainforest Conservancy 501 (c) 3, was established to promote the conservation and management of Mesoamerican forests through education, conservation and community outreach. We are funded by travel opportunities available for groups and researchers. Our fair trade booth offers products made by our women's entrepreneurship project.

MaLa Scientific Booth 316

Glenside, PA • www.malascientific.com

MaLa Scientific produces educational models, lesson plans, and student supplies for teaching blood cell biology and diseases. The macroscopic models enable instant understanding of various anemias, leukemias and lymphomas, the the lesson plans emphasize qualitative and quantitative understanding of the hematopoietic system. Student and faculty feedback has been outstanding.

miniPCR Booth 113

Cambridge, MA • www.minipcr.com

DNA curious? miniPCR develops innovative tools to enable hands-on DNA experimentation. The DNA Discovery System is a portable biotech lab including a miniPCR machine, blueGel electrophoresis and transilluminator, and a micropipette. Teach Genetics, Food Safety, Forensics, and more with miniPCR Learning Labs. Put DNA analysis entirely in the hands of students!

Monsanto Company Booth 114

St. Louis, MO • www.discover.monsanto.com

Sustainable agriculture requires all aspects of STEM to develop the many tools farmers need to combat pesky insects and pressure from weeds, among other challenges. By getting everyone involved and informed, together we can prepare for a growing world — one that's projected to be 9 billion people by 2050.

MSOE Center for BioMolecular Modeling Booth 202

Milwaukee, WI • cbm.msoe.edu/

An instructional materials development laboratory, we create student-centered, hands-on kits and models for the molecular biosciences. Through our professional development experiences, teachers learn active teaching skills and are involved in developing and field testing new kits. Ask about SMART Teams and Science Olympiad Protein Modeling Event outreach programs.

2016 EXHIBITORS

Nasco Booth 318

Modesto, CA • www.enasco.com

Nasco specializes in secondary and university level science material, kits, live and preserved specimens, and lab equipment. Our laboratory-bred *Xenopus* frogs have served the research community for over 35 years. We focus on quality products and budget-sensitive prices. Please visit us at www.enasco.com or call 1-800-558-9595.

National Academies Press Booth 315

Washington, D.C. • www.nap.edu

The National Academies Press (NAP) was created by the National Academy of Sciences to publish the reports of the National Academies of Sciences, Engineering and Medicine. The books published by the NAP provide authoritative information on important matters in science and health policy.

National Center for Science Education (NCSE) Booth 216

Oakland, CA • www.ncse.com

NCSE defends the integrity of science education against ideological interference. We work with teachers, parents, scientists, and concerned citizens at the local, state, and national levels to ensure that topics including evolution and climate change are taught accurately, honestly, and confidently.

National Math and Science Initiative Booth 324

Dallas, TX • www.nms.org

NMSI is transforming education across the nation by building college readiness through exceptional teaching. We are a non-profit focused on delivering effective educational programs to states and schools by providing training and resources.

Nebraska Scientific Booth 423

Omaha, NE • www.NebraskaScientific.com

Your supplier for biology and life science supplies, especially preserved specimens for dissection – including fetal pigs, frogs, brains, hearts and more. We also offer live specimens, models, skeletons, kits, microscopes and more. Free catalog.

New York Chiropractic College Booth 224

Seneca Falls, NY • www.nycc.edu

New York Chiropractic College offers an on line Master's degree in Human Anatomy & Physiology Instruction, which is a great opportunity for those seeking to teach Anatomy & Physiology at the undergraduate level or obtain professional development credit.

● OpenStax, Rice University Booth 300, 302

Houston, TX • openstax.org/

OpenStax is a nonprofit based at Rice University, and our mission is to improve access to education. Our free, peer-reviewed textbooks have been used by over 1.5 million students, and we're piloting adaptive, personalized learning technology that improves learning. Through philanthropic partnerships, OpenStax is empowering students and instructors to succeed.

● PASCO Scientific Booth 201

Roseville, CA • www.pasco.com

Help students "think science" with PASCO Scientific's award-winning, state-of-the-art science learning environment. Integrating STEM and the latest standards-based content, probeware, and data collection and analysis software, PASCO science solutions are easy to use, cost-effective, and work on your devices: iPad®/iPhone®, Chromebook™, Android™ tablets and phones, and Mac® and Windows® computers.

Pearson Booth 112

Bloomington, MN • www.pearsoned.com

Every learning moment builds character, shapes dreams, guides futures, and strengthens communities. At Pearson, your learning gives us purpose. We are devoted to creating effective, accessible solutions that provide boundless opportunities for learners at every stage of the learning journey. For more information, visit www.pearsoned.com.

Pearson Lab Booth 126

Bloomington, MN • www.pearsoned.com/

In this booth Pearson will feature demonstrations and short talks given by classroom teachers, authors, and experienced educators sharing useful biology teaching strategies, methods, and insights. Come to hear Fred & Theresa Holtzclaw share AP Exam test preparation strategies, Brad Williamson talk about data and statistics, Valerie May demonstrate how she sets up a "course" for her students in MasteringBiology, Eric Simon talk about strategies for increasing the relevance of the course for students, and Diane Sweeney share her students 'Greatest Hits' in MasteringBiology. These succinct, 20-minute talks and demonstrations will be scheduled throughout the exhibit hall hours (check your program for the schedule).

Rainforest and Reef CR Booth 322

Escazu, San Jose, Costa Rica • www.rainforestandreefcr.com

Rainforest and Reef Costa Rica is a travel company with more than 18 years of experience, helping professors in the design of the best programs to bring the classroom curriculum outside, according with interests and budget, where participants can experience what they are learning in a real life environment.

SimBio Booth 301

Missoula, MT • www.simbio.com

SimBio is a leading developer of interactive, simulation-based labs in biology, used in over 25% of colleges and universities. Please stop by our booth to meet an author, see our ecology, evolution, genetics, and cell-biology modules, explore the brand new Understanding Experimental Design lab, and/or register for FREE evaluation software.

Small World Journeys Booth 425

Earlville, Australia •
www.smallworldjourneys.com.au

Educational Adventures Australia! We are the only tour operator in Queensland/Great Barrier Reef region devoted solely to student groups. Our multi-day trips center around biology, ecology, Aboriginal culture, sustainability and community service projects. All-inclusive tours with expert guides, customized to match your budget and educational goals. We are the only tour operator in Queensland & Great Barrier Reef region devoted exclusively to student group tours. Our multi-day trips center around biology, Aboriginal culture, sustainability, marine science and community service projects.

Speak Easies Booth 323

Santa Rosa, CA • www.speakeasies.biz

Biology teachers created Speak Easies hands-on manipulatives to engage students and build comprehension and retention. NGSS-aligned kits make lecturing easy too! Imagine your students at the markerboard constructing a cell membrane or enacting cellular respiration! Even challenged learners get it. Stop at our booth and get your sample.

The American Phytopathological Society Booth 225

St. Paul, MN • www.apsnet.org

The American Phytopathological Society (APS) is a 501(c)(3) nonprofit scientific organization dedicated to the study and control of plant diseases.

The MiniOne Electrophoresis Booth 206

San Diego, CA • www.theminione.com

The MiniOne Electrophoresis System is powered for research and priced for education, making hands-on, inquiry-based education accessible for all schools. DNA bands separate in 20 minutes allowing students to prepare, run, and document their experiments in one class period. The MiniOne engages students and simplifies classroom management, safely and affordably.

University of Nebraska at Kearney Booth 418

Kearney, NE • ecampus.unk.edu/onlinegraduate-programs

UNK is a public university offering quality and affordable education. The two accredited graduate programs in Biology and in Science/Math Education are for those who want to become better teachers and inspire their students. UNK is a leader in online education offering 40+ online programs and 400+ online courses.

U.S. Department of Energy, Bioenergy Technologies Office 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, costcompetitive, high-performance biofuels, value-added products, and biopower to reduce dependence on fossil fuels.

Van-Griner Booth 219

Cincinnati, OH • www.van-griner.com

Van-Griner is an independent publisher whose sole focus is creating the best product and experience for instructors and students. For instructors this translates into one-to-one customer care with the opportunity to take advantage of all of our services including print and digital. Students get the best price in the business.

B.A.C.K. for Learning
Biology Active Classroom Kits

Biology kits designed by a Biology Educator

Actively teaches hard to visualize concepts

Come see us in booth 409

Kits are easy to manipulate and fun to use

2016 EXHIBITORS

● Vernier Software & Technology Booth 106

Beaverton, OR • www.vernier.com/

Vernier Software & Technology is the leader in data collection technology for biology, life science, and environmental science education. Our award-winning hardware, software, and curricula will help you integrate technology and inquiry into your courses. Visit our booth to see what's new and enter to win a Vernier LabQuest Stream!

● Vizi Online Texts Booth 414

Mucie, IN • www.vizicourseware.com

Vizi Online Texts are interactive, online learning resources designed to engage students more effectively than traditional print textbooks. Using a multimodal approach, Vizi allows students to learn important concepts at their own pace and provides faculty feedback to evaluate student preparedness. Contact Vizi for free trial access.

Ward's Science Booth 307

Rochester, NY • www.wardsci.com

All you need to turn your science lessons into science connections. Ward's Science is your complete solution for materials and support for every science subject.

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.

WeatherHawk Booth 417

Logan, UT • www.weatherhawk.com

WeatherHawk®, a division of Campbell Scientific, Inc., is responsible for the sales and support of the WeatherHawk family of personal weather stations and handheld wind meters. WeatherHawk is used by schools, government agencies, agriculture, industry, homeowners, resorts, and consumers in a wide variety of applications.

Wisconsin Fast Plants Booth 125

Madison, WI • www.fastplants.org

Wisconsin Fast Plants freely shares innovative resources for teaching science at all levels with rapid-growing Fast Plants. We bring to NABT and share online NGSS-aligned resources for elementary, middle/high school, and AP Biology. From life cycle, to genetics, evolution and environmental sciences, Fast Plants bring science alive.

W.W. Norton and Company Booth 217

New York, NY • www.wwnorton.com

The oldest and largest publishing house owned wholly by its employees, W. W. Norton, Inc. publishes about 400 trade, college, and professional titles each year.



THANKS to the many VOLUNTEERS

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

 #NABT2016



You recognize excellent teaching ...
so do we!

Nominate a teacher for a 2017 NABT Award.

Award Nominations must be received by **March 15, 2017.**

Submit your nomination at
www.nabt.org/awards



2016 PROGRAM PARTICIPANTS

A

Agboola, Oluwaseun	32
Alvarado Rodriguez, Karen	50
Amagai, Satoshi	23, 65
Ambos, Catherine	38
Anderson, Charles (Andy)	50
Angle, Julie	30, 51
Annee, Sherry	43
Argall, Brittany	56
Arlidge, Sue	54

B

Baird, William	47
Baltzley, Michael	51, 52
Barber, Nicola C.	40
Barnes, Elizabeth	40, 50
Bascom-Slack, Carol	51
Bateman, Ken	41
Baum, Kristen	51
Baumgartner, Erin	59
Beachly, William	51
Beadles-Bohling, Amy S.	51, 59
Beardsley, Paul M.	40, 50, 51
Beck, Shannon	51
Bennett-Day, Brooke	52
Bertka, Connie	40
Birt, Julie A.	50
Blair, Amy C.	52
Bland, Mark W.	51
Blasberg, Michael	45
Boehm, Julie	41
Boettger-Tong, Holly	52
Bokor, Julie	23, 32
Bonetta, Laura	28
Bonney, Kevin	48
Boomer, Sarah	51, 52
Bosse, Ephiram	51
Bourdélat-Parks, Brooke	55
Bourne, Nathaniel	56
Brewer, Rebecca	62
Brigati, Jennifer	52
Brokaw, Ann	45
Broo, Jennifer	23, 57
Brown, Jeffrey	59
Brownell, Sara E.	40, 50
Buchmann, Ann	52
Bucklin, Carrie J.	30, 52

Burke, Ingrid	54
---------------	----

C

Campbell, A. Malcolm	52
Campbell, Benjamin	50
Campbell, Polly	51
Carden, Jennifer	44
Cardenas, Deborah	38
Carter, B. Elijah	52
Chasteen, Stephanie	59
Cheatham, Tom	40
Cheesman, Kerry	51, 52
Cheesman, Maryann	51
Chou, Chris	28
Christenson, Steven	54
Clark, Christopher	56
Clark, Jim	36, 53, 58
Close, Pamela	37
Conneely, Bridget	38, 62
Cooper, Robert	65
Cortinas, Summer	37
Costlow, Jessica L.	51
Cotner, Sehoya	48
Cowles, Elizabeth	32
Craig, Matthew	29
Crean, Jason	29, 36, 58
Csikari, Melissa	32, 57

D

Daniel, Kristy L.	50, 51, 52
DasSarma, Priya	61
Daugherty, Ellyn	29
de Beer, Josef	56
Deal, Kelsey	51
Dean, Kellie	62
Delgado, Francisco	56
Derouin, Paige	56
Dillard, Sheila	52
Donovan, Brian M.	40
Donovan, Sam	44, 51, 52, 59
Dougherty, Michael	54
Doust, Andrew	51
Dubach, Jean	58
Duncan, Jason	59
Dunk, Ryan	50
Dutrow, Natalie	62

E

East, Kelly	31, 61
Eberhard, Mark	28
Elbirt, Diana	56
Elfring, Lisa	27
Elser, James	40
England, Ben	52

F

Failor, Kim	32
Fairbanks, Sue	51
Fassler, Amy	38
Favre, David E.	40
Ferguson, Lee	37, 44, 55
Fernandes, Nicole	58
Fernandez, Martin	40
Finazzo, Susan	21, 48
Fleming-Davies, Arietta	51, 59
Fletcher, Linnea	34
Ford, W. David	50
Forshee, Lance	30, 39, 44
Foster, Danielle	51
Fowler, Vivia L.	52
Foy, Brian	37
Freeman, Tom	47
French, Donald	30, 34, 39, 44, 50, 51, 62
Fulcher, Teresa	32
Fuller, Rebecca (Becky)	33

G

Gallucci, Kathy	32
Garcia, Juan C.	56
Gardner, Grant	32, 40, 50, 59
Garimella, Umadevi	36
Gates, Terry	56
Gathmann, Dennis	48
Gay, Cindy	48, 54
Genet, Kristen	55
Gentile, Chris	30
Getty, Stephen	50
Gibson, Amanda	62
Gibson, J. Phil	38
Glover, Cassandra	50
Goedhart, Christine M.	40
Gonzalez, Elizabeth	36
Granados, Enya	50

Grandgenett, Neal	52
Grandin, Temple	9, 58, 62
Graves, Ben	44
Griffith, Meg	43
Grim, Jeffrey M.	59
Gusky, Sharon	48

H

Hafey, Michelle	56
Hagins, Whitney	23, 53
Haine, Dana	36
Hale, Alison	44, 51, 52, 59
Hamerlinck, Gabriela	44, 51, 59
Hanzlick-Burton, Camden	58
Hardy, Joyce	52
Hawkins, Rachel	62
Henson, Kate	48
Herman, Tim	28, 44, 57
Heyer, Laurie J.	52
Hiatt, Anna	32, 38, 50, 54
Hogan, Kelly A.	59
Holmberg, Tara Jo	34
Holtzclaw, Fred	46, 53
Holtzclaw, Theresa	46, 53
Hong, David	38
Hott, Adam	31, 43, 61
Hove, Alisa	38
Hulleman, Chris S.	50
Hurst-March, Robin	50
Hyland, Callen	61

I

Inbarasu, Jeba	56
Ingemunson, Kate	30

J

Jamison, Wendy	52
Jenkins, Kristin	44, 59
Johnson, Samantha	53
Johnson, Wendy R.	50, 62

K

Kapley, Becky	58
Kayes, Lori	59

Kean, Sam	10, 54, 61, 62
Kenney, W. Larry	10, 37
Kirkelie, Erin	51
Kiser, Stacey	43, 59
Kjelvik, Melissa	33
Klein, Chi	32, 36
Kleinschmit, Adam	51
Koehler, Michele	29
Kowalski, Susan	27
Kraves, Dr. Sebastian	44
Kroen, William	52
Krutchen, Anne	59
Kuhn, Bob	30, 62

L

Lamb, Neil	31, 43, 48
Lampley, Sandra	32
Langen, Tom A.	51
Langendorf, Ryan	36
Latham, Kristin	51, 52
Lazzaro, Brian	36
Leatherman, Judith L.	52
Lemus, Mireya	50
Leone, E. Austin	50
Lionberger, Karen	36
Lisenbee, Cayle S.	52
Little, Mark	61
Loftin, Madelene	31, 61
Lohr, Mary Ellen	61
Lontok, Katherine	37
Lukin, Kara	47
Lytte, Rachel	32

M

Mahoney, Jessica	23, 57
Makky, Khadijah	51, 52
Maloney, Judith	51
Marcey, David	27
Marcy, Ariel	48
Maroo, Jill	30
May, Valerie	65
McComas, William	48, 61
McConnell, David	8, 27
McDaniel, Ivy	29
McKillop, Mike	54
McKinley, Maggie	56

McLaughlin, Jacqueline	27, 40, 56
McLean, Peter K.	56
McNeil, Leigh	40
Mead, Louise	33
Metz, Anneke	24
Meyers, Stacy	56
Michelotti, Ron	47
Minbiole, Julie	38
Mischke, Michelle	53
Moore, John	52
Moore, Michael K.	52
Moore, Michael E.	50, 51, 62
Moran, Sean	23
Morgan, William	52
Morris, Amy	51, 52
Morvillo, Nancy	36
Mourad, Teresa	51
Mower, Teddie	43
Muñoz, Evelin	50
Munzenmaier, Diane	28
Muzny, Dylan	48

N

Nadel, Julie	38
Nailor, Natalie	52
Nash, Troy N.	50, 59
Neufeld, Howard	38
Nicholas, Lori	48
Nielsen, Mark	53
Nolen, Zachary L.	50

O

O'Connor, Karen	29
Orndorf, Haley	52
Orr, Rebecca	57
Ostrander, Elaine	8, 24
Ovard, Leslie	52
Oxley, Florence M.	50

P

Palffy, Christina	29
Paradise, Christopher J.	52
Parrish, Jennifer	40, 50
Parsley, Kathryn M.	50
Pashkevich, Michael	51

2016 PROGRAM PARTICIPANTS

Pauley, Mark	52
Peters, Brenda J.	52
Petersen, Neal	52, 56
Peterson, Brian	29
Peterson, Zachary	52
Petto, Andrew	50
Pfaffinger, Christine	62
Pfannerstill, Jennifer	30, 36, 43, 53
Phillips, Paula	53
Pigg, Rachel M.	50, 59
Pobiner, Briana	40
Poole, Angela	51, 52
Poole, Jesse	51, 52
Porter, Dan	29
Premathilake, Dineesha	51
Price, Mitch	30
Pruneski, Justin	50
Puhalski, Roxanne	54
Pulliam, Kanika	54

Q

Quizon, Rafael	29
----------------	----

R

Ragan, Alisha	54
Reardon, Ryan	23, 44
Reece, Takisha	38
Robalino, Javier	45
Robertson, Tom	58
Robinow, Steven	27
Robinson, Andrea	36
Rogg, Steve	45
Roseman, Jo Ellen	40
Royal, Brenda	53

S

Sabel, Jaime	34, 52
Sadler, Kim	32
Salinas, Karina	50
Sanchez-Dinwiddie, Melanie	52
Satterthwait, Donna	39
Schultheis, Elizabeth	33
Schussler, Elisabeth	52
Scott, Aleutia	56
Sferrazza, Melanie	51

Shabani, Lilian	51
Sharpe, Tanya	61
Shaw, Tarren	59, 62
Shiverdecker, Terry	52
Shmaefsky, Brian	56
Shriner, Walter	59
Siegel, Marcelle A.	40
Sigismondi, Linda	38, 55
Sims, Becky	47
Sloane, Jeremy D.	50
Smith, Kelcie	50
Smith-Staton, Linda	38
Snider, Caitlin	51
Snodgrass, Helen	28
Snyder, Julia J.	50
Sorger, Daniela Magdalena	56
Sowell, Scott	32
Stam, Alan	51, 52
Stark, Louisa	40, 46
Stavrinaeas, Stasinios	59
Steel, Jordan	50, 51
Steinwand, Blaire J.	59
Stennett, Betty	27
Stevenson, Shannon	52
Stonewood, Jesse	36
Stoughton, Julie A.	51
Strode, Paul	23, 36, 48
Swails, Nancy	51, 52

T

Techentin, Danielle	51
Thomas, Aimée K.	51, 56
Tighe, Damon	28
Traphagen, Stephen	30
Truong, Sy	50
Tucker, Matt	56

U

Uno, Gordon	48
-------------	----

V

van Hoeck, Kathy	29, 58
Vogt, Gina	28, 44, 57

W

Waliczek, Tina Marie	50
Walter, Emily M.	50, 51, 59
Walters, Payton	51
Ward, Jennifer	38
Warwick, Alexa	33
Watson, William	40
Weinstein, Suzanne	40
Welch, Amy	47
West, Shonqualla	51
Westenberg, Dave	37
Whalen, Joe	39
Wilburn, Kaylee	50
Wiles, Jason R.	50
Wilkes, Austin	51
Will, Tammy	51
Williamson, Brad	29, 43, 53
Williamson, Carol	56
Williamson, Paula S.	50
Winterton, Christina I.	50
Wojdak, Jeremy	59
Wojiski, Sarah	57
Wolf, Alexis	52

Y

Yang, Christine	36
Yang, Suann	50, 59
Young, Virginia A.	52

Z

Zaret, Shannon	52
Zedalis, Julianne	61
Zeitlin, Maria	52

We have what you need. Booth 412



www.biologyproducts.com

UNK UNIVERSITY OF NEBRASKA KEARNEY | **eCAMPUS** EXCELLENCE IN ONLINE EDUCATION

**IMPROVE YOUR
TEACHING,
INSPIRE YOUR
STUDENTS.**

Earn a degree fully online in:

M.S. in Biology or

M.S.Ed. in Science/Math Education

visit ecampus.unk.edu

For more information, visit
our booth **#418** or call **1.800.865.6388**.

Nebraska
UNIVERSITY OF
Online Worldwide

The University of Nebraska is an affirmative action/equal opportunity institution. Individuals needing accommodation under ADA should contact the ADA Coordinator at UNK, 308.865.8655. UNK Communications & Marketing. 08.2016

INDEX OF SESSIONS BY SUBJECT

ANATOMY & PHYSIOLOGY

Of All The Nerve	44
What it Takes: Human in Deep Space	31

AP BIOLOGY

BIOZONE's AP Biology: From Content Coverage to Understanding	34
Creating Cognitive Models to Foster Connections Within the AP Biology Curriculum	44
EK + SP = LO: Remodeling Legacy AP Biology Questions to Align with the Redesigned Exam	30
Enzymes: Technology Inspired by Nature	28
Exploring and Teaching with Mathematical Models in the Biology Classroom-Meeting the Challenge	29
Exploring <i>The Violinist's Thumb</i> Study Guide	61
Help Your Students Succeed in AP Biology	46
Identifying Strengths and Problems: Using College Board Learning Objectives to Improve Assessment and Metacognition in AP Biology	30
Improving Science Practices Through Evaluating Scientific Journal Articles	29
Introducing Bioinformatics Resources to Study Human Disease	38
Measuring Learning Outcomes with Good Multiple-Choice Questions	30
Not Just Blowing Bubbles: Modeling Population Demographics	37
The AP Curriculum Meets Vision and Change: Incorporating Active Learning in Small Classrooms and in Large Lecture Halls	36
The Exosome: Making Chemical Exposures Relevant to Biology Instruction	36
Un-"covering" AP Biology: How "Doing Biology" Connects the Course to the Exam	53
Unleash Inquiry in AP Biology	45

BIOTECHNOLOGY

Biotech is STEM - Molecular Modeling.....	29
Bringing a Pharmaceutical to Market	54
Contagion! Track the Spread of Dangerous Disease	28
Discovering DNA with a Novel Way to Perform PCR, Anywhere!	44
DNA Detectives: Applications of DNA Profiling ...	28
DNA Sequencing in the High School Classroom ...	41
GMO Detection Without PCR	37
How STEM & Modern Agriculture Bridge: A Look at Technology	46
How to Give Your Students the Best of Everything in Biotech	34
miniPCR and blueGel electrophoresis - Transforming Biotech!	58
Molecular Scissors, Mission (Im) Possible, and the PTC: Personal Genetics Presenters	53
Proteins are the Cash of Biotech - The rAmylase Project	29
Starting a Biotech Program One Piece of Equipment at a Time	28
Top 10: Genetics and Biotechnology Discoveries 2015	48
Twenty Minute Biotech	61

COMMITTEE MEETING

ABT Advisory Committee	61
Archival Committee	30
Awards & OBTA Committees	61
Four-Year Section Committee	65
Four-Year Section Executive Committee	24
Global Perspectives Committee	27
Membership Committee	43
NABT Board Meeting	23

Nominating Committee	34
Professional Development Committee	38
Retired Member Committee	48

CURRICULUM DEVELOPMENT

Beyond the Mean: Using Data for Instruction and Assessment	30
Getting More Out of Less: Designing Short Homework Assignments that Focus on Application and Analysis	38
Implementing Profession-Based Learning and Entrepreneurship in the Bioscience Classroom	39
Improving Student Success in Introductory Biology: The Use of Summative Assessment as an Inclusive Practice	32
Intro Bio Task Force: Enhancing Student Ability to Apply the Process of Science in Introductory Classrooms	48
Intro Bio Task Force: Enhancing Student Ability to Model Complex Processes and Ideas in Introductory Classrooms	54
Intro Bio Task Force: Enhancing Student Quantitative Literacy and Reasoning in Introductory Classrooms. What is it? How do I Teach it? And How do I Measure it?	43
Join The American Biology Teacher Team: Writing and Reviewing for the ABT	48
Project-Based Learning in the Biology Classroom	58

ECOLOGY / ENVIRONMENTAL SCIENCE / SUSTAINABILITY

Activities for the Anthropocene	47
Authentic Research In The Classroom: Using Plant-Based Research To Explore Ecological Responses to Global Change	38
Data, Ecology and More Data	48
Designing Authentic Field Studies for Secondary Students and Teachers	54

Ecological Service Learning: Connecting Natural and Human Communities	34
Environmental Monitoring with PASCO Wireless Sensors	45
“Fracking? Here? Let’s talk about it!” A Hands-on Exploration of “Fracking” and Other Socio-scientific Issues That Will Get Students to “Engage in Argumentation”	44
Inquiry-based Ecology Using a Citizen Science Trail Camera Project	38
Now You See It, Now You Don’t - Patterns in Ecology	36
Sustainable Earth Speed Dating - In a Hurry to Find a Solution?	43
Trophic Cascades: A Force of Nature	53
Using Data and Graphics to Stimulate Student Learning	55

EVOLUTION

Drowsy <i>Drosophila</i> : Rapid Evolution in the Face of Climate Change	57
Emerging Research in Evolutionary Biology: Data Nugget Workshop	30, 33
Emerging Research in Evolutionary Biology: Why Be Blue in a Swamp? The Evolution of Color Patterns and Color Vision in Killifish	30, 33
Evolution the NGSS Way	46
Getting Beyond the Obvious: Barriers to Teaching and Learning Evolution	48
Go Extinct! An NGSS-aligned Board Game Engaging Players with the Most Radical Idea in Biology ..	48
Having a BLAST with Plants: Using Rubisco to Explore Evolutionary Relationships	32
Phylocards - A Plant Evolution Card Game	38
Simulating Genetic Drift with EXCEL	36
The Red Queen’s Race: An Experimental Card Game to Teach Coevolution	62
Using an Active Learning Strategy To Impact Students’ Acceptance of Evolutionary Theory ..	61

GENERAL BIOLOGY

Accessibility of Biology Lab for Students Who are Blind Increased by Making Novel Models and Tactile Items	38
Algae Beads: Study Photosynthesis and Cellular Respiration	28
Assessing Students’ Prior Knowledge of the Chemistry in Cellular Respiration	39
Biology for NGSS: A New Approach for a New Program	34
Breaking Down the Stages of Cellular Respiration	38
BSCS Biology A Human Approach - An Inquiry-based, NGSS Aligned Curriculum	55
Developing Student Thinking in the Biology Classroom Without Recreating Your Entire Year: Analysis of the Rigor of Your Lessons	32
Engaging Graduate Teaching Assistants in Lesson Study to Improve Instruction in an Introductory Biology Laboratory Course	32
Finding the Genetic Basis of Diseases and Traits: RB, CF, and BMI	54
Flinn Favorite Biology Lab Activities and Games ..	43
Flipping AP Biology With Flinn Prep	43
Foolproof Gel Electrophoresis for Pennies Per Student	32
From Folklore to Herbal Medicines to Science ..	38
Going Green With Algae: Algae as Energy	47
Integrating Undergraduate Research into the Curriculum of Introductory Biology Courses for Majors and Nonmajors	55
Interactive Case Studies for Biology, AP Bio, & Anat-Phys	58
Introductory Biology Students’ Use of Rubrics and Reflection Questions as Scaffolds to Engage in Metacognition and Enhance Understanding ..	34
Investigating a Rare Disease through Hands-on and Blended Settings	32

Melanin: A Model NGSS Storyline	29
Online Education for Biology and Science Teachers	29
Online Resources for Energy Concepts in High School Biology	27
Simple, Inexpensive Ways to Develop Understanding of the Most Difficult Biological Concepts	36
SMART (Students Modeling a Research Topic) and MAPS (Modeling a Protein Story) Teams: Taking Teaching Protein Structure and Function to the Next Level	28
Testing the Testing Effect: Modifying Summative Assessments to Enhance Learning	62
The Ins and Outs of Constructing and Crossing the Cell Membrane!	57
Utilizing Models in Biology	62
Zoo Genetics: A Free, Phenomenon-driven Curriculum	58

GENETICS

Big Data, Big Science, Big Impact	31
Genes, Genomes and Personalized Medicine: An NIH-SEPA Project	28
HudsonAlpha’s Collecting Cancer Causing Changes	44
My Patients Used to be Your Students	31

GLOBAL EDUCATION

Implementing Vision & Change at the Departmental Level with PULSE Rubrics: A Hands-on Workshop for College and University Faculty	27
---	----

INSTRUCTIONAL STRATEGIES & TECHNOLOGIES

An Easy-to-Use Platform for All Your Open Content Needs	46
Authentic Modeling in Biology Class	54

INDEX OF SESSIONS BY SUBJECT

Bringing Professional Biological Research into the Classroom	32
Come Create a Journal With Us! Providing an Authentic Research Experience through Publishing	44
Custom-Build High-Quality Course Materials with aerSelect	46
Discussion-Based Classrooms - Teaching Biology Without Direct Instruction	29
Engaging Students with Authentic Scientific Literature	32
Engaging Students with Literacy Strategies	62
Feedback for Learning in Biology	39
Future of the Textbook: Adaptive, Personalized Courseware	46
Get that Grant Money!	28
Going Beyond the Biology Book with OpenStax and Odigia	46
Graduate Student Networking and Mentoring Workshop	27
Hands-on DNA Forensics Activity for the College Classroom	48
Identifying Changes in Preservice Biology Teachers' Science Teaching Efficacy After Facilitating an Authentic Biology Research Course	30
Integrating SimBio Virtual Labs with OpenStax's Bio Textbook	46
Let's Get Digital: Teaching Biology with Adaptive Courseware	46
Making the Impossible Possible - Leveraging Active Learning in Class and On the Go	47
Modeling in the Pre-AP Biology Classroom	36
My Flippin' Classroom	58
NABT Biology Education Research Symposium	38, 40
Personalized Learning with OER, An Educator's Best Friend	46
Refocus	31

The Making of and Science Behind Touching Triton	31
Using Workshop in the Biology Classroom to Get Students to Think Like Scientists	48
Using Interactive Notebooks to Improve Student Learning in AP Biology	55
Undergraduate Biology Summit: Scalable Change in Undergraduate Biology Education	59, 61
Visualizing Student Thinking Using the NGSS Approach	36
What are My Students Thinking? Preparing for Your Flipped Biology Class	62

INVITATION ONLY

NABT/BSCS AP Biology Academy Workshop	23
NABT/BSCS AP Biology Academy Reception	24
Past President's Meeting	24
QUBES Math Anxiety Faculty Mentor Network	23

MEAL FUNCTION (TICKETS REQUIRED)

AP Biology Section Luncheon	34
BioClub Breakfast	43
First Timers' Breakfast	27
Four-Year Section Luncheon	34
<i>Touching Triton</i> Breakfast	43
Two-Year Section Luncheon	34

MICROBIOLOGY & CELL BIOLOGY

ASM Presents: Vectors of Disease	37
Coupling Case Studies And Multimedia To Increase Engagement In Introductory Biology Courses	57
Molecular Wars: Using Simple Models To Understand Viruses, Drugs, And Disease	45

PLANT PHYSIOLOGY

Inheritance and Variation of Traits in Wisconsin Fast Plants	44
--	----

POSTER SESSION

General Biology Education Posters	48, 50
Global Perspectives Committee: Local to Global: Citizen Science Across Borders	56, 61
Mentored Undergraduate Research (Student Competition)	51
Scholarship of Teaching and Learning (Student Competition)	50

SCIENCE PRACTICES

The DataBlitz: Student Presentation of Authentic Research	47
Design, Implementation, and Evaluation of Faculty Mentoring Networks: A Model for Promoting Faculty Teaching Scholarship	44
Do You See What I See?	58
It's Statistics, Not Sadistics: Simply and Effectively Utilize Statistics in Science Classes to Teach the Scientific Method	29
Lessons Learned from a Flipped Classroom	32
Making Natural Phenomena Central in the Biology Classroom	62
Temperature Conversions: Explaining $y=mx+b$	36
Using Primary Literature to Teach Data Literacy	62
Using the 5E Instructional Model to Teach Life Science: An Immersive Learner Experience	36
SPECIAL EVENT (TICKETS REQUIRED)	
Behind the Scenes at the Denver Zoo	23
The Biology of Brewing	62
HHMI Night at the Movies with Sean Carroll	41
NABT Honors Luncheon	54
Rocky Mountain Arsenal Wildlife Refuge	65

SPECIAL PROGRAM


Book Signing with Sam Kean and Temple Grandin	62
Exhibit Hall Closing Reception	41
Exhibit Hall Opening Reception	24
NABT Open Forum	23

SPECIAL SPEAKER

Aging in a Changing Climate: Physiology in Context	37
Different Kinds of Minds Contribute to Science	58
The Violinist's Thumb	54
What Research Tells Us About Effective Strategies That We Will Actually Use	27
Whole Genome Sequencing in Dogs: Facilities Studies of Breed Variation and Disease Susceptibility	24

SPECIAL WORKSHOP (TICKETS REQUIRED)

20 in 20: The Next Chapter	23
Bringing Natural History Museum Collections into the Classroom: Exploring 55 Million Years of Horse Evolution in Response to a Changing Climate	23
Intro Bio Task Force: Unpacking Common Competencies and Science Practice Outcomes in K-18 Biology Education	23
Math And Stats In The Biology Classroom With HHMI BioInteractive	23, 65
Touching Triton Implementation Workshop	61




UNI Overseas Placement Service

"An incredible opportunity for science teachers to meet and interview with over 120 American K-12 schools from around the world."

\$50 All-In Registration Fee Includes:

- ◆ Access to UNI Overseas Recruiting Fair - Feb. 3-5, 2017
- ◆ UNI Employment Database
- ◆ UNI staff support and publications



University of Northern Iowa

Registration begins Sept. 1, 2016.
Registration deadline Jan. 13, 2017.
Visit website below for details.

UNI Overseas Placement Service for Educators
 UNI Career Services, 102 Gilchrist
 Cedar Falls, Iowa USA 50614-0390
 Phone: (319) 273-2083 Fax: (319) 273-6998
 E-mail: overseas.placement@uni.edu
www.uni.edu/placement/overseas

EVOLUTION IS FUN

CHECK OUT OUR GRAPHIC MATERIAL



Science **e** for evolution

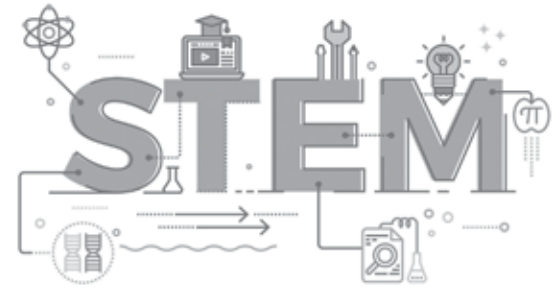
communication

- POSTERS • INFOGRAPHICS •
- PRINTS • DIGITAL FILES • FULL COLOR •
- PRINT/PRESS/SCREEN QUALITY • MECHANISMS •
- EVIDENCE • MAIN CHARACTERS •
- TIMELINE • HUMAN EVOLUTION •
- MISCONCEPTIONS • EXAMPLES •

eforevolution.com

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

TEACH THE SCIENCE ALL K-12 STUDENTS SHOULD KNOW



Our essential STEM education resources
are free to download.
www.nap.edu

VISIT US AT BOOTH # 315

THE NATIONAL ACADEMIES PRESS

American Society For Microbiology	35
B.A.C.K for Learning, LLC	71
Bio Corporation	77
Bio-Link and AC2 Bio-Link Regional Center	45
Bio-Rad Laboratories, Inc.	7
Carolina Biological Supply Company	47
E for Evolution	82
Howard Hughes Medical Institute	57
HudsonAlpha Institute for Biotechnology	31
IEEE (EMB)	55
miniPCR	Cover 3
Nasco	53
National Academies Press	82
New York Chiropractic College	61
OpenStax College Rice University	Cover 2, 1
PASCO Scientific	20
Rainforest and Reef CR	37
The MiniOne Electrophoresis	39
The Washington University	Cover 4
University of California Press (UC Press)	41
University of Nebraska at Kearney	77
University of Northern Iowa Overseas Placement Service	81
Vernier Software & Technology	25
W.W. Norton & Company	49
Ward's Science	63

National Association of Biology Teachers

Certificate of Attendance

is hereby granted to:

to certify that he/she has attended the
NABT Professional Development Conference

November 3–6, 2016
Denver, Colorado



Bob Melton, NABT President–2016



Our Mission

The National Association of Biology Teachers **empowers** educators to provide the best possible biology and life science education for all students.

Today
NABT empowered
thousands of educators.

With your help, we can
empower even more
tomorrow.

Our Values

We believe that...

- ...biological science education at all levels is essential and fundamental for all in a global society.
- ...teachers are professionals entitled to respect, recognition and opportunities for growth in discipline knowledge and pedagogical excellence.
- ...teachers are the best advocates for their students, colleagues and the profession.
- ...the science of biology and the practice of pedagogy are dynamic and linked.
- ...all biology learning experiences should be engaging, meaningful, holistic, and immerse students in the nature and practices of science particularly with application to other sciences, society and world issues.

Donate now at
www.nabtdonations.org



2017
ST. LOUIS
NOV
9-12



Professional Development Conference
ST. LOUIS UNION STATION HOTEL • ST. LOUIS, MO

The DNA Discovery System™

Electrophoresis, PCR, and biotech
for the classroom



Booth 113

Demo: Sat. 1:30PM

Plaza Court 1

minipcr®

Science for everyone, everywhere

MASTER OF SCIENCE IN BIOLOGY FOR SCIENCE TEACHERS



Two summer institutes in residence at Washington University's main campus in St. Louis.



Online coursework during the academic years.



Acquire nationwide contacts with colleagues who are working to strengthen biology education.



Participate in professional networks to keep in touch and to provide support for papers and conference proposals.



Develop leadership skills for curriculum innovation at the district, local and national levels.

ucollege.wustl.edu/msinbiology | schoolpartnership@wustl.edu | (314) 935-6700

VISIT US TODAY IN BOOTH 213!