



ST. LOUIS 2017

NOVEMBER 9-12, 2017

ST. LOUIS UNION STATION HOTEL
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CONFERENCE

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- **9:00 a.m. - 10:00 a.m.: Building an online science kit with Carolina Biological and OpenStax**

Learn about building an online science kit with hands-on investigations for your students.

- **10:00 a.m. - 11:30 a.m.: Help us shape the future of ed tech – OpenStax Tutor Beta Feedback Session***

Help us make more gains in student learning and get free OpenStax Tutor Beta access for your students.

- **1:30 p.m. - 3:00 p.m.: Forge a new frontier in education with OpenStax Tutor Beta***

Learn best practices from OpenStax Tutor Beta user Melissa Hardy and explore how to help raise the bar for learning technology across the board.

* Refreshments will be provided



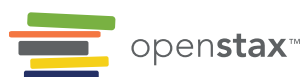
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SPECIAL THANKS

NABT thanks these organizations for their generous support of activities at the 2017 Professional Development Conference.

PROGRAM PARTNER



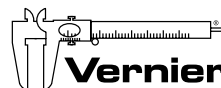
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Welcome to St. Louis, Gateway to the West, and the host city for the 2017 NABT Professional Development Conference!

Whether this is your first conference or your fortieth, you will find something to renew your enthusiasm for classroom teaching, find new ideas for biology instruction, and expand your biology “family.”

There are a multitude of events competing for your time and here are a few you should not miss:

- The NABT Open Forum on Thursday is your opportunity to help us shape the future of NABT.
- First Time attendees are invited to meet some not-first timers at breakfast on Friday to share a meal and learn about the conference.
- Getting more involved at NABT is as easy as meeting the wrong person at the right time at leader meet ups and committee meetings.
- The Friday evening HHMI Night at the Movies with Sean Carroll is always an educational and inspiring.
- NABT will present the 2017 Distinguished Service Award to Dr. May Berenbaum on Saturday.
- And we end with what promises to be a great evening with a great group of people at the City Museum.

Conference planning is a year-long process involving many people who ensure we have an excellent program that suits your professional development needs. The Professional Development Committee is central to the development of the program and there are an additional seventeen standing and ad hoc committees which work throughout the year to further the vision and goals of NABT. The NABT Board of Directors, and their commitment, advice, and support this year has been invaluable. Our Executive Director, Jacki Reeves-Pepin, has also continued to be a steady, capable hand guiding the organization. Thank you all for your dedication and hard work. Finally, I would like to thank our numerous sponsors and exhibitors. Our conference and many of our programs happen because of their generous support. Please be sure to thank them when you visit the Exhibit Hall.

While you are here don't forget to share your experiences with the NABT community using **#NABT2017**.

I look forward to meeting you while we are in St. Louis, and I hope you have a spectacular conference! Learn something new, meet someone new, recharge, and return home prepared to face the challenges and reap the rewards of teaching.



Susan Finazzo, NABT President 2017

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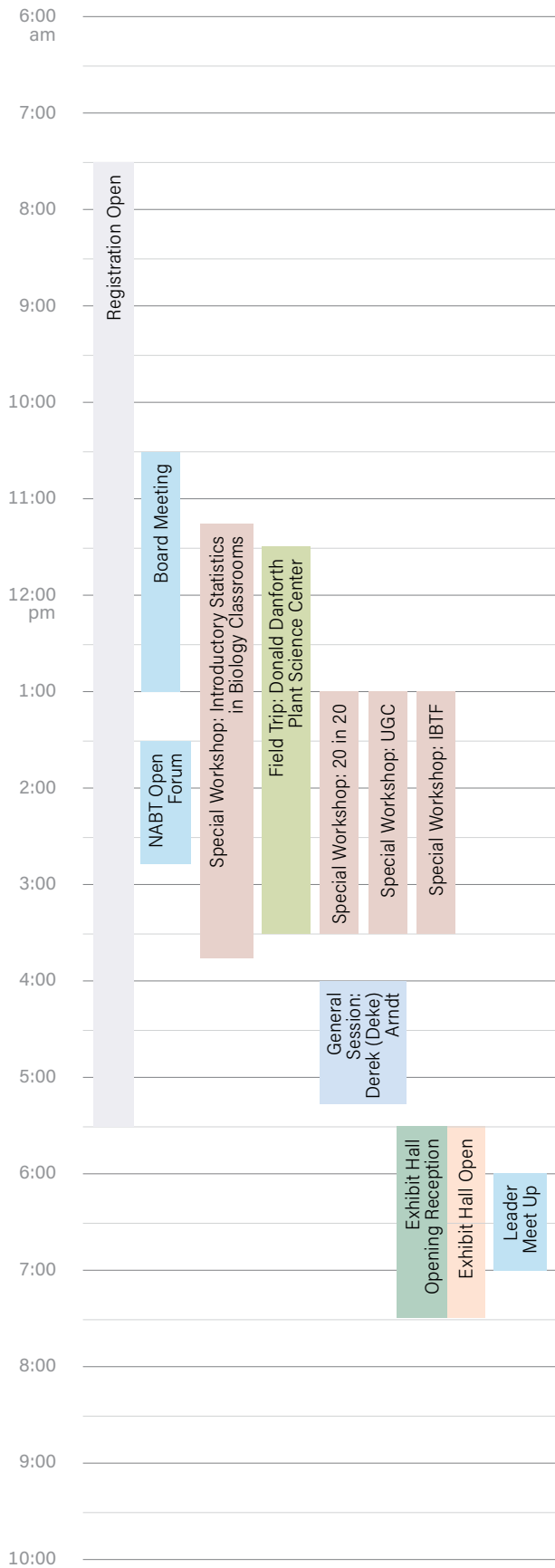
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HELPFUL ITEMS

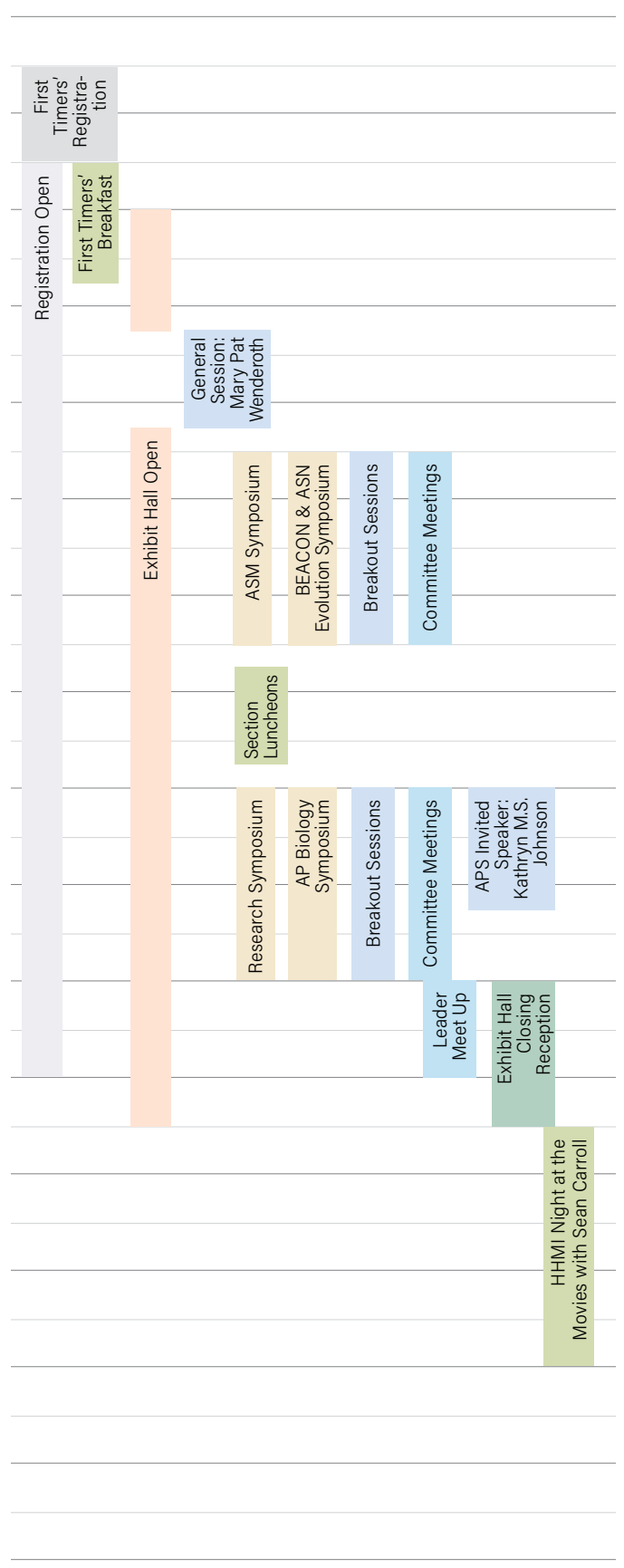
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**SCHEDULE
AT A GLANCE**

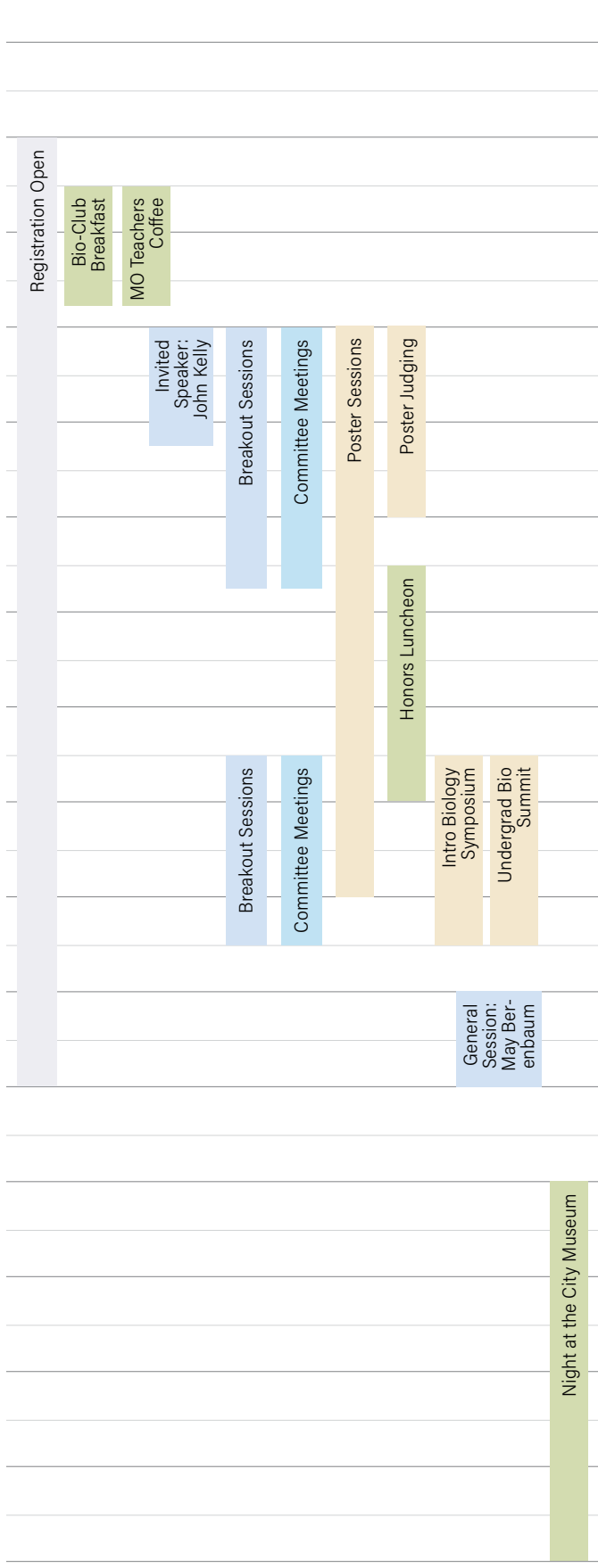
Thursday



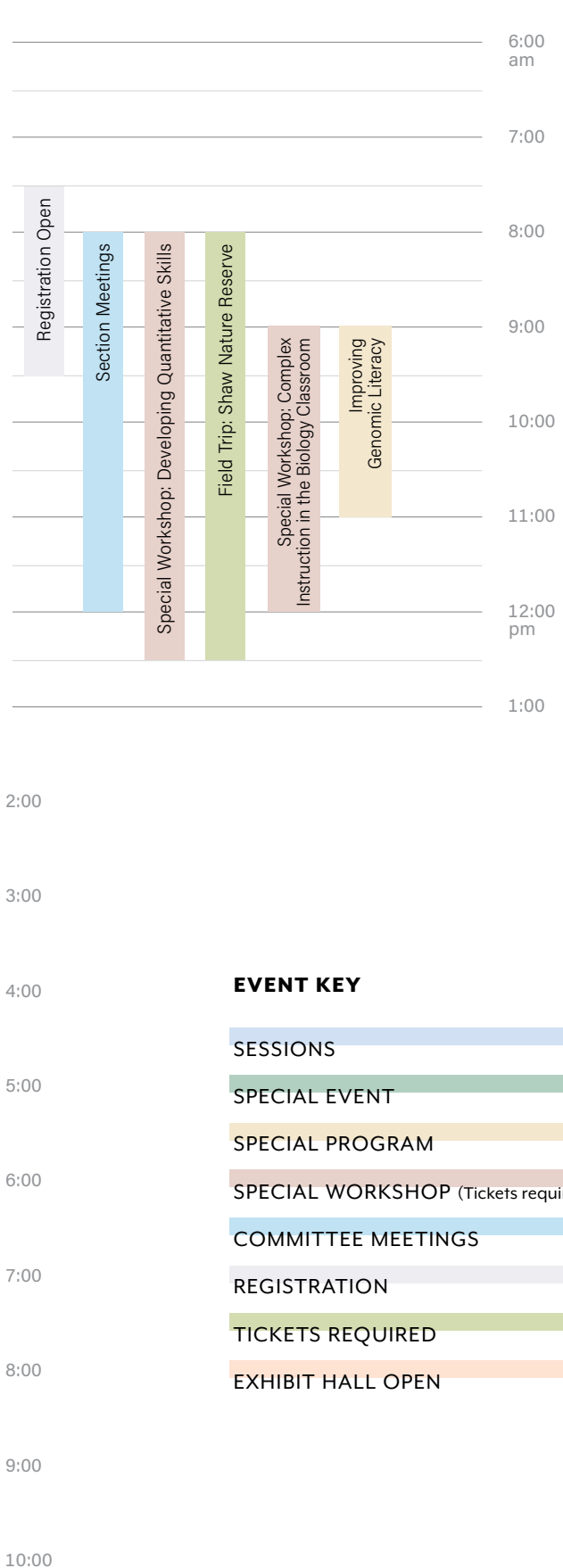
Friday



Saturday



Sunday



EVENT KEY

- SESSIONS
- SPECIAL EVENT
- SPECIAL PROGRAM
- SPECIAL WORKSHOP (Tickets required)
- 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 first floor, at the Depot Registration Office. It will be open during the following hours:

Wednesday, November 8

4:00 PM – 6:00 PM

Thursday, November 9

7:30 AM – 5:00 PM

Friday, November 10

6:30 AM – 7:30 AM

First Timers' registration

7:30 AM – 5:00 PM

Saturday, November 11

7:00 AM – 6:00 PM

Sunday, November 12

7:30 AM – 9:30 AM

**FUTURE NABT CONFERENCE
DATES & SITES****2018 Professional
Development Conference**

November 8–11, 2018

Sheraton San Diego Hotel & Marina,
San Diego, CA

**2019 Professional
Development Conference**

November 14–17, 2019

Sheraton Grand Chicago
Chicago, IL

**2020 Professional
Development Conference**

November 5–8, 2020

Baltimore Marriott Waterfont
Baltimore, MD



Use #NABT2017 to Tweet from St. Louis!

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 St. Louis Union Station Hotel. Please consult this guide and signage for room information.

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 9 5:30pm – 7:30pm

Friday, November 10 8:00am – 5:30pm
(Closing Reception starts at 4:00pm)

**WIFI LOG-IN DETAILS**

SSID

NABT

Password

nabt2017

**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.

**Providing Session Feedback**

All education sessions are reviewed by the NABT Professional Development Committee for acceptance. Help us ensure you see great sessions at the NABT Conference. Use the QR code or visit <https://www.surveymonkey.com/r/nabt2017> to submit feedback.



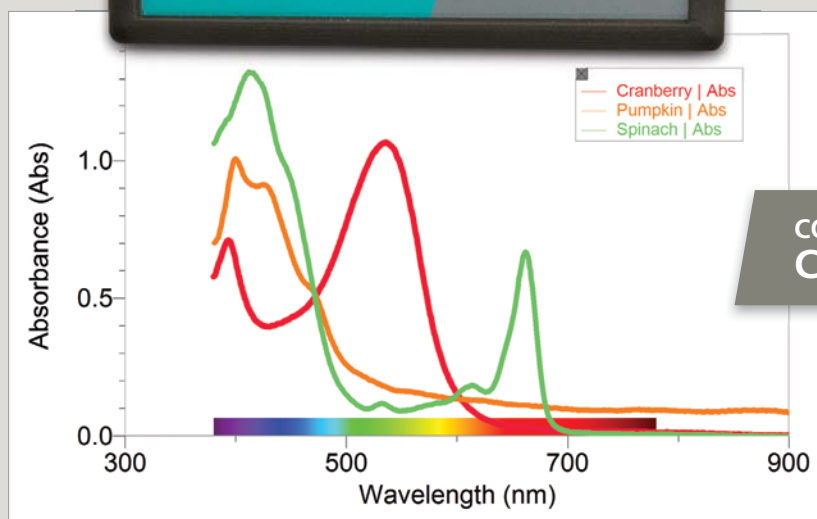
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Thursday, November 9



DEREK (DEKE) ARNDT

Chief, Climate Monitoring Branch
National Oceanic and Atmospheric Administration
National Centers for Environmental Information, Asheville, NC

Deke Arndt is the Chief of the Climate Monitoring Branch at NOAA's National Centers for Environmental Information (NCEI) in Asheville, North Carolina. NCEI is the largest archive of weather and climate data in the world. The Monitoring group are the scorekeepers of the global climate system. They track climate on large scales (global warming), on smaller scales (regional drought), and host the U.S. Drought Portal (drought.gov). Mr. Arndt has served as the lead or co-lead editor

of the State of the Climate report, the "annual physical" of the climate system, published in the Bulletin of the American Meteorological Society since 2010. This year's version was written by 460 authors from 62 countries. Mr. Arndt is also the chair of the U.S. Global Change Research Program's (GCRP's) Climate Indicator Working Group. He holds a B.S. and M.S. in Meteorology from the University of Oklahoma, and, proudly, a diploma from Putnam City West High School in Oklahoma City.

➔ For session details, see page 24.

Friday, November 10



MARY PAT WENDEROTH, Ph.D.

Principal Lecturer, Department of Biology
University of Washington, Seattle, WA

Mary Pat Wenderoth, Ph.D. is a Principal Lecturer in the Biology Department at the University of Washington (UW) where she teaches animal physiology courses and conducts biology education research on how students learn biology. Her main research interests focus on assessing implementation of cognitive science principles in the classroom, particularly those associated with conceptual change; use of first principles in constructing conceptual frameworks; and student metacognition. She received the UW Distinguished Teaching Award in 2001 and has served as the co-director of

the UW Teaching Academy. She is a co-founder of the UW Biology Education Research Group (UW BERG) and the national Society for the Advancement of Biology Education Research (SABER). She served as a facilitator at the HHMI Summer Institute for Undergraduate Biology Education from 2007–2011. Dr. Wenderoth earned her B.S. in Biology from the Catholic University of America in Washington D.C., her M.S. in Women's Studies from George Washington University, her M.S. in Exercise Physiology from Purdue University, and her Ph.D. in Physiology from Rush University in Chicago.

➔ For session details, see page 27.



MAY BERENBAUM, Ph.D.

Professor and Department Head, Entomology
University of Illinois at Urbana-Champaign, Urbana, IL

May Berenbaum, Ph.D. has been a member of the faculty of the Department of Entomology at the University of Illinois at Urbana-Champaign since 1980, serving as head since 1992, and holding the endowed Swanlund Chair of Entomology since 1996. Dr. Berenbaum is known for her contributions to chemical ecology, elucidating the chemical mediation of interactions between insects and plants, including detoxification of natural and synthetic chemicals. She is interested in the application of ecological principles toward developing sustainable management practices for natural and agricultural communities. Her research has produced over 300 refereed scientific publications and 35 book chapters. A member of the National Academy of Sciences, she has chaired two National Research Council committees, including the Committee on the Status of Pollinators in North America, and has

testified before Congress on pollinator decline. In 2011 she received the Tyler Prize for Environmental Achievement, and in 2014 she was awarded the National Medal of Science. In addition to research and service, she is devoted to teaching and to fostering scientific literacy through both formal and informal education; in 2006 she was the first female entomologist to receive the Distinguished Achievement Award for Teaching from the Entomological Society of America (26 years after the award was instituted). She has authored numerous magazine articles as well as six books about insects for the general public, and has gained some measure of fame as the founder of the UIUC Insect Fear Film Festival, now in its 35th year. She graduated summa cum laude with a B.S. degree and honors in biology from Yale University in 1975, and a Ph.D. in ecology and evolutionary biology from Cornell University in 1980.

NABT IS PROUD TO
HONOR DR. MAY
BERENBAUM WITH
THE 2017 NABT
DISTINGUISHED
SERVICE AWARD.

➔ For session details, see page 62.



PHOTO: KATHRYN FAITH

Friday, November 10**KATHRYN M.S. JOHNSON, Ph.D.**

Associate Professor of Biology, Department of Biology
Beloit College, Beloit, WI

As a physiologist, Dr. Johnson is both a researcher and teacher. Her laboratory assesses the connection between obesity and hormones that regulate glucose levels in horses. Her academic work also investigates how teaching practices affect learning attitudes and outcomes in diverse student populations. Dr. Johnson is a passionate educator, and she teaches

Human Biology, Anatomy, and Human Physiology in an inquiry-based, active learning format. In her free time, she loves to play outside with her husband, Matt, and daughter, Eliza, as well as ride her horse, Rock 'n' Roll. Dr. Johnson earned her Bachelor of Science at Beloit College and Ph.D. at Vanderbilt University.

➔ For session details, see page 40.

Saturday, November 11**JOHN KELLY, Ph.D.**

Professor, Department of Ecology & Evolutionary Biology
University of Kansas, Lawrence, KS

John Kelly, Ph.D. is a geneticist. He received his B.S. from the University of Connecticut and his Ph.D. from the University of Chicago. John has been a professor at the University of Kansas since 1999, where he has worked primarily within the fields of evolution-

ary quantitative genetics, molecular population genetics, and the evolution of pathogens. John's teaching has focused on the integration of quantitative reasoning into biology, with a particular focus on statistical data analysis.

➔ For session details, see page 47.

NABT BOARD OF DIRECTORS

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

REGIONAL COORDINATORS

Region I (CT, ME, MA, NH, RI, VT) **Margaret Carroll**
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 Region VI (AL, FL, GA, LA, MS, PR) **Madelene Loftin**
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 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 **Anna Hiatt**
 Two-Year College Biology Section **Lindsey Carter**

NABT COMMITTEE CHAIRS

ABT Journal Advisory Committee **William McComas**
 Archival Committee **Carrie Boyce & Jill Maroo**
 Awards Committee **Jason Crean**
 Finance Committee **Steven D. Christenson**
 Honorary Membership Committee **Elizabeth Cowles**
 Member Resources Committee **Sherry Annee**
 Nominating Committee **Donald French**
 Past President Advisory Council **Elizabeth Cowles**
 Professional Development Committee **Kristina Nicosia**
 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 and Cindy Gay**

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**)
 Tennessee Association of Biology Teachers (**TNABT**)
 Virginia Association of Biology Teachers (**VABT**)

NABT is looking for a few good leaders: leaders like you. Committee and section meetings are open to all NABT members and you are invited to learn more about – and help develop – the programs that support you.

FULL MEETING SCHEDULE:

NABT Open Forum: Thursday • 1:30 PM – 2:45 PM • Regency A
ABT Advisory Committee: Friday • 2:00 PM – 3:15 PM • Switchman
Archival Committee: Friday • 12:00 PM – 12:30 PM • Switchman
Awards Committee: Saturday • 9:00 AM – 10:15 AM • Switchman
Conference Committee: Saturday • 1:30 PM – 2:45 PM • Switchman
Citizen Science & Stewardship Committee: Saturday • 10:30 AM – 11:45 AM • Switchman
Equity Committee: Friday • 2:00 PM – 3:15 PM • Red Cap Room
Global Outreach Committee: Saturday • 10:30 AM – 11:45 AM • Switchman
Member Resources Committee: Saturday • 3:00 PM – 3:30 PM • Switchman
Nominating Committee: Friday • 10:30 AM – 11:45 AM • Switchman
OBTA Directors: Saturday • 9:00 AM – 10:15 AM • Switchman
Professional Development Committee: Saturday • 1:30 PM – 2:45 PM • Switchman
Retired Members Committee: Friday • 3:30 PM – 4:00 PM • Switchman
AP Biology Section: Sunday • 9:00 AM – 11:00 AM • Burlington Route
Four-Year College and University Section: Sunday • 9:00 AM – 11:00 AM • Jefferson/Knickerbocker
Two-Year College Section: Sunday • 9:00 AM – 11:00 AM • Wabash Cannonball

BIOCLUB STUDENT AWARDS

Anna Becherer

Cardinal Gibbons High School, Raleigh, NC
Outstanding student members of a NABT BioClub are eligible for this textbook scholarship, with one student from a BioClub high school chapter and one student from a community college chapter being eligible each year.

Sponsored by Carolina Biological Supply Company

BIOLOGY EDUCATOR LEADERSHIP SCHOLARSHIP (BELS)

Veronica Vasquez

Roseland University Prep, Santa Rosa, 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

May Berenbaum

University of Illinois Urbana-Champaign, Urbana, IL

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

Robert Hodgdon

Richmond Hill Middle School, Richmond Hill, GA

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 their commitment to the environment into the community.

Sponsored by Vernier Software and Technology

EVOLUTION EDUCATION AWARD

Bertha Vazquez

G.W. Carver Middle School, Miami, FL

This award recognizes innovative classroom teachers and their efforts to promote the accurate understanding of biological evolution within the larger community.

Sponsored by BEACON and BSCS

FOUR-YEAR COLLEGE & UNIVERSITY SECTION BIOLOGY TEACHING AWARD

Jordan Steel

Colorado State University-Pueblo, Pueblo, CO

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

Mary Pat Wenderoth

University of Washington, Seattle, WA

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

Christine Marshall-Walker

Phillips Academy, Andover, MA

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

John M. Moore

Taylor University, Upland, IN

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 FOGLEIA AP® BIOLOGY SERVICE AWARD

Lee Ferguson

Allen High School, Allen, TX

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 2017 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, Mini One, and Population Connection.

OUTSTANDING NEW BIOLOGY TEACHER ACHIEVEMENT AWARD

Rachel Lytle

Brentwood High School, Brentwood, TN

This award recognizes outstanding teaching in grades 7-12 by a "new" biology/life science instructor within their 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 their career.

Sponsored by the Neil A. Campbell Educational Trust and Pearson

PROF. CHAN TWO-YEAR COLLEGE AWARD FOR THE ENGAGED TEACHING OF BIOLOGY

Not awarded in 2017

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 their commitment into the community to promote biology education.

Sponsored by Sarah McBride and John Melville

THE RON MARDIGIAN BIOTECHNOLOGY TEACHING AWARD

Isis M. Arsnoe

Bay de Noc Community College, Escanaba, MI

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

Dan Porter

Amarillo College, Amarillo, TX

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 and Cell Zone, Inc.



OUTSTANDING BIOLOGY TEACHER AWARD



For 55 years the National Association of Biology Teachers has been committed to recognizing outstanding biology teachers.

The Outstanding Biology Teacher Award is proudly sponsored by:



Other consideration provided by Flinn Scientific, The MiniOne System, PASCO Scientific, and Population Connection.

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.



OBTA HONOREES 2017

Region I

Janet Harver Belval
South Windsor High School
Tolland, CT

Don Pinkerton
Revere High School
Revere, MA

Region II

Joshua Tennant
Wall Township High School
Wall Township, NJ

Jeffrey McGowan
South Fayette High School
McDonald, PA

Kasi Daniel
Landstown High School
Virginia Beach, VA

Region III

Michele Koehler
Riverside Brookfield High School
Riverside, IL

Alyce Myers
Lafayette Jefferson High School
Lafayette, IN

Allison Fuelling
Marshall Public School
Marshall, WI

Region IV

Kevin Schneider
Dowling Catholic High School
Des Moines, IA

Brittany Roper
Olathe North High School
Lawrence, KS

Ryan Lacson
Greater Ozarks Centers for
Advanced Professional Studies
Springfield, MO

Jeff Peterson
West Central High School
Hartford, SD

Region V

Keri Meador
Central High School Magnet
Career Academy
Louisville, KY

Lori Treiber
Central Cabarrus High School
Kannapolis, NC

Katherine Seastead
Nation Ford High School
Fort Mill, SC

Elizabeth Forrester
Baylor School
Chattanooga, TN

Debra Rocky
Brooke High School
Wellsburg, WV

Region VI

Ryan Reardon
Jefferson County International
Baccalaureate
Homewood, AL

Robert Kuhn
Centennial High School
Roswell, GA

Angela (Lacey) Hoosier
Buckeye High School
Deville, LA

Denise Thibodeaux
Cathedral High School
Natchez, MS

Region VII

Jamie Blum
Highland High School
Gilbert, AZ

Rachel Norris
Little Rock Central High School
Little Rock, AR

Benton Shriver
Putnam City High School
Oklahoma, OK

Daniel Bryant
Incarnate Word Academy
Pasadena, TX

Region VIII

Paul Strode
Fairview High School
Boulder, CO

Jeff Karlin
Lewiston Senior High School
Lewiston, ID

Randy Mogen
Park High School
Livingston, MT

Helene Pollins
Eldorado High School
Las Vegas, NV

Michelle Smith
Spring Creek Middle School
Spring Creek, NV

Dani Bainsmith
Northwest Middle School
Salt Lake City, UT

Kim Parfitt
Central High School
Cheyenne, WY

Region IX

Katherine Ward
Aragon High School
San Mateo, CA

Brenda Gordon
Cleveland High School
Portland, OR

Ryan Monger
Sultan Senior High School
Sultan, WA

Region X

Patrick Wells
Holy Spirit High High School
Conception Bay South, NL

PAST PRESIDENTS & CONFERENCE LOCATIONS

- 2016** — Bob Melton, Denver, CO
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 — VivianLee 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, Berkeley 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, Berkley, 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. Lichtenwaller, 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

- 2017** — John M. Moore
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

- 2017 — May Berenbaum, University of Illinois Urbana-Champaign, Urbana, IL
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

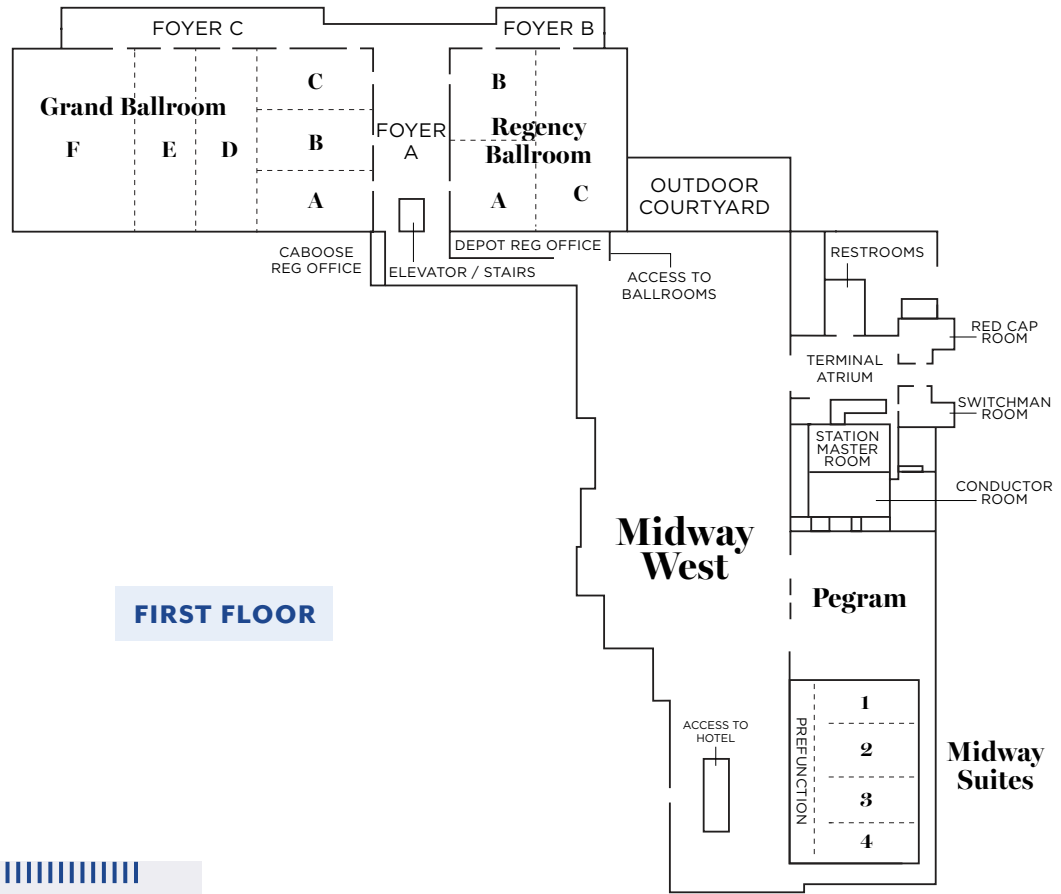


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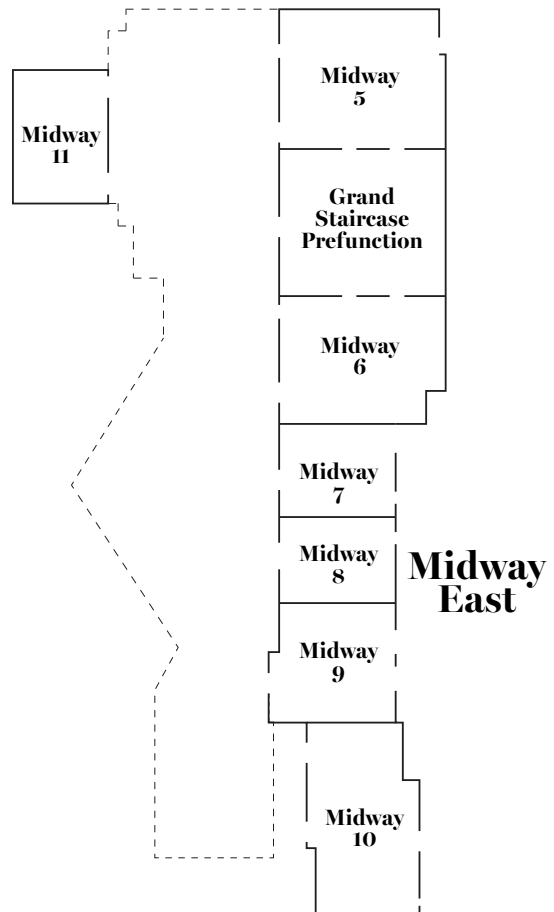




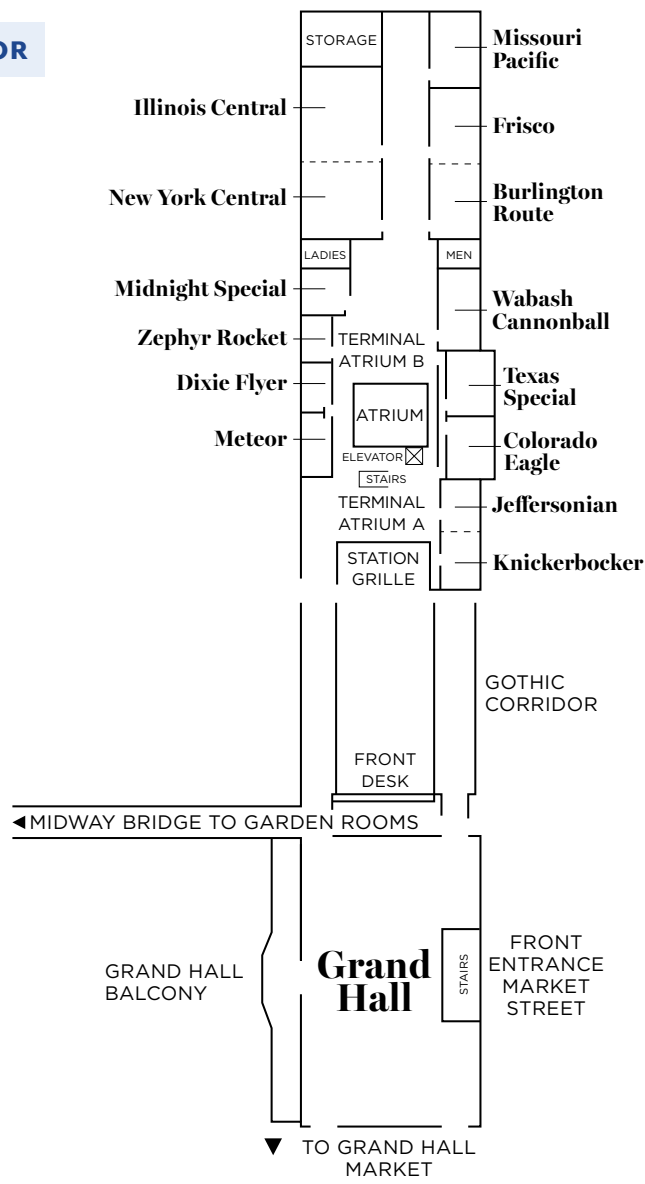
FIRST FLOOR

ROOM INDEX

Room Name	Floor
Burlington Route	2nd
Colorado Eagle	2nd
Dixie Flyer	2nd
Frisco	2nd
Gothic Corridor	2nd
Grand Ballroom A-F	1st
Grand Hall	2nd
Illinois Central	2nd
Jeffersonian	2nd
Knickerbocker	2nd
Meteor	2nd
Midnight Special	2nd
Midway	1st
Midway Suites 1-10	1st
Missouri Pacific	2nd
New York Central	2nd
Pegram	1st
Regency Ballroom A-C	1st
Station Master Room	1st
Switchman Room	1st
Texas Special	2nd
Wabash Cannonball	2nd
Zephyr Rocket	2nd



SECOND FLOOR



FIELD TRIPS**Thursday, November 9****Donald Danforth Plant Science Center****11:00 AM - 3:30 PM**
\$30 Advance, \$40 Onsite

The Donald Danforth Plant Science Center (DDPSC) is the world's largest independent nonprofit research institute focused on plant science. Twenty-two scientific teams conduct basic and applied research to sustain and improve agriculture with lessened environmental impact, biofortify the world's major food crops, improve photosynthesis and energy capture, and develop strategies to render plants more resistant to drought, pests and disease. The tour will begin with an overview of the center's mission and major projects. From there, you will visit the DDPSC's state-of-the-art laboratories and core facilities, including a visit to the greenhouses to see new crop lines being developed.

Sunday, November 12**Shaw Nature Reserve****8:30 AM - 12:00 PM**
\$30 Advance, \$40 Onsite

The Shaw Nature reserve is a private nature reserve operated as an extension of the Missouri Botanical Garden. While there, visitors will ride *The Wilderness Wagon* that takes guests on a three-mile tour while a naturalist describes the Reserve's history, what's in bloom, the Pinetum conifer collection, the tall grass prairie, local wildlife and wetlands. After the wagon tour, groups will visit the Bascom House, a restored 1879 home which adjoins the Whitmire Wildflower Garden. Time can then be spent walking through the gardens, or by going on a self-guided hike on some of the many hiking trails.

This field trip is weather permitting and alternate arrangements will be made in the event of inclement weather.

SPECIAL WORKSHOPS**Thursday, November 9****Introductory Statistics in Biology Classrooms****11:15 AM - 3:45 PM**
Science Practices - HS, 2Y, 4Y -
FREE (Tickets Required) SOLD OUT
(Lunch included)

Learn fundamental statistical concepts related to variation and hypothesis testing such as standard error of the mean, confidence intervals, and t-tests. Analyze data and develop presentation-ready representations using spreadsheet software.

Sponsored by  **hhmi**
BioInteractive

20 in 20: The Next Chapter**1:00 PM - 3:30 PM**
General Biology - MS, HS, 2Y -
FREE (Tickets Required) SOLD OUT

Come try numerous 20-minute inquiry based activities that are sure to engage and excite your students. You and your students will be glad you did!

Sunday, November 12**Developing Quantitative Skills in Your Introductory Biology Course Using HHMI BioInteractive Resources****8:00 AM - 12:15 PM**
General Biology - 2Y, 4Y - FREE
(Tickets Required)

Learn how HHMI resources can be used in introductory classes to increase quantitative literacy and student confidence working with data. We will explore modules and applications specific to higher education.

Sponsored by  **hhmi**
BioInteractive

Understanding Global Change (UGC): A New Interdisciplinary Conceptual Framework and System Models to Integrate Climate and Earth System Science into Biology Curricula**1:00 PM - 3:30 PM**
Biology / Environmental Science /
Sustainability - MS, HS, GA - FREE
(Tickets Required)

Climate and global change can be seamlessly interwoven into ecology and evolution lessons, but need to be conceptually linked to biology content. UGC resources guide their integration into existing curricula.

IBTF Symposium - Common Competencies and Science Practices in K-18 Biology Education**1:00 PM - 3:30 PM**
General Biology - HS, 2Y, 4Y - FREE
(Tickets Required)

Join the NABT Introductory Biology Task Force (IBTF) for the next series of unpacking skills highlighted in guiding documents like NGSS, AP Curriculum, and Vision and Change. Biology educators from all levels will engage in discussions and activities to help students succeed along the continuum of biology education.

Complex Instruction in the Biology Classroom: Using Equitable Teaching Strategies to Increase Students' Opportunities to Learn**9:00 AM - 12:00 PM**
Instructional Strategies - MS, HS -
FREE (Tickets Required)

Participants will learn about the equity strategy, *Complex Instruction*, for increasing the engagement of all students in learning cognitively demanding biology content using actionable norms.

MEAL FUNCTIONS

Friday, November 10

First Timers' Breakfast

7:30 AM – 8:45 AM

FREE (Tickets Required)

NABT Conference "first timers" are invited to learn more about 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 St. Louis.

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



AP Biology Section Luncheon

12:45 PM – 1:45 PM

~~\$10 Advance, \$15 Onsite~~ SOLD OUT

Meet other AP Biology teachers in a friendly informal setting to ask questions, share insight, and build community. You may even finally get to meet some of your favorite fellow AP teachers in person. The luncheon also includes a special presentation of the *Kim Foglia AP Biology Service Award*.

The AP Biology Section Luncheon is made possible through the generous support of



Four-Year College & University Section Luncheon

12:45 PM – 1:45 PM

~~\$10 Advance, \$15 Onsite~~ SOLD OUT

Do you teach at a four-year college and/or university? Join faculty, education researchers, graduate students, and others for some networking and nourishment. The lunch will include a meeting to highlight projects and initiatives of the section, including a special presentation of the Four-Year College & University Section Awards.

Two-Year College Section Luncheon

12:45 PM – 1:45 PM

\$10 Advance, \$15 Onsite

Help build the two-year college community by sharing your successes, challenges, epiphanies, and best practices (and worst jokes) over lunch. The winners of the *Two-Year College Biology Teaching* and *Prof. Chan Teaching Award* will also be recognized.

Saturday, November 11



BioClub Breakfast

7:30 AM – 8:45 AM

FREE (Tickets Required)

The NABT BioClub continues to grow, and both current and *future* BioClub Advisors are invited to share favorite resources, and stories about their chapters. Join the club (BioClub that is)!

The BioClub Breakfast is made possible through the generous support of



SPECIAL EVENTS

Friday, November 10



HHMI Night at the Movies

5:30 PM – 8:00 PM

FREE (Tickets Required)

HHMI BioInteractive (www.biointeractive.org) and NABT are pleased to host the *7th Annual HHMI Night at the Movies with Sean Carroll*. Join Dr. Carroll for the premiere of a new release and discussion. This free red-carpet event will begin at 5:30pm with a reception including free food and drink.

Saturday, November 11

NABT Honors Luncheon

11:30 AM – 2:00 PM

\$50 Advance, \$60 Onsite

Join us as we recognize the 2017 NABT Award recipients, including the Outstanding Biology Teacher Award (OBTA) honorees. This celebration honors exceptional biology teaching and everyone is welcome to help us applaud these remarkable individuals.



Bio-Rad Escape Room Experience

11:30 AM – 2:00 PM

FREE (Tickets Required)

Solve the mystery to break out of Bio-Rad's lab skills escape room for high school and college life science. Workshop space is limited.

Get tickets at the Bio-Rad booth (Booth 22) on Thursday evening or Friday.

Night at the City Museum

6:00 PM – 10:00 PM

\$25 Advance, \$35 Onsite

Come play with us at the City Museum, a 600,000 square-foot "play house museum," consisting of repurposed architectural and industrial objects that are housed in the former International Shoe Company. The City Museum features an eclectic mix of rooms, objects, and playground. Space for this event is limited and a ticket includes transportation, admission, a reception with light food and drink, and a lot of fun!

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NABT.

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will be
Friday,
November
10th
at NABT2017!

ST. LOUIS
NOV
9-12

NABT
National Association of
Biology Teachers



THURSDAY

NOV 9

ABBREVIATION KEY

E: Elementary School

MS: Middle School

HS: High School

2Y: Two-Year College

4Y: Four-Year College

GA: General Audience

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ST. LOUIS 2017

8:00 AM – 3:00 PM**178 • Incorporating Authentic Research into Introductory Biology Labs****Wabash Cannonball** • Instructional Strategies • Invitation Only

By the end of the workshop, participants will have a preliminary plan for the development, implementation, and assessment of a research module for an introductory lab course.

Christopher Beck and Rachele Spell, Emory University, Atlanta, GA and Kristen Miller, University of Georgia, Athens, GA

10:30 AM – 1:00 PM**NABT Board Meeting and Leader Lunch****Frisco/Burlington Route** • Committee Meeting • Invitation Only**11:15 AM – 3:45 PM****314 • Introductory Statistics in Biology Classrooms****Regency B** • Science Practices • Special Workshop (Tickets Required) • HS, 2Y, 4Y

Learn fundamental statistical concepts related to variation and hypothesis testing such as standard error of the mean, confidence intervals, and t-tests. Analyze data and develop presentation-ready representations using spreadsheet software.

Valerie May, Woodstock Academy, Woodstock, CT and Satoshi Amagai and Paul Beardsley, HHMI, Chevy Chase, MD

11:30 PM – 3:30 PM**Donald Danforth Plant Science Center****Donald Danforth Plant Science Center** • Field Trip (Tickets Required) • GA

The Donald Danforth Plant Science Center (DDPSC) is the world's largest independent nonprofit research institute focused on plant science. Twenty-two scientific teams conduct basic and applied research to sustain and improve agriculture with lessened environmental impact, biofortify the world's major food crops, improve photosynthesis and energy capture, and develop strategies to render plants more resistant to drought, pests, and disease.

1:00 PM – 3:30 PM**233 • 20 in 20: The Next Chapter****Grand B** • General Biology • Special Workshop (Tickets Required) • MS, HS, 2Y

Come try numerous 20-minute inquiry-based activities that are sure to engage and excite your students. You and your students will be glad you did!

Whitney Hagins, MassBioEd/BioTeach, Cambridge, MA

303 • Understanding Global Change (UGC): A New Interdisciplinary Conceptual Framework and System Models to Integrate Climate and Earth System Science into Biology Curricula**Grand C** • Ecology / Environmental Science / Sustainability • Special Workshop (Tickets Required) • MS, HS, GA

Climate and global change can be seamlessly interwoven into ecology and evolution lessons, but need to be conceptually linked to biology content. UGC resources guide their integration into existing curricula.

Jessica Bean, University of California Museum of Paleontology, Berkeley, CA and Joseph Levine, Organization for Tropical Studies, Concord, MA

1:00 PM – 3:30 PM continued**INTRO BIO TASK FORCE****77 • IBTF Symposium - Common Competencies and Science Practices in K-18 Biology Education****Illinois Central** • General Biology • Special Workshop (Tickets Required) • HS, 2Y, 4Y

Join the NABT Introductory Biology Task Force (IBTF) for the next series of unpacking skills highlighted in guiding documents like the NGSS, AP Biology Curriculum Framework, and Vision and Change. Biology educators from all levels will engage in discussions and activities to help students succeed along the continuum of biology education.

NABT Intro Bio Task Force

1:30 PM – 2:45 PM**NABT Open Forum****Regency A** • Special Program • GA

Join NABT leaders and fellow members in this interactive format that highlights "the state of the association." Learn more about ongoing projects, upcoming initiatives, and ways you can get involved. Your participation helps NABT continue to be the "leader of life science education," and everyone is invited to contribute.

3:00 PM – 3:45 PM**NABT / BSCS AP Biology Academy Reception****Grand A** • Special Program • Invitation Only

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BIO-RAD

4:00 PM – 5:15 PM**GENERAL SESSION SPEAKER****Derek Arndt**

➔ See page 8 for biography.

Pulse of the Planet: Measuring Change in the Global Climate

Grand Ballroom D, E, F • Special Speaker • GA

Climate change and its impacts are both obvious and pervasive, through measurement and experience. Climate change itself is controversial in some circles, and its connections to certain extreme weather hazards are controversial even within science. The globe has warmed by nearly two degrees Fahrenheit in the last century. How much of that has been driven by human, versus natural, activity? Through September, 15 separate weather and climate disasters have caused at least one billion dollars in direct damages in the United States. How are these events related to climate change? This presentation will examine climate change, from the lens of the institution tasked to calculate both the rate of warming and the number of billion dollar disasters, and will explore the relationships between climate and extreme weather, and share insights on what can be learned from history.

5:30 PM – 7:30 PM**Exhibit Hall Opening Reception**

Midway • Special Program • GA

You are the guest of honor at this special opening reception of the 2017 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 as we kick off the NABT Conference in style.

6:30 PM – 7:30 PM**Past Presidents Meeting**

President's Suite • Committee Meeting • Invitation Only

Leader Meet Ups to Help You Get Involved with NABT

Pegram • Committee Meeting • GA

Is it time for you to get more involved with the NABT Community? Learn more about the different opportunities available from our volunteer leaders. Committee Chairs, Section Chairs, and Regional Coordinators will be on hand to highlight NABT programs and answer your questions.

Thursday, November 9

Committee and Section Chairs

6:00 PM – 7:00 PM

Friday, November 10

Regional Coordinators

4:00 PM – 5:00 PM

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is digital learning

Attend these lab sessions in the Pearson Lab (booth #50) to learn how to get the best out of Mastering Biology® and request a copy of Campbell *BIOLOGY*, 11e or *Biology in Focus*, 2e.

Thursday, November 9

- 5:30 PM **Scientific Reasoning Strategies for the AP Biology Exam**
Fred & Theresa Holtzclaw, *The Webb School of Knoxville*
- 6:00 PM **A Teacher's Insight Into Using Mastering Biology**
Valerie May, *Woodstock Academy*
- 6:30 PM **Mastering Biology Support: Ask the Expert!**
Pearson Team, *Pearson*

Friday, November 10

- 10:00 AM **How to Get the Most Out of Mastering Biology for Beginners**
Josh Frost, *Pearson*
- 10:30 AM **Preview the NEW LabBench**
Fred & Theresa Holtzclaw, *The Webb School of Knoxville*
- 11:00 AM **Students' Best Advice on Using Mastering Biology**
Diane Sweeney, *Sacred Heart Preparatory*
- 11:30 AM **Help Your Students Develop Strong Science Practice Skills**
Lisa Urry, *Author, Mills College*
- 12:00 PM **Students' Perspective on Mastering Biology**
Mike Judge, *Sacred Heart Preparatory*
- 1:00 PM **A Teacher's Insight Into Using Mastering Biology**
Valerie May, *Woodstock Academy*
- 1:30 PM **Early Alerts in Mastering Biology: Help For Struggling Students**
Jodi Bolognese, *Pearson*
- 2:00 PM **Using Mastering Biology? Deepen Your Students' Experience with Active Learning Resources**
Josh Frost, *Pearson*
- 2:30 PM **AP Environmental Science and Mastering**
Mike Judge, *Sacred Heart Preparatory*
- 3:00 PM **Using Learning Catalytics to Create an Interactive Classroom**
Rebecca Orr, *Collin College*
- 3:30 PM **Students' Best Advice on Using Mastering Biology**
Diane Sweeney, *Sacred Heart Preparatory*
- 4:00 PM **Develop Students' Science Literacy Skills Using Mastering Biology**
Debbie Schmidt and Christa Pelaez, *Pearson*
- 4:30 PM **Scientific Reasoning Strategies for the AP Biology Exam**
Fred & Theresa Holtzclaw, *The Webb School of Knoxville*



FRIDAY NOV 10

NOV

10

FRIDAY

ABBREVIATION KEY

E: Elementary School

MS: Middle School

HS: High School

2Y: Two-Year College

4Y: Four-Year College

GA: General Audience

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2017

7:30 AM – 8:45 AM

First Timers' Breakfast

Regency C • Meal Function (Tickets Required) • GA

NABT Conference "first timers" are invited to learn more about 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 St. Louis.

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



10:30 AM – 12:30 PM

ASM PRESENTS:

Combatting Superbugs Across Habitats

Midway Suites 5 • Microbiology & Cell Biology • Symposium (120 min) • HS, 2Y, 4Y

Dr. Gautam Dantas published the first genetic evidence that soil microbes transfer multiple antibiotic resistance genes to human pathogens. Join us for his talk, followed by a hands-on classroom activity.

Katherine Lontok, American Society for Microbiology, Washington, D.C.; Gautam Dantas, Washington University School of Medicine, St. Louis, MO; and Dave Westenberg, Missouri Science and Technology University, Rolla, MO

9:15 AM – 10:15 AM

GENERAL SESSION SPEAKER

Mary Pat Wenderoth

➔ See page 8 for biography.

End of Lecture: The Future of Evidence-based Teaching

Grand Ballroom D, E, F • Special Speaker • GA

Meta-analysis of 225 papers that compared student performance under active learning versus lecturing in undergraduate courses across the STEM disciplines will be presented. The results indicate that on average students are 1.5 times more likely to fail when being lectured to as compared to when the same course has an active learning component, and active learning increases exam scores by almost half a standard deviation. Research results that increase student achievement will be summarized, including discussion of how even small changes can close the gap between teaching and student learning; this has tremendous implications for all students, especially those from underserved groups. PORTAAL, a new classroom observation tool that identifies key elements of an active learning classroom associated with enhanced student learning, will be presented.

10:30 AM – 11:45 AM

SPECIAL PROGRAMMING PRESENTED BY HudsonAlpha

91 • Top 10 Biotech Stories of 2017

Regency A • Biotechnology • Demonstration (75 min) • HS, GA

Want to include cutting edge genetic research in your class? See Dr. Neil Lamb present the top 10 discoveries of 2017 in student-friendly language and receive your free Guidebook.

Neil Lamb, HudsonAlpha Institute for Biotechnology, Huntsville, AL

313 • Constructing and Using Models to Investigate Ecological Relationships Using HHMI BioInteractive Resources

Regency B • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Join us for an engaging and interactive workshop highlighting new resources that will have participants constructing and using models to explore ecological relationships based on authentic field data.

Mark Eberhard, St. Clair High School, St. Clair, MI; Robin Bulleri, Carrboro High School, Carrboro, NC; and Mark Nielsen, HHMI, Chevy Chase, MD

BEACON EVOLUTION SYMPOSIUM: Emerging Research in Evolutionary Biology

10:30 AM – 12:30 PM • Midway Suites 6

Join us for this talk featuring cutting edge research in evolutionary biology, followed by a workshop on strategies to bring this authentic data into your classroom!

Living Laboratories: Using Islands to Track Natural Selection in Wild Lizards

Evolution • Symposium (60 min) • MS, HS, 2Y, 4Y

Evolution is often viewed in a historical sense, playing out over millions of years. We'll highlight research on anole lizards that focuses on evolution in action that can be observed today.

Robert Cox and Aaron Reedy, University of Virginia, Charlottesville, VA

BEACON Data Nugget Workshop

Evolution • Hands-on Workshop (60 min) • MS, HS, 2Y, 4Y

This hands-on workshop will follow the "Learning Laboratories" presentation and participants will go through a Data Nugget activity that can be used to bring the anole data back to their classrooms.

Melissa Kjelvik, Michigan State University, Hickory Corners, MI; and Elizabeth Schultheis and Louise Mead, Michigan State University, East Lansing, MI

The symposium is made possible by Michigan State University's BEACON Center and the American Society of Naturalists.

NABT 2017 EVOLUTION SYMPOSIUM



BEACON
An NSF Center for the Study of
Evolution in Action



American
ASN
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Naturalists

Emerging Research in Evolutionary Biology

Join us to hear about new research in evolutionary biology, and attend a Data Nuggets workshop to bring this authentic data into your classroom.

Living Laboratories: Using islands to track natural selection in wild lizards

Robert Cox, University of Virginia

Robert's talk focuses on cutting edge techniques in natural selection research, and the scientists exploring evolution in action in anole lizards.

**Data Nugget Workshop:
Is it dangerous to be a showoff?**

Aaron Reedy, Elizabeth Schultheis, Melissa Kjelvik

Following the talk, we use Data Nuggets to model bringing authentic research, and the story of the scientists behind the data, into your classroom.





8:00 AM – 4:00 PM

SPECIAL PROGRAMMING PRESENTED BY Bio-Rad Laboratories

All sessions in Midway Suites 2

All sessions: Cassy Granieri, Bio-Rad Laboratories, Hercules, CA

8:00 AM – 9:15 AM

340 - Conserving Panda Population: One Hormone Test Design at a Time!

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

Come put your immunology and reproductive endocrinology systems knowledge basics to the test as you engineer a hormone detection system that can be utilized for Giant Panda Population Conservation efforts.

10:30 AM – 11:45 AM

341 - Investigate Photosynthesis and Cellular Respiration with Algae Beads

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

Use algae beads in a color-assay to study photosynthesis and cellular respiration through authentic inquiry investigations for AP and NGSS biology. Learn extensions to study the effects of various parameters.

12:00 PM – 12:30 PM

342 - Yes You Can! Equipping Students to Make Meaningful Contributions to the Scientific Community

Instructional Strategies • Paper (30 min) • HS, 2Y, 4Y

Students often demonstrate interest in biology, but believe meaningful contributions are years away. I'll share evidence of students' contributions and strategies used to equip learners to "make a difference".

2:00 PM – 3:15 PM

343 - Barcoding a Lionfish's Last Meal: A Citizen Science Project for the Classroom

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

Learn about this student-centered project that dissects lionfish to see what other fish species it ate. Participants will observe lionfish dissection and extract DNA from fish bits for DNA sequencing.

3:30 PM – 4:00 PM

344 - Project-based Learning for High School and College: Sequencing Plant Species

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

See how Tyler Zarubin (Concordia University) adapted a plant-based cloning and sequencing kit to engage students in original research. His students gained valuable research skills and experience, and published sequences!

10:30 AM – 11:45 AM cont.

NABT Committee Meeting: Nominating Committee

Switchman Room • Committee Meeting • GA

Donald French, Committee Chair

266 • Forensic Analysis of Ötzi the Iceman

Midway Suites 7 • General Biology • Hands-on Workshop (75 min) • E, MS, GA

Use the discovery of Ötzi the Iceman to integrate genetics, anthropology, and forensics. Pollen analysis and DNA isolation mimic techniques used to investigate the mysterious mummy's ancestry, health, and murder!

Amanda McBrien, Cold Spring Harbor Laboratory/
DNA Learning Center, Cold Spring Harbor, NY

228 - Pokemon in the Midst - Using Pokemon GO! as a Free and Accessible Proxy for Wildlife in Biology Education

Midway Suites 8 • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • 2Y, 4Y, GA

Use Pokemon GO!, a game that populates your area with virtual wildlife (with data and traits), as a realistic proxy for real wildlife within biology and ecology education.

Quent Lupton, Craven Community College, New Bern, NC and Lynn Swafford, Wayne Community College, Goldsboro, NC

125 - Evolution: DNA and the Unity of Life

Midway Suites 9 • Evolution • Hands-on Workshop (75 min) • HS

Explore a curriculum unit that integrates NGSS three dimensions of learning with published scientific data to address core ideas in evolution including common ancestry, heredity, natural selection, and speciation. Free at learn.genetics.utah.edu

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

10:30 AM – 4:00 PM**SPECIAL PROGRAMMING PRESENTED BY
Carolina Biological Supply Company****All sessions in Midway Suites 1****10:30 AM – 11:45 AM****332 - C4: Collecting Cancer Causing Changes**

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

Using digital vignettes, beads, and dice to simulate the fate of a cell population across multiple divisions. This model illustrates how cells become varied over time through mutations in regulatory genes.

Dhani Biscocho, Carolina Biological Supply Company, Burlington, NC

12:00 PM – 12:30 PM**333 - Arriving on the Scene: Collect and Analyze Evidence Like the Pros**

Instructional Strategies • Hands-on Workshop (30 min) • HS, 2Y, 4Y, GA

Expose your students to the fascinating world of forensics by using real-world techniques practiced by law enforcement agencies. Keep students captivated by analyzing and documenting evidence to recreate crime scenes.

Dhani Biscocho, Carolina Biological Supply Company, Burlington, NC

2:00 PM – 3:15 PM**334 - From Gene to Protein: Making a Green Fluorescent Protein Necklace**

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

Use a novel but simple purification procedure, requiring no centrifuges or purification columns to isolate GFP from freeze dried bacterial cells. Discover the biology and chemistry that makes this possible.

Dhani Biscocho, Carolina Biological Supply Company, Burlington, NC

3:30 PM – 4:00 PM**330 - Teaching Online Lab Science Courses: Challenges and Solutions**

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

How can we run lab sections of science courses online? Come and actively participate in hands-on lab investigations that your students will be doing from their homes.

Shannon McGurk, Carolina Biological Supply Company, Burlington, NC

10:30 AM – 11:45 AM cont.**293 - Scoring Health Literacy**

Midway Suites 10 • Instructional Strategies • Hands-on Workshop (75 min) • MS, HS

We are confronted daily with health information ranging from amazing science discoveries to snake oil. Come learn how students can develop rubrics to make sense of information from many sources.

Anne Westbrook, BSCS, Colorado Springs, CO

220 - Making the Most of Models

Station Master Room • Science Practices • Hands-on Workshop (75 min) • HS, 2Y, 4Y

We will demonstrate how to use this common mathematical model to help students understand scientific concepts more deeply, practice the scientific process and apply models to solve biological problems.

Kristin Jenkins, BioQUEST, Boyds, MD; Sam Donovan, University of Pittsburgh, Pittsburgh, PA; M. Drew LaMar, College of William and Mary, Williamsburg, VA; Gabriela Hamerlinck, BioQUEST, Madison, WI; and Hayley Orndorf, QUBES, Pittsburgh, PA

279 - Melanin and Other Phenomenon Used To Anchor NGSS Storylines

Burlington Route • General Biology • Demonstration (75 min) • MS, HS

Using melanin and albinism as the driving phenomenon to integrate multiple concepts in a cohesive storyline. Concepts integrated include genetics and evolution. Storylines currently in progress will also be discussed.

Michele Koehler, Riverside Brookfield High School, Riverside, IL and Jason Crean, Lyons Township High School, Western Springs, IL

Come Join Us!



Combatting Superbugs Across Habitats

Friday, November 10
10:30 a.m. – 12:00 p.m.
Midway Suites 5

This research update and live lesson demo features Dr. Gautam Dantas, the first researcher to provide genetic evidence that soil microbes exchange multiple antibiotic resistance genes with human pathogens.

This session is presented by the American Society for Microbiology (ASM).

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July 26-29, 2018 Austin, TX

Come see ASM in booth #94 to learn more about ASMCUE and other microbiology education resources.



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10:30 AM – 11:45 AM**SPECIAL PROGRAMMING
PRESENTED BY
LrnR****All sessions in Midway Suites 3****10:30 AM – 11:00 AM****400 - panOpen Invites You to Learn About Customized Open Educational Resource (OER) Learning Solutions for your Biology, A&P and Environmental Science Courses**

Curriculum Development • Symposium
(30 min) • MS, HS, 2Y, 4Y

Join panOpen to discover solutions to the main challenges of adopting OER and open courseware in the biological sciences. Participants will learn how Biology faculty at University of Kentucky utilized the panOpen platform to design an interactive and customized student-centered learning experience.

Jean Downs, LrnR, New York, New York

11:00 AM – 11:45 AM**401 - What Everyone Should Know About The Future Of Personalized Education Technology In The Life Sciences**

Curriculum Development • Symposium
(45 min) • MS, 2Y, 4Y, GA

Many technologies claim to be “personalized”, but what does it really mean? Join us on our mission to make personalized learning more accessible, affordable, and engaging, all while innovating the next generation of resources for the students of tomorrow!

Aravind Pochiraju, LrnR, San Francisco, CA

10:30 AM – 4:00 PM**SPECIAL PROGRAMMING PRESENTED BY
MiniOne Systems****All sessions in Midway Suites 4**

All sessions: Richard Chan, MiniOne Systems, San Diego, CA

10:30 AM – 11:45 AM**345 - Go Viral: Amplify From One to a Billion Copies in 20 minutes by PCR**

Technology in the Classroom • Hands-on Workshop
(75 min) • HS, 2Y, 4Y

Experience how engaging and accessible classroom biotechnology can be! Amplify DNA fragment using the fast and robust MiniOne PCR System and analyze the PCR products on the MiniOne Electrophoresis System.

12:00 PM – 1:15 PM**347 - Who Is Baby Whale's Father? DNA Fingerprinting Solves the Mystery!**

Technology in the Classroom • Hands-on Workshop
(75 min) • HS, 2Y, 4Y

Get hands-on experience in teaching electrophoresis and DNA fingerprinting in one classroom session. Pour, load, and run a gel to deduce a probable conclusion for a whale of a mystery.

1:30 PM – 2:45 PM**348 - Foodborne Outbreak Investigation Using Gel Electrophoresis**

Technology in the Classroom • Hands-on Workshop
(75 min) • HS, 2Y, 4Y

Learn firsthand how to engage students to use scientific reasoning by mimicking a foodborne outbreak investigation and designing an experiment with gel electrophoresis to determine the source of the outbreak.

3:00 PM – 4:00 PM**349 - Deduce the Genotype of PTC Taster versus Non-taster**

Technology in the Classroom • Hands-on Workshop
(60 min) • HS, 2Y, 4Y

Get hands-on experience teaching Mendelian genetics and genotyping by electrophoresis. Pour, load, and run a gel, analyze the results, and determine PTC taster genotype - all within one classroom session.

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NABT St. Louis Workshop Schedule

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Friday November 10

8:00–9:15 AM Midway Suite 2

Conserving Panda Population: One Hormone Test Design at a Time!

Take on the role of giant panda conservation scientist using ELISA in this hands-on workshop.

10:30–11:45 AM Midway Suite 2

Investigate Photosynthesis and Cellular Respiration with Algae Beads

Use algae beads to study photosynthesis and cellular respiration in authentic inquiry investigations for AP and general biology.

12:00–12:30 PM Midway Suite 2

Yes you can! Equipping students to make meaningful contributions to the scientific community

Tyler Zarubin will share his strategies on equipping learners to make a difference now.

2:00–3:15 PM Midway Suite 2

Barcoding Lionfish Last Meal: A Citizen Science Project for the Classroom

Learn about this student-centered project where students dissect lionfish and use sequencing to identify the fish species they eat.

3:30–4:00 PM Midway Suite 2

Project-Based Learning for High School and College: Sequencing Plant Species

See how Tyler Zarubin engages students in original genetic research and publishes DNA sequences!

Saturday November 11

11:30 AM–2:00 PM The Midway

Special Event — Lab Skills: The Escape Room! Experience an escape room like no other. Space is limited. Get tickets at the Bio-Rad booth.

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10:30 AM – 4:00 PM**SPECIAL PROGRAMMING PRESENTED BY
miniPCR****All sessions in Missouri Pacific**

All sessions: Zeke Alvarez-Saavedra, miniPCR, Cambridge, MA

10:30 AM – 11:45 AM**370 • DNA Fingerprinting: An Introductory DNA Electrophoresis Lab**

Biotechnology • Demonstration (75 min) • MS, HS

This guided-inquiry activity exposes students to the fundamental principles of DNA analysis by comparing patterns of cleaved DNA separated by gel electrophoresis. You will gain familiarity with fast, classroom-friendly DNA gel electrophoresis techniques using the blueGel system.

12:00 PM – 12:30 PM**372 • Are You a Night Owl? A Morning Lark? The Answer May be in Your Genes**

Biotechnology • Demonstration (30 min) • HS, 2Y, 4Y

Students test one of their own circadian clock genes by amplifying a VNTR that has been associated with sleep behavior (preference for morning vs. evening activity) and test this postulated association between circadian genotypes and sleep phenotypes. Contribute to a citizen science database! Includes PCR and electrophoresis activities.

2:00 PM – 3:15 PM**373 • PTC Taster Lab: From Phenotype to Genotype in the Classroom!**

Biotechnology • Demonstration (75 min) • MS, HS, 2Y, 4Y

Are you a supertaster? Come explore the molecular genetics of taste. Introduce key molecular techniques to students, such as DNA extraction, DNA amplification of taster genes, DNA digestion, and gel electrophoresis to identify taste receptor variants. Come link your DNA to your taster phenotype!

3:30 PM – 4:00 PM**371 • Real Biotech, Real Free. No-Cost Biotech Resources for Your Classroom**

Biotechnology • Demonstration (30 min) • MS, HS

Biotech resources at no cost, including a loaner Lab in a Box to run a complete biotech lab; miniPCR DNAdots, simple explanations of modern genetic techniques; Genes in Space™, a competition that sends DNA experiments to space; and LARPing with Bruce, to engage students through live action role-playing.

10:30 AM – 11:45 AM cont.**179 • Embedding Authentic Research into Introductory Biology Lab Courses**

Frisco • Instructional Strategies • Hands-on Workshop (75 min) • 2Y, 4Y

Faculty who are developing authentic research for lab courses will disseminate the critical background and sample development plans so that other faculty can create their own course-based research experiences.

Christopher Beck and Rachele Spell, Emory University, Atlanta, GA; and Kristen Miller, University of Georgia, Athens, GA

180 • Inquiry, Argumentative Writing, and Data All-In-One!

Illinois Central • Science Practices • Demonstration (75 min) • MS, HS, 2Y

Learn a student presentation tool that emphasizes the SEP's of NGSS, integrating inquiry, data analysis, "CER," and communication. Participants will leave with inquiry examples and a rubric for efficient grading.

Amy Welch, Fullerton Joint Union High School District, La Habra, CA

160 • Reconsidering the Role of the Science Fair in Biology Education

Jefferson/Knickerbocker • Instructional Strategies • Symposium (75 min) • GA

Participants will view the new documentary film titled "Uncontrolled Variables," which follows science fair students and teachers as they prepare projects and compete. The screening is followed by a panel discussion.

William McComas, University of Arkansas, Fayetteville, AR

170 • Planting Inquiry in Science Classrooms

New York Central • Science Practices • Hands-on Workshop (75 min) • MS, HS, 2Y, 4Y

Experience a variety of activities that help students develop skills ranging from

10:30 AM – 11:45 AM cont.

generating observation-based questions to exploring alternative explanations for data. Learn simple techniques that enhance student-centered learning.

Catrina Adams, Botanical Society of America, Saint Louis, MO; Gordon Uno, University of Oklahoma, Norman, OK; and Marshall Sundberg, Emporia State University, Emporia, KS

261 - Understanding Real Research: Incorporating Primary Literature into Coursework

Wabash Cannonball • Technology in the Classroom • Demonstration (75 min) • HS, 2Y, 4Y

Science in the Classroom (SitC) is an expanding collection of research articles, carefully annotated for teaching. Learn about best practices for incorporating SitC into AP and college courses.

Beth Ruedi, Science in the Classroom, AAAS, Washington, D.C.

12:00 PM – 12:30 PM**310 - Using Primary Literature to Teach Science Literacy**

Regency B • Nature of Science • Hands-on Workshop (30 min) • HS, 2Y, 4Y

HHMI BioInteractive's "Data Points" are resources featuring figures from primary literature to engage students in the process of interpreting graphs. Participants will analyze and interpret trends and patterns in data.

Bob Kuhn, Centennial High School, Roswell, GA and Bridget Conneely, HHMI, Chevy Chase, MD

NABT Committee Meeting: Archival Committee

Switchman Room • Committee Meeting • GA

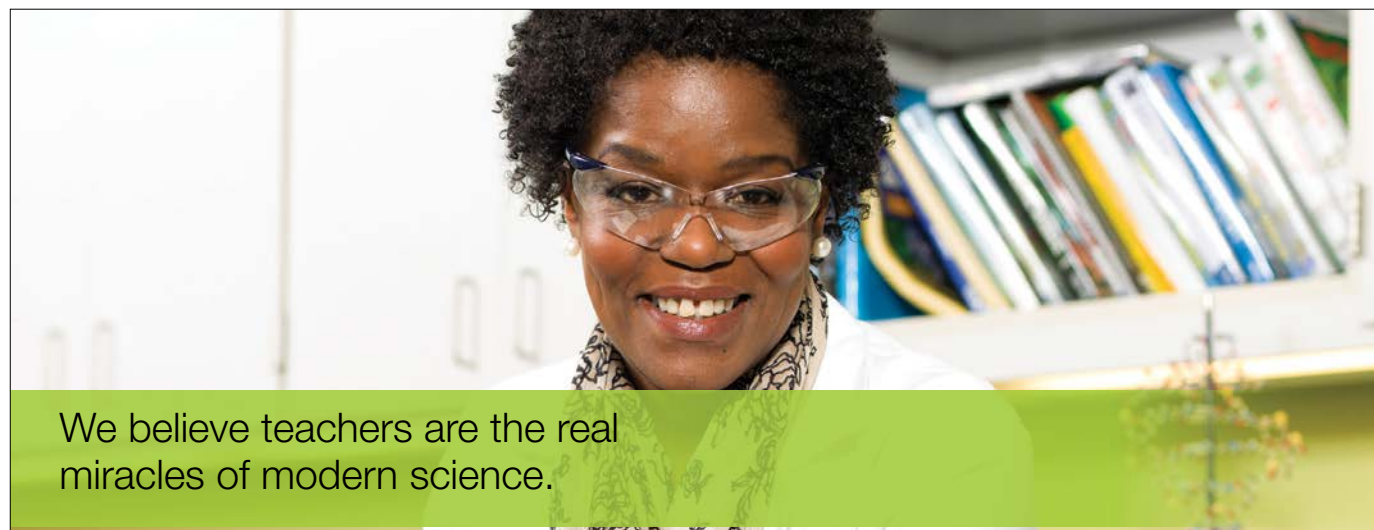
Carrie Bucklin and Jill Maroo, Committee Chairs

SPECIAL PROGRAMMING PRESENTED BY AC2-Bio-Link Regional ATE Center**335 - Do You Have the Skill Set to Work in the Biotechnology Industry?**

Midway Suites 3 • Biotechnology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Learn about the skills and knowledge needed to work in the biotechnology industry. Dr. Fletcher and Dr. Porter, field experts, have over 20 years of experience educating students for the biotechnology industry.

Linnea Fletcher, AC2 Bio-Link Regional Center, Austin, TX and Sandra Porter, Digital World Biology LLC, Seattle, WA



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12:00 PM – 12:30 PM continued**143 - How to Integrate Personal Genetics into a Biotechnology Curriculum****Midway Suites 7** • Biotechnology • Demonstration (30 min) • HS, 2Y

The session will outline how to effectively integrate personal genetics into a biotechnology course, and associated ethical considerations. Course material from the Personal Genetics Education Project will be highlighted.

Julie Boehm, Wellesley High School, Wellesley, MA

196 - On the Cheap: Care and Use of Invertebrates in the Classroom**Midway Suites 8** • General Biology • Demonstration (30 min) • HS, 4Y, GA

Instructors without previous experience can learn to maintain invertebrates for use in their classrooms with these effective protocols. Lesson plan ideas will also be discussed with handouts provided.

Elizabeth Davis-Berg and Julie Minbiole, Columbia College Chicago, Chicago, IL; and Michael LaBarbera, University of Chicago, Chicago, IL

288 - Sacred Bovines “Live!”: Understanding the Naturalizing Error in Science**Midway Suites 9** • Nature of Science • Paper (30 min) • HS, 4Y, GA

Douglas Allchin, author of the “Sacred Bovines” column in *The American Biology Teacher*, presents several cases from his new book focusing on critical strategies about recognizing ideological positions disguised as claims about nature.

Douglas Allchin, University of Minnesota, St. Paul, MN

58 - A CURE: Vertebrate Heart Development and Physiology**Midway Suites 10** • Anatomy & Physiology • Demonstration (30 min) • HS, 2Y, 4Y, GA

This CURE on vertebrate heart development and physiology investigates how cardiovascular drugs affect heart rate and contractility of surgically isolated living hearts of chicken embryos, the vertebrate model system.

Jacqueline McLaughlin and Mit Patel, Penn State Lehigh Valley, Center Valley, PA

219 - Live from the Morgue**Station Master Room** • Anatomy & Physiology • Hands-on Workshop (30 min) • HS

Learn about our live-feed, interactive, video-educational program on the autopsy. Join us for an open discussion at the intersection of anatomy, health, death, and scientific investigation.

Ben Margolis, Autopsy Center of Chicago, Chicago, IL and Caroline Milne, Barrington High School, Barrington, IL

92 - Expedition to the Enchanted Isles – Facilitating a Student Trip to the Galápagos Islands**Burlington Route** • Evolution • Demonstration (30 min) • HS

In the summer of 2015, we toured and studied the Galápagos Islands with a group of high school students. This session covers planning, logistics, lessons learned, and suggestions for planning such an adventure with your students.

James Reid, Woodberry Forest School, Woodberry Forest, VA and John Leighton Reid, Missouri Botanical Garden, St. Louis, MO

320 - Turning the Classroom into a Crime Scene: An Evidence-based Discussion on how Active Team-based Learning Enhances Student Enthusiasm and Comprehension of Microbial Pathogens**Frisco** • Instructional Strategies • Demonstration (30 min) • 2Y, 4Y, GA

The 2017 winner of the *Four-Year Section's Biology Teaching Award* will present his in-class project, “Microbial Murders: A Crime Scene Investigation”, and explain the logistics of implementing the project and evidence that this active team-based learning project is effective at engaging students and helping them understand the microbial sciences.

Jordan Steel, Colorado State University - Pueblo, Pueblo, CO

28 - AP Biology Culminating Inquiry Laboratory Experience**Illinois Central** • AP Biology • Hands-on Workshop (30 min) • HS

An AP biology culminating laboratory experience will be presented where students review required AP labs. Timeline, requirements, student examples, supplies, and a demo of the inquiry process will be modeled.

Kate Silber and Roxanne Jamroz, Highland Park High School, Highland Park, IL

158 - A Comprehensive Program to Boost Student Success in Large Enrollment Introductory Biology Courses**Jefferson/Knickerbocker** • Curriculum Development • Paper (30 min) • 4Y

Results will be presented for an ongoing comprehensive student success program to improve both course completion rates and retention through modified teaching practices and improved learning strategies among students.

Richard Knapp, University of Houston, Houston, TX

12:00 PM – 12:30 PM *continued*

240 • PlantingScience: Using an Online Mentoring Platform to Enhance Student-Driven Plant Science Investigations

New York Central • Technology in the Classroom • Demonstration (30 min) • MS, HS, 2Y

The free PlantingScience.org online mentoring community supports students through all stages of an investigation. Feel overwhelmed advising multiple teams with diverse interests in your classroom? Our volunteer scientists can help!

Catrina Adams, Botanical Society of America, Saint Louis, MO

68 • How Active Learning Instruction Motivates Students to Learn Biology

Wabash Cannonball • General Biology • Paper (30 min) • 2Y, 4Y, GA

Come and learn as we present our research showing how active learning can increase students' intrinsic motivation to learn biology. Practical implications for teaching college biology will also be addressed.

Michael Moore, Baylor University, Waco, TX; Donald French, Oklahoma State University, Stillwater, OK; Grant Gardner, Middle Tennessee University, Murfreesboro, TN

12:45 PM – 1:15 PM

SPECIAL PROGRAMMING PRESENTED BY Washington University

339 • Master Teacher Share-a-Thon

Midway Suites 3 • Instructional Strategies • Symposium (30 min) • MS, HS, 2Y

Come share in 5-10 minutes your favorite lesson plan, lab, or teaching resource with teachers from across the country who participated in Washington University's Master of Science in Biology program.

Margo Hathaway, Charles McWilliams, and Victoria May, Washington University in St. Louis, St. Louis, MO



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Friday, Nov. 10, 2017, Midway Suites 4

- 10:30 - 11:45 am PCR DNA Amplification
- 12:00 - 1:15 pm DNA Fingerprinting
- 1:30 - 2:45 pm Foodborne Outbreak Investigation
- 3:00 - 4:00 pm PTC Taste by Genotyping

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NABT BIOLOGY EDUCATION RESEARCH SYMPOSIUM

2:00 PM – 4:00 PM • Midway Suites 6

SCHEDULED PRESENTATIONS:

A Critical Review of the Literature on Biology Graduate Teaching Assistant Professional Development

Joshua Reid, Penny Carroll, and Grant Gardner, Middle Tennessee State University, Murfreesboro, TN; Miranda Chen and Elisabeth Schussler, University of Tennessee, Knoxville, TN; Gili Marbach-Ad, University of Maryland, College Park, MD; Kristen Miller, University of Georgia, Athens, GA; and Judith Ridgway, The Ohio State University, Columbus, OH

Graduate Teaching Assistants (GTAs) are critical yet under-appreciated instructors in the movement to reform undergraduate STEM instruction. In biology specifically, GTAs teach a large proportion of undergraduate “gateway” courses shown to be critical for success and retention of biology students. Yet GTA Teaching Professional Development (TPD) continues to be limited or nonexistent nationwide. This study is a critical review of the GTA professional development literature. We focus on a subsample of $n = 23$ studies of biology GTAs in the larger sample of $n = 117$ reviewed manuscripts. Findings highlight the types of TPD being published in the literature and the types of outcomes variables being measured including: GTA cognitive outcome variable, GTA teaching practice outcome variables, and undergraduate student learning outcomes. Implications for research and practice in this field will be discussed.

Comparing Learning Objective Communication between Professors and Students in the Classroom

Jennifer L. Idema, Zachary L. Nolan, E. Austin Leone, Kathryn M. Parsley, Sara Salisbury and Kristy L. Daniel, Texas State University, San Marcos, TX

University courses have learning objectives that are commonly found in course syllabi. Because students and professors place different values on syllabi, perceptions of learning objectives vary. Previous studies have investigated the relationship between student-teacher expectations and syllabi content, but do not address the role of explicit syllabi content. Our study used qualitative methods to investigate the relationships among student-reported perceptions of course learning objectives, professor-reported intended course learning objectives, and explicit syllabus content. We used interviews from two professors who taught introductory biology courses for non-majors, course syllabi, and student responses to an open-ended questionnaire about course learning objectives. After deductively coding students' responses, we found only 33% of students accurately identified a learning objective listed in the course syllabus. We identified three main themes in student reported learning objectives: Knowledge (83.9%), Practice (11.3%), and Performance (4.8%). Two of these (Knowledge and Practice) are in line with professor intended learning goals. Our findings show that the syllabus alone is an ineffective tool for communicating course learning objectives. Other communication methods should be employed to convey course learning objectives to students. By understanding how students interpret learning objectives, professors are better equipped to help students succeed.

Formative Assessment in Online Science Classes: Exploring how Assessments Drive Teacher Practices that Aid Learning

Shannon M. Burcks and Marcelle A. Siegel, University of Missouri, Columbia, MO

Science curricula integrated into virtual formats have shown promise meeting the goals set forth in the Next Generation Science Standards (NGSS Lead States, 2013). In online courses, assessments are presented in a virtual format where they are also incorporated into a teacher's practice. Therefore, it is essential to understand how assessments in online courses impact teachers' formative assessment practices. In this study, we chose to consider how aspects of course assessments in an online undergraduate introductory non-majors nutrition course influenced a teacher's practices to support student learning of science content. We used the Assessment Literacy conceptual model (Abell and Siegel, 2011) with a specific focus on Interpretation and Action Taking to analyze our data. Our findings demonstrate how online assessments may aid or unintentionally constrict teacher practices which support learning. Additionally, we show that a teacher with a high-level of assessment literacy can reduce the impact of limitations presented by an assessment. Our study suggests further support for developing teachers' assessment literacy and the use of assessments that provide the opportunity for customization during multiple interactions with students would help teachers to better interpret student needs and take action to support student learning.

Acceptance of Evolution among American College Students at Two Arkansas Regional Universities

Holli Hall, Arkansas Tech University, Russellville, AR and Mark W. Bland, University of Central Arkansas, Conway, AR

Evolutionary theory is the unifying concept across all branches of biology, and higher levels of acceptance of this theory correlates with a better understanding of science and scientific processes. Demographic factors such as religiosity, age, gender, ethnic heritage, attendance of a public vs. private high school, and their choice of major were additional factors influencing students' acceptance rates of evolution as a unifying concept. A Likert scale survey (the MATE) was administered to students enrolled in a freshman level biology course at the beginning of each of three semesters. At the end of each semester, after lecture and testing on evolutionary concepts, the students were administered the same survey. Results were evaluated by topic question for each demographic group using average MATE scores, ANOVA, and Pearson's R values for statistical analysis. The religious background and age of the students were found to predict their acceptance of evolutionary concepts. Results further indicated that a students' level of religiosity has the greatest influence on students' MATE scores. Significant results between the demographic groups including major vs. non-major, age, gender, ethnic heritage, religious affiliation, and their attendance in a public high school vs. a private high school were all found to be predictors for students' MATE scores.

Instructors' Formative Assessment in Undergraduate Biology: Influences, Context, and Practices

Julie A. Birt, Marcelle A. Siegel, Linh T. Ngo, Hai T. Nguyen, Elizabeth M. Gammel, Keala Cummings and Bethany R. Mordhorst, University of Missouri, Columbia, MO

In this multiple case study, drawing on the personal practice assessment theory (PPAT) model from Box, Skoog & Dabbs (2015), we investigated two experienced college biology instructors' theories and contextual influences on their formative assessment practices. Data collected included classroom observations, instructor interviews, course artifacts and student focus group. Qualitative analysis of the data revealed that each instructor's differing PPATs affected their purpose, planning, and implementation of formative assessment. Tasha's PPATs led her to believe that assessment should be a carefully planned motivational and learning opportunity for students, while Jack viewed assessment as a diverse and stress-free student learning experiment. Tasha's many years of teaching acted as a barrier in that she felt she could anticipate all student difficulties while Jack's adaptable assessment practices were facilitated by his confidence in his tenured status. Cross-case analysis affirmed that both instructors chose assessment practices they enjoyed and focused on assessment for student learning, but only Jack allowed the assessment results to effect an immediate change in his practices while Tasha planned changes for the following semester. Overall we present a focused glimpse into the private classrooms of college biology instructors which shed valuable insights into the personal practice theories of experienced college instructors.

The Hidden Role of "Buy-In": How Faculty and Student Attitudes Impact Curricular Reform

Tarren Shaw, University of Oklahoma, Norman, OK; Suann Yang, SUNY Geneseo, Geneseo, NY; Troy Nash, Mercer University, Macon, GA; Rachel Pigg, Presbyterian College, Clinton, SC; and Jeff Grim, University of Tampa, Tampa, FL

Vision & Change recommends transformation in undergraduate biology education, but some faculty may be reluctant to reform their courses for fear of student resistance. Faculty may use many measures to evaluate the extent of student resistance, such as student evaluations of teaching or verbal comments from students or colleagues. It is less common for faculty to use a thorough assessment of both student learning gains and self-efficacy to inform curricular change. We assessed both of these measures in a mixed-majors biology course at a small liberal arts college. Students self-reported increases in learning gains on surveys, and formative and summative assessments demonstrated actual learning/performance gains. STEM majors were more likely to report positive opinions than non-STEM majors, though more positive compared to negative opinions were expressed by students who took the course, regardless of major. Because of a decrease in interest in biology by non-majors, we suggest that offering a non-majors introductory biology course may be more successful in engaging these students.

12:45 PM – 1:45 PM

Two-Year College Section Luncheon

Grand A • Meal Function (Tickets Required) • 2Y

Help build the two-year college community by sharing your successes, challenges, epiphanies, and best practices (and worst jokes) over lunch. The winner of the *Two-Year College Biology Teaching Award* will also be recognized.

Four-Year College and University Section Luncheon

Grand B • Meal Function (Tickets Required) • 2Y

Do you teach at a four-year college or university? Join faculty, education researchers, graduate students, and others for some networking and nourishment. The lunch will include a meeting to highlight projects and initiatives of the section, including a special presentation of the *Four-Year College and University Section Awards*.

AP Biology Section Luncheon

Grand C • Meal Function (Tickets Required) • HS

Meet other AP Biology teachers in a friendly informal setting to ask questions, share insight, and build community. You may even finally get to meet some of your favorite fellow AP teachers in person. The luncheon also includes a special presentation of the *Kim Foglia AP Biology Service Award*.

The AP Biology Section Luncheon is sponsored by



2:00 PM – 3:15 PM

INVITED SPEAKER

Kathryn M.S. Johnson

➔ See page 10 for biography.



Horse Hormones: Predicting and Preventing Painful Lameness Initiated by Insulin Resistance

Regency A • Special Speaker • GA

Horses are popular pets, and horse owners are eager to keep their pets happy and healthy. Extreme lameness in horses is typically very painful for the animal, and it is a common reason that horses are euthanized. One of the most severe types of lameness in horses is laminitis, which occurs when blood vessels are damaged within the hoof. As opposed to lameness caused by a traumatic injury, the damage within the hoof that occurs with laminitis is linked to obesity and changes in blood hormone levels, such as insulin. Laminitis is also more common in some breeds than others.

During this presentation, Dr. Johnson will explore what a horse's gait and breed can tell us about how nutrients and hormones are changing in its blood, and what horse owners can do to prevent painful implications of laminitis.

2:00 PM – 3:15 PM

315 • Made for Each Other: Pairing HHMI Resources with Case Studies

Regency B • Instructional Strategies • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Combine HHMI Biointeractive resources with case studies to engage students in problem-solving. In this session, you will experience such a classroom and dissect how to do it effectively.

Annie Prud'homme-Généreux, Quest University Canada/TELUS World of Science - Edmonton, AB, Canada; Sarah Wojiski, Jackson Laboratory for Genomic Medicine, Farmington, CT; and Mark Nielsen, HHMI, Chevy Chase, MD

NABT Committee Meeting: Equity Committee

Red Cap Room • Committee Meeting • GA
Committee Chair to be Selected

NABT Committee Meeting: ABT Advisory Committee

Switchman Room • Committee Meeting • GA

William McComas, Editor of the ABT

SPECIAL PROGRAMMING PRESENTED BY Princeton University Press

329 • Everything is Regulated: How to Use The Serengeti Rules, Storytelling, and a New Curriculum Supplement to Enhance Your Biology Curriculum

Midway Suites 3 • Ecology / Environmental Science / Sustainability • Workshop (75 min) • HS, 2Y, 4Y

Join a discussion with Sean B. Carroll and Paul Strode about how you can use Sean's book, "The Serengeti Rules", to better engage your students in your biology curriculum.

Paul Strode, Fairview High School, Boulder, CO and Sean Carroll, University of Wisconsin/Howard Hughes Medical Institute, Madison, WI

2:00 PM – 3:15 PM cont.

269 - Sense in Molecules: Modeling Personalized Medicine

Midway Suites 7 • Biotechnology • Demonstration (75 min) • HS, 2Y, 4Y

Analyzing their DNA, students predict their ability to taste a bitter substance. This lab highlights the relationship between phenotype and genotype, illustrating personalized medicine - predicting drug responses using DNA.

Bruce Nash, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY

37 - Zoo Genetics Plus: A Free Curriculum Rooted in Real World Data

Midway Suites 8 • General Biology • Hands-on Workshop (75 min) • HS, 2Y, GA

Zoo Genetics Plus is a free curriculum based on the partnership between teacher and scientist. Dr. Jason Crean will showcase this data-driven curriculum written with wildlife geneticist Dr. Jean Dubach.

Jason Crean, Lyons Township High School/Saint Xavier University, Western Springs, IL

36 - Using Simulations and Computational Models to Teach Scientific Practices

Midway Suites 9 • Science Practices • Hands-on Workshop (75 min) • HS, 2Y, 4Y, GA

Computational models can simplify complex dynamic systems for students by constraining parameters. Learn how to effectively use simulations to have students discover relationships and practice science by incrementally perturbing parameters.

Jon Darkow, Seneca East High School, Attica, OH

2:00 PM – 4:00 PM

NABT AP BIOLOGY SYMPOSIUM

Student Misconceptions and Challenge Areas: What Does the AP Exam Tell Us?

Midway Suites 5 • AP Biology • Symposium (60 min) • MS, HS, 2Y, 4Y

Student responses on the AP Exam provide teachers with insight into misconceptions and challenge areas. Find out what concepts and skills are challenging, and how to scaffold activities addressing those misconceptions.

Jennifer Pfannerstill, North Shore Country Day School and The College Board, Winnetka, IL and Tanya Sharpe, The College Board, Duluth, GA

Un“covering” AP Biology: A Community Conversation about Content and Skills

Midway Suites 5 • AP Biology • Symposium (60 min) • HS, 2Y, 4Y

Work with mentor teachers in small groups to answer questions every AP Biology teacher has, and join our community conversation on how “doing biology” will improve your students’ exam scores.

Jennifer Pfannerstill, North Shore Country Day School and The College Board, Winnetka, IL; Brad Williamson, University of Kansas, Lawrence, KS; Chris Monsour, Tiffin Columbian High School, Tiffin, OH; Theresa Holtzclaw, The Webb School, Knoxville, TN; Gordon Uno, University of Oklahoma, Norman, OK; Cindy Gay, BSCS, Colorado Springs, CO; and Sara Brownell, Arizona State University, Tempe, AZ

286 - When Elementary Learners “Become” Veterinarians: A Serious Educational Game Designed to Examine Diabetes, Obesity, and the Human Body Systems

Midway Suites 10 • Technology in the Classroom • Demonstration (75 min) • E, MS, GA

Students immerse in the “Virtual Vet”, a serious educational game designed to engage elementary learners with critical thinking skills in the context of the body systems.

Georgia Wood Hodges, Kayla Pritchard, and Sandhya Krishnan, University of Georgia, Athens, GA

2:00 PM – 4:00 PM

NABT Biology Education Research Symposium

Midway Suites 6 • Instructional Strategies • Symposium (120 min) • MS, HS, 2Y, 4Y

NABT is proud to present the 9th Annual Biology Education Research Symposium. Presentations were accepted through a double-blind review process that was open to biology instructors and education researchers at all levels.

➔ Full abstracts are available on page 38 and proceedings will be published online at <https://www.nabt.org/2017-Research-Symposium>

Coordinators: Erin Baumgartner, Western Oregon University, Monmouth, OR and Jaime Sabel, University of Memphis, Memphis, TN

2:00 PM – 3:15 PM cont.**129 • The Neuroscience of Our Senses****Station Master Room • Neuroscience • Hands-on Workshop (75 min) • MS, HS**

Touch. Hear. Balance. See. Taste and Smell. Explore with five iOS apps, companion activities, and related content that examine perception at molecular, cellular, and tissue levels. Free: Learn.Genetics.utah.edu and iTunes.

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

194 • Modifying Existing Curriculum to Mirror Local Environments to Benefit Students**Burlington Route • Curriculum Development • Hands-on Workshop (75 min) • MS, HS**

This workshop provides a methodology for converting existing curricula from other regions into locally relevant curricula that meet local and national standards using a USVI project as a model.

Carrie Bucklin, Southern Utah University, Cedar City, UT

96 • Save the Polar Bear! Ecology Escape Game**Frisco • Instructional Strategies • Hands-on Workshop (75 min) • MS, HS**

Using ecology knowledge, work to find clues, solve puzzles, and free a (toy) polar bear from the black market! Discuss application to your classroom and leave with classroom-ready resources.

Laura Schisler, Missouri Southern State University, Joplin, MO and Shana Kelley, Parkway Central High School, Chesterfield, MO

115 • The American Association of Immunologists Presents: AAI Teachers Research Program - Immunology Lessons for the Classroom**Illinois Central • AP Biology • Hands-on Workshop (75 min) • MS, HS**

Learn how to bring the excitement of immunology research to students in the classroom with units presented by teachers from the American Association of Immunology Summer Research Program for Teachers.

Courtney Pinard, Mary Litzinger, and Megean Garvin, American Association of Immunologists, Rockville, MD and Clinton Mathias, Western New England University, Springfield, MA

120 • A Flexible Approach to Integrating Authentic Research Experiences into Various Types of Introductory Biology Courses**Jefferson/Knickerbocker • Curriculum Development • Symposium (75 min) • HS, 2Y, 4Y**

From subtle shifts to massive changes - learn how we use different approaches to offer students research experiences in their first biology, biochemistry, botany, chemistry, microbiology, and zoology courses.

Donald French, Lucy Bailey, John Gelder, John Gustafson, Wouter Hoff, Janette Steets, and John Stewart, Oklahoma State University, Stillwater, OK

19 • Plants Suck...Carbon Dioxide! 30 Ready-to-Use Plant-Based Activities to Bring to Your Classroom**New York Central • Botany & Plant Biology • Hands-on Workshop (75 min) • HS**

Come to our "Jeopardy" style session to learn about 30 engaging plant-based activities and labs that are ready to use in your classroom.

Michael LeDuc and Chris Hilvert, Glenbrook South High School, Glenview, IL

149 • Investigating Innovations in Community College Biology Teaching and Learning: What We Learned from CC faculty at the Forefront of Biology Education Research**Wabash Cannonball • Instructional Strategies • Symposium (75 min) • 2Y, 4Y**

Engage with Community College faculty conducting Biology Education Research (CC-BER). Learn about the current state of CC-BER, how CC-BER relates to student success, and peer networks that support CC-BER.

Jeff Schinske, Foothill College, Los Altos Hills, CA and Lisa Corwin, University of Colorado, Boulder, Boulder, CO

3:30 PM – 4:00 PM**309 • Picture This! Using HHMI's Image of the Week in Phenomena-Driven, Three-Dimensional Lessons****Regency B • Instructional Strategies • Hands-on Workshop (30 min) • MS, HS, GA**

Interested in learning how to use phenomena to drive your three-dimensional lessons? HHMI's images of the week spark student curiosity and inquiry, leading to student-created models, investigations, and scientific explanations.

Samantha Johnson, Arroyo High School, San Lorenzo Unified School District, San Lorenzo, CA and Bridget Conneely, HHMI, Chevy Chase, MD

NABT Committee Meeting: Retired Members Committee**Switchman Room • Committee Meeting • GA**

Dennis Gathmann, Committee Chair

**SPECIAL PROGRAMMING
PRESENTED BY
Washington University**

**339 - Master Teacher
Share-a-Thon**

Midway Suites 3 - Instructional Strategies - Symposium (30 min) - MS, HS, 2Y

Come share in 5-10 minutes your favorite lesson plan, lab, or teaching resource with teachers from across the country who participated in Washington University's Master of Science in Biology program.

Margo Hathaway, Charles McWilliams, and Victoria May, Washington University in St. Louis, St. Louis, MO

259 - Breaking Down Barriers to Evolution by Going "Into The Jungle"

Midway Suites 8 - General Biology - Demonstration (30 min) - HS, 2Y, 4Y

Learn how the combination of Sean B. Carroll's book, "Into The Jungle", HHMI BioInteractive videos, and group discussion has created opportunities to remove stereotypes and broaden understanding of how evolution works.

Jess Robbins, Vincennes University, Vincennes, IN

215 - Evolutionary Movers and Shakers: Researching, Debating, and Ranking the "Top 20" Evolutionary Scientists of All Time - Dig Deeper with the Pioneers of Evolutionary Theory

Midway Suites 9 - Evolution - Hands-on Workshop (30 min) - MS, HS, 4Y

Expand and enliven your evolution curriculum by having students research, debate and rank the "Top 20" evolutionary scientists. How do they compare with the opinions of our Expert Panel!

John Mead, St. Mark's School of Texas, Dallas, TX and Amanda Glaze, Georgia Southern University, Statesboro, GA



DO YOU HAVE THE SKILL SET TO WORK IN THE BIOTECHNOLOGY INDUSTRY?

DR. FLETCHER AND DR. PORTER

LOCATION: Midway Suites 3

DATE: Friday, November 10, 2017

TIME SLOT: 12:00-12:30 p.m.

Bio-Link college programs and high school affiliates have been educating students in workforce oriented biotechnology and bioscience areas for the past 20 years. They exemplify the combination of core skills, knowledge and pedagogical practices discussed in the Next Generation Science Standards, the AP Biology Framework and the Vision and Change document.

Learn to locate biotechnology jobs both nationally and locally, about emerging biotechnology and bioscience workforce trends and identify different kinds of careers. Connect with the biotech education community on national and local levels!



3:30 PM – 4:00 PM cont.**161 - Unlocking the Mysteries of Science: Using Breakout 'Escape' Boxes to Engage Students in Case Study Problem-Solving in the Sciences****Midway Suites 10** • Instructional Strategies • Hands-on Workshop (30 min) • E, MS, HS

No better way to stimulate curiosity than a locked box mystery, especially when clues to the lock combinations are about SCIENCE! Participate in a mini-breakout using this exciting classroom strategy.

Pamela Close and Jessica Platto, David H. Hickman High School, Columbia, MO

26 - What's New in Neuroscience Activities**Station Master Room** • Neuroscience • Hands-on Workshop (30 min) • MS, HS, 2Y, GA

Neuroscience is becoming more accessible to highschool-aged students. This workshop allows first-hand experience with three new neuroscience activities that integrate physiology and technology principles equally well. Excite their curiosity!

Susan Park, The Hotchkiss School, Lakeville, CT

64 - Engaging Students of Science with SAMR - Redefine Your Assessments**Burlington Route** • General Biology • Symposium (30 min) • MS, HS

Increase classroom engagement with lessons that align to NGSS. Use the SAMR model of Substitution, Augmentation, Modification, and Redefinition to infuse technology into learning. Easily adaptable for middle and high school classes.

Caroline Milne, Laura Turngren, Erin Tantillo, Julie Baylor, and Vanessa Fennig, Barrington High School, Barrington, IL

11 - Graduate Student Workshop: Navigating Graduate School and Transitioning into Academia**Illinois Central** • Instructional Strategies • Symposium (30 min) • GA

Join us for an opportunity to network, connect with mentors, and learn about opportunities for growth as a biology education scholar.

NABT Graduate Student Committee

145 - Development of an Innovative Science Methods Course that Strengthens Preservice Biology Teachers' Understanding about Nature of Science Through the Lens of Authentic Research**Jefferson/Knickerbocker** • Instructional Strategies • Paper (30 min) • 2Y, 4Y

Come learn how we use authentic research experiences, during a secondary science methods course, to strengthen preservice biology teachers' understanding of scientific practices and nature of science.

Julie Angle and Donald French, Oklahoma State University, Stillwater, OK

265 - The Flipped Classroom: What the Students Say**Wabash Cannonball** • Instructional Strategies • Paper (30 min) • 2Y, 4Y

The viewpoints of general biology students in the flipped classroom, summarized from discussions, surveys, and interviews, will be presented. Practical advice on how to make the flip will be offered.

Kathy Gallucci, Elon University, Elon, NC

4:00 PM – 5:30 PM

Exhibit Hall Closing Reception

Midway • Special Program

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 special reception, prize giveaways, and more!

Sponsored by 

5:30 PM – 8:00 PM

HHMI Night at the Movies with Sean Carroll



Grand Ballroom D, E, F • Special Event (Tickets Required)

HHMI BioInteractive (www.biointeractive.org) and NABT are pleased to host the 7th Annual *HHMI Night at the Movies with Sean Carroll*. Join Dr. Carroll for the premiere of a new release and discussion. This free red-carpet event will begin at 5:30 pm with a reception including free food and drink.

Movie Night Pre-Reception to be held in Grand Ballroom Foyer. Movie will be shown promptly at 6:30 PM in Grand Ballroom D, E, F.



HHMI Night at the Movies with Sean Carroll

Friday, November 10, 2017

Movie Night

Reception and Book Signing
Foyer A,B,C 5:30–6:30 p.m.
Food and Drink Provided

Screening 6:30 p.m.
Grand Ballroom D,E,F



SATURDAY NOV II

NOV



SATURDAY

ABBREVIATION KEY

E: Elementary School

MS: Middle School

HS: High School

2Y: Two-Year College

4Y: Four-Year College

GA: General Audience

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ST. LOUIS
2017

7:30 AM – 8:45 AM**BioClub Breakfast**

Regency C • Meal Function (Tickets Required) • GA



The NABT BioClub continues to grow, and both current and future BioClub Advisors are invited to share favorite resources, and stories about their chapters. Join the club (BioClub that is)!

The BioClub Breakfast is made possible through the generous support of

CAROLINA
www.carolina.com

Missouri Biology Teachers Morning Coffee**Pegram**

Missouri teachers are invited to meet other local teachers for some coffee, camaraderie, and to learn more about NABT.

9:00 AM – 10:15 AM**INVITED SPEAKER
SCOTT WILLIAMSON SPEAKER SERIES****John Kelly**

➔ See page 10 for biography.

The Question of Variation

Regency A • Special Speaker • GA

Nearly all populations display genetic variation in behavior, morphology, physiology, and the susceptibility to disease. The question of why organisms vary is a classic one that resisted a comprehensive answer. However, advances in both quantitative and molecular biology now allow us to address the question of variation in an unprecedented way. In this talk, Dr. Kelly will discuss the processes that maintain genetic variation in nature with a particular focus on the model plant species *Mimulus guttatus*. This work illustrates how genetics, mathematics, and field biology can be combined to study these processes.

Dr. Kelly is the inaugural speaker in a new series established by Brad and Carol Williamson to honor their son Scott, a gifted biologist who loved the challenge of the big questions in biology but who balanced this passion with his devotion to his family.

9:00 AM – 10:15 AM**9:00 AM – 11:00 AM****NABT Biology Education Poster Session**

Midway • Poster Session (120 min) • HS, 2Y, 4Y, GA

This poster session will highlight research, practices, and programs in three distinct categories: general strategies for teaching biology, the scholarship of teaching and learning, and mentored student research. Posters presented by undergraduate and graduate students may be entered into two competitions.

➔ Complete listing starts on page 52

Coordinator: Troy Nash, Mercer University, Macon, GA

302 • Which Scientist's Work Saves 8 Million Lives a Year? Special NABT Screening of the Award-winning Documentary, Hilleman: A Perilous Quest to Save the World's Children

Grand B • Biotechnology • Symposium (75 min) • HS, 2Y, 4Y

Most haven't heard of him, but his work probably affected their lives. Join us to learn about this American hero. Meet the film director, get free classroom resources, and leave inspired!

Charlotte Moser, Vaccine Education Center at Children's Hospital of Philadelphia, Philadelphia, PA and Donald Mitchell, Medical History Pictures, Haverford, PA

301 • The Central Dogma of Genetic Medicine - A New Animated, Interactive Video, and Hands-on Activity to Teach CRISPR and Other Techniques, such as Gene Therapy and RNA Interference, Which Target the Flow of Genetic Information from DNA to RNA to Protein

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

Hear from experienced educators how to incorporate into your lesson plans exciting new classroom-made resources focused on the latest technologies used to treat genetic disease.

Ann Brokaw, Rocky River High School, Rocky River, OH; Kate Fisher, Oregon City High School, Oregon City, OR; and Laura Bonetta, HHMI, Chevy Chase, MD

9:00 AM – 3:00 PM**SPECIAL PROGRAMMING PRESENTED BY
OpenStax****All sessions in Midway Suites 1****9:00 AM – 10:00 AM****410 • Building an Online Science Kit with Carolina Biological and OpenStax**

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

Learn about building an online science kit with hands-on investigations for your students. Discover how your learning outcomes can be synced with individual investigations and specific sections of OpenStax texts, giving students a one-stop-shop for their text and kit that makes online science easier than ever.

Louis F. McIntyre, Sr, Rockingham Community College, Houston, TX

10:00 AM – 11:30 AM**411 • Help Us Shape the Future of Ed-Tech – OpenStax Tutor Beta Feedback Session**

General Biology • Demonstration (90 min) • 2Y, 4Y

OpenStax is conducting a feedback session on our new, low-cost courseware – we need your help to improve our tool and make more gains in student learning. Learn about our technology and get a free semester of OpenStax Tutor access for your students.

Kathi Fletcher, OpenStax, Houston, TX

1:30 PM – 3:00 PM**412 • Forge a New Frontier in Education with OpenStax Tutor Beta**

General Biology • Demonstration (90 min) • 2Y, 4Y

Discover how our new OpenStax Tutor Beta courseware uses our biology book to deliver quality content, spaced practice, and immediate feedback. Learn how we've designed our low-cost, research-based tool to shape the future of ed tech, then give feedback to help us improve!

Kathi Fletcher, OpenStax, Houston, TX

9:00 AM – 10:15 AM continued**NABT Committee Meeting:
Awards Committee and OBTA
Directors****Switchman Room • Committee
Meeting • GA**Jason Crean, Committee Chair, and
Mark Little, National OBTA Coordinator**9:00 AM – 11:00 AM****SPECIAL PROGRAMMING
PRESENTED BY
HudsonAlpha****88 • Touching Triton****Midway Suites 2 • General Biology •
Special Workshop (120 min) • HS, 2Y**

HudsonAlpha's *Touching Triton* uses a game-like interface to challenge students to make medical packing decisions by analyzing risk for common complex disease. This session provides everything you need to get started using *Touching Triton* in your classroom.

Madelene Loftin and Adam Hott,
HudsonAlpha Institute for Biotechnology,
Huntsville, AL**9:00 AM – 10:15 AM continued****50 • Integrating Human
Rights Advocacy into Biology
Coursework****Midway Suites 5 • Ecology /
Environmental Science / Sustainability •
Paper (75 min) • HS, 2Y, 4Y**

Scientists possess valuable knowledge for resolving human rights issues. This presentation describes a civic engagement project in which students consulted with human rights groups to resolve water quality issues.

Brian Shmaefsky, Lone Star College - Kingwood
and the American Association for the Advance-
ment of Science, Kingwood, TX**75 • Tissue Engineering -
Exploring Engineering Design
in Biology with Free DIY Guides
from Allen Distinguished
Educator Resources****Midway Suites 6 • General Biology •
Hands-on Workshop (75 min) • MS, HS**

Come experience the Tissue Engineering unit from the Allen Distinguished Educators free DIY guides. Learn how to excite students about bio-engineering with inexpensive materials.

Kathryn Davis, Hood River Valley High School,
Hood River, OR

9:00 AM – 10:15 AM *continued*

85 • Teaching a High School Research Course

Midway Suites 7 • Nature of Science - Hands-on Workshop (75 min) • HS, 2Y, GA

We will discuss the research courses we teach at our schools that get students to think, write, and talk like scientists while engaging in authentic open-ended inquiry.

Paul Strode, Fairview High School, Boulder, CO and Ryan Reardon, Jefferson County International Baccalaureate, Irondale, AL

209 • Developing a Model for Negative Feedback Mechanisms of Thermoregulation

Midway Suites 8 • General Biology - Hands-on Workshop (75 min) • HS

Participants will engage in a three-dimensional lesson that illustrates how to teach students to construct conceptual models, using the negative feedback mechanisms of thermoregulation.

Susan Johnson and Stacy Allen, Southern Arkansas University STEM Center for K-12 Education, Magnolia, AR

298 • Making Student Thinking Visible to Improve Teaching and Learning

Midway Suites 9 • Instructional Strategies - Hands-on Workshop (75 min) • MS, HS, 2Y

Do you know what your students really understand about biology? Experience how intentional, research-based questioning strategies and video analysis can reveal student thinking and improve instructional practice.

Cindy J. Gay, BSCS, Colorado Springs, CO and Jamie Gay, Longmont High School, Longmont, CO

9:00 AM – 11:45 AM

SPECIAL PROGRAMMING PRESENTED BY Flinn Scientific

All sessions in Midway Suites 3

All sessions: Meg Griffith, Flinn Scientific, Inc., Batavia, IL

9:00 AM – 10:15 AM

326 • Flinn Favorite Biology Lab Activities and Games

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

Join us as we share labs, demos, and games! We focus on topics like evolution, genetics, biochemistry, and more. You're sure to find a favorite that works for you! Handouts provided!

10:30 AM – 11:45 AM

325 • Flipping AP Biology with FlinnPREP

AP Biology • Demonstration (75 min) • HS

Learn how FlinnPREP™, a supplemental digital curriculum, can ease your transition with video, images, and written content in a condensed form. Free teacher resources and door prizes will be distributed.

9:00 AM – 11:45 AM

SPECIAL PROGRAMMING PRESENTED BY Fisher Scientific

All sessions in Midway Suites 4

All sessions: Ellyn Daugherty, Fisher Science Education/GBiosciences, El Dorado Hills, CA and Colin Heath, G-Biosciences, St. Louis, MO

9:00 AM – 10:15 AM

355 • Biotech is STEM: Cheese-making and Scientific Methods

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

Biotech labs and computer activities give relevance to science content and process. In this workshop, teachers conduct a cheese-making lab that's used to teach scientific methodologies and bioinformatics (molecular modeling).

10:30 AM – 11:45 AM

356 • Proteins are the Cash of Biotech - The rAmylase Project

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

Proteins are usually colorless and always submicroscopic. How can scientists recognize and measure protein presence and activity? In this hands-on workshop, participants study amylase (enzyme) activity using protein indicator testing.

9:00 AM – 10:15 AM continued**285 • How Do We Assess Students in a Three-Dimensional Classroom?****Midway Suites 10** • Science Practices • Hands-on Workshop (75 min) • MS, HS, 2Y, GA

Assessing NGSS performance expectations requires multiple, rigorous assessment opportunities that demonstrate student understanding of content, and their engagement with SEPs and CCCs. Come change one-dimensional assessments into two- or three-dimensional!

Jim Clark, San Lorenzo Unified School District, San Lorenzo, CA and Samantha Johnson, Arroyo High School, San Lorenzo, CA

127 • The Anthropocene Era - Using Data Analysis, Claims, Evidence, and Reasoning to Explore Human Impacts on Our Planet**Burlington Route** • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS

How does the carbon cycle affect earth's systems and ocean acidification? Join us for hands-on activities and free HHMI Biointeractive resources that will help your students explore these challenging topics.

Dana Grooms, Thousand Oaks High School, Thousand Oaks, CA and Beth Dixon, Western Sierra Collegiate Academy, Rocklin, CA

174 • Weaving Biotechnology Throughout Your Biology Curriculum**Illinois Central** • General Biology • Hands-on Workshop (75 min) • HS

Explore areas of basic biology curriculum, and demonstrate where and how you can integrate biotech in a way that is supportive of fundamental, biological concepts yet teaches basic biotechnology.

Leslie Prudhomme, Mass Insight Education, Boston, MA

163 • Contributing to *The American Biology Teacher*: A Hands-on Workshop**Jefferson/Knickerbocker** • General Biology • Hands-on Workshop (75 min) • GA

The editorial team of *The American Biology Teacher* will jointly present a workshop for those who would like to be authors and/or reviewers with a practice review and article development session.

William McComas, University of Arkansas, Fayetteville, AK

242 • Learning Biological Processes with Computational Thinking**Missouri Pacific** • Science Practices • Hands-on Workshop (75 min) • MS, HS

This presentation showcases a protein synthesis and computational thinking unit in the context of a socio-scientific issue about Alzheimer's disease and genetic testing. Attendees are encouraged to bring computers/tablets.

Amanda Peel, University of Missouri, Columbia, MO

138 • Biology Practices That Drive Thinking Forward**New York Central** • General Biology • Hands-on Workshop (75 min) • HS

Explore the use of interactive biology manipulatives and engaging kits that get students figuring out biological concepts, while enjoying learning. Emphasis will be on "designed to discover" high school activities.

Rebecca Brewer, Troy High School, Troy, MI

78 • The Evolution of a Mutual Mentoring Relationship**Wabash Cannonball** • Curriculum Development • Symposium (75 min) • HS, 2Y, 4Y

This presentation will discuss a 15-year professional, mutual-mentoring relationship between high school and university faculty members. Discussion on how to create these collegial relationships will be emphasized.

Barry Greenwald, St. Paul Public Schools, St. Paul, MN and Mark Decker, University of Minnesota, Minneapolis, MN

10:30 AM – 11:00 AM**31 • From Soil to Sun...Engaging At-Risk Students With Plants in an Introductory Biology Class!****Midway Suites 8** • Instructional Strategies • Hands-on Workshop (30 min) • MS, HS

A compilation of classroom strategies, labs, hands-on activities, technology, and media to enhance engagement and performance of at-risk students in the introductory-level biology classroom, with a focus on plants.

Marianne Gudmundsson, Mary Ann Ericksen, Erin McBride, and Lisa Pavic, Glenbrook South High School, Glenview, IL

152 • Stratifying Biology Research in an Undergraduate Biology Program**Missouri Pacific** • Science Practices • Demonstration (30 min) • 2Y, 4Y

Current Research and Vision & Change recommend that a research experience increases retention in undergraduate sciences in both major and non-major classes. Explore the model Taylor University is using.

John Moore, Brian Dewar, and Jessica Vanderploeg, Taylor University, Upland, IN

307 - HHMI Biointeractive's "Scientists at Work" Video Series and Accompanying Resources Use Creative Storytelling and Active Learning Exercises to Foster Understanding of the Scientific Method - "What's in Your Pollen" and "Virus Hunters" will be Explored

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

With "Scientists at Work", students see diverse scientists "geek out" about their work. This session shows how to use this "hook" to teach hypothesis-driven inquiry to investigate current, real-world problems.

Dave Westenberg, Missouri University of Science and Technology, Rolla, MO; Holly Basta, Rocky Mountain College, Billings, MT; and Paul Beardsley, HHMI, Chevy Chase, MD

NABT Committee Meetings: Global Outreach and Citizen Science & Stewardship Committees (formerly Global Perspectives Committee)

Switchman Room • Committee Meeting • GA

Committee Chairs to be Selected

243 - Messy Data to Make Authentic Models for Stability and Change

Midway Suites 5 • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS

Real data is messy. Your students need to learn how to interpret it to make and analyze models. Models help students identify and explain stability, and change patterns.

Jim Clark, San Lorenzo Unified School District, San Lorenzo, CA

UNK

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Curtis Reese, MS in Biology, Graduate

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NABT POSTER SESSION • 9:00 AM – 3:00 PM • Midway

Poster Session Manned: 9:00 AM – 11:00 AM • Poster Judging: 9:00 AM – 11:00 AM

BIOLOGY EDUCATION RESEARCH COMPETITION

1. Characterization of Students' Experimental Design Approaches in Traditional Laboratories versus Course-Based Undergraduate Research Experiences*

David Esparza, Haidar Ahmed, and Jeffrey Olimpo, The University of Texas at El Paso, El Paso, TX

2. Comparing Instructional Approaches Using the Tree of Life and Student Learning Outcomes

Edward Leone, Oklahoma State University, Stillwater, OK; Kristy Daniel, Texas State University, San Marcos, TX

3. Ecological Literacy, Urban Green Space, and Mobile Technology: Exploring the Impacts of an Arboretum Curriculum Designed for Undergraduate Biology Courses

Patrick Phoebus, Kim Sadler, and Michael Rutledge, Middle Tennessee State University, Murfreesboro, TN

4. Effective Instructional Design for Online Activities: Investigating the Role of Feedback in an Activity for Phylogenetics

David Ford, East Tennessee State University, Johnson City, TN; Anna Hiatt, University of Nebraska-Lincoln, Lincoln, NE

5. An Exploration of Socio-Scientific Reasoning Through Teaching About Genetically Modified Organisms

Hai Nguyen, Bethany Stone, and Troy Sadler, University of Missouri, Columbia, MO

6. Exploring Student Motivation and Engagement in Community College Introductory Science Classes Using the MUSIC® Model

Kerri Donohue and Gayle Buck, Indiana University, Bloomington, IN

7. Implementing a Comprehensive Action Research Workshop within an Upper-Division Scientific Teaching Course Improves Pre-Service Teachers' Knowledge of and Attitudes Toward Action Research Methodologies

David Esparza and Jeffrey Olimpo, The University of Texas at El Paso, El Paso, TX

8. Investigating Instructional Behaviors and Expectations of College Biology Instructors

Spenser Biehler and Pradeep Max Dass, Northern Arizona University, Flagstaff, AZ

9. An Investigation into How Students Perceive the Use of Social Media in the Science Classroom

Zachary Nolen and Kristy Daniel, Texas State University, San Marcos, TX

10. Measuring Changes in Student Content Knowledge, Reasoning, and Decision-Making About Modern Food Labels Using a Case Study Approach*

Enya Granados, Kaylee Wilburn, and Justin Pruneski, Heidelberg University, Tiffin, OH

11. Measuring the Effect of Invasive Species Education Curricula on Student Attitudes Toward Invasive Species

Kathryn Parsley, The University of Memphis, Memphis, TN; Tina Cade and Paula Williamson, Texas State University, San Marcos, TX; Florence Oxley, Austin Community College, Austin, TX

12. Overcoming Figure Phobia: A Graphical Approach to Reading a Scientific Paper

Adam Brown, Jocelyn Malamy, and Beatrice Fineschi, The University of Chicago, Chicago, IL

13. Preservice Teacher Engagement and Perceptions of Informal, Outdoor Learning Environments

Sara Salisbury and Kristy Daniel, Texas State University, San Marcos, TX

14. Student Understanding and Misconceptions of the Nature of Chromosomes Related to Genetic Material and Cell Division in an Introductory Biology Course at a Community College

Lauren Elliott and David Rudge, Western Michigan University, Kalamazoo, MI

15. Using Concept Maps to Monitor Knowledge Structure Changes in a Science Classroom

Leah Cook, Davenport University, Caledonia, MI; Brandy Skjold, Western Michigan University, Kalamazoo, MI

MENTORED UNDERGRADUATE RESEARCH

1. Assessing Red Fox (*Vulpes vulpes*) and Coyote (*Canis latrans*) Populations on Presque Isle State Park Using Remote Cameras

Tyler Chispen and Amy Burniston, Mercyhurst University, Erie, PA

2. Hatching Behavior of *H. glycines*

Aaron West, PRECS, Champaign, IL; Nathan Schroeder and Sit Thapa, The University of Illinois, Champaign, IL

3. Transgenerational Responses of Freshwater Snails to Fish Predators

Maggie Pearce, Scott Goepfner, Lynne Beaty, Julie Angle, and Barney Luttbeg, Oklahoma State University, Stillwater, OK

4. Using Herbarium Specimens to Study Plant Phenology in Southern Appalachia

Liane Ventura and Amy Boyd, Warren Wilson College, Asheville, NC

5. The *Wolbachia* Infection Frequency of Insects in Central West Virginia

Maren Wentzel and Sara Sawyer, Glenville State College, Glenville, WV

* Undergraduate students

GENERAL (NON-COMPETITION) CATEGORY**1. Active Learning, Anxiety, and Alienation: Potential Impacts on Student Persistence and Success**

Ben England, The University of Tennessee, Knoxville, TN; Jennifer Brigati, Maryville College, Maryville, TN; Elisabeth Schussler, The University of Tennessee, Knoxville, TN

2. A Classroom Activity Simulation Population-level Evolution by Hand

Travis Hagey, Alexa Warwick, and Louise Mead, Michigan State University, East Lansing, MI

3. Development and Implementation of Zero-Cost Version of General Biology for Non-Majors

Vedham Karpakakunjaram, Aubrey Smith, and Virginia Crichton, Montgomery College, Rockville, MD

4. Do Students Engaged in a Curriculum that Stresses Critical Thinking Change Their Approach to Learning?

Anneke Metz, Southern Illinois University, Carbondale, IL

5. Does Behavioral Response to a Novel Environment Vary in Parental Species and Hybrids?

Caitlin Cobbs, Oklahoma State University, Stillwater, OK

6. Effectiveness of Different Assessment Strategies in Non-Majors Introductory Biology

Lindsay Chaney, Snow College, Ephraim, UT

7. The Effects of Case-Based Instruction on Undergraduate Biology Students' Understanding of the Nature of Science

Amy Burniston, Mercyhurst University, Erie, PA

8. Faculty Professional Development in Quantitative Biology Promotes Scholarly Teaching

Gabriela Hamerlinck, BioQUEST Curriculum Consortium, Madison, WI; Kevin Kidder, Sandra LoRe, and Pamela Bishop, The University of Tennessee, Knoxville, TN; Kristin Jenkins, BioQUEST Curriculum Consortium, Boyds, MD; Samuel Donovan, University of Pittsburgh, Pittsburgh, PA

9. A Game of Selection: Exploring Galápagos Colonization

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

10. Genetics Course Augmentation with Technology (GCAT): A Framework for Enhancing Active Learning in STEM Using Mobile Devices

Joseph Ross, California State University at Fresno, Fresno, CA

11. The Genomics Education Partnership and G-OnRamp: Expanding Opportunities for Undergraduate Research in Genomics

Sarah Elgin, Washington University in St. Louis, St. Louis, MO; Diane Sklensky, Lane College, Jackson, TN; Yating Liu, Washington University in St. Louis, St. Louis, MO; Luke Sargent, Oregon Health and Science University, Portland, OR; Wilson Leung, Washington University in St. Louis, St. Louis, MO; Jeremy Goecks, Oregon Health and Science University, Portland, OR

12. Group Exams: A Way to Stimulate Teamwork in a Large Enrollment Class

Ana Medrano and Ann Cheek, University of Houston, Houston, TX

13. Integrating Concepts in Biology: A Data Driven Approach to Introductory/AP Biology

Elizabeth Forrester, Baylor School, Chattanooga, TN; A. Malcolm Campbell, Laurie J. Heyer, and Christopher Paradise, Davidson College, Davidson, NC

14. An Interactive E-Text: Advantages for the Student and for the Instructor

Kimberly Gonzalez, Middlesex Community College, Bedford, MA; Thomas Shea, University of Massachusetts at Lowell, Lowell, MA

15. Pathways and Subways: Using Analogies and Guided Inquiry to Introduce Metabolic Pathways

Kerry Hull, Bishop's University, Sherbrooke, Quebec, Canada; Murray Jensen, The University of Minnesota, Minneapolis, MN; Patricia Marx, Bishop's University, Sherbrooke, Quebec, Canada

16. Philosophies and Practices of Inquiry: A Comparative Case Study of Dual-Enrollment Physics and Physiology Courses

Murray Jensen, Laura Seithers, and Elizabeth Greene, The University of Minnesota, Minneapolis, MN; Kerry Hull, Bishop's University, Sherbrooke, Quebec, Canada

17. PRECS: A Collaborative Model for Undergraduate Research with Community College Students

C. Britt Carlson, Parkland College, Champaign, IL; Nathan Schroeder, University of Illinois, Urbana-Champaign, Urbana, IL

18. Promoting Success with Critical Thinking and Metacognition in the Science Classroom for First-Year Students Utilizing Supplemental Instruction

Sheela Vemu, Waubensee Community College, Sugar Grove, IL; Lindsey Carter, Butler Community College, El Dorado, KS; Jessica Moreno, Janel Venegas, and Maria Aguilar, Waubensee Community College, Sugar Grove, IL

19. Students' Perceptions about Conservation and Environmental Knowledge After Participating in Ecological Restoration Projects

Kim Sadler, Penny Carroll, and Angelique Troelstrup, Middle Tennessee State University, Murfreesboro, TN

➔ continued on next page

NABT POSTER SESSION

GENERAL (NON-COMPETITION) CATEGORY, CONTINUED

20. Take a Shot: Integrating Math with the Life Sciences Using Simple Epidemiological Calculations to Examine How Immunization Programs Protect Populations

Darrell Ray, University of Tennessee-Martin, Martin, TN

21. Use of Scaffolds to Support Self-Regulated Learning and Metacognition in Undergraduate Biology Students

Jaime Sabel, The University of Memphis, Memphis, TN

22. Using Food as a Tool for Understanding

Andrea Huntoon, Fox Valley Technical College, Appleton, WI

23. Using Graphing Materials to Improve Undergraduate Biology Students' Graph Choice, Construction, and Interpretation in an Upper-Division Animal Behavior Lecture Course

Emily Weigel and Aakanksha Angra, Georgia Institute of Technology, Atlanta, GA

24. Using Human Examples to Teach Evolution in AP Biology Classrooms Increases Understanding and Decreases Misconceptions

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

25. Validity and Reliability of the Chemistry in Cellular Respiration Concept Inventory

Lance Forshee, Southern Utah University, Cedar City, UT; Donald French, Oklahoma State University, Stillwater, OK

10:30 AM – 11:45 AM continued

188 • The Fascinating and Controversial Science of CRISPR: Structured-inquiry Lab Activity

Midway Suites 6 • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

This lab activity introduces students to genome editing using CRISPR technology. Students design, model, and simulate a CRISPR-Cas9 complex targeting a particular gene of interest.

David Wollert, Chattanooga State Community College, Chattanooga, TN

56 • Project-Based Learning in the NGSS Biology Classroom

Midway Suites 7 • General Biology • Hands-on Workshop (75 min) • MS, HS

A hands-on workshop to aid teachers in generating ideas, planning, and implementing a project-based unit in line with the *Next Generation Science Standards*.

Camden Hanzlick-Burton, Summit Sierra High School, Seattle, WA; Kelly Kluthe, Olathe West High School, Olathe, KS; and Andrew Davis, Lawrence Free State, Lawrence, KS

20 • Experimenting with Summative Assessment in an Exam-Free Undergraduate Biology Course

Midway Suites 9 • Instructional Strategies • Hands-on Workshop (75 min) • HS, 2Y, 4Y

I will share the successes and challenges I experienced while implementing an exam-free non-majors undergraduate biology course. Participants will experiment with creating their own exam-free summative assessments.

Karla Fuller, Guttman Community College, New York, NY

86 • A Vision of Proficiency-based Grading: Using Videos to Assess Student Understanding as they Develop and Use Models to Illustrate Biological Systems

Midway Suites 10 • Science Practices • Hands-on Workshop (75 min) • MS, HS, 2Y

What does it mean to "Use a model to illustrate" the flow of energy and matter? Discover the power of teaching and learning through model-building and listening to student explanations.

Roxane Johnson De Lear, Mill River Union High School, North Clarendon, VT

256 • Explore the Connections Between Ecosystems, Climate Change, and Human Interactions with Hands-on Modeling Activities from an NGSS-aligned High School Biology Unit Focused on Understanding the Underlying Ecosystem Biology of a Vector-borne Disease

Burlington Route • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Track a mysterious disease using scientists' data on how Lyme disease spreads through ecosystem communities. Investigate the role that ecosystem dynamics have on increasing the occurrence of vector-borne disease.

Barbara Hug and Tanya Josek, University of Illinois, Champaign, IL; Natasha Capell, Tuscola High School, Tuscola, IL; and Becky Fuller, University of Illinois, Urbana, IL

282 • Our Real BFF 2.0

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

This session will highlight free, web-based activities, developed under NIH collaboration, on the use of dogs as model organisms for the study of classical and molecular genetics/genomics, evolution, and disease.

Cheryl Hach, Kalamazoo Area Mathematics and Science Center, Kalamazoo, MI and Roberta Cramer, Michigan Science Teachers Association, Grand Haven, MI

273 • Zika Virus, Drug Discovery, and Student Projects in Bioinformatics

Jefferson/Knickerbocker • Biotechnology • Demonstration (75 min) • HS, 2Y, 4Y, GA

Can we repurpose existing drugs to treat new viruses? Learn how students can apply bioinformatics tools like BLAST and

"Molecule World" to address real-world problems and make discoveries.

Sandra Porter, Austin Community College, Seattle, WA

136 • MODEL Like a Scientist: Develop, Adapt, Test, and Apply Agent-Based Models in AP Biology - Meeting the Challenge of Incorporating Models into your Everyday Curriculum.

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

Netlogo is a free modeling tool to deeply probe Biology's "big ideas." We'll explore how models help students think like scientists and do science. Bring your computers with Netlogo downloaded. <https://ccl.northwestern.edu/netlogo/>

Brad Williamson, University of Kansas (retired), Lawrence, KS

NABT Honors Luncheon

Regency C • Special Event (Tickets Required) • GA

Join us as we recognize the 2017 NABT Award recipients, including the Outstanding Biology Teacher Award (OBTA) honorees. This celebration honors exceptional biology teaching, and everyone is welcome as we applaud these remarkable individuals.

Bio-Rad Escape Room Experience



Midway • Special Event (Tickets Required) • GA

Solve the mystery to break out of Bio-Rad's lab skills escape room for high school and college life science. Workshop space is limited.

Get tickets at the Bio-Rad booth (Booth 22) on Thursday evening or Friday.



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1:30 PM – 3:30 PM**SPECIAL PROGRAMMING PRESENTED BY
HudsonAlpha Institute for Biotechnology****All sessions in Midway Suites 3****1:30 PM – 2:45 PM****323 • Big Data: Large-Scale Genomics Projects**

General Biology • Demonstration (75 min) • HS

The Human Genome Project provided a reference sequence for humans. Since the completion of the HGP, other large scale projects are answering the remaining questions, reshaping thinking about DNA changes.

Madelene Loftin, Neil Lamb, and Jennifer Carden, HudsonAlpha Institute for Biotechnology, Huntsville, AL

3:00 PM – 3:30 PM**324 • Investigating Common Complex Disease with Touching Triton**

Technology in the Classroom • Demonstration (30 min) • HS, 2Y

Through the storyline of long-term space flight, students learn about the complexity of risk for common disease such as diabetes and colon cancer in this web-based serious game from HudsonAlpha.

Madelene Loftin and Dasi Price, HudsonAlpha Institute for Biotechnology, Huntsville, AL

11:45AM – 1:15 PM**NABT Energy Break**

Midway • Special Program • GA

Take a break to enjoy a snack, grab a drink, network with fellow attendees, and be sure to spend time checking out the student posters.

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**1:30 PM – 3:30 PM****INTRO BIO TASK FORCE****318 • Intro Bio Symposium**

Grand A • Instructional Strategies • Symposium (120 min)

This symposium will present evidence-based approaches to implementing science practices into the introductory course. Participants will then work together to help develop appropriate learning progressions for teaching core introductory biology themes.

Presented by the NABT Introductory Biology Task Force

1:30 PM – 3:30 PM**NABT Undergraduate Biology Summit: Faculty Development in an Age of Evidence**

Grand B • Instructional Strategies • Symposium (120 min) • HS, 2Y, 4Y

This year's symposium will highlight projects that are currently undergoing scalable (group-level) and transferrable faculty development at the institutional, college, departmental, or working group levels. Presenters will share evidence-based efforts to promote faculty development along with practical deliverables for session attendees.

➔ See page 58 for featured presentations.

Coordinators: Grant Gardner, Middle Tennessee State University, Murfreesboro, TN and Emily Walter, California State University – Fresno, Fresno, CA

1:30 PM – 2:45 PM**NABT Committee Meeting: Professional Development and Conference Committees**

Switchman Room • Committee Meeting • GA

Kristina Nicosia and Ryan Lacson, Committee Chairs

308 • Using DNA Metabarcoding to Understand Niche Partitioning in the African Savanna

Regency B • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Scientists are using cutting-edge DNA metabarcoding technology to understand how species coexist on the African savanna through niche partitioning. Participants will explore classroom-ready HHMI BioInteractive resources in this hands-on workshop.

Scott Sowell, Darnell-Cookman Middle/High School, Jacksonville, FL; Katie Ward, Aragon High School, San Mateo, CA; and Bridget Conneely, HHMI, Chevy Chase, MD

1:30 PM – 2:45 PM *continued*

105 - DNA Barcoding - Independent Research in the Classroom

Midway Suites 2 • Ecology / Environmental Science / Sustainability • Demonstration (75 min) • HS, 2Y, 4Y

Engage students in student-driven research and course-based research experiences (CURES) by identifying organisms through unique DNA barcodes.

Bruce Nash, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY

112 - Biology Curriculum for a Crowded World

Midway Suites 5 • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • MS, HS

Participate in hands-on activities that apply math and science skills to tackle major

global challenges, including human population pressures, finite natural resources, and climate change.

Brian Shmaefsky, Lone Star College - Kingwood, Kingwood, TX

253 - BioBuilder - Bringing Science and Technology Problem-solving into the K-12 and Undergraduate Classroom

Midway Suites 6 • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Synthetic biology links biology, engineering, mathematics and computer science. This session will introduce sample BioBuilder activities and discuss BioBuilder programs to integrate synthetic biology into the curriculum.

Dave Westenberg, Missouri S&T, Rolla, MO

1:30 PM – 3:30 PM

SPECIAL PROGRAMMING PRESENTED BY Monsanto

331 - GMO, Pesticides, and Farming: A Hot Topic in the Media and Classroom - Monsanto Panel Discussion and Presentation

Midway Suites 4 • Biotechnology • Symposium (120 min) • HS, 2Y, 4Y, GA

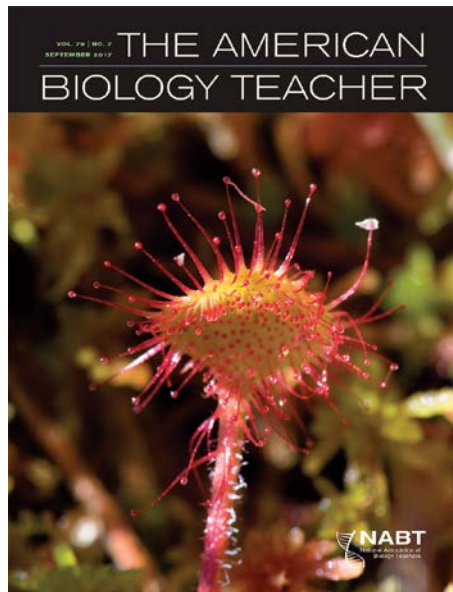
Scientists will discuss topics like GMOs and pesticides: what they are and aren't, how these innovations are tested, limitations/benefits of the technology, and where biotechnology is used outside of agriculture.

Valerie Bayes, Monsanto, St. Louis, MO



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NABT FOUR-YEAR COLLEGE AND UNIVERSITY SECTION UNDERGRADUATE BIOLOGY SUMMIT

Faculty Development in an Age of Evidence

Saturday, November 11

1:30 PM – 3:30 PM • Grand B

1:30 PM – 1:40 PM

Welcome and Introductions

Dr. Grant Gardner

Middle Tennessee State University, Murfreesboro, TN

Dr. Emily Walter

California State University - Fresno, Fresno, CA

Co-Chairs: Professional Development Summit Committee

1:40 PM – 2:10 PM

Keynote Address

**Building on Disciplinary Norms: The Role of
Mentoring in Faculty Development**

Dr. Cynthia Brame

Vanderbilt University, Nashville, TN

*Assistant Director of the Center for Teaching and Senior
Lecturer of Biological Sciences*

2:10 PM – 2:30 PM

Paper #1

**Building a Culture of Diversity and Inclusion in
Biology Education Research: The Formation of the
iEMBER Network**

Dr. Jana Marcette

Harris-Stowe University, St. Louis, MO

Dr. Michael Moore

Baylor University, Waco, TX

Dr. Rachel Tennial

University of Arkansas - Little Rock, Little Rock, AR

Dr. Erin Solomon

Washington University - St. Louis, St. Louis, MO

2:30 PM – 2:50 PM

Paper #2

**Examining the Understanding of Inquiry-Based
Learning and Teaching Among Undergraduate
Teachers and Students**

Dr. Maren Hudson

East Tennessee State University, Johnson City, TN

2:50 PM – 3:10 PM

Paper #3

**Exploring Patterns in Teaching Practice and
Organizational Barriers to Teaching Improvement**

Dr. Emily Walter

California State University - Fresno, Fresno, CA

Ivan Ceballos-Madriral

California State University - Fresno, Fresno, CA

3:10 PM – 3:30 PM

Roundtable Discussion

137 • BPA Is Not OK! Using a BPA Assay Kit to Promote Student Understanding of Cell Signaling Through a Simple Modification of an AP Biology Lab Investigation

Midway Suites 7 • AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Bring inquiry to the forefront of your AP Biology class! Participants will measure the concentration of BPA and investigate the effect of BPA on the onion root tip cell cycle.

Adam Bergeron and Charles Collis, School District of Clayton, Clayton, MI

70 • Modern Ecology in the Classroom: Utilizing Current Ecological Research to Understand How Invasive Species Affect Biodiversity

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

This session introduces a unit designed through an *NSF Research Experience for Teachers* fellowship utilizing modern ecological research and data analysis to address important concepts in ecology.

Jeanette Bosomworth, Beijing National Day School, Beijing, China

130 • So You Like to “Argue.” What Evidence Do You Have to Support Your Claim? Developing Argumentation Skills for the Biology Classroom

Midway Suites 9 • Instructional Strategies • Hands-on Workshop (75 min) • E, MS, HS

Attention preservice and novice biology teachers! Are you skilled at engaging in argumentation without arguing? Learn how to facilitate a biology classroom community that fosters evidence-based argumentation.

Julie Angle and Amy Olson, Oklahoma State University, Stillwater, OK

236 • Inquiry Without Insanity: Practical Approaches to Easily Add Inquiry-driven Labs in High School Biology

Midway Suites 10 • Instructional Strategies • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Want to support students in doing inquiry-driven work? Overwhelmed by constraints of time, materials, and logistics? Come see how to support student inquiry using labs you already know and like!

Stephen Traphagen, Rolling Meadows High School, Rolling Meadows, IL

295 • Sustainable Earth Education Speed Dating for Life Science Educators

Burlington Route • Ecology / Environmental Science / Sustainability • Symposium (75 min) • 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 Phillipson-Mower, Indiana University Bloomington, Bloomington, IN

168 • What is Genome Editing? Tackling the Scientific and Ethical Questions in the Classroom

Frisco • Biotechnology • Symposium (75 min) • MS, HS, 2Y

Learn about the cutting-edge field of genome editing/CRISPR and lesson plans that explore potential applications for human health and de-extinction as well as the scientific and ethical questions.

Marnie Gelbart, Dana Waring, and Lauren Tomaselli, Personal Genetics Education Project/ Harvard Medical School, Boston, MA



1:30 PM – 2:45 PM *continued***157 • 30+ Activities to Engage At-Risk Students in Introductory Biology Classes****Illinois Central** • General Biology • Hands-on Workshop (75 min) • MS, HS

A compilation of 30+ classroom strategies, labs, hands-on activities, review strategies, technology, and media to enhance engagement and performance of at-risk students in the introductory-level biology classroom.

Marianne Gudmundsson, Lisa Pavic, Mary Ann Ericksen, and Erin McBride, Glenbrook South High School, Glenview, IL

95 • RGEODE: Mining Big Data in the Biology Classroom**Jefferson/Knickerbocker** • Biotechnology • Demonstration (75 min) • HS, 2Y

Prepare your students for the era of big data! We will demonstrate RGEODE, an activity that utilizes GEO expression data to reinforce genetics concepts and introduce students to R programming.

Alexis Norris, Johns Hopkins University, Baltimore, MD and Kelly Hoffman, Montgomery County Public Schools, Gaithersburg, MD

89 • Evolutionary Medicine: Medicine Without Evolution Is Like Engineering Without Physics**Missouri Pacific** • Anatomy & Physiology • Hands-on Workshop (75 min) • HS, 2Y

Evolutionary medicine or Darwinian medicine is the application of modern evolutionary theory to understanding health and disease. Integrate into your Physiology, Anatomy, Biology or AP Biology course.

Mark Friedman, International Society for Evolutionary Medicine and Public Health, Redondo Beach, CA and Robert Perlman, University of Chicago (emeritus), Chicago, IL

258 • Using Formative Assessments in the Classroom**New York Central** • General Biology • Hands-on Workshop (75 min) • HS

Participants will engage in formative assessment strategies that can be used the next class day. The presentation will focus on practicing strategies that increase student learning and engagement.

Diana Siliezar-Shields, Barrington High School, Barrington, RI

3:00 PM – 3:30 PM**NABT Committee Meeting: Member Resources Committee****Switchman Room** • Committee Meeting • GA

Sherry Annee, Committee Chair

312 • Introducing Undergraduates to Primary Literature using Science in the Classroom (SitC) and Paired HHMI BioInteractive Resources**Regency B** • General Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Teaching students to understand primary literature can be challenging. Come learn about ready-to-use annotated research materials paired with BioInteractive multimedia and activities to help students analyze primary literature.

Kathryn Jones, Howard Community College, Columbia, MD, and Paul Beardsley, HHMI, Chevy Chase, MD

3:00 PM – 3:30 PM**SPECIAL PROGRAMMING PRESENTED BY PASCO Scientific****415 • Modeling Inquiry and Class Data Aggregation in the Modern Lab****Midway Suites 2** • Instructional Strategies • Hands-on Workshop (30 min) • HS

Create a class data set to discuss enzyme function and protein structure in just minutes. See how easy it can be to increase statistical rigor and inquiry using free software, a smartphone, a few consumables (and one sensor). Please download the PASCO SPARKvue app in advance.

Mike Blasberg, PASCO Scientific, Roseville, CA

255 • Incorporation of Creative Writing Techniques to Increase Engagement in Collegiate Molecular Science Curricula**Midway Suites 5** • Microbiology & Cell Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Even the most dedicated student can become enmeshed in complex molecular mechanisms. To enhance student engagement with pathways, creative writing techniques can be useful.

Erin Sellner, Stephens College, Columbia, MO

131 • Socio-Scientific Issues Teaching and Learning**Midway Suites 6** • Instructional Strategies • Demonstration (30 min) • HS

This session highlights the Socio-Scientific Issues Teaching and Learning framework and its implementation in a secondary biology classroom, and in a professional development program for secondary biology and chemistry teachers.

Amanda Peel and Troy Sadler, University of Missouri, Columbia, MO

67 • Guppies in the Classroom - A Model Organism Used to Investigate Animal Behavior and Experimental Design Directed at Implementation of Statistics in the Biology Classroom

Midway Suites 7 • AP Biology • Hands-on Workshop (30 min) • HS

Our activity complements the units of the scientific process, evolution, and animal behavior emphasizing the use of statistics. You will observe guppy courtship and determine which traits females select.

David Ganey and Rick Hirst, Jefferson City High School, Jefferson City, MO

153 • Witnessing Respiration: A Bean is a Bean is a Bean??? Demonstration of a Quantitative, Low-cost, Low-tech Cellular Respiration Inquiry Protocol Alternative for Biology Students

Midway Suites 8 • General Biology • Hands-on Workshop (30 min) • MS, HS

Transform qualitative cellular respiration demonstrations into quantitative student investigations. This protocol for investigating differential cellular respiration in legumes is adaptable for middle school through AP level.

Pam Close and Jessica Platto, D. H. Hickman High School, Columbia, MO

72 • Assessing Laboratory Investigations Using BioBlitz Presentations

Midway Suites 9 • Instructional Strategies • Demonstration (30 min) • HS, 2Y, 4Y

This session will demonstrate the use of a 1-slide, 60-second “BioBlitz” presentation, followed by a peer-review session by the class, as a way to assess student labs.

Ryan Lacson, Galena High School, Galena, MO

210 • Using Published Research Data to do Biology: QUBES Examples, Strategies, and Resources

Midway Suites 10 • Instructional Strategies • Demonstration (30 min) • 2Y, 4Y

The Quantitative Undergraduate Biology Education and Synthesis (QUBES) Project has organized a diverse and flexible suite of resources to support faculty working with published research data in their classrooms.

Sam Donovan, University of Pittsburgh, Pittsburgh, PA; Kristin Jenkins, BioQUEST, Boyds, MD; M. Drew LaMar, College of William and Mary, Williamsburg, VA; and Hayley Orndorf, QUBES, Pittsburgh, PA

281 • A Case for Introductory Ecology in Two- and Four-Year Colleges and Universities

Burlington Route • Ecology / Environmental Science / Sustainability • Paper (30 min) • 2Y, 4Y

Ecology and sustainability are important concepts for all students. Introducing these concepts through rigorous introductory courses can serve as a means of recruitment and can improve program retention.

Tara Holmberg, Northwestern Connecticut Community College, Winsted, CT

211 • Leaving the Textbook Behind: Creating a Dynamic and Relevant Classroom Experience

Frisco • General Biology • Hands-on Workshop (30 min) • MS, HS

Textbooks are expensive and static in a discipline that is extraordinarily fluid and dynamic. Come and learn how to use current events to drive the content of your course.

Lindsey Lohwater, St. Mark's School, Southborough, MA

167 • Card Sort Extravaganza! Activities for Visible Thinking and Formative Assessment!

Illinois Central • General Biology • Hands-on Workshop (30 min) • MS, HS

Join us as we share several different types of card sort activities that can be used to see the student's visual thinking. Lots of examples and handouts provided!

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


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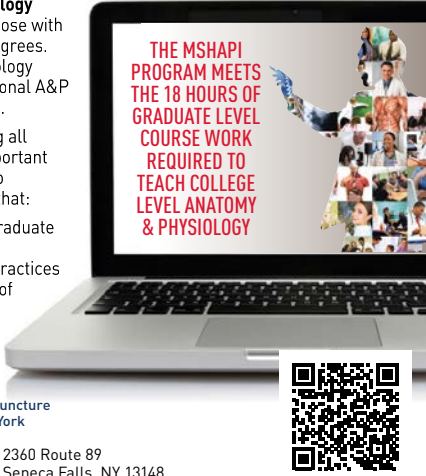
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4:00 PM – 5:00 PM**GENERAL SESSION SPEAKER****May Berenbaum**

➔ See page 9 for biography.

Science Fiction Films in the Classroom: Teaching Science Through Bad Examples

Grand Ballroom D, E, F • Special Speaker • GA

Because watching movies is an activity enthusiastically embraced by a large proportion of the public, movies provide a platform for engaging students based on their pre-existing interests. A 2016 RedBox study (Smith 2016) revealed that Americans watch on average a total of 5,040 movies throughout their lifetimes, with an average person watching 84 movies per year via a variety of platforms. That there is potential for movie-watching to have an impact on STEM learning is evidenced by the finding that 41% of respondents said a movie “changed the way they see the world”, and 10% said that a movie influenced their career choice.

Beyond the frequency with which Americans watch movies, the diversity of scientific subjects depicted in films provides almost limitless opportunities for sharing knowledge with interested and motivated students. Of the all-time top 25 movies based on cumulative domestic box office, 80% have explicit science content, encompassing but not limited to cybernetics, ecology, anthropology, glaciology, engineering, paleontology, genomics, physics, astrophysics, exobiology, and arachnology. Movies can be effective teaching tools because they emphasize narratives that engage learners and they present a simplified jargon-free (albeit often erroneous) interpretation of science. Once they are engaged, students can learn and remember concepts by contrasting the science reality with the movie version. Examples from 34 years of movies shown at the University of Illinois’ Insect Fear Film Festival will be provided as exemplars for building on Hollywood’s cinematic excesses for teaching science.

3:00 PM – 3:30 PM continued**321 • Giving (Grass)Roots to STEM: A Community-level Approach to Science Literacy and Advocacy with the Science Booster Clubs**

Missouri Pacific • Instructional Strategies • Demonstration (30 min) • MS, HS, GA

We will discuss NCSE’s Science Booster Clubs, how the booster club model supports local STEM education, and demonstrate two activities developed for teaching climate change and evolution to general audiences.

Laura Banker, University of Colorado-Denver, Denver, CO

39 • NABT Awards: Recognizing Excellence in Life Science Classrooms

New York Central • General Biology • Demonstration (30 min) • GA

NABT Awards Chair Dr. Jason Crean, along with Dr. Kristin Milks, Awards Coordinator of the Ron Mardigian Biotechnology Award, will present the numerous opportunities available for recognition in NABT.

Jason Crean, Lyons Township HS/Saint Xavier University, Western Springs, IL and Kristin Milks, Bloomington High School South, Bloomington, IN

3:00 PM – 3:30 PM continued**264 • How Does Participation in Course-embedded Undergraduate Research Experiences in Introductory Biology Courses Affect Students’ Motivation and Persistence in Life-science Majors?**

Wabash Cannonball • Instructional Strategies • Paper (30 min) • HS, 2Y, 4Y

Come learn what we can predict about student persistence in biology from measures of motivation and perception of research in biology, biochemistry, botany, chemistry, microbiology, and zoology CUREs.

Donald French, Lucy Bailey, John Stewart, Janette Steets, John Gustafson, and Wouter Hoff, Oklahoma State University, Stillwater, OK; and Michael Moore, Baylor University, Waco, TX

6:00 PM – 10:00 PM**Night at the City Museum**

Midway (Glass Doors to the right of Registration) • Special Event (Tickets Required)

Come play with us at the City Museum, a 600,000 square-foot “play house museum”, consisting of repurposed architectural and industrial objects that are housed in the former International Shoe Company. The City Museum features an eclectic mix of rooms, objects, a playground, and a lot of fun!

First shuttle departs the hotel at 5:45 PM. Shuttles run every 15 minutes then for the entirety of the event. Shuttle pick-up is off of the Midway exhibit hall space, just outside the large glass archway doors.

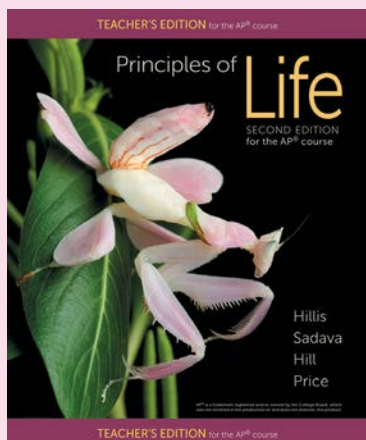
Last shuttle departs City Museum at 9:45 PM.



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SUNDAY NOV 12

NOV
12

SUNDAY

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.

ST. LOUIS
2017

8:00 AM – 12:00 PM**AP Biology Academy Meeting**

Frisco • Invitation Only

8:00 AM – 12:00 PM**Shaw Nature Reserve****Midway** (Glass doors to the right of registration) • Field Trip (Tickets Required) • GA

The Shaw Nature Reserve is a private nature reserve operated as an extension of the Missouri Botanical Garden. While there, visitors will ride The Wilderness Wagon that takes guests on a three-mile tour while a naturalist describes the Reserve's history, what's in bloom, the Pinetum conifer collection, the tall grass prairie, local wildlife, and wetlands. After the wagon tour, groups will visit the Bascom House: a restored 1879 home which adjoins the Whitmire Wildflower Garden.

This field trip is weather permitting, and alternate arrangements will be made in the event of inclement weather.

8:00 AM – 12:30 PM**311 • Developing Quantitative Skills in Your Introductory Biology Course Using HHMI BiolInteractive Resources****Regency B** • General Biology • Special Workshop (Tickets Required) • 2Y, 4Y

Learn how HHMI resources can be used in introductory classes to increase quantitative literacy and student confidence working with data. We will explore modules and applications specific to higher education.

Rebecca Orr, Collin College, Plano, TX; Kristine Grayson, University of Richmond, Richmond, VA; and Satoshi Amagai, HHMI, Chevy Chase, MD

9:00 AM – 11:00 AM**NABT Section Meeting: AP Biology Section****Burlington Route** • General Biology • Committee Meeting • GA**NABT Section Meeting: Four-Year College and University Section****Jefferson/Knickerbocker** • General Biology • Committee Meeting • GA**NABT Section Meeting: Two-Year College Section****Wabash Cannonball** • General Biology • Committee Meeting • GA**9:00 AM – 12:00 PM****22 • Complex Instruction in the Biology Classroom: Using Equitable Teaching Strategies to Increase Students' Opportunities to Learn****New York Central** • Instructional Strategies • Special Workshop (Tickets Required) • MS, HS

Participants will learn about the equity strategy, Complex Instruction, for increasing the engagement of all students in learning cognitively-demanding biology content using actionable norms.

Michele Cheyne and Anna Monteiro, Knowles Science Teaching Foundation, Moorestown, NJ; Lauren Kline, Joliet Central High School, Joliet, IL; Bernice O'Brien, William Monroe High School, Bainbridge Island, WA; and Jim Clark, San Lorenzo School District, San Lorenzo, CA

9:00 AM – 12:00 PM cont.**Improving Genomic Literacy: Identifying Resources, Dissemination Strategies, and Future Needs****Illinois Central** • Genetics • Symposium • HS, 2Y, 4Y, GA

NHGRI/NIH has proposed a Genomic Literacy, Education, and Engagement (GLEE) Initiative, which aims to enhance genomic literacy commensurate with the pace of genomic advances. Join a diverse group of stakeholders to discuss what you consider to be high-quality genomics education resources, lend your expertise to inform the development of a rubric to evaluate genomic resources, and discuss the future/anticipated needs of K-16 educators in genomics.

Elizabeth Tuck and Carla Easter, National Human Genome Research Institute (NHGRI) of the National Institutes of Health (NIH) Bethesda, MD

🕒 EXHIBIT HALL HOURS

Thursday

5:30 PM – 7:30 PM

Exhibit Hours

+ Exhibit Hall Opening Reception

Friday

8:00 AM – 5:30 PM

Exhibit Hours

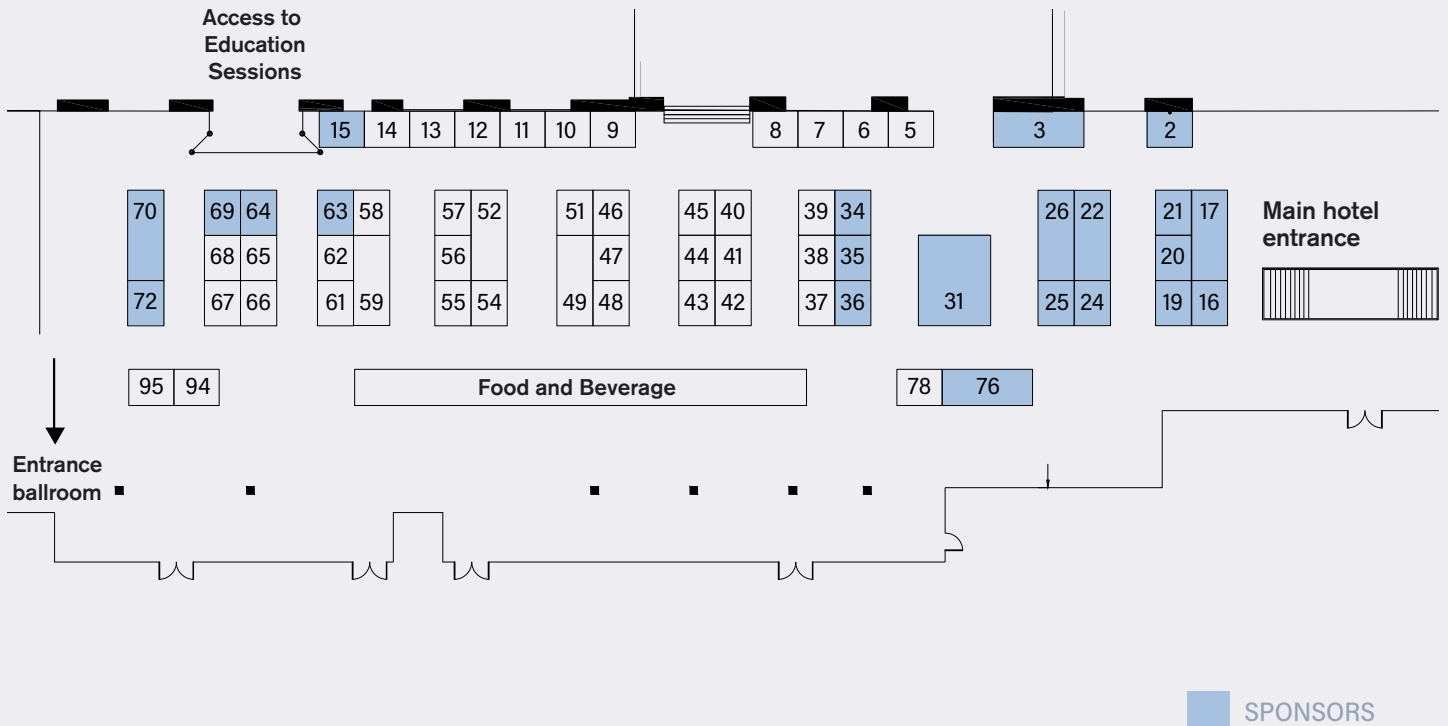
4:00 PM – 5:30 PM

Exhibit Hall Closing Reception

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EXHIBIT HALL MAP



EXHIBITORS

● AC2 Bio-Link Regional ATE Center

Booth 72 

Austin, TX • www.ac2.bio-link.org

AC2 Bio-Link Regional Advanced Technological Education Center is headquartered at Austin Community College, Austin, Texas. It shares a mission with Bio-Link Next Generation National ATE Center for Biotechnology and Life Sciences. Its activities will broaden the impact of the national center, focusing on biotechnology workforce needs of Texas and Kentucky.

American Physiological Society

Booth 62

Bethesda, MD • www.the-aps.org

The American Physiological Society is a professional scientific membership organization devoted to fostering scientific research, education, and the dissemination of scientific information. The APS supports a variety of educational activities including programs and fellowships to encourage the development of young scientists, with a focus on women and underrepresented minorities.

American Phytopathological Society

Booth 78

St. Paul, MN • apsnet.org

APS is a vibrant community of plant health scientists and practitioners from around the world. APS members contribute cutting-edge research to propel the science of plant pathology. Members aim to teach others the importance of plant pathology and the impact this critical science in today's world.

American Society for Microbiology

Booth 94

Washington, DC • www.asm.org

The American Society for Microbiology is the largest single life science society, composed of over 50,000 scientists and health professionals. ASM's mission is to promote and advance the microbial sciences, including the teaching of microbial sciences at K-12 and post-secondary levels.

American Society of Plant Biologists

Booth 59

Rockville, MD • www.aspb.org

ASPB is a professional society devoted to the advancement of the plant sciences. It publishes two world-class journals and organizes conferences, and other activities that are key to the advancement of the science.

Anatomage

Booth 45

San Jose, CA • www.anatomage.com

Anatomage products are used in tens of thousands of institutions worldwide. These include imaging equipment, radiology software, and display equipment. Anatomage products have been featured in TED, BBC and PBS due to their originality and positive impact. Anatomage is dedicated to making innovative products and creating the highest quality experiences.

Animalearn

Booth 65

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-  Silver
-  A La Carte
-  Treasure Hunt Exhibitors

BEACON Center for the Study of Evolution in Action

Booth 55

East Lansing, MI • beacon-center.org

The BEACON Center brings together biologists, computer scientists, and engineers to study evolution in action and apply this knowledge to solve real-world problems. BEACON partners include Michigan State University, North Carolina A&T State University, University of Idaho, University of Texas at Austin, and University of Washington, funded by NSF.

Bedford, Freeman & Worth High School Publishers

Booth 57

Hamilton, NJ •

www.highschool.bfwpub.com/catalog

Bedford, Freeman & Worth (BFW) Publishers is your source for innovative science resources. We publish the best-selling book, Environmental Science for AP®, as well as Principles of Life for AP® Biology and Living by Chemistry for pre-AP® Chemistry. Stop our booth to receive more information on these programs.


● Bio Corporation

Booth 21 

Alexandria, MN • www.biologyproducts.com

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● Bio-Rad Laboratories

Booth 22 

Hercules, CA • www.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!

● Bone Clones, Inc.

Booth 26 

Canoga Park, CA • www.boneclones.com

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● Carolina Biological Supply Company

Booth 17 

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 61

Springfield, MA • cellzone.org

Cell Zone, Inc. offers active learning solutions for teaching cells, biological molecules, histology, diversity and food webs, and mitosis. Founded by a teacher, Cell Zone products transform any high school or college classroom into a student-centered learning environment. Come by our booth to enter our drawing.

Clemson University

Booth 47

Clemson, SC • www.clemson.edu/science/departments/biosci/academics/online-masters/index.html

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.

Earthwatch Institute

Booth 68

Boston, MA • earthwatch.org

Earthwatch Institute, a 45-year-old citizen-science non-profit, facilitates field research expeditions led by renowned environmental researchers around the world. Teachers and students who volunteer on our expeditions return to the classroom with a deeper understanding of science, conservation, and sustainability. Expeditions are open to individuals or groups throughout the year.

Ecology Project International

Booth 39

Missoula, MT • www.ecologyproject.org

Ecology Project International (EPI) is a student travel company like no other - our non-profit's mission is to inspire science education and conservation efforts around the world through student-scientist partnerships. Bring your students & join us in the field in Yellowstone, Hawaii, Costa Rica, Belize, Mexico, Ecuador, and the Galápagos.

EDVOTEK

Booth 67

Washington, DC • www.edvotek.com

EDVOTEK was the world's first company dedicated to demystifying biotechnology for young people. In 1987, we envisioned how the emerging area of biotechnology could inspire students to choose a science career. Since then, Edvotek has become the leading supplier of safe, affordable and easy-to-use biotechnology kits and equipment for education.


● Fisher Science Education/ G-Biosciences

Booth 9 

El Dorado Hills, CA • www.fisheredu.com/bs4nm

Fisher Science Education, a leading supplier of products for all science education needs, is working with Ellyn Daugherty to supply a complete list of Biotechnology: Science for the New Millennium (BS4NM), 2017 lab materials, offer biotech professional development opportunities and provide biotech lab training for new and experienced teachers.

● Flinn Scientific

Booth 34 

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 schools, high schools and higher Ed.

Genes in Space Competition (miniPCR)

Booth 64

Cambridge, MA • genesinspace.org

The miniPCR DNA Discovery System is a complete biotech lab for your classroom: miniPCR machine, blueGel electrophoresis system, and micropipettes at prices you can afford. Teach Genetics, Food Safety, and Forensics with the same technology used in the International Space Station. Come learn about the Genes in Space STEM contest.

Holbrook Global Field Expeditions

Booth 54

Gainesville, FL • holbrooktravel.com

Since 1974, Holbrook Global Field Expeditions has offered engaging, inquiry-based educational travel across Latin America, Africa, and beyond. From teacher-led scientific expeditions for students to educator PD, Holbrook incorporates academic experiences with a focus on STEM learning. Plus, ask about our 500-acre private reserve and teaching center in Costa Rica.

HHMI BioInteractive

Booth 76

Chevy Chase, MD • www.BioInteractive.org

HHMI BioInteractive develops free resources, including short films, virtual labs, apps, and print materials, that are based on real data and highlight the science practices. These high-quality multimedia resources are developed, vetted, and field-tested by educators and scientists - and are all tied to major curriculum standards.

HudsonAlpha Institute for Biotechnology

Booth 20

Huntsville, AL • hudsonalpha.org

HudsonAlpha Institute for Biotechnology is a nonprofit institute dedicated to innovating in the field of genomic technology and sciences. Opened in 2008, its mission is four-fold: sparking scientific discoveries; bringing genomic medicine into clinical care; fostering life sciences entrepreneurship and business growth; and encouraging the creation of a genomics-literate society.

Lrnr

Booth 25

Vallejo, CA • www.lrnr.us

Lrnr's personalized homework solutions cleanly integrate OpenStax content, homework, interactivity, adaptive assessment, and actionable analytics into a single environment - providing a complete course solution that drives better student outcomes and improves retention.

Macmillan Learning

Booth 56

New York, NY • macmillanlearning.com

Macmillan Learning brings together some of the most respected imprints in Biology Education to enhance the classroom and lab. Learn how we partner with thought leaders in Biology Education to produce the best in scientific publishing from W.H. Freeman, Roberts & Company, Hayden-McNeil, Sapling Learning, and Late Nite Labs.

Maderas Rainforest Conservancy

Booth 46

Miami, FL • www.maderasrhc.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 in Nicaragua, Costa Rica, and Guatemala. We sell products made by our women's entrepreneurship project.



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Millikin University

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Decatur, IL • www.millikin.edu

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MiniOne Systems

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San Diego, CA • www.theminione.com

MiniOne Systems provides electrophoresis systems and PCR systems specifically for hands-on learning in classrooms. Our systems are designed to be safe, reliable, robust, easy, fast, and affordable. MiniLabs, complete lab kits, simplify classroom management and engage students with real world experiments. Teach and do electrophoresis or PCR in 45 minutes.

miniPCR

Booth 63

Cambridge, MA • www.minipcr.com

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St. Louis, MO • www.monsanto.com/stem/

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National Center for Science Education

Booth 44

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 Library of Medicine

Booth 42

Bethesda, MD • www.nlm.nih.gov

The National Library of Medicine provides K-12 teachers and students with FREE, reliable science and health information resources and programs to help introduce, reinforce, and supplement education programs. Resources include biology, careers, chemistry, environmental health science, forensics, general health, genetics, and HIV/AIDS. For more information, please visit sis.nlm.nih.gov/outreach/k12.html.

New York Chiropractic College

Booth 14

Seneca Falls, NY • www.nycc.edu

NYCC offers an on line Master of Science in Human Anatomy & Physiology Instruction. Professional healthcare degree holders and biologists with graduate degrees have the foundation to teach anatomy and physiology at the undergraduate level but often lack the instructional training necessary for success in the college and university setting.

OpenStax

Booth 31

Houston, TX • openstax.org

OpenStax provides free, peer-reviewed, openly licensed textbooks for introductory college and advanced placement courses, as well as low-cost, personalized courseware that helps students learn. A nonprofit ed tech initiative based at Rice University, we're committed to helping students access the tools they need to meet their educational goals.

PASCO Scientific

Booth 70

Roseville, CA • www.pasco.com

PASCO technologies transform science education and student learning with award-winning wireless probeware, software, and curriculum, promoting science inquiry and 21st century readiness skills for the global marketplace. Today teachers and students worldwide use PASCO solutions for physics, biology, chemistry, earth and environmental sciences, as well as programming and robotics.

Pearson

Booth 49

Hoboken, NJ • www.pearson.com/us

Pearson, the world's leading learning company, partners with K-20 institutions and educators to provide educational solutions and services that help to improve learning outcomes. Pearson serves learners of all ages around the globe, employing 41,000 people in more than 70 countries. For more information, visit www.pearson.com/us.

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Booth 51

Boston, MA • www.pged.org

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PhytoTechnology Laboratories

Booth 66

Lenexa, KS • www.phytotechlab.com

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PlantingScience

Booth 41

St. Louis, MO • plantingscience.org

PlantingScience.org is a FREE online mentoring program for middle and high school teachers and their students. Small teams of students design and conduct their own research investigations with online help from volunteer scientists. Nine NGSS-aligned investigation themes available on plant science topics from agronomy to genetics. Join our community!

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BSCS

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Monsanto Company

www.monsanto.com

University College at Washington University St. Louis


www.wustl.edu

SILVER LEVEL SUSTAINING MEMBERS

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www.pasco.com

● Princeton University Press

Booth 35 

Princeton, NJ • press.princeton.edu

Princeton University Press publishes distinguished trade and textbooks in the biological sciences. Visit our booth to see new titles on display including *The Serengeti Rules* by Sean Carroll, *Monarchs and Milkweed* by Anurag Agrawal, *How to Clone a Mammoth* by Beth Shapiro and *The Quotable Darwin* edited by Janet Browne.

SimBio

Booth 58

Missoula, MT • www.simbio.com

SimBio is a leading developer of interactive, simulation-based biology labs, used in over 20% of colleges and universities. Please stop by our booth to meet an author, see our ecology, evolution, genetics, and cell-biology modules, explore the NEW tutorial-style Keystone Predator lab, and/or register for FREE evaluation software.


Smithsonian Student Adventures

Booth 13

Denver, CO • walkingtree.org

Our Mission is to inspire students to become global citizens by taking an active interest in the world around them. Unlike a typical tour, our dynamic and engaging programs provide for an authentic international experience that offers the opportunity to effect positive change at home and abroad.

● Trubooks

Booth 36 

Palo Alto, CA • www.trunity.com

Trunity is transforming publishing for education and the way students learn; delivering world-class educational content seamlessly integrated with our Trubooks Global Learning Platform. Trubooks seamlessly combines learning management, customizable course creation and classroom collaboration directly within digital textbooks. Trunity provides the best innovative, active-learning content from outstanding educators and publishers.

● University College at Washington University St. Louis

Booth 16 

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.

University of Nebraska at Kearney Online Biology, MS

Booth 10

Lincoln, NE • online.nebraska.edu

The online Biology, MS from the University of Nebraska at Kearney is a non-thesis program with a low student to faculty ratio that assures the guidance necessary for positive individual experiences and successful program completion. The program offers lab and field experiences while providing flexibility in coursework and timing.


Vaccine Education Center at Children's Hospital of Philadelphia

Booth 8

Philadelphia, PA • vaccine.chop.edu/schools

The Vaccine Education Center at Children's Hospital of Philadelphia has been providing up-to-date, scientifically accurate information about vaccines to the public for more than fifteen years. Visit our booth for information about free classroom materials about the immune system, diseases and vaccines and for free vaccine information in various formats.

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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.

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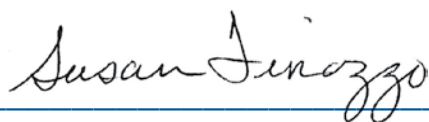
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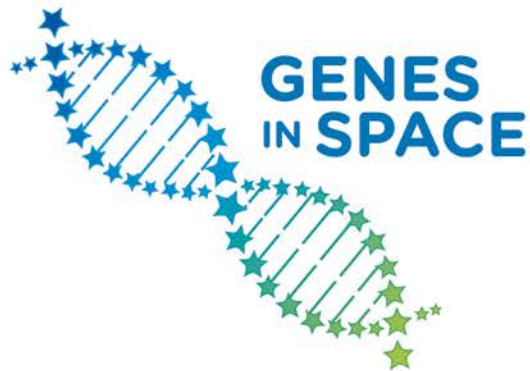
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