NABT '23
BALTIMORE
NOVEMBER 2-5, 2023
2023 Professional Development Conference
Baltimore Marriott Waterfront · Baltimore, Maryland
PROGRAM GUIDE
The winners of the 2023 BEST of STEM competition in the Life Science category represent a new frontier in giving students remarkable opportunities to explore the wonders of science and the possibilities of new academic and career opportunities. These learning solutions engage students and empower teachers to make strides in life science and STEM education.

- 267,000 STEM educators surveyed
- An expert panel of judges selected the finalists

Visit the website for complete competition details.

www.bestofstemawards.com

SPONSORED BY

www.carolina.com

CONGRATULATIONS to the Life Science Winners!

Accelerate Learning
Collaborate Science ML-PBL Powered,
Best of STEM: Phenomena-Based Teaching Grades K-5.

Avantis Education
Eduvance, Trailblazer Award: Immersive Reality.

BrainPOP
Science, Best Educator Support for Teaching & Learning.

BrainPOP
Science, Best of STEM: Phenomena-Based Teaching Grades 6-8.

Carolina Biological
Building Blocks of Science 3D, Bridging the Gap—English Language Learners: Science & Literacy.

Carolina Biological:
ECG Training.

Carolina Biological:
ECG Simulators, CTE Training: Health Science—Training Kits.

Carolina Biological:
Pathways to Success, BEST of STEM: Culturally Responsive 6–12 Curriculum,

Carolina Biological:
Bridging the Gap—Math Intervention Resources.

Carolina Biological:
Beyond the Water Bottle: Minimizing Microplastic Pollution,
Social Impact Award: Developing Citizen Scientists.

Carolina Biological:
Most Comprehensive Culturally Relevant Teaching.

Carolina Biological:
Sterling Hayes Healthcare Simulations Kit, CTE Training: Health Science—Training Kits.

Code.org
Online Gateway, Trailblazer Award: Hybrid Learning Superhero.

Code.org
Culturally Responsive 6–12 Curriculum,

Code.org
Culturally Relevant Teaching Grades 6–12.

Discovery Education
STEM Careers Coalition, Best Freebies for STEM Careers.

ExploreLearning
Flex, Best Innovation for 2023.

ExploreLearning
Reflex, Bridging the Gap—Math Intervention Resources.

HudsonAlpha Institute for Biotechnology
FILTERED, Best Freebies for STEM Curriculum Integration.

JASON Learning
Beyond the Water Bottle: Minimizing Microplastic Pollution,
Social Impact Award: Developing Citizen Scientists.

JASON Learning
Pathways to Success, CTE Champion: Career Explorations.

Learning Undefeated

RealityWorks
ECG Simulators, CTE Training: Health Science—ECG Training.

Brentwood Academy, Brentwood, TN
Bloomington High School South, Bloomington, IN
Bethlehem High School, Bardstown, KY
Brentwood Academy, Brentwood, TN
Bloomington High School South, Bloomington, IN
..
From the President

Welcome to Baltimore and the 2023 National Association of Biology Teachers (NABT) Annual Conference! This is my favorite conference of the year, and I am so excited to be attending along with such a wonderful group of dedicated educators from across the world. Some program highlights include:

**Thursday:** I encourage you to kick off the conference at our NABT Open Forum to learn more about NABT and speak with the Board. Then join us for our opening General Session and Exhibit Hall Grand Opening to get the conference off to a great start!

**Friday:** If this is your first NABT Conference, don’t miss the First Timers’ Coffee Break to start the day! Take advantage of the speakers and sessions highlighting their work on the cutting edge of science and life science education. “Find the President” and win some great prizes in the exhibit hall in the afternoon. Friday will then conclude with another wonderful HHMI Night at the Movies.

**Saturday:** Begin your morning with the Biology Education Research Symposium, offering an excellent chance to delve deeper into the research conducted by our members. Following lunch, a variety of outstanding conference sessions await you! Later in the day, join us in applauding the Student Poster Award winners, and then for the closing session, where we will honor Dr. Lee Berger and his wonderful achievements in education, open science, and human evolution.

It is important to acknowledge that the generosity of our partners, sponsors, and exhibitors enables us to organize this event; I encourage you to take a moment to thank them throughout the conference.

I want to express my gratitude to the Professional Development Committee and our dedicated volunteers for their time and forward-thinking efforts in ensuring that the conference remains dynamic and highly beneficial to our community. I also want to commend the NABT members who devote their time and energy to serve on committees, the Board of Directors, Regional Coordinators, State and Provincial representatives, BioClub Advisors, and our State Affiliates. Our exceptional team has dedicated themselves tirelessly to ensure the success of NABT. And, finally, a special thank you to our amazing staff and Executive Director, Jacki Reeves-Pepin, for her outstanding leadership.

I look forward to meeting and gaining insights from all of you during our time in Baltimore. May you be refreshed, nourished, and affirmed when you return on Monday.

Tara Jo (TJ) Holmberg, PhD
NABT President, 2023
GENERAL CONFERENCE INFORMATION

ABOUT THE PROFESSIONAL DEVELOPMENT CONFERENCE
All functions, meetings, and exhibits will take place at the Baltimore Marriott Waterfront unless otherwise noted. Please consult this guide and signage for room information.

FOR PERSONS WITH DISABILITIES
Careful consideration is made during the planning of the NABT Conference to make it accessible to all participants. Should you require special services, please go to the registration area to contact an NABT representative. We will strive to meet your needs.

NURSING ROOM
A quiet space has been set aside for you across from Grand Ballroom II (3rd Floor).

CERTIFICATE OF ATTENDANCE
See page 71

REGISTRATION HOURS
The NABT registration desk is located on the 3rd Floor. It will be open during the following hours:

Thursday, November 2
7:00AM – 5:00PM
Friday, November 3
7:00AM – 5:00PM
Saturday, November 4
7:00AM – 5:00PM
Sunday, November 5
7:00AM – 10:30AM

FUTURE NABT CONFERENCE DATES & SITES
2024 Professional Development Conference
November 14–17, 2024
Anaheim Marriott
Anaheim, CA

A limited NABT WiFi network is available.
NETWORK: NABT    PASSWORD: NABT2023

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.

VISITING THE EXHIBIT HALL
The NABT Exhibit Hall is your venue to interact with a diverse group of curriculum designers, publishers, manufacturers, developers, non-profit partners, and other providers with resources to support you as a biology educator. Receptions, contests, and other special experiences will also be featured in the Exhibit Hall.
Registration badges are required for admission to the Exhibit Hall.

TRANSPORTATION FOR OFFSITE EVENTS
Transportation will be provided on request for the field trip to IMET and the Haunted History Tour. 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 by sharing your comments at bit.ly/NABT2023

NURSING ROOM
A quiet space has been set aside for you across from Grand Ballroom II (3rd Floor).

CERTIFICATE OF ATTENDANCE
See page 71

REGISTRATION HOURS
The NABT registration desk is located on the 3rd Floor. It will be open during the following hours:

Thursday, November 2
7:00AM – 5:00PM
Friday, November 3
7:00AM – 5:00PM
Saturday, November 4
7:00AM – 5:00PM
Sunday, November 5
7:00AM – 10:30AM

FUTURE NABT CONFERENCE DATES & SITES
2024 Professional Development Conference
November 14–17, 2024
Anaheim Marriott
Anaheim, CA

A limited NABT WiFi network is available.
NETWORK: NABT    PASSWORD: NABT2023

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.

VISITING THE EXHIBIT HALL
The NABT Exhibit Hall is your venue to interact with a diverse group of curriculum designers, publishers, manufacturers, developers, non-profit partners, and other providers with resources to support you as a biology educator. Receptions, contests, and other special experiences will also be featured in the Exhibit Hall.
Registration badges are required for admission to the Exhibit Hall.

TRANSPORTATION FOR OFFSITE EVENTS
Transportation will be provided on request for the field trip to IMET and the Haunted History Tour. 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 by sharing your comments at bit.ly/NABT2023
Lauren Feldman, Ph.D. is a Professor in the School of Communication & Information at Rutgers University. She is a leading scholar in the areas of political science and environmental communication. Her current research emphasizes three primary areas of interest: climate change communication, partisan media and misinformation, and comedy and social change. Lauren’s research has been published in more than thirty peer-reviewed journal articles, as well as in several edited volumes, and has been widely covered in major media outlets. She is co-author, with Caty Borum Chattoo, of the book, “A Co- median and an Activist Walk into a Bar: The Serious Role of Comedy in Social Justice,” which examines how comedy can be used to engage audiences with challenging issues such as climate change and global poverty.

Her work has been supported by grants from the National Science Foundation, the Carnegie-Knight Task Force on Journalism, and the Spanish Ministry of Science, among other funders, and has been recognized with various academic awards. Lauren serves on the editorial boards of the Journal of Communication, Communication Research, and Environmental Communication, and she is an affiliate of the Rutgers Climate Institute and the George Mason University Center for Climate Change Communication.

Lauren earned her Ph.D. from the Annenberg School for Communication at the University of Pennsylvania. She also holds an M.A. in Communication from the University of Pennsylvania and a B.A. in English from Duke University. Prior to joining the Rutgers faculty, she was an Assistant Professor in the School of Communication at American University.

Rajiv McCoy, Ph.D.
Assistant Professor, Department of Biology
Johns Hopkins University
Baltimore, MD

Rajiv McCoy, Ph.D. is an assistant professor in the Department of Biology at Johns Hopkins University, where he began his appointment in 2018. He received a Ph.D. in Biology from Stanford University in 2015 and completed postdoctoral work in the Department of Ecology and Evolutionary Biology at Princeton University, as well as the Department of Genome Sciences at the University of Washington.

The McCoy lab (https://mccoy-lab.org) seeks to understand the genetic basis of variation in human complex phenotypes and fitness through the development and application of computational methods. This work combines diverse datasets and concepts from population genetics and statistics to achieve quantitative perspectives on human evolution and reproduction. Evolutionary research in the lab includes investigation of poorly resolved and repetitive regions of the genome; functional and fitness impacts of gene flow between modern and archaic hominins; and development of statistical methods for improving the mapping of complex traits in samples from diverse and admixed populations. Reproductive research includes investigation of the molecular origins of human aneuploidy; implications for human development, and genetic factors influencing its occurrence; improved analysis of data from preimplantation and prenatal genetic testing; and testing for violations of Mendelian inheritance, for example by mutistic drive, embryonic mortality, or other mechanisms of transmission distortion.

Rajiv is a member of the Origins of Aneuploidy Research Consortium as well as a co-organizer of its annual meeting. He is also a member of the Telomere-to-Telomere Consortium, contributing to analysis of the first gapless assembly of a complete human genome. The McCoy lab is funded by a R01 Outstanding Investigator Award from the National Institute of General Medical Sciences of the NIH, as well as a Discovery Award from Johns Hopkins University.

Ryan Gutenkunst, Ph.D.

Ryan Gutenkunst, Ph.D. came late to the study of biology, after receiving his B.S. in Physics from the California Institute of Technology. It was while pursuing his Ph.D. in Physics at Cornell University that he discovered the beautiful depth of modern biology, shifting his research toward modeling the complex biochemical networks within cells. In his postdoctoral work, he expanded his biological breadth by modeling intracellular immune signaling and by developing a powerful and popular method for learning population history from genomic data.

Ryan joined the Department of Molecular and Cellular Biology at the University of Arizona in 2010, where he now serves as Interim Department Head. His research has focused on developing computational methods for learning about history and natural selection from genomic data, with notable applications to humans, fruit flies, and desert tortoises. His teaching has primarily been in computational biology, but he is currently developing a course focused on the relationships between personal genetics, ancestry, and conceptions of race.
Lee Berger, Ph.D., D.Sc., is an award-winning researcher, explorer, author, and speaker. He is the recipient of the National Geographic Society’s inaugural Prize for Research and Exploration, the Academy of Achievement’s Golden Plate Award, the South African Academy of Sciences Gold Medal, and was the 2016 National Geographic Society’s Rolex Explorer of the Year.

His work has brought him recognition as a Fellow of the Royal Society of South Africa, the Royal Geographical Society, and the American Philosophical Society. He has authored more than two hundred scholarly and popular works, including refereed publications and books on paleontology, natural history, and exploration. His discoveries have been featured three times on the cover of Science and have been named the top 100 science stories of the year by Time, Scientific American, and Discover Magazine on numerous occasions. He has appeared in many television documentaries on subjects related to archaeology, paleoanthropology, and natural history. The 2015 PBS Nova National Geographic documentary “Dawn of Humanity,” about Lee’s discovery of Homo naledi and the Rising Star expedition, was nominated for an Emmy. Lee is an internationally recognized expert in open-access science and open sourcing. His collaborative team of scientists numbers over 140 individuals, and his novel approach to inclusive science and open collaboration has given him recognition as a Pioneer in Science by the World Federation of Scientists. In 2016, Lee was recognized him as one of the 100 Most Influential People in the World.

Lee is an avid diver and adventurer and holds a PADI Divemaster certificate, among many other specialties. He was born in Shawnee Mission, Kansas, and grew up in rural Georgia. He is presently the Director of the Centre for the Deep Human Journey at the University of the Witwatersrand, Johannesburg, South Africa, and an Explorer in Residence for the National Geographic Society. His collaborative team of scientists numbers over 140 individuals. He holds a Ph.D. in palaeoanthropology and a Doctor of Science in the same field.
BioClub Student Awards
Jaspeet Hayero
Cardinal Gibbons High School, Ft. Lauderdale, FL

Outstanding student members of a NABT BioClub are eligible for this humanitarian scholarship, with one student from a BioClub high school chapter and one student from a community college chapter named each year. Sponsored by Carolina Biological Supply Company.

Bioclub Leadership Awards
Nina Marchando
Alliance Renew and Meyer Luskin College Ready Academy, Los Angeles, CA

This award recognizes an innovative and student-centered classroom, teacher who has successfully developed and demonstrated an innovative approach in the teaching of biology/environmental science and has carried their commitment to the environment into the community. Sponsored by Venus Software and Technology.

Ecology/Environmental Science Teacher Award
Lisa Bircher, Ph.D.
East Palatine High School, East Palatine, OH

This award recognizes a middle or high school biology teacher who has successfully developed and demonstrated an innovative approach in the teaching of biology/environmental science and has carried their commitment to the environment into the community. Sponsored by Venus Software and Technology.

Excellence in Encouraging EJDI Award
Kelly Moore, Ph.D. & Elishe Friedwirth
Wallace State Community College, Morristown, TN

The NABT Excellence in Encouraging Equity, Diversity, Inclusion, and Student Development (EJDI) Award recognizes efforts to promote equitable life in science education. The recipient/Recipients demonstrate a passion and commitment to IDE through their teaching and outreach activities that identify successful strategies that increase enthusiasm for biology. Sponsored by National Association of Biology Teachers.

Evolution Education Award
Rebecca Bower
Troy High School, Troy, MI

This award recognizes innovative classroom teachers and their efforts to promote the accurate understanding of biological evolution within the larger community. Sponsored by BSCS Science Learning & NCE.

Four-Year College & University Section Biology Teaching Award
Sambhava Raich, Ph.D.
University of Alabama, Birmingham, AL

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
Stanley Lu, Ph.D.
University of California San Diego, La Jolla, CA

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
Karie Kienzle, Ph.D.
Brown University, Providence, RI

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 GSA.

Honorary Membership
William F. McCorm, Ph.D.
University of Arkansas, Fayetteville, AR

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.

Jennifer Pfannenstiel Travel Award
Not awarded in 2023.

Established to honor the memory of Jennifer Pfannenstiel, this award is a need-based scholarship to support a teacher who has demonstrated a commitment to the environment into the community. Sponsored by the National Association of Biology Teachers.

Outstanding Biology Teacher Award (OBTa)
See the full OBTa listing for 2023 Honorees.

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

OBTa Honororees 2023

Region I
Kenneth Bateman
Welllesley High School
Welllesley, MA

Region II
Joseph Evans
Kent County High School
Worton, MD

Carisa Steinberg
Syosset High School
Syosset, NY

Camilla Walk
Princess Anne High School
Virginia Beach, VA

Region III
Madeline Munar
Glenbrook South High School
Glenview, IL

Jeremy Cook
Carmel High School
Carmel, IN

Chandler Missig
L’Anse Creuse Frederick V. Pankow Center
Clinton Township, MI

Anna Riddell
Fairfield City Schools
Fairfield, OH

Region IV
Kelley Bennett Tuel
Blue Valley Center for Professional Studies
Overland Park, KS

Region V
Jessica Minton
Houston High School
Germantown, TN

Renee Haines
Martinsburg High School
Martinsburg, WV

Region VI
Lara McDonald
Etowah High School
Woodstock, GA

Raven Veillon-Skretti
Schools of the Sacred Heart
Grand Coteau, LA

Lincoln Clark
Spain Park High School
Pelham, AL

Region VII
Matthew Holden
Fayetteville High School
Fayetteville, AR

Miranda Thornton
Basha High school
Gilbert, AZ

Region VIII
Linda Rost
SUCCESS Academy
Fayetteville, AR

Region IX
Daniel Shay
North Central High School
Spokane, WA

Other consideration provided by Bio-Rad Laboratories, the Botanical Society of America, miniPCR, and Population Connection.

Thank you to 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.

The Outstanding Biology Teacher award is proudly sponsored by:

Carolina.com

www.carolina.com

NABT Professional Development Conference

Baltimore, 2023 | #NABT2023

NABT AWARDS

Region I

Region II

Region III

Region IV

Region V

Region VI

Region VII

Region VIII

Region IX

NABT AWARDS

The Outstanding Biology Teacher Award

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

The Outstanding Biology Teacher Award is proudly sponsored by:

Carolina.com

www.carolina.com

NABT AWARDS

The Outstanding Biology Teacher Award

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

The Outstanding Biology Teacher Award is proudly sponsored by:

Carolina.com

www.carolina.com

NABT AWARDS
PAST PRESIDENTS & CONFERENCE LOCATIONS

<table>
<thead>
<tr>
<th>CITY, YEAR</th>
<th>#NABTXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td></td>
</tr>
<tr>
<td>1977</td>
<td></td>
</tr>
<tr>
<td>1976</td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td></td>
</tr>
<tr>
<td>1974</td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td></td>
</tr>
<tr>
<td>1966</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td></td>
</tr>
<tr>
<td>1964</td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td></td>
</tr>
<tr>
<td>1959</td>
<td></td>
</tr>
<tr>
<td>1958</td>
<td></td>
</tr>
<tr>
<td>1957</td>
<td></td>
</tr>
<tr>
<td>1956</td>
<td></td>
</tr>
<tr>
<td>1955</td>
<td></td>
</tr>
<tr>
<td>1954</td>
<td></td>
</tr>
<tr>
<td>1953</td>
<td></td>
</tr>
<tr>
<td>1952</td>
<td></td>
</tr>
<tr>
<td>1951</td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td></td>
</tr>
<tr>
<td>1949</td>
<td></td>
</tr>
<tr>
<td>1948</td>
<td></td>
</tr>
<tr>
<td>1947</td>
<td></td>
</tr>
<tr>
<td>1946</td>
<td></td>
</tr>
<tr>
<td>1945</td>
<td></td>
</tr>
<tr>
<td>1944</td>
<td></td>
</tr>
<tr>
<td>1943</td>
<td></td>
</tr>
<tr>
<td>1942</td>
<td></td>
</tr>
<tr>
<td>1941</td>
<td></td>
</tr>
<tr>
<td>1940</td>
<td></td>
</tr>
<tr>
<td>1939</td>
<td></td>
</tr>
<tr>
<td>1938</td>
<td></td>
</tr>
</tbody>
</table>

HONORARY MEMBERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>John A. Zangl</td>
<td>2002</td>
</tr>
<tr>
<td>Patricia Perleb</td>
<td>2001</td>
</tr>
<tr>
<td>Bob Nelson</td>
<td>2000</td>
</tr>
<tr>
<td>Dennis Gauthier</td>
<td>1999</td>
</tr>
<tr>
<td>Michael Avey</td>
<td>1998</td>
</tr>
<tr>
<td>John M. Mayeur</td>
<td>1997</td>
</tr>
<tr>
<td>Margaret Blumenthal</td>
<td>1996</td>
</tr>
<tr>
<td>Shane Burkholder</td>
<td>1995</td>
</tr>
<tr>
<td>Lucy Lubkin</td>
<td>1994</td>
</tr>
<tr>
<td>Todd Carter</td>
<td>1993</td>
</tr>
<tr>
<td>Markus Robinson</td>
<td>1992</td>
</tr>
<tr>
<td>Jessica Salk</td>
<td>1991</td>
</tr>
<tr>
<td>Patricia Muller</td>
<td>1990</td>
</tr>
<tr>
<td>Robert Williamson</td>
<td>1989</td>
</tr>
<tr>
<td>1990</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td></td>
</tr>
</tbody>
</table>

NABT PROFESSIONAL DEVELOPMENT CONFERENCE

Get your favorite biology education resource delivered right to your way.

Visit www.nabt.org/Resources-American-Biology-Teacher for more information, or find the A&T on iTunes, Google Play, and Amazon.
There are many opportunities to volunteer at NABT. Committee and section meetings are open to all NABT members, and we invite you to get involved—and help develop—the programs that support you as a leader in life science education.

Another great place to find out more about NABT programs is the NABT Leader Meet & Greet in the Exhibit Hall from 8:30AM – 9:00AM on Friday, November 3rd.
Interactions in General Education Life Science Courses (IGELS): Introducing the LifeSkills Guide for Undergraduate Faculty
This interactive, inquiry-based workshop will engage participants in practical activities to help students increase their reasoning and science process skills. Workshop participants will be introduced to a newly developed tool, the “LifeSkills Guide,” based on Vision and Change. IGELS faculty will also share learning outcomes, activities, and assessments for undergraduate non-science students’ LifeSkills.

Sponsored by PROJECT IGELS

Thursday, November 2
11:30AM – 3:30PM

Introducing OpenSciEd Biology!

Come join us to see how OpenSciEd’s materials can help you build science learning experiences anchored in compelling phenomena and in important community and global problems. This session will introduce you to the first unit in the OpenSciEd biology course and provide you with a launching point for teaching OpenSciEd Biology in your classroom.

Sponsored by NCSE

Thursday, November 2
12:30PM – 3:30PM

Hands-on Activities from Carolina, HudsonAlpha, and Wisconsin Fast Plants

Stop by for a special open pop-up event! Carolina, HudsonAlpha, and Wisconsin Fast Plants showcase new activities and resources with multiple hands-on stations. Be introduced to Carolina’s new Labskills series of free instructional content for teaching essential lab skills such as testing pH, micropipetting, measuring volume, and more. HudsonAlpha’s authentic genomics and biotechnology activities will be available. Wisconsin Fast Plants will demonstrate how rapid growing brassica plants can be used to teach selection and inheritance. (Tickets not required.)

Sponsored by Carolina, HudsonAlpha, and Wisconsin Fast Plants

Storylining in Biology for Coherent Instruction

Storylines led by engaging phenomena improve student engagement and understanding of the overarching biological concepts. Using phenomena to anchor instruction and lead instruction are modeled in the workshop hosted by the team at All Species Animal Consulting.

Sponsored by IMET

Thursday, November 2
12:30PM – 3:00PM

Tackling Misconceptions in Climate Change: The Power of Place-Based Resources

The National Center for Science Education (NCSE) has developed free place-based NGSS-aligned lessons to help overcome student misconceptions about climate change. Come preview these activities, then learn how to create relevant lessons based on local climate issues.

Sponsored by NCSE

Thursday, November 2
12:30PM – 3:00PM

NABT NETWORKING LUNCHES

Friday, November 3
12:45 – 1:45PM

Everyone’s conference registration includes a boxed lunch, and tickets for your entire selection were made with your registration.

Pick up your lunch outside the Grand Ballroom and join a section event, meet up with friends, or find a quiet spot to relax and recharge.

Elementary & Middle Level Teachers Luncheon

Grab your lunch and meet up with other elementary and middle-level teachers at this informal networking lunch designed to help you connect with colleagues.

High School Teachers Luncheon

If you teach funny freshmen, serious seniors, and/or everyone inbetween, you will want to grab your lunch, grab a seat, and connect with other high school biology teachers in this informal setting.

AP Biology Section Luncheon

Grab your lunch and meet other AP Biology teachers in a friendly, informal setting to share insights, ask questions, and build community. You may even get to meet some of your favorite AP teachers in person. The luncheon includes a special presentation of the Kim Frego AP Biology Service Award.

Sponsored by minipcr

Two-Year College Section Luncheon

Join a supportive community of two-year college educators to share your strategies, your struggles, and your successes. The winners of the Two-Year College Biology Teaching Award and the Professor Chan Teaching Award will also be recognized.

Sponsored by Carolina

Friday, November 3
5:00PM – 7:00PM

HHMI Night at the Movies

Join us for a sneak peek of the upcoming Wild Hope season from Tangled Bank Studios and help us celebrate Sean B. Carroll’s pioneering approach to science storytelling and education.

Saturday, November 4
7:30AM – 8:45AM

NABT BioClub Breakfast

FREE
(Tickets Required)
The BioClub continues to grow, with new chapters being formed at 8-12 schools, community colleges, and informal learning organizations all over North America. Share the great things your club is doing, or learn how to start one.

Sponsored by www.carolina.com

Saturday, November 4
7:30AM – 8:45AM

2023 NABT Honors Luncheon

Tickets Required • $50 Advance / $60 Onsite
NABT is proud to recognize the 2023 NABT Award Recipients during this celebration. We will honor exceptional biology teachers from all levels, and everyone is welcome to join us and congratulate these remarkable professionals.

Saturday, November 4
6:00PM – 8:00PM

NABT BioClub Breakfast

FREE
(Tickets Required)
The BioClub continues to grow, with new chapters being formed at 8-12 schools, community colleges, and informal learning organizations all over North America. Share the great things your club is doing, or learn how to start one.

Sponsored by www.carolina.com

Saturday, November 4
11:30AM – 2:00PM

Baltimore Haunted History Tour & Closing Reception

Tickets Required • $35 Advance / $45 Onsite
Conclude the 2023 NABT Conference experience with an evening of Baltimore history and haunts. Picture Fell’s Point, as it was, a rowdy seaport town, the birthplace of the sleek and dangerous clipper ship. Its streets were full of sailors from foreign lands spilling off ships, immigrants anxious to start a new life, and ladies of the night looking to make ends meet. Given this explosive combination, is it any wonder that many ghosts remained behind? Join us for a bite and a beverage harboride at the hotel, before our guides lead the groups in a walking tour of Baltimore’s most historic waterfront neighborhood, closing out at a popular spot to “cheers” to a successful conference.

We hope to make this experience as accessible as possible. Please contact conference@nabt.org if you need an accommodation or special consideration to participate.
Nominate a teacher for a 2024 NABT award.

Submit your nomination online before March 15th
https://nabt.org/Awards-NABT-Award-Nomination-Form

There is HIGH energy and then there is...

*AMANDA Energy is defined as the energy created when a freight train full of dynamite goes through a nitroglycerin factory.

Good luck keeping up with Amanda at the NABT Conference!
If you match her speed and FIND THE PRESIDENT, you can enter to win some great prizes from NABT.
The drawing will be Friday, November 3rd.
9:00AM–2:30PM
PALM Network Vision and Change Workshop
Essex B & C (4th Floor) • Committee Meeting • Invitation Only

11:30AM–1:30PM
NABT Board of Directors Meeting & Leader Lunch
Dover B & C (3rd Floor) • Committee Meeting • Invitation Only

11:30AM–3:30PM
1536-94538 Interactions in General Education Life Science Courses (IGELS): Introducing the LifeSkills Guide for Undergraduate Faculty
Grand I Ballroom (3rd Floor) • Science Practices • Special Workshop (Tickets Required) • 2Y, 4Y
This interactive, inquiry-based workshop will engage participants in practical activities to help students increase their reasoning and science process skills. Workshop participants will be introduced to a newly developed tool, the “LifeSkills Guide”, based on Vision and Change. IGELS faculty will share learning outcomes, activities, and assessments for undergraduate non-science students’ LifeSkills.
In the second part of the workshop, participants will use the IGELS LifeSkills Guide to refine or revise their own classroom activity. Participants should bring an activity or draft activity to work on.
Bryan Dewsbury, Florida International University, Miami, FL; Sam Donovan, BioQUEST, Pittsburgh, PA; Katia Fuller, Gustman Community College, New York, NY; Tamar Goulet, University of Mississippi, MS; Gabriela Hammerlinck, University of Florida, Gainesville, FL; Elizabeth Harrison, Kennesaw State University, Kennesaw, GA; John Moore, Taylor University, Upland, IN; Heather Risley, North Iowa Area Community College, Mason City, IA; Davida Smyth, Texas AMU University; San Antonio, San Antonio, TX; Gordon Uto, University of Oklahoma, Norman, OK

12:30PM–3:30PM
Tour of the Institute of Marine and Environmental Technology (IMET)
Offsite • Field Trip (SOLD OUT) • GA

12:30PM–3:30PM
1536-94452 Tackling Misconceptions in Climate Change: The Power of Place-Based Resources
Grand Ballroom II (3rd Floor) • Ecology / Environmental Science / Sustainability • Special Workshop (Tickets Required) • MS
The National Center for Science Education (NCSE) has developed free place-based NGSS-aligned lessons to help overcome student misconceptions about climate change. Come preview these activities, then learn how to create relevant lessons based on local climate issues.
Lin Andrews and Cari S. Herndon, National Center for Science Education, Oakland, CA

12:30PM–3:30PM CONT.
1536-94506 Introducing OpenSciEd Biology!
Grand Ballroom VII (3rd Floor) • General Biology • Special Workshop (Tickets Required) • HS
Learn how OpenSciEd’s materials can help you build science learning experiences anchored in compelling phenomena and in important community and global problems. This session will introduce you to the first unit in the OpenSciEd biology course, providing you with a launch point for teaching OpenSciEd Biology in your classroom. Teachers will put on a “student hat” so they can feel what it’s like to be a student whose thoughts and questions help drive learning forward in the unit. We will then open up and explore the structure of units and discuss the routines and resources to promote equitable science learning in high school.
Kate Henson, University of Colorado Boulder, Boulder, CO

SPECIAL PROGRAMMING PRESENTED BY CAROLINA & PARTNERS
1536-99226 Hands-on Activities from Carolina, HudsonAlpha, and Wisconsin Fast Plants
Grand Ballroom IX (3rd Floor) • General Biology • Special Workshop (Tickets Not Required) • HS
Stop by for a special open pop-up event! Carolina, HudsonAlpha, and Wisconsin Fast Plants showcase new activities and resources with multiple hands-on stations. Be introduced to Carolina’s new Labskills series of free instructional content for teaching essential lab skills such as testing pH, micropipetting, measuring volume, and more. HudsonAlpha’s authentic genetic and biotechnology activities will be available. Wisconsin Fast Plants will demonstrate how rapid growing brassica plants can be used to teach selection and inheritance.

BALTIMORE, 2023 | #NABT2023
2023 NABT EVOLUTION SYMPOSIUM
Friday, November 3, 2023 | 10:30 am – 12:30 pm | Room: Laurel C&D

How to Survive A Mass Extinction
Riley Black, Science Writer
Join award-winning author Riley Black as she discusses what made the difference between survival and extinction as the Age of Dinosaurs ended and the Age of Mammals began.

Welcome to our FREE Workshops!

3:30 – 4:00 PM
The Plight of the Bumblebee: Studying Bee Genetic Biodiversity using DNA Barcoding
Chandler Tawney, Blake Touchet, Lin Andrews
Explore the relationship between extinction, evolution, and biodiversity as part of an NGSS-aligned storyline that utilizes hands-on activities focused on the fossil record.

2:00 – 3:15 PM
Track Norovirus Spread Using Modeling and Gel Electrophoresis
The NCSE National Center for Science Education
Understand how to design a model that mimics the spread of infection using data and data analysis.

8:00 – 9:00 AM
Welcome to our 2023 NABT EVOLUTION SYMPOSIUM
Margaret Wells, NCSE National Center for Science Education
Explore the relationship between extinction, evolution, and biodiversity as part of an NGSS-aligned storyline that utilizes hands-on activities focused on the fossil record.

3:00 – 4:30 PM
The Flight of the Bumblebee: Studying Bee Genetic Biodiversity using DNA Barcoding
Chandler Tawney, Blake Touchet, Lin Andrews
Explore the relationship between extinction, evolution, and biodiversity as part of an NGSS-aligned storyline that utilizes hands-on activities focused on the fossil record.

3:30 – 4:00 PM
The Plight of the Bumblebee: Studying Bee Genetic Biodiversity using DNA Barcoding
Chandler Tawney, Blake Touchet, Lin Andrews
Explore the relationship between extinction, evolution, and biodiversity as part of an NGSS-aligned storyline that utilizes hands-on activities focused on the fossil record.

2:00 – 3:15 PM
Track Norovirus Spread Using Modeling and Gel Electrophoresis
The NCSE National Center for Science Education
Understand how to design a model that mimics the spread of infection using data and data analysis.

8:00 – 9:00 AM
Welcome to our 2023 NABT EVOLUTION SYMPOSIUM
Margaret Wells, NCSE National Center for Science Education
Explore the relationship between extinction, evolution, and biodiversity as part of an NGSS-aligned storyline that utilizes hands-on activities focused on the fossil record.
7:30AM–8:30AM
NABT First Timers’ Coffee Break
Grand Ballroom VIII & IX (3rd Floor) • Special Event • GA
First-time attendees are invited to learn more about NABT, the 2023 Professional Development Conference, and network with former “first timers.” NABT Mentors will be available to answer your questions and help you make the most of your time in Baltimore. The NABT First Timers’ Event is made possible through the generous support of

8:00AM–9:00AM
SPECIAL PROGRAMMING PRESENTED BY BIO-RAD
1536-98363 PCR Amplified: Advanced Topics & Techniques
Grand Ballroom II (3rd Floor) • Biotechnology • Demonstration (60 min) • HS, 2Y, 4Y
Learn about the versatile techniques of PCR (qPCR, ddPCR, etc.) and real-world applications in life science research, clinical and molecular diagnostics like gene expression, disease outbreaks, mutation detection, and more.
Damon Tighe, Bio-Rad Laboratories, Hercules, CA

9:15AM–10:15AM
Rajiv McCoy
See biography on page 9
Human Genome Evolution Across Scales of Biological Organization
Grand Ballroom V & VI (3rd Floor) • Special Speaker (60 min) • GA
Genetic variation mediates much of the phenotypic diversity observed in nature. DNA sequencing and related assays have produced a wealth of data that allow us to test long-standing hypotheses about how evolution shapes genetic variation and ensuing phenotypes. The scale and complexity of these data, in turn, require the development of novel computational and statistical methods tailored for their analysis. Showcasing these themes, Dr. McCoy will describe recent foci in his lab that span scales of biological organization. The first regards one of the most surprising features of human biology, whereby less than half of all conceptions survive to live birth. Using data from in vitro fertilized embryos reveals diverse mechanisms of chromosome mis-segregation and their role in pregnancy loss. Extending from cells to individuals to populations, the McCoy lab is also developing resources and methods for studying abundant and impactful classes of genetic variation that have eluded the field, including contribution to the first gapless assembly of a human genome. This research has uncovered new evidence of historical natural selection, including selection favoring alleles inherited via ancient interbreeding with Neanderthals. Lastly, Dr. McCoy will end the talk by describing recent work generating and analyzing a large gene expression dataset from globally diverse human populations, creating a more complete view of gene expression evolution. Together, this research helps explain the origins and maintenance of genetic variation underlying the phenotypes that make us all unique.
The Road to Extinction

There’s never been a mass extinction like it. Sixty-six million years ago, an immense asteroid struck the Earth and approximately 75% of known species disappeared virtually overnight. Yet many forms of life made it through the catastrophe, from feathered dinosaurs to our primate ancestors. In this talk, award-winning author of “The Last Days of the Dinosaurs”, Riley Black will replay what made the difference between survival and extinction as the Age of Dinosaurs ended and the Age of Mammals began.

Riley Black, Science Writer, Las Vegas, NV

The Road to Extinction

Are humans living through the sixth great extinction? While extinction is a major feature of the history of life, humans often have a variety of preconceived notions about Earth’s fossil record. This lesson set explores the relationships between extinction, evolution, and biodiversity in an effort to resolve these issues. Teachers will explore a free NGSS-aligned storyline from the National Center for Science Education that investigates mass extinctions to better understand how current populations adapt (or not) to human impacts. Walk away with hands-on activities grounded in primary evidence from the fossil record that allow students to explore possible solutions to mitigate the adverse impacts on biodiversity that often result from human activity.

Chandler Tawney, L’Anse Creuse Public Schools, Clinton Township, MI and Blake Touchet and Lin Andrews, National Center for Science Education, Oakland, CA

SPECIAL PROGRAMMING PRESENTED BY EDVOTEK

1536-07039 Introducing Your Students to Gene Editing with CRISPR

Dover A (3rd Floor) • Biotechnology - Hands-on Workshop (75 min) - HS, 2Y, 4Y

Explore the Nobel Prize-winning gene-editing tool CRISPR with your students! In this workshop, we’ll experiment with guide RNA design, curing genetic diseases, and changing bacterial genomes.

Thomas Synder, Stephanie Shum, Edvotek, Washington, DC

1536-93403 Meet the 2023 HudsonAlpha Guidebook

Dover B & C (3rd Floor) • Biotechnology - Demonstration (75 min) - GA

Want to include cutting-edge genetic discoveries in your class? Meet the 2023 HudsonAlpha Guidebook. This free resource is packed with “too new for textbooks” content, phrased in student-friendly language.

Katy East and Madeleine Lott, HudsonAlpha Institute for Biotechnology, Huntsville, AL

SPECIAL PROGRAMMING PRESENTED BY BIO-RAD

1536-98394 Hands-On Chromosomal Gene Editing with the Out of the Blue CRISPR Kit

Grand Ballroom II (3rd Floor) • Biotechnology - Hands-on Workshop (75 min) - HS, 2Y, 4Y

CRISPRs most relevant uses require more than just knockouts! In this hands-on workshop, use CRISPR-Casp to cut and repair an E. coli chromosomal gene while learning about essential experimental controls.

Damon Tighe, Bio-Rad Laboratories, Hercules, CA

1536-94431 Engineering in Biology: Free Labs and Project-Based Learning

Essex B & C (4th Floor) • Ecology / Environmental Science / Sustainability - Hands-on Workshop (75 min) - HS

Engineering Tomorrow STEM labs is developed and delivered by engineers for free and can work well in your biology classroom! Come learn about the program and receive complimentary Teacher Toolkit!

Marisa Maggin, Stuyvesant High School, New York, NY and Constance Chiplock, Engineering Tomorrow, Farfaht Station, VA

1536-94410 The American Association of Immunologists Presents: AAI Teachers Research Program—Immunology Lessons for the Classroom

Grand Ballroom I (3rd Floor) • Microbiology & Cell Biology - Hands-on Workshop (75 min) - HS

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

Mike Crouchel, Texas A&M University, College Station, TX

1536-94447 Climate Hope in the Classroom: Using Local Climate Impacts and Environmental Actions to Teach Climate Science

Grand Ballroom VII (3rd Floor) • Ecology / Environmental Science / Sustainability - Hands-on Workshop (75 min) - ML, HS, GA

Attendees will walk through a task that engages students in climate science and inspires them to action. The task centers regional impacts, environmental actions, and strategies to address climate anxiety.

Erin Capra, West High School, Salt Lake City, UT; Erin Smith, Berkley High School, Berkley, CA; Lucas Ringer, West Albany High, Albany, OR; Jody Daulerog, Balboa High School, San Francisco, CA
10:30AM–11:45AM CONT.

1536-93653 What Are We Learning Again? Reducing Cognitive Clutter to Focus Students on Science Practice

Grand Ballroom VIII (3rd Floor) • Instructional Strategies • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Advanced labs often require students to perform unfamiliar procedures, acquire new content, and often end in frustration. Come see how NGSS science practices can clarify learning goals in sophisticated labs. Stephen Tspahagen, Oak Park and River Forest High School; Oak Park, IL; Julie Mierbel, Columbia College Chicago, Chicago, IL; and Kirstin Mills, Bloomington High School South/Indiana University Bloomington, Bloomington, IN

1536-94267 Tasks and FRQs: Deciphering the Science Practices in AP Biology

Grand Ballroom IX (3rd Floor) • AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

This session will explore the AP Biology Science Practices that students should develop. The session will also model how the science practices are assessed in FRQs: Catherine E. Walsh, College Board, New York, NY and Chris Monsour, Tiffin High School, Tiffin, OH

1536-94391 QB@CC Biological and Mathematical Methods to Assess Biodiversity

Grand Ballroom X (3rd Floor) • Ecology • Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Using QB@CC “Impact of Introduction of American Bullfrogs on Species Diversity Activity” to demonstrate a biological and mathematical approach to teaching species biodiversity concepts in the classroom and beyond. Christine Patrum, Georgia State University, McDonough, GA and Heather Zimmer-Del常州, Georgia State University, Mableton, GA

Justice, Equity, Diversity, & Inclusion (JEDI) Committee

Iron (4th Floor) • Committee Meeting (75 min) • GA

The JEDI Committee helps NABT develop programs and resources that address the needs of a diverse community of biology teachers to ensure full access and opportunities following the guidance articulated by the NABT values statement. Enya Granados, Committee Chair

1536-94394 Scientific Literacy Re-visited

Kent A (4th Floor) • Nature of Science • Demonstration (75 min) • 2Y, 4Y, GA

Workshop participants will explore activities illustrating components of the new model of scientific literacy for undergraduates developed by the NSF-funded “Liberal Art of Science” (AAAS, 1990) revision project. Gordon Uno, University of Oklahoma, Norman, OK; Sam Donovan, BioQUEST, Pittsburgh, PA

1536-94367 The BioGraph Curriculum: Valuing Diverse Identities and Fostering Data Literacy in Biology

Kent B & C (4th Floor) • Curriculum Development • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Learn how to adapt open educational resources from the Biologists and Graph Interpretation (BioGraph) Project to improve representation of diverse scientists and incorporate data interpretation skills in your courses. Rachel M. Pigg, University of Louisville, Louisville, KY; Suain Yang, SUNY Geneseo, Geneseo, NY; Stanley M. Lo, University of California San Diego, La Jolla, CA; Sheela Vemu, Waubonsee Community College, Chicago, IL; Elizabeth Hamman, St. Mary’s College of Maryland, St. Mary’s City, MD; Catherine L. Quilanti, Howard University, Washington, DC

12:00PM–1:30PM

1536-94318 How to Be A Better Teacher Collaborator

Dover A (3rd Floor) • Curriculum Development • Demonstration (30 min) • HS, 4Y, GA

This is a presentation on best practices for how to work with university research partners in urban contexts to facilitate teacher research enabling the use of their resources. Richard Jacob Zemny, Julia R. Masternak School, Philadelphia, PA

1536-94552 "Dear Colleague:“ Meet Your NSF Program Officers

Dover B & C (3rd Floor) • Instructional Strategies • Symposium (75 min) • GA

This session will highlight some of NSF’s key programs while also giving participants practical advice on how to improve their chances of impressing Reviewer 2. Kadyne Shea Owens, National Science Foundation, Alexandria, VA

Presented by MInPCR

1536-98408 Using Synthetic Biology to Explore the Central Dogma and Protein Structure

Laurel A & B (4th Floor) • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Use the cell-free Biobits® system to experiment directly with concepts that have previously been inaccessible in many educational settings. Simple to implement, authentic molecular investigations with bright fluorescent readouts! Ally Huang, mInPCR bio, Cambridge, MA

Time to Teach Biology

Our industry-leading biology investigations, materials, and instructional tools reduce your prep time—so you have more time for teaching and building student engagement and skills. Explore them now at Carolina.com/biologytopics.
12:00PM–12:30PM CONT.

1536-96526 Take Math Anxiety Out of Teaching Population Growth With HHMI BioInteractive’s Lionfish Click & Learn
Grand Ballroom III & IV (3rd Floor) • General Biology - Hands-on Workshop (30 min) • HS, 2Y, 4Y
Come explore how to incorporate math concepts into life science curricula with BioInteractive’s fun and interactive. We'll discuss how to adapt this resource for active learning in online and in-person settings.

Megan Lopak, North Carolina State University, Raleigh, NC

Long Range Planning Committee
Iron (4th Floor) • Committee Meeting (30 min) • GA
Working with the Board of Directors and other NABT leaders, the Long Range Planning Committee develops goals and objectives that align with NABT’s Strategic Plan.

Steve Christenson, Committee Chair

ABT Advisory Committee
James (4th Floor) • Committee Meeting (30 min) • GA
The ABT Advisory Committee helps ensure the American Biology Teacher publishes articles and highlights themes relevant to the teaching and learning of biology and life science at all levels.

William McComas, ABT Editor-in-Chief

1536-94294 Student-Centered Learning in Biology Content Using the Explorations of Diverse Scientists
Kent A (4th Floor) • General Biology - Paper (30 min) • ML, HS, GA
Biological texts provide legitimacy and belonging in science. The explorations of National Geographic African American scientist explorers connect socio-emotional learning and social awareness with biology content in the classroom.

Catherine J. Quinlan, Howard University, Rockville, MD

1536-94366 How Focus Questions Work to Make Student Thinking Visible
Kent B & C (4th Floor) • Instructional Strategies - Hands-on Workshop (30 min) • HS, 4Y, GA
We will discuss using focus questions at the beginning of lessons and units as a way to improve student engagement, agency, and inclusion as they learn biology.

Thomas Diviett and Paul K. Stolte, Fairview High School, Boulder, CO

SPECIAL PROGRAMMING PRESENTED BY MINIPCR
1536-98405 Hands-on Activities to Bring CRISPR-Cas9 to Your Class
Laurel A & B (4th Floor) • Biotechnology - Hands-on Workshop (30 min) • HS, 2Y, 4Y
See our suite of CRISPR-Cas9 activities. We have something for everyone with both in vitro and in vivo CRISPR/Cas9 labs and free resources like paper modeling activities.

Ally Huang, minIPCR bio, Cambridge, MA

NABT Book Club
4th Floor Landing (4th Floor) • Special Program - Discussion (30 min) • GA
Join the NABT Book Club for a discussion of the 2024 selection and timeline. This community read is a great way to talk to other biology teachers about what you’re learning in an informal (and fun) setting.

Cindy Gay, NABT Director-at-Large, Steamboat Springs, CO

12:45PM–1:15PM

NABT Lunch Break
Your conference registration includes a boxed lunch, and we invite you to pick up your lunch outside the Grand Ballroom and join a section event, meet up with friends, or find a quiet spot to relax and recharge.

Tickets for your entreé selection were made with your registration. Please present your lunch ticket to staff to pick up your boxed lunch.

AP Biology Section Luncheon
Grand Ballroom V (3rd Floor) • AP Biology - Meal Functions (60 min) • HS
Grab your lunch and meet other AP Biology teachers in a friendly, informal setting to share insights, ask questions, and build community. You may even get to meet some of your favorite AP colleagues in person. The luncheon includes a special presentation of the Kim Fogli AP Biology Service Award.

Kent B & C (4th Floor) • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Join a supportive community of two-year college educators to share your strategies, your struggles, and your successes. The winners of the Two-Year College Biology Teaching Award and the Professor Chun Teaching Award will also be recognized.

Four-Year College & University Section Luncheon
Grand Ballroom VIII (3rd Floor) • General Biology - Meal Functions (60 min) • 4Y
Faculty, education researchers, graduate students, and anyone associated with four-year colleges and universities are invited to network with colleagues and learn about section programs and opportunities. There will also be a special presentation of the Four-Year College & University Section Awards. Be sure to grab your lunch before heading to the luncheon!

Two-Year College Section Luncheon
Grand Ballroom IX (3rd Floor) • General Biology - Meal Functions (60 min) • 2Y

If you teach funny freshmen, serious seniors, and/or everyone in between, you will want to grab your lunch, grab a seat, and connect with other high school biology teachers in this informal setting.

Elementary and Middle-Level Luncheon
Grand Ballroom VII (3rd Floor) • General Biology - Meal Functions (60 min) • ELEM, MS
Grab your lunch and meet up with other elementary and middle-level teachers at this informal networking lunch designed to help you connect with colleagues.

1:15PM–2:00PM

Four-Year College & University Section Luncheon
Grand Ballroom IX (3rd Floor) • General Biology - Meal Functions (60 min) • 4Y

If you teach funny freshmen, serious seniors, and/or everyone in between, you will want to grab your lunch, grab a seat, and connect with other high school biology teachers in this informal setting.

Elementary and Middle-Level Luncheon
Grand Ballroom VII (3rd Floor) • General Biology - Meal Functions (60 min) • ELEM, MS
Grab your lunch and meet up with other elementary and middle-level teachers at this informal networking lunch designed to help you connect with colleagues.

2:00PM–3:15PM

1536-97501 Writing for The American Biology Teacher
Dover A (3rd Floor) • Curriculum Development - Hands-on Workshop (75 min) • GA

Work with members of the ABT editorial team during this interactive session designed to help get your idea through submission, review, and acceptance.

William McComas, ABT Editor-in-Chief, University of Arkansas, Fayetteville, AR

2:00PM

SPECIAL PROGRAMMING PRESENTED BY MINIONE SYSTEMS
1536-99346 Wet and Dry Labs to Introduce CRISPR-Based Gene Editing
Essex A (4th Floor) • Biotechnology - Hands-on Workshop (75 min) • HS, 2Y, 4Y

Unveil CRISPR’s genetic prowess in this novel wet and dry lab simulation to introduce high school and undergraduate students to CRISPR-based gene editing technology.

David Vollert, Chattanooga State Community College, Chattanooga, TN

Please present your lunch ticket to staff to pick up your boxed lunch.

Tickets for your entreé selection were made with your registration. Please present your lunch ticket to staff to pick up your boxed lunch.

AP Biology Section Luncheon
Grand Ballroom V (3rd Floor) • AP Biology - Meal Functions (60 min) • HS
Grab your lunch and meet other AP Biology teachers in a friendly, informal setting to share insights, ask questions, and build community. You may even get to meet some of your favorite AP colleagues in person. The luncheon includes a special presentation of the Kim Fogli AP Biology Service Award.

Kent B & C (4th Floor) • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Join a supportive community of two-year college educators to share your strategies, your struggles, and your successes. The winners of the Two-Year College Biology Teaching Award and the Professor Chun Teaching Award will also be recognized.

Four-Year College & University Section Luncheon
Grand Ballroom VIII (3rd Floor) • General Biology - Meal Functions (60 min) • 4Y

If you teach funny freshmen, serious seniors, and/or everyone in between, you will want to grab your lunch, grab a seat, and connect with other high school biology teachers in this informal setting.

Elementary and Middle-Level Luncheon
Grand Ballroom VII (3rd Floor) • General Biology - Meal Functions (60 min) • ELEM, MS
Grab your lunch and meet up with other elementary and middle-level teachers at this informal networking lunch designed to help you connect with colleagues.

1:15PM–2:00PM

Four-Year College & University Section Luncheon
Grand Ballroom IX (3rd Floor) • General Biology - Meal Functions (60 min) • 4Y

If you teach funny freshmen, serious seniors, and/or everyone in between, you will want to grab your lunch, grab a seat, and connect with other high school biology teachers in this informal setting.

Elementary and Middle-Level Luncheon
Grand Ballroom VII (3rd Floor) • General Biology - Meal Functions (60 min) • ELEM, MS
Grab your lunch and meet up with other elementary and middle-level teachers at this informal networking lunch designed to help you connect with colleagues.
Instructional Strategies in AP Science Classes: A Systematic Literature Review
Robin Buller & Sonnye Park, North Carolina State University, Raleigh, NC

The Advanced Placement (AP) program provides an opportunity for students to learn rigorous, college-level content while they are in high school. In addition, it provides financial benefits as students can earn college credit with a qualifying score on the end-of-course exam (Kolluri, 2018). The College Board, who designs the AP courses and exams, aims to increase both access and equity in the AP program. Consequently, in the past two decades, the number of students who take an AP course has doubled, to nearly three million (Saavedra et al., 2021). Despite recent efforts to expand both equity and access to AP courses, however, significant gaps remain in both areas. Historically, high-income schools offered more AP courses than low-income schools. Due to dramatic financial support from federal, state, and local governments, 50% of students now attend a school offering at least one AP course (Long et al., 2019). However, gatekeeping practices such as prerequisite mathematics and science courses like chemistry, algebra II, and precalculus create barriers to AP science courses which, in turn, yield student populations that are less diverse than introductory courses (Kolluri, 2013). Further, quality AP programs require effective teachers along with support from school and district (Long et al., 2019). In particular, given the close relationship between teachers’ instructional practices and student learning outcomes (Hattie, 2012; Liou, 2021), understanding how AP courses are delivered in classrooms is imperative to better support AP teachers to implement effective teaching approaches that will promote science learning for all students from diverse backgrounds. In this regard, this review study aims to identify and characterize instructional strategies implemented in AP science courses for biology, chemistry, environmental science (APES), and physics, that are featured in research articles about AP courses published for the past ten years using a systematic approach to literature review. In addition, this review aims to identify instructional strategies that are empirically supported to contribute to student learning outcomes in AP science courses.

How Should I Write Exam Questions: An Investigation into How Different Formats of Exam Questions in Biology Classes Can Influence Student Performance and Attitudes
Jeremy Woolf, Noelle Clark, Kate Hill, Melissa Rowland-Goldsmith, Chapman University, Orange, CA

Quizzes and exams are nearly ubiquitous across both K-12 and college biology courses, with such assessments often playing major roles in determining student success and persistence in science, technology, engineering, and math (STEM). However, little work has explored how the framing of assessment questions may influence student performance and affect, despite past work showing that small changes in question structure can have large impacts. For instance, personalizing questions with students’ interests (e.g., grounding scenarios in students’ academic and extracurricular topics relevant to students) can increase motivation and learning (e.g., Awofala 2014; Bernacki & Walkington 2014, D’Agata 2015; Xu & Sullivan 2001, Melsky 2021). However, this past work has primarily been done in the context of math, physics, and engineering courses, and we are not aware of any work examining the influence of another type of question are worded in biology classes on student performance or affect.

Here, we explore question framing in scenario-based constructed-response questions where students read real scenarios and predict results in the context of an undergraduate introductory molecular genetics course. These authentic assessments mimic real-world application since students think critically about open-ended tasks (Koh 2017, Wiggins 1995). We also situate our work in discourse comprehension (Van Dijk & Kintsch 1986). Under this theory (also known as construction-integration), students must build both a textbase and situation model when reading a new scenario. The textbase represents a basic understanding of the language used and contains only minimal levels of inferences, while the situation model represents more complex mental representations (Graesser & Zwaan 1993; Gunel et al. 2009, Kintsch 1986, Van Dijk & Kintsch 1986).

Do the Benefits of Collaborative Group Exams Extend Beyond Just Improved Student Learning?
Jillian Arzuomanian, University of Tampa, Tampa, FL; Suann Yang, SUNY-Genesee, Geneseo, NY; Michelle Roux-Osovitz, Jeffrey Gim University of Tampa, Tampa, FL

Modern pedagogical approaches are adapted to facilitate student-centered learning to promote engagement and interpersonal skills. Collaborative group exams (CGEs) allow students to work together in collective peer groups after first attempting an assessment individually. The implementation of CGEs should convert exam-style assessments into learning opportunities focused on improving performance and learning.

Students seek an educational experience that will aid in achieving their academic, professional, and personal goals. Consequently, career readiness competencies were developed to provide students with the necessary resources employers look for, and increasing attention is given to promoting student well-being and a sense of belonging.

This study explores the effects of large-scale adoption of CGEs on student performance, learning, and group dynamics across all levels of a biology curriculum at a mid-sized private university, with quantitative and qualitative data recorded from 834 individual students. Of particular interest were students at all levels benefit from CGEs: improving exam performance (by 44%) and perceived learning through positive group dynamics and peer interactions, which likely assist students’ career preparation and promote student retention.

Therefore, we recommend CGEs to all educators, especially those teaching biology, to ensure students’ academic achievement, career readiness, and overall well-being both in and out of the classroom.

Causal Mechanisms Behind Changing Minds About Evolution Using Cultural Competence
Jamie Jensen, Brigham Young University, Provo, UT; Morgan Meyers, University of Georgia-Athens, Athens, GA; Jonathan Hodson, Dalton Bourne, Noah Emery, Brigham Young University, Provo, UT

It has now been established that religious culturally competent strategies for evolution education (ReCCEE, Barnes & Brownell, 2017) can be successful. We have developed a ReCCEE strategy which we refer to as the Reconciliation Model (RM), that appears to be successful in a variety of settings and religious affiliations in overcoming barriers to evolution acceptance, specifically among Judeo-Christian audiences (e.g., Ferguson & Jensen, 2021; Lindsay et al., 2019). Although some of the factors that influence acceptance have been studied, including religiosity (Glaze & Goldston, 2015; Rissler et al., 2014), perceived conflict (Barnes et al., 2021), understanding the nature of science (Glaze & Goldston, 2015), and sometimes religious knowledge (see Dunk et al., 2017), very little is known about the causal mechanisms directly underlying this specific ReCCEE model (the RM). In this presentation, we will share the results of a combined analysis of nationwide survey data with classroom interventions that shed light on the potential causal mechanisms behind the RM.
2:00PM–3:15PM CONT.

1536-94390 DataVersity: Humanizing and Diversifying Scientist Role Models in Data Literacy Instruction

Essex B & C (4th Floor) • General Biology - Demonstration (75 min) • HS, 2Y, GA

Strategies and resources to use scientist profiles in tandem with data literacy instruction will be discussed. Results from our efficacy study, examining how the inclusion of diverse scientist role models in instruction affected student attitudes will also be shared.

Melissa Kyelk, Michigan State University, Vádez, AZ

1536-96935 Science Communication: It’s Not Just the Facts!

Grand Ballroom I (3rd Floor) • Instructional Strategies • Demonstration (75 min) • ML, HS, GA

Using vaccines as an example, this session will examine the complex relationship between science and communication. It will highlight how informal and community science programs can support biology and life science instruction. Help NABT identify initiatives, develop strategies for navigating primary sources using BioInteractive’s suite of CRISPR activities.

Young Hoi, Augusta College, Rock Island, IL and Karen Avery, Pennsylvania College of Technology, Williamsport, PA

Informal Science Committee

Iron (4th Floor) • Committee Meeting (75 min) • GA

Help NABT identify initiatives, develop activities, and promote services that highlight how informal and community science programs can support biology and life science instruction.

Jill Maroo, Committee Chair

Awards Committee

James (4th Floor) • Committee Meeting (75 min) • GA

This committee coordinates the nomination and application process for the NABT Awards program. Committee members evaluate applications, select award recipients, and notify the honorees of their awards.

Jason Crew, Committee Chair

2:00PM–3:15PM CONT.

1536-94479 Enhancing Biology Education Through the Use of ChatGPT: Exploring the Benefits and Challenges

Kent A (4th Floor) • Technology in the Classroom - Demonstration (75 min) • ML, HS, 4Y

ChatGPT was released to much fanfare and consternation. Its brief utilization in Brandon Boswell’s biology classroom (since January 2023) has had a compelling impact on his practice, students, and assessments.

Brandon Boswell, Broward County Public Schools, Miami, FL

1536-94457 Winging It: Using BioInteractive’s CRISPR Resources to Unpack Primary Literature

Grand Ballroom III & IV (3rd Floor) • Science Practices - Hands-on Workshop (75 min) • HS, 2Y, 4Y

Reading a scientific paper can seem daunting for students. During this workshop, we’ll explore strategies for navigating primary sources using BioInteractive’s suite of CRISPR activities.

Young Hoi, Augusta College, Rock Island, IL and Karen Avery, Pennsylvania College of Technology, Williamsport, PA

1536-94475 EvolvingSTEM: A Three-Dimensional Laboratory Evolution Curriculum That Improves Student Learning and Engagement in Life Sciences

Laurel C & D (4th Floor) - Evolution - Hands-on Workshop (75 min) • ML, HS, 4Y

We will share a broadly adaptable, NGSS-aligned curriculum that uses authentic, student-led research to teach genetics, ecosystem dynamics, microbiology, and biotechnology skills within the organizing principle of evolution.

Abigail Matela, University of Pittsburgh, Pittsburgh, PA; Edwina Kirchinton, Pittsburgh Science and Technology Academy, Pittsburgh, PA; and Karen Sujaqja, Pittsburgh Creative and Performing Arts School, Pittsburgh, PA

3:00PM–4:00PM

1536-94515 The Highs and Lows and Joys and Woes of Creating and Maintaining a State NABT Affiliate

Dover A (3rd Floor) • International Education - Hands-on Workshop (30 min) • GA

If you’ve ever wanted to bring NABT back to your home state, you may have considered establishing a state affiliate. Meet with colleagues who can help troubleshoot the hurdles of making that dream a reality.

Brenda Royal, Central Magnet School, Murfreesboro, TN and Robert Pratt, Montgomery Bell Academy, Nashville, TN

SPECIAL PROGRAMMING PRESENTED BY BI-O-RAD

1536-98397 Personalized Medicine: Cell and Gene Therapy in Cancer Treatments!

Grand Ballroom II (3rd Floor) • Biotechnology - Special Speaker • HS, 2Y, 4Y

Learn about CAR-T cells and how immunotherapies are produced, how viral vectors deliver gene therapies, and how physicians use them to treat inherited genetic disorders.

James DeKloe, Solano Community College, Fairfield, CA

SPECIAL PROGRAMMING PRESENTED BY BI-O-RAD

1536-98005 Data and the Science Practices for AP Bio

Grand I (3rd Floor) • AP Biology - Demonstration (30 min) • HS, 2Y, 4Y

Infuse data, the science practices, math, and more into your AP courses while being both effective and efficient as you try to cram in the CED before the May exam!

Eric Friesen, Pivot Interactives, Mendota Heights, MN

1536-94385 Contextualizing the Social and Cultural Embeddedness of the Nature of Science Using the Lived Experiences and Narratives of Black Heritage

Essex B & C (4th Floor) • Curriculum Development - Paper (30 min) • ML, HS, GA

Preservice teachers engage in inquiry explorations using the science-capital and cultural scripts of Black heritage. Findings using modified Views of the Nature of Science (version C) are presented.

Catherine L. Gantian, Howard University, Rockville, MD

1536-98406 Using Molecular Tools to Identify Antibiotic Resistance Genes in Environmental DNA

Laurel A & B (4th Floor) • Ecology / Environmental Science / Sustainability - Hands-on Workshop (75 min) • HS, 2Y, 4Y

Use PCR to detect antibiotic resistance genes in soil samples and contribute your data to a national database.

Alex Quinn, miniPCR bio, Cambridge, MA

SPECIAL PROGRAMMING PRESENTED BY MINIPCR

1536-98407 Winging It: Using BioInteractive’s CRISPR Resources to Unpack Primary Literature
1536-9457 Critical Conversations in Science: A Call to Equitable Practice Through Language
Grand Ballroom VIII (3rd Floor) • Instructional Strategies • Demonstration (30 min) • ELEM, MS, HS
Through personal narratives and culturally responsive pedagogy, this session will provide participants with the resources needed to support sLGBTQIA+ equitable practices in a classroom setting through inclusive language.
Cassandra Herndon, University of San Diego, San Diego, CA and Tao Richardson-McIver, Oklahoma State University, Stillwater, OK
We will demonstrate the capabilities of HHMI BioInteractive’s Assessment Builder, a crowdsourced database of high-quality questions intended to improve learning in AP Biology and undergraduate introductory biology.
Angela Hodgson, North Dakota State University, Fargo, ND
1536-94343 Sea to Sky: Free Online Educational Resources from the National Oceanic and Atmospheric Administration (NOAA)
Grand Ballroom VII (3rd Floor) • Ecology / Environmental Science / Science Education • Demonstration (30 min) • ELEM, MS, HS
Join NOAA for a demo of our database of 1,300+ FREE educational resources covering ocean, coasts, Great Lakes, weather, and climate. Tour lesson plans and activities and ask us anything!
Bekkah Lampe, National Oceanic and Atmospheric Administration (NOAA), Silver Spring, MD
1536-94312 Strategies for Increasing Diversity and Inclusion and Reducing Bias in AP Environmental Science
Grand Ballroom IX (3rd Floor) • Instructional Strategies • Hands-on Workshop (30 min) • ELEM, MS, HS
Design a more diverse, inclusive, and less bias-driven AP Environmental Science Course. Topics include designing curricular resources, evaluating grading practices, and updating classroom strategies. Participants will model a redesigned lesson.
Sarah Utley, New Troy Township High School, Evanton, IL and David Hong, College Board/La Habra Heights, CA
1536-98665 Student Poster Practice Session
James (4th Floor) • Instructional Strategies • Hands-on Workshop (30 min) • HS, 2Y, 4Y
Join other student presenters (and their mentors) for an informal practice session to help you prepare for the NABT Biology Education Poster Session.
Michael Moore and Rachel Pigg, NABT Biology Education Poster Session Coordinators
1536-93049 The Making of University Life Science Lab: A Vision and Change Transition
Grand Ballroom X (3rd Floor) • Instructional Strategies • Hands-on Workshop (30 min) • HS, 2Y, 4Y
"Vision and Change: A Call to Action" appeared twelve years ago. This session shares one university’s journey to bring the Vision and Change Core Competencies to fruition for non-majors biology.
Bob Metton and Alan Jones, University of Central Oklahoma, Edmond, OK
1536-98434 HHMI Night at the Movies
Grand Ballroom V & VI (3rd Floor) • Special Event • GA
From Tangled Bank Studios and Smithsonian Institution’s Wild Hope, come see the newest bringing dinosaurs to life and药店 model the accurate teaching of human and non-human evolution in Alabama, developing, testing, and now sharing modules to address misconceptions, perceived conflict, and critical content.
Amanda Towley, Georgia Southern University, Statesboro, GA, Connie Berika, Science & Society Resources, Potomac, MD, and Briana Plbiner, Smithsonian Institution Human Origins Program, Washington, DC
1536-94522 Evaluating OER as an Inclusive Teaching Practice in STEM
Kent B&C (4th Floor) • Curriculum Development • Paper (30 min) • 2Y, 4Y
We share results from an institutional study on adoption of Open Educational Resources (OER) and Inclusive Access (IA) materials in helping address issues regarding access and equity across STEM courses.
Anna Hurt, Hannah Ray, and Chad Brasil, University of Nebraska at Lincoln, Lincoln, NE
1536-94101 Implementing Standards-Based Grading When the Rest of Your School Uses Traditional Grading
Kent A (4th Floor) • General Biology • Demonstration (30 min) • HS, 2Y
Wendy will share her experience transitioning her 9th grade class to standards-based grading and "making it fit" with the traditional 100-point grading scale. Example assessments and tips and tricks!
Wendy R. Johnson, Kentwood Public Schools, Kentwood, MI
1536-98433 The LUDA Project: Resources for Teaching Evolution in General Biology
Laurel A & B (4th Floor) • Biotechnology • Hands-on Workshop (30 min) • HS, 2Y, 4Y
Join us for a sneak peek of the upcoming Wild Hope season featuring a new approach to science storytelling and education.
WILDE HOPE

NABT BioClub Breakfast
Grand Ballroom IX & X (3rd Floor) - Special Event (Tickets Required) - GA
The BioClub continues to support students at K-12 schools, community colleges, and informal learning organizations all over North America. Join us to share what your club is doing or learn how to start a BioClub Chapter of your own!

Sponsored by

NABT Biology Education Poster Session & Coffee Break
Harborside Ballroom C (4th Floor) - General Biology - Special Symposium (120 min) - ZY, 4Y, GA
The NABT Poster Session features practices, programs, and research in three distinct categories: general strategies for teaching biology, the scholarship of teaching, and mentored student research. Posters presented by students are eligible for two competitions and winners will be announced before the closing general session.

See full listing on page 42-44

1536-94520 Should We? Teaching Bioethics Through Mock Senate Hearings
Essex B & C (4th Floor) - Biotechnology - Hands-on Workshop (75 min) - HS, 2Y, 4Y
Explore modern dilemmas in genetics and biotechnology in a new way! Learn to incorporate bioethics into your curriculum using mock senate hearings and debates.
Rebecca Donski and Jason Ader, Mount Saint Joseph High School, Baltimore, MD

1536-94329 Anchored Inquiry Learning: Designing Meaningful Instruction to Make Sense of Authentic Phenomena
Grand Ballroom I (3rd Floor) - Instructional Strategies - Hands-on Workshop (75 min) - HS, GA
Experience how the BSCS Anchored Inquiry Learning instructional model builds on the 5Es to design learning experiences that motivate students to engage with real-world phenomena and problems in biology!
Cindy Gay, BSCS Science Learning, Colorado Springs, CO
BIOLOGY EDUCATION RESEARCH COMPETITION (GRADUATE STUDENTS)
1. A Comparison of Biology Students and Biology Faculty Perceptions and Uses of ChatGPT
Shahbil Bin Syad & Joshua Reid, Texas Tech University, Lubbock, TX
2. An Investigation of College-Level Students’ Interpretation of Phylogenetic Trees by Eye Movement
Midasha Saha, Daniel Ferguson, & Kristy Daniel, Texas State University, San Marcos, TX
3. Examining Introductory Undergraduate Biology Students’ Engagement in Metacognition Using the BioMet Learning Modules
Elizabeth Schriner, Amatunique Gray, & Jamie Sabel, University of Memphis, Memphis, TN; Jarri Paal, Christian Brothers University, Memphis, TN
4. Exploring Demographics: Why are African American Students Leaving or Staying in the Biology Program?
Kendra Wright, Sedra Sous, & Jaime Sabel, University of Memphis, Memphis, TN
5. Impact of Outdoor Science Activities on Participants’ Understanding of STEM Techniques, Learning, and the Natural World
Carolyne Jon, Jill Zeppen, & Kristy Daniel, Texas State University, San Marcos, TX
6. The Impact of Two Sequential CURES on Student Outcomes in an Introductory Biology Laboratory Course
Emme Threlkeld, Rachel Pigg, Natalie Christian, Jefrey Masters, & Mikas Advitis-Able, University of Louisville, Louisville, KY
7. Using Discord as Primary Student-Student and Student-Teacher Interaction Tool for an Online, Synchronous Biology Lab During the COVID-19 Pandemic
Rebekah Whit & Jordan Lauter, University of Arkansas, Little Rock, AR
8. A Comparative Analysis of ChatGPT’s Other Language Models’ Performance on Open-Note Biochemistry Exams Versus Student Performances
Ana Roman, Maria Simatitth, Kadaysh Hoody, Michael Yotum Roth, & John Cogan, The Ohio State University, Columbus, OH
Ravi Misra, Barry Fishman, Kali Francisco, & Ally Venv, University of Michigan, Ann Arbor, MI
10. Building a Basis for Community College Biology Education Research: Exploring Factors Which Influence Core Concept Understanding
Noah Courtney, David Espinoza, & Michelle Smith, Cornell University, Ithaca, NY
11. STEM Outreach Impacts Students’ Self-Efficacy in Scientific Skills
Vivian Swearingen, Sophia Taylor-Davis, Kamara Barnes, Pepper Horning, Ashbra Johnson, & Christi Palladino, Aiken County Career and Technology Center, Aiken, SC
12. The Benefits of Collaborative Group Exams Transcend Specific Modes of Implementation
Jillian Arzoumanian, Michelle Rous-Overtree, & Jeffrey Grimes, University of Tampa, Tampa, FL; Swati Yang, SUNY Geneseo, Geneseo, NY
Sophia Taylor-Davis, Kamara Barnes, Emily Heath, Alexandra Martin, Vivian Swearingen, & Christi Palladino, Aiken County Career and Technology Center, Aiken, SC
Anshika Peer, James Logan High School, Union City, CA; Varunakha Murugan, Yellow Institute of Technology, Chennai, India
15. Harnessing Bacterial Activity for Sustainable Decolorization of Textile Dyes and Pollution Mitigation
Johne Haydon & Bailei Nandu, Georgia Highlands College, Rome, GA
16. Improving Contemporary Mathematical Models of Metastatic Cancer: Analyzing PACC Quesience, Treatment, and TME Stress-Response
Caitlin Garrett, Vanderbilt High School, Austin, TX; Anna Dubrovnaya, Texas Christian University, Dallas, TX
17. Trials of Triage: Using Classification to Detect Implicit Bias in Patient Disposition during Hospital Triage
Hiroshi Fumio & Phil Miu, Aspiring Scholars Directed Research Program (ASDRP), Fremont, CA
18. A Case for Place: Leveraging Placed-Based Education through Local Soundscapes to Make Connections to Ecosystem-Level Assessments of Prairie Conservation
Kiley Dau, ATEC Charter Schools, Oklahoma City, OK
19. A Case-Study Control of the Effectiveness of a Microbiology-Focused CURE in an Introductory Biology Course
Andrew Mashimoto & Richard Hamman, Kutztown University, Kutztown, PA
20. An HHMI-Supported Course-Based Research Program—A Call to Participate
Vikawth Sivakumar, Howard Hughes Medical Institute, Chevy Chase, MD
21. An OER Biotechnology Lab that Costs Less than 50 Cents per Student
MaryAnn Williamson, Northern Virginia Community College, Sterling, VA
22. Building a Community Among Maryland Community Colleges: An Inter-Institutional and Interdisciplinary Effort to Improve Engagement in Laboratory Activities
Kelly Leiveche, Anne Arundel Community College, Arnold, MD; Sean McNamara, Community College of Baltimore County, Catonsville, MD; Gina Wexler, Montgomery College, Rockville, MD; Allison Hill, Howard Community College, Columbia, MD; Richard Barclay, Smithsonian National Museum of Natural History, Washington, DC; Heather Reider, University of Maryland, College Park, MD
23. Complimentary Course Pairing: An Approach to Engage Community College Students with Vision and Change Core Competencies and Intuse Diversity, Inclusion, and Equity into Biology and English Curriculum
Ramy Taqieddin, Saint Charles Community College, Saint Peters, MO
Kate Sandlin & Laura K. Reed, The University of Alabama, Tuscaloosa, AL; Wilson Leung, Washington University in St. Louis, St. Louis, MO; D’Andrew Harrington, College of Southern Nevada, Las Vegas, NV; David Ledfort, Grinnell College, Grinnell, IA; S. Catherine Silver, Washington College, Chestertown, MD
25. Development of a Flexible and Structured Supplemental Instruction
Jon Lau & Picabo Roscher, Truckee Meadows Community College, Reno, NV; James Iyer, Stephen Armstrong, & Brittany Ryan, University of Nevada Reno, Reno, NV
26. Diversifying Academia: Understanding and Implementing Equitable and Inclusive Hiring Practices through Faculty Learning Communities
Stanley Le, Erik Arenado, & Eva Puentes-Lopez, University of California San Diego, La Jolla, CA; Mike Wilton, University of California Santa Barbara, Santa Barbara, CA
27. Effect of Climate Change on Resource Management in Some Selected Secondary Schools in Pankshin, Plateau State
Tima Mama Antip, Federal College of Education Pankshin, Plateau State, Nigeria
28. Engaging Students in Authentic Investigations Through Community Science
Sarah Jones, Emma Oschrin, Taran Lichtenberg, Jennifer Schwartz, & Karry Havens, Chicago Botanic Garden, Glencoe, IL
29. Enhance Student Competency in Ecology with Figure Sets and 4-Dimensional Ecology Education (4DEE)
Emily Rauschert, Cleveland State University, Cleveland, OH; Swati Yang, SUNY Geneseo, Geneseo, NY
30. Enhance Student’s Learning Efficiency and Knowledge Application Capacity: Active and High-Impact Teaching of Plant and Human Nutrition
Hong Li Wang, University of Arkansas, Little Rock, AR
31. Evolving the Culture of Biology through Teaching Assistant Training in Inclusive and Evidence-based Practices
Kaleb Heinrich, The University of Alabama, Tuscaloosa, AL; Stephanie Ganule, Georgia State University, Atlanta, GA; Erin Shortlidge, Portland State University, Portland, OR; Mitra Angiri, University of Missouri, Columbia, MO; Adam Chouinard, Oregon State University, Corvallis, OR; Star Lov, University of California Irvine, Irvine, CA
32. Following the Science in the Age of Institutional Corruption
Antonio Chaves, Montgomery College, Takoma Park, MD
33. Fostering Scientific Literacy Across Disciplines: A Graphic Organizer-Based Approach to Analyzing Research Articles
Ashley Burkart, Estella Mountain Community College & Maricopa Community College District, Arvada, AZ
34. Implementation of Collaborative Group Exams in Biology Courses Reduces the Student Performance Gap
Jillian Arzoumanian, Michelle Rous-Overtree, & Jeffrey Grimes, University of Tampa, Tampa, FL; Swati Yang, SUNY Geneseo, Geneseo, NY
35. The Impact of TME Stress-Response in Metastatic Cancer: Analyzing Mathematical Models of Tumor Growth
Taiwan Chen, Sun Yat-Sen University, Hong Kong
36. Implementing Equitable Practices through Faculty Learning Communities
Ramy Taqieddin, Saint Charles Community College, Saint Peters, MO
37. Enhancing Student Competency in Ecology with Figure Sets and 4-Dimensional Ecology Education (4DEE)
Emily Rauschert, Cleveland State University, Cleveland, OH; Swati Yang, SUNY Geneseo, Geneseo, NY
38. Enhance Student’s Learning Efficiency and Knowledge Application Capacity: Active and High-Impact Teaching of Plant and Human Nutrition
Hong Li Wang, University of Arkansas, Little Rock, AR
42. The Impact of Using Human Examples and Cultural and Religious Sensitivity Teaching Strategies on Evolution Understanding and Acceptance in Alabama Introductory High School Biology Classrooms

Brian Pohler, Smithsonian Institution, Washington, DC; William Watson, Disciple of Camden Catholic Schools, Camden, NJ; Paul Buerkley, California State Polytechnic University Pomona, Pomona, CA; Constance Bertka, Science and Society Resources, Potomac, MD; Amanda Tompkins, Georgia Southern University, Savannah, GA; Ella Beaudouin, Cambridge University, Cambridge, United Kingdom

43. The WBIOS Institute: Supporting STEM Education Transformation through Innovation, Education Research, and Collaborative Learning for a Racially Just, Inclusive, Open STEM Education

Kathleen Bonner, M John Fisher University, Rochester, NY; Carissa Diaz Eaton, Bates College, Lewiston, ME; Karen Cantalagido, ROCS, Lewiston, ME; Bryan Drewbury, Florida International University, Miami, FL; Sam Donovan, BusQUEST, Pittsburgh, PA

44. University Life Science Lab: A Vision and Change Transition

Alan Jones, University of Central Oklahoma, Edmond, OK

45. Using Book Clubs to Connect Students Across 2-YR and 4-YR Campuses: A Proposed Student Learning Community

Sarah Kuklay, Iowa State University, Ankeny, IA; Heather Riedler, Northern Iowa Community College, Mason City, IA; Nouda Sabet, Western Iowa Tech Community College, Sioux City, IA

46. Using the MEBA-plate Experiment to Engage Students in Co-evolutionary Concepts and Evolutionary Thinking around Antibiotic Resistance

Justin Promak, Rensselaer Polytechnic University, Troy, NY; Stephanie Carr, Hartwick College, Oneonta, NY; Stefanie Matthews, North Carolina State University, Raleigh, NC; Nikolas Stanuli, University of New Haven, New Haven, CT

43. The Impact of Using Human Examples and Cultural and Religious Sensitivity Teaching Strategies on Evolution Understanding and Acceptance in Alabama Introductory High School Biology Classrooms

Brian Pohler, Smithsonian Institution, Washington, DC; William Watson, Disciple of Camden Catholic Schools, Camden, NJ; Paul Buerkley, California State Polytechnic University Pomona, Pomona, CA; Constance Bertka, Science and Society Resources, Potomac, MD; Amanda Tompkins, Georgia Southern University, Savannah, GA; Ella Beaudouin, Cambridge University, Cambridge, United Kingdom

44. University Life Science Lab: A Vision and Change Transition

Alan Jones, University of Central Oklahoma, Edmond, OK

45. Using Book Clubs to Connect Students Across 2-YR and 4-YR Campuses: A Proposed Student Learning Community

Sarah Kuklay, Iowa State University, Ankeny, IA; Heather Riedler, Northern Iowa Community College, Mason City, IA; Nouda Sabet, Western Iowa Tech Community College, Sioux City, IA

46. Using the MEBA-plate Experiment to Engage Students in Co-evolutionary Concepts and Evolutionary Thinking around Antibiotic Resistance

Justin Promak, Rensselaer Polytechnic University, Troy, NY; Stephanie Carr, Hartwick College, Oneonta, NY; Stefanie Matthews, North Carolina State University, Raleigh, NC; Nikolas Stanuli, University of New Haven, New Haven, CT

Science and Global Issues: Biology, a full-year, hands-on course, designed for the NGSS.

44. University Life Science Lab: A Vision and Change Transition

Alan Jones, University of Central Oklahoma, Edmond, OK

45. Using Book Clubs to Connect Students Across 2-YR and 4-YR Campuses: A Proposed Student Learning Community

Sarah Kuklay, Iowa State University, Ankeny, IA; Heather Riedler, Northern Iowa Community College, Mason City, IA; Nouda Sabet, Western Iowa Tech Community College, Sioux City, IA

46. Using the MEBA-plate Experiment to Engage Students in Co-evolutionary Concepts and Evolutionary Thinking around Antibiotic Resistance

Justin Promak, Rensselaer Polytechnic University, Troy, NY; Stephanie Carr, Hartwick College, Oneonta, NY; Stefanie Matthews, North Carolina State University, Raleigh, NC; Nikolas Stanuli, University of New Haven, New Haven, CT

Science and Global Issues: Biology, a full-year, hands-on course, designed for the NGSS.
Special Programming Presented by Biozone

1536-94477 Biozone’s Latest Biology Titles: Learn how These Superb, Interactive Texts Deliver Flexible & Engaging Programs

Dover A (3rd Floor) - General Biology - Demonstration (15 min) - HS

Biozone’s interactive worktext approach is a departure from traditional textbook learning—providing flexible, engaging, student-centered resources. Print and digital formats deliver powerful NGSS, IB, Texas, and AP programs.

Richard Allan, Biozone International, Hamilton, Waikato, New Zealand

Special Programming Presented by Nourish the Future

1536-93944 Crickets for Lunch? Using 3D Instruction to Build Science Literacy

Grand Ballroom X (3rd Floor) • General Biology - Hands-on Workshop (30 min) - HS, 2Y, 4Y

The “Crickets for Lunch?” unit encourages high school biology students to reflect on community, culture, and personal experiences as they learn how to communicate their knowledge of life science concepts.

Kia G. Boose, Kevin S. Garner, and Maceo Cooper, Great Minds PBC, Somerset, NJ

Special Programming Presented by 3D Molecular Designs

1536-98151 Oh! Melosis! Modeling the Processes That Create Genetic Diversity

Grand Ballroom II (3rd Floor) • General Biology - Hands-on Workshop (30 min) - ML, HS, 4Y

Engaging in scientific modeling improves student engagement and understanding. Participants will learn how to use 3DMD’s Chromosome Connections Kit to model the processes of meiosis that lead to genetic diversity.

Susan Remshak, 3D Molecular Designs, Milwaukee, WI

Special Programming Presented by National Geographic - Cengage

1536-99708 National Geographic Learning

- Teaching Strategies: Lesson Plans (30 min) - ML, HS, GA

National Geographic Learning is a chance for Biology teachers to get hands-on by doing one of the MiniLab lessons from the new National Geographic Biology program.

Brock O’Neill, National Geographic Learning - Cengage, St. Johns, FL

1536-94507 Citizen Science for Students: Monitoring Marine and Freshwater Microplastics

Grand Ballroom VII (3rd Floor) • Ecology / Environmental Science / Sustainability - Hands-on Workshop (30 min) - HS, 4Y, GA

The number of Hispanic students in STEM majors is much lower than other populations. This presentation will introduce using Noches Bilingües to recruit and retain Hispanic students in STEM majors.

Kelly Moore and Evelyn Goodfriend, Walters State Community College, Morristown, TN

Special Programming Presented by HHMI

1536-94157 Evolution with Viruses for ALL Students

Grand Ballroom VIII (3rd Floor) • Evolution - Paper (30 min) - ML, HS, GA

We will discuss how bacteriophages, model viruses that infect bacteria, are used for student-driven research on evolution and antibiotic resistance regardless of student expertise and available funding.

Zach Pratt, Parker High School, Janesville, WI and Melinda Hendry, Hampton Roads Academy, Newport News, VA

1536-94300 Using NASA’s GeneLab Platform to Explore Gene Expression

Grand Ballroom IX (3rd Floor) • AP Biology - Demonstration (30 min) - HS, 2Y, 4Y

Gene expression is a key concept that is difficult for students to investigate. In this lesson, students are introduced to RNA sequencing and analyze NASA data to explore the topic.

Jennifer Callison Bliss, Wheeler High School, Smyrna, GA

1536-93994 Using NASA’s GeneLab Platform to Explore Gene Expression

Grand Ballroom X (3rd Floor) • General Biology - Hands-on Workshop (30 min) - HS

The “Crickets for Lunch?” unit encourages high school biology students to reflect on community, culture, and personal experiences as they learn how to communicate their knowledge of life science concepts.

Kia G. Boose, Kevin S. Garner, and Maceo Cooper, Great Minds PBC, Somerset, NJ

Member Resources Committee

Iron (4th Floor) - Committee Meeting (30 min) - GA

Review resources, services, and program recommendations to better support both NABT members and the biology teacher community.

Catherine Ambos, Committee Chair

NABT Professional Development Conference

Baltimore, Maryland | November 4-7, 2023

Special Programming Presented by 3DMD

1536-96933 Reimagining Scientific Literacy for Community Engagement

Dover B & C (3rd Floor) - Instructional Strategies: Demonstration (30 min) - 2Y, 4Y, GA

Scientific literacy plays an important role in the education of all undergraduate students. This talk explores how a community engagement tool was utilized to address socio-scientific topics of interest to enhance scientific literacy for non-STEM majors.

Samantha Raut, University of Alabama at Birmingham, Birmingham, AL

Special Programming Presented by Nourish the Future

1536-93948 Tomorrow’s Science is Looking for Leaders

Essex A (4th Floor) • General Biology - Demonstration (30 min) - ML, HS, GA

Introduce students to high-tech STEM careers through the lens of agriculture! Learn about teacher leadership opportunities and explore free resources from nourishthefuture.org that connect your curriculum to a real-world context.

Heather Bryan, Nourish the Future, Columbus, OH and Gary Hudg in Education Projects, Grossa Pointe Woods, MI

1536-93820 Using Noches Bilingües to Recruit Hispanic Students to STEM Fields

Grand Ballroom I (3rd Floor) - Science Practices - Paper (30 min) - 2Y, 4Y, GA

The number of Hispanic students in STEM majors is much lower than other populations. This presentation will introduce using Noches Bilingües to recruit and retain Hispanic students in STEM majors.

Kelly Moore and Evelyn Goodfriend, Walters State Community College, Morristown, TN

Special Programming Presented by HHMI

1536-96779 How to Use and Contribute to HHMI BioInteractive’s New Educator Resource Library

Grand Ballroom III & IV (3rd Floor) - Instructional Strategies - Hands-on Workshop (30 min) - HS, 2Y, 4Y

Join us as we share an exciting new BioInteractive feature—the Educator Resource Library! We’ll discuss using and contributing to this repository of educator-generated materials connected to BioInteractive resources.

Kristine Grayson, University of Richmond, Richmond, VA and Missy Holzer, Great Minds PBC, Somerset, NJ

1536-94381 Closing the Equity Gap in Success with Development of an Integrated Biology Course for Non-majors

Kent B & C (4th Floor) - Curriculum Development - Paper (30 min) - ML, HS, 2Y, 4Y

Converting mixed majors biology courses into majors and non-majors sequences has led to increased student performance and closure of equity gaps by integrating molecular metabolism with system function and application.

Mandy Comis and Trena Fischer, Pellissippi State Community College, Knoxville, TN

1536-96932 The Wolbachia Project: Student Research Experiences with Global Impact

Laurel C & D (4th Floor) - Evolution - Hands-on Workshop (30 min) - 2Y, 4Y, GA

Wolbachia manipulates insect reproduction and reduces the transmission of mosquito-borne diseases. Join a global effort to determine the frequency and distribution of this microbial symbiont.

This session is a special presentation by the 2023 Huxley Award Winner.

Sarah Bundreden, The Pennsylvania State University, University Park, PA

1536-94380 Using NASA’s GeneLab Platform to Explore Gene Expression

Grand Ballroom VIII (3rd Floor) • Evolution - Paper (30 min) - ML, HS, GA

With the help of bacteriophages, model viruses that infect bacteria, we used student-driven research on evolution and antibiotic resistance regardless of student expertise and available funding.

Zach Pratt, Parker High School, Janesville, WI and Melinda Hendry, Hampton Roads Academy, Newport News, VA

1536-94381 Closing the Equity Gap in Success with Development of an Integrated Biology Course for Non-majors

Kent B & C (4th Floor) - Curriculum Development - Paper (30 min) - ML, HS, 2Y, 4Y

Converting mixed majors biology courses into majors and non-majors sequences has led to increased student performance and closure of equity gaps by integrating molecular metabolism with system function and application.

Mandy Comis and Trena Fischer, Pellissippi State Community College, Knoxville, TN

Member Resources Committee

Iron (4th Floor) - Committee Meeting (30 min) - GA

Review resources, services, and program recommendations to better support both NABT members and the biology teacher community.

Catherine Ambos, Committee Chair
11:36-94046 Moving Beyond the Central Dogma: A Systems Biology Approach to Studying Environmental Influence of Disease
Dover B & C (3rd Floor) - Science Practices - Hands-on Workshop (75 min) - HS, SY
Conduct an interactive activity to learn how systems biologists are using bioinformatics and a systems biology approach to investigate the effects of exogenous and endogenous factors on cellular and molecular processes.

Andrea C. Karski, Krista F. Krasnow, Rebecca Thomas, Montgomery College, Rockville, MD; Julie Takacs, Evdokia Kastanos and K. Rebecca Thomas, Montgomery College, Rockville, MD; Julie Takacs, Evdokia Kastanos and K. Rebecca Thomas, Montgomery College, Rockville, MD; Julie Takacs, Evdokia Kastanos and K. Rebecca Thomas, Montgomery College, Rockville, MD.

11:36-94275 Exploring the Immune System Using Mini Cases and HHMI Biointeractive Grand Ballroom VII (3rd Floor) - General Biology - Demonstration (75 min) - GA
This workshop will explore narrative mini cases alongside the HHMI Biointeractive Immune System learning module. The activity introduces the cells of the immune system and walks through the timeline of a typical immune response while comparing it to several real-life immune reactions. Participants will identify and explain the role of memory cells when the body responds to various common antigens by interpreting graphs and images.

Tom Wills, Biology Magnets, St. Simon's Island, GA.

11:36-94258 Cellular Respiration, pH, and 1536-94504 Learning Substances (PFAS) Exposure on Health
Biology • Hands-on Workshop (75 min) • HS, SY
This hands-on workshop introduces physical models to explore the mechanisms of cell communication in the brain at the molecular level, including the specific application to teaching the pathways of addiction.

Alan Alten, 3D Molecular Designs, Milwaukee, WI.

11:36-94251 Inquiring into Biology Magnets and Understanding How Ecosystem Interactions Affect Patterns of Biological Diversity
Biology Education • Hands-on Workshop (75 min) • HS
Look for patterns in species diversity in coral reef ecosystems and other animals to determine causes and effects of relationships and understand how ecosystem interactions affect patterns of biological diversity.

Lisa Kelp, Lab-Aids, Renton, WA.

11:36-94045 Red Light, Green Light: Using Biointeractive Resources to Explore Cancer as a Phenomenon
Grand Ballroom IX (3rd Floor) - General Biology - Hands-on Workshop (75 min) - HS, SY
Explore Biointeractive resources to investigate how cancer affects checkpoints (stoplights) in the cell cycle. We will provide opportunities for participants to collaborate to discuss implementation in their classroom contexts.

Jim Lane, Mahtomedi High School, Mahtomedi, MN and Amaya Jim Lane, Mahtomedi High School, Mahtomedi, MN and Amaya Jim Lane, Mahtomedi High School, Mahtomedi, MN and Amaya Jim Lane, Mahtomedi High School, Mahtomedi, MN and Amaya.

11:36-94044 Reaching Every Student in Your Classroom— Culturally and Linguistically Responsive Pedagogy
Kent B & C (4th Floor) - Instructional Strategies - Hands-on Workshop (75 min) - HS, SY
Participants will be guided to recognize and share approaches in culturally responsive teaching they already use, as well as develop new ways to implement equitable classroom practices.

Dessy Dimova, MassInsight Education Laboratory, Farmington, CT.

11:36-94043 Teaching the Molecular Mechanisms of Addiction with Physical Models
Grand Ballroom II (3rd Floor) - General Biology - Hands-on Workshop (75 min) - HS, SY
This hands-on session introduces physical models to explore the mechanisms of cell communication in the brain at the molecular level, including the specific application to teaching the pathways of addiction.

Alan Alten, 3D Molecular Designs, Milwaukee, WI.

11:36-94042 Learning Substances (PFAS) Exposure on Health
Biology • Hands-on Workshop (75 min) • HS, SY
This hands-on workshop introduces physical models to explore the mechanisms of cell communication in the brain at the molecular level, including the specific application to teaching the pathways of addiction.

Alan Alten, 3D Molecular Designs, Milwaukee, WI.
2:00PM–3:15PM

1536-94502 Teaching About Misconceptions and Science Communication Using Primary Scientific Literature

Dover A (3rd Floor) • Science Practices • Hands-on Workshop (75 min) • HS

Participants will engage in an activity that uses primary scientific literature (PSL) to dispel misconceptions about various science topics and engage in a science communication activity to share their findings.

Ashi Patel, Florida International University, Miami, FL

1536-94512 Marginalizing Misinformation & Mentoring Myth-Busters

Essex A (4th Floor) • General Biology • Hands-on Workshop (75 min) • GA

Anti-xenics, climate change nay-sayers, COVID myths, wonder diets, and greenwashing by industry — all challenges our students. Help them develop skills in assessing credibility and busting bogus scientific claims in the media.

Douglas Ahle, University of Minnesota, St Paul, MN

1536-94726 Dealing with a Zombie Epidemic: Applying Knowledge of Microbiology, Immunology, and Potential Treatments

Essex B & C (4th Floor) • Microbiology & Cell Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

This lesson puts students in the shoes of the CDC as they investigate the next pandemic by determining the type of pathogen attack and planning a viable treatment plan.

Kirsty Daniel and Carme Jo Badger, Texas State University, San Marcos, TX

1536-94542 DEI Implementation Framework for College Classrooms

Grand Ballroom I (3rd Floor) • Science Practices • Hands-on Workshop (75 min) • 2Y, 4Y

We will introduce a template guide for implementing DEI concepts in the classroom. Participants will discuss and apply these strategies to an example resource.

Bryan Dewbury, Florida International University, Miami, FL; Elizabeth Harrison, Kennesaw State University, Kennesaw, GA; Gabriela Hameleirck, University of Florida, Gainesville, FL; Davida Smyth, Texas A&M University, San Antonio, TX; Heather Risler, North Iowa Area Community College, Mason City, IA; Dayna Dever, University of Alaska Anchorage, Anchorage, AK

1536-96534 Bioblotropic Data Explorer: A Versatile Tool for Graphing and Data Analysis

Grand Ballroom III & IV (3rd Floor) • Science Practices • Hands-on Workshop (75 min) • ML, HS, 4Y

Data Explorer is a user-friendly tool that enables students to analyze datasets. Participants will use Data Explorer and connected Bioblotropic resources to consider its applications in their classroom contexts.

Peter J. Park, Farmingdale State College, Farmingdale, NY and Samuel J. Loftus, Shattuck Middle School, Eugene, OR

SPECIAL PROGRAMMING PRESENTED BY 3D MOLECULAR DESIGNS

1536-98152 3D Molecular Designs Presents: Uncovering the Truth: Modeling a DNA Replication Error

Grand Ballroom II (3rd Floor) • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Explore the incredible versatility of the Flow of Genetic Information Kit by using it to model one type of replication error within the context of a real crime.

Sherry Ameen, 3D Molecular Designs, Milwaukee, WI

1536-94447 Mimicry in Velvet Ants: Investigating Evolution through the Practices of Science

Grand Ballroom VII (3rd Floor) • General Biology • Hands-on Workshop (75 min) • HS

Participants will engage in a task for teaching evolution through mimicry in velvet ants (Mutillidae). Participants will also begin developing their own phenomenon-based tasks for teaching in their own context.

John Maddux, Festus Senior High School, Festus, MO and Jam Lane, Mahomet High School, Mahomet, MN

1536-94391 Using eDNA for Project Based Learning

Grand Ballroom X (3rd Floor) • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Participants will learn methods to extract DNA from water samples in order to test for the presence of the amphibian pathogen Batrachochytrium dendrobatidis and sakamandivosin.

Daniel Shay, North Central High School, Spokane, WA

1536-99918 Using Data Explorer: A Versatile Tool for Biogeochemistry

Kent A (4th Floor) • Ecology/Environmental Science • Hands-on Workshop (75 min) • ML, HS, GA

Engage students in evidence-based arguments using extremophiles of Yellowstone National Park. Back by popular demand, this presentation describes a lesson designed to strengthen students’ understanding of resource availability even in the harshest of ecosystems.

Jake Angle, Oklahoma State University, Stillwater, OK

SPECIAL PROGRAMMING BY BEDFORD FREEMAN & WORTH

1536-10000 Effective Ways to Develop Science Practices for AP® Environmental Science Students, Using a Textbook

Kent B & C (4th Floor) • Ecology/Environmental Science • Sustainability • Demonstration (75 min) • HS

Explore literacy and science skill enrichment opportunities for AP® Environmental Science students. Delve into the seven science practices for AP® Course 4e.

Amy Fassler, Marshfield High School, Marshfield, WI

1536-94466 Bringing Justice, Equity, Diversity, and Inclusion into Classrooms Through Networking and Take-Away Resources

Grand Ballroom IX (3rd Floor) • Instructional Strategies • Hands-on Workshop (75 min) • GA

Participants will choose networking tables led by the NABT JEDI Committee. Each table will have a different equity focus for participants to gather resources, discuss applications, and collaborate.

Enya Granados, Cedar Shores High School, Athens, GA; Maribel Gondreau, Hampton Roads Academy, Newport News, VA; Catherine Bischoff, Rye Country Day School, Rye, NY; Holly Basta, Rocky Mountain College, Billings, MT; Zach Pratt, Parker High School, Janeville, WV; Alston Brown, Hampton Roads Academy, Newport, VA

1536-94456 Insights on Student Success in the Community College Ecosystem

Laurel A & B (4th Floor) • Instructional Strategies • Symposium (75 min) • 2Y, GA

Panelists will share their experience and insight on how to support faculty professional development and scholarship at the two-year college level. They will also provide recommendations for those trying to do similar work.

James DeKloe, Solano College, Fairfield, CA; Evodika Kastanos, Montgomery College, Rockville, MD; and Paulette Ronsen, Georgia State University-Perimeter College, Decatur, GA; and Shavale Yem, Waubonsee Community College, Sugar Grove, IL

3:30PM–4:00PM

1536-94382 Play, Simulate, and Model - Using the BioGraph Curriculum to Teach Core Biological Concepts

Dover A (3rd Floor) • Technology in the Classroom • Demonstration (30 min) • HS, 2Y

Struggling to teach students complex biological content like gene regulation, genetic drift, or cell transport? Learn about free NGSS-aligned online simulations that model real-world phenomena and engage students as scientists.

Meng-Ping Tu, Stuyvesant High School, Forest Hills, NY and Erika Mitsu, The Governor’s Academy, Byfield, MA
1536–93865 The Empathetic Educator: Tips for Building Relationships in the Classroom
Grand Ballroom 1 (3rd Floor) • Instructional Strategies • Demonstration (30 min) • ML, HS
Building strong relationships with students is critical for creating an inclusive and welcoming classroom. Learn about the strategies that an early-career educator leveraged to build relationships with his students. 
Alexander Eden, Florida International University, Miami, FL

1536–99535 BioInteractive’s New Online Community: A Space to Connect and Learn With Fellow Life Science Educators
Grand Ballroom III & IV (3rd Floor) • General Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y
You’re invited to BioInteractive’s new Online Community! We’ll discuss how this Community connects life science educators so you can share ideas, enhance classroom practice, and learn from each other’s experiences.
Marjie Chmiel, Howard Hughes Medical Institute, Chevy Chase, MD and Melissa Haskell, Delta College, University Center, MI

1536–94505 Mathematics and Computational Thinking in OpenSciEd High School Biology
Grand Ballroom VIII (3rd Floor) • General Biology • Demonstration (30 min) • HS
Experience phenomenon-based, storyline curriculum in high school biology! Use an agent-based model (in the form of a tabletop game) to generate evidence to answer questions about predator prey interactions.
Kate Henson, University of Colorado Boulder, Boulder, CO

1536–96587 NABT Equity Networking Social
Grand Ballroom IX (3rd Floor) • Instructional Strategies • Special Event (30 min) • GA
Network with other practitioners who are passionate about justice, equity, diversity, and inclusion. This event is open to all levels and light refreshments are included.
NABT Justice, Equity, Diversity, and Inclusion (JEDI) Committee

1536–94964 The Virtual Lab Experience
Kent A (4th Floor) • Curriculum Development • Hands-on Workshop (30 min) • ML, HS, 2Y, 4Y
Join a workshop on virtual labs on LabXchange, where you will discover the power of online labs to enhance your teaching and learning experience.
Jenny Frank, LabXchange, Harvard, Cambridge, MA

1536–92422 Where Are We Now? Evolution Teaching and Learning Across the United States
Laurel C & D (4th Floor) • Evolution • Paper (30 min) • HS, 4Y, GA
Examining results from a national study on evolution education from universities around the United States, this session focuses on answering the question, “Where do we stand?” through a unique lens.
Amanda Towley, Georgia Southern University, Statesboro, GA

SUNDAY NOVEMBER 5
8:30AM–10:30AM
Four-Year College & University Section Meeting
Dover A (3rd Floor) • Committee Meeting • 4Y, GA
Two-Year College Section Meeting
Dover B (3rd Floor) • Committee Meeting • 2Y, GA

4:15PM–4:30PM
Announcement of the 2023 Poster Winners
Grand Ballroom V & VI (3rd Floor) • Special Event • GA
NABT is pleased to announce the student winners of the Biology Education Research Competitions and the Mentored Student Research Competitions.

6:00PM–8:00PM
Baltimore Haunted History Tour & Closing Reception
Waterview ABC • Special Event (Tickets Required) • GA
Join us for a bite and a beverage closing out at a popular spot to network with other practitioners who are passionate about justice, equity, diversity, and inclusion. Light refreshments are included.

GENERAL SESSION & PRESENTATION OF THE 2023 NABT DISTINGUISHED SERVICE AWARD
Lee Berger
See biography on page 10
The Future of Exploration in the Greatest Age of Exploration
Grand Ballroom V & VI (3rd Floor) • Evolution • Special Speaker • GA
Dr. Lee Berger is an award-winning researcher, explorer, author, and speaker. Since finding a fossilized femur of an early hominin as an undergraduate, Lee has become one of the most influential (and recognizable) paleoanthropologists in the world. Berger’s decades of research on human origins in Africa, Asia, and Micronesia have resulted in numerous new discoveries, including the discovery of two new species of early human relatives—Homo naledi in 2013 and Homo naledi in 2013. Berger may be best known for his significant discoveries, but his contributions to exploration sciences have also resulted in advances in the application of technology to explore, excavate, and recover hominid remains in sub-equalitarian Africa.
In this interactive presentation, Dr. Berger will share details about his work at the Rising Star Cave System in Africa’s Cradle of Humankind, including some of his most recent findings. The presentation will then be followed by Q&A.
NABT is proud to name Dr. Lee Berger the recipient of the 2023 Distinguished Service Award for Enhancing Biology Education.
The American Biology Teacher is an award-winning, peer-refereed professional journal for K-16 biology teachers. Topics covered in the journal include modern biology content, teaching strategies for the classroom and laboratory, field activities, applications, professional development, social and ethical implications of biology and ways to incorporate such concerns into instructional programs, as well as reviews of books and classroom technology products.
BioBrain offers a variety of engaging and effective educational materials for science teaching and learning. Our resources are designed to help students understand complex concepts and improve their own understanding and retention of material. We offer comprehensive learning materials in clear and detailed scientific formats. Our modules are designed to help students learn at their own pace, anytime, and anywhere.

BioBrain offers an online platform that caters to the unique needs of students and teachers. Our platform is accessible from anywhere, at any time, and at any pace. This ensures that students can learn and practice independently, without the need for traditional textbooks or classroom instruction.

We think of learning as an ongoing process, and we provide a range of resources to support this process. Our materials are designed to be engaging, interactive, and effective, and they are available in a variety of formats, including digital and print.

In conclusion, BioBrain is an online platform that offers a comprehensive range of resources for science learning. Our platform is designed to support students and teachers in their ongoing quest for knowledge and understanding. Whether you are a student or a teacher, BioBrain is here to support you on your journey to success.
NABT PROFESSIONAL DEVELOPMENT CONFERENCE

Booth #301
lab-aids.com

Lab-Aids is a core and supplementary curriculum publisher, exclusively in K-12 science, that focuses on providing a hands-on experience for students and field-tested instructional materials for teachers. Our high school biology course, Science and Global Issues: Biology, is developed at the Lawrence Hall of Science with a new NGSS edition released this year. For more, please visit lab-aids.com.

Booth #115
labchange.org

LabXchange is a global science classroom open to every curious mind. Created by Harvard University with support from the Amgen Foundation, this powerful digital platform makes high-quality science education accessible, connects learning to careers and gives everyone, everywhere, the opportunity to chart a path in science—for free. Through collaboration, personalization, and contextualization, LabXchange offers an integrated teaching and learning ecosystem in which instructors and students can build knowledge, contribute unique perspectives, and engage with a diverse global community to develop a sense of belonging.

Booth #310
ncse.org

The National Center for Science Education works to ensure that what is taught in science classrooms is accurate and consistent with the current best understanding in the scientific community. NCSE focuses on combating the coexistence of science education evolution—areas of science that are socially, but not scientifically, controversial. NCSE works to provide nature of science resources to teachers—and to prime students to show up for class ready to learn. In 2022 we’re 100% employee-owned!

Booth #317
socresearch.org

Seeds of Change, Inc. (SOC Research) is a 501(c)(3) nonprofit organization, with a mission to encourage high school students to pursue science-related careers. SOC Research empowers students to join thousands of young scientists across the world to contribute scientific data on arthropod diversity within their local communities and report the frequency of a fascinating bacterial endosymbiont, Wolbachia pipientis. Together, we will collaborate with scientists in The Penn State Microbiome Center to optimize, accelerate, and disseminate long-lasting applications and knowledge on the microbiome.

Booth #414
themis.com

Game-changing MiniOnes® Systems equipment and labs equal access to lab-based biotechnology for grades 7-12 and beyond. Whether used in the classroom lab or at home, our systems and associated lab kits save time and money, and engage students with hands-on participation to answer real world questions.

Booth #215
cseag.org

The National Center for Science Education promotes a sustainable, resourced founded and aquatic ecosystems, resilient communities and economies, and environmental literacy and workforce development. Maryland Sea Grant, founded in 1973, is a partnership between the State of Maryland and the National Oceanic and Atmospheric Administration.

Booth #311
mdsg.umd.edu

Maryland Sea Grant is a state and federally funded organization that supports and provides environmental research, outreach, and education on the Chesapeake Bay, Maryland’s coastal bays, and their watersheds. We work to fund research to advance understanding of Maryland’s estuaries, coasts, and waterbodies; help the people of Maryland solve environmental challenges; educate students of all ages, from K-12 to graduate students; promote a sustainable coastal economy; and support conservation of the Bay and Maryland’s coastal resources. Our offices are in College Park, Maryland, and our funded researchers, fellows, and Extension specialists work across the state. Our focus areas include healthy coastal ecosystems, sustainable fisheries and aquaculture, resilient communities and economies, and environmental literacy and workforce development. Maryland Sea Grant, founded in 1973, is a partnership between the State of Maryland and the National Oceanic and Atmospheric Administration.

Booth #315
malscientific.com

After decades of teaching biological and medical topics, MALa Scientific President, Dr. Lakhkar Bajwa, knew the topics where students struggled. MALa Scientific was created by educators, for educators. Our educational models and lesson plans enable students to understand blood cellology, diseases, human skin, and cancer. Lesson plans and model kits are available for (1) Blood Cellology and diseases (2) Human Skin: Think Inside the Box. The kit includes a detailed lesson plan with information on all skin layers, materials for constructing a model of human skin, and colorful original hand-drawn illustrations. (3) Cancers that impact high school and college students. MALa Scientific provides an easy-to-read booklet to educate young adults on 8 cancers that can impact young people, and details on their prevention.

Booth #310
nglf.cengage.com

National Geographic Learning, a part of Cengage Group, is a K-12 publisher focused on college and career readiness with content and interactive learning and high school AP courses. We are launching our newest program, National Geographic Biology. Only National Geographic can present biology through amazing photography and diverse National Geographic Explorers who share biology stories, case studies, and original Virtual Labs that transport students to rain forests, deep oceans, and more to learn and study.

Booth #110
nrv.org

The National Anti-Vivisection Society (NAVS) is a nonprofit organization dedicated to advancing science without harming animals. Through our biology education advancement program, BioLEAP, we support teachers in providing a compassionate learning experience for students. Our program website, bioleap.org, offers an extensive catalog of over a hundred different humane dissection tools that serve as cruelty-free alternatives to specimen dissection. To further support teachers, we offer awards of up to $1,000 through the BioLEAP Classroom Grant, assisting in the replacement or reduction of animal dissection labs. We also provide free high school level curricular materials that align with Next Generation Science Standards and introduce the 3Rs Principle of Humane Experimental Technique.

Booth #307
kendallhunt12.com

Kendall Hunt Publishing Co. published the first English language text for high school biology in 1952. Since then we have published over 100 texts in all major subjects, including Health Education, English Language Arts, Mathematics, History, Social Sciences, Science, and more to learn and study. Kendall Hunt has a 75-year history of providing innovative education solutions. At Kendall Hunt, our mission is to improve educational outcomes. Understanding for Life is a full-year, high school level program and inquiry-based, for educators. Our digital platform is freely available as an open educational resource. Understanding for Life is an inquiry-based, research-driven curriculum designed for the Next Generation Science Standards while inquiryHub Biology engages students in ways to help them become more proficient in all life science and engineering practices. For more information, visit: https://k12.kendallhunt.com/
TeachDNA
Booth #404
teachdna.net

TeachDNA was born to design, manufacture, distribute, and explain hands-on, buildable, dynamic models of biomolecular structure. Launching in 2023, we begin with PlayDNA!—a simple cartoon sculpture kit that uniquely enables tactile simulation of molecular geometry, bond strength, and the important bending and twisting mechanics of the nucleic acid double-helix. Students can build accurate representations of DNA replication, RNA synthesis, and even codon-anticodon pairing, for starters; advanced students can build Holliday junctions, pseudoknots, and other things real and imaginary. Deep learning is made possible by hands-on exploration! More designs are on the way. We use local talent and nontoxic materials to make durable, beautiful, and instructive things. Our things are engineered to minimize cost to consumers, thus maximizing accessibility. Have fun learning and teaching DNA!

University of Florida, Biotility
Booth #103
biotility.research.ufl.edu

Biotility at the University of Florida offers pathways for individuals seeking to jumpstart or advance their career in the bioscience industries. Our programs include industry short-courses, bioscience educator professional development, and the Biotechnician Assistant Credentialing Exam (BACE) — a biotechnology industry-recognized credential that can be earned before students even graduate high school.

Vaccine Education Center at Children’s Hospital of Philadelphia
Booth #100
vaccinemakers.org

The Vaccine Makers Project (VMP) is the classroom-based program of the Vaccine Education Center at Children’s Hospital of Philadelphia (VREC). Our team is committed to public education about vaccine science via scientifically supported, historically accurate, and emotionally compelling content. To this end, the VMP has developed a variety of free, school-based curricula to educate students about how the immune system works, how diseases develop, and how vaccines work to prevent them. While the immediate goal is to provide educators with the information and resources necessary to teach this scientific success story, the greater opportunity is to immunize our country’s next generation of adults against scientific misinformation and disinformation while also equipping them with the skills necessary to critically evaluate the multitude of science-based topics central to how we live on and interact with this planet. Only when people understand and consider the scientific underpinnings of relevant topics can we expect that they will be equipped to make informed and logical decisions.

Visible Body
Booth #202
visiblebody.com

Visible Body’s 3D biology and AR human anatomy and physiology platforms improve in-class and online education outcomes while making learning anatomy easy and fun. Visible Body’s Courseware platform integrates with Canvas and Blackboard and allows instructors to assign and customize auto-graded labs and homework, 3D models, and flashcards.

W.W. Norton & Company
Booth #216
wwnorton.com/biology

Norton Biology brings together the best minds in biology teaching and research under one roof—from Sean Carroll to Bruce Alberts to Peter Parham. We provide superior visuals, up-to-date research, and active learning resources to help students see the world like biologists.

Wisconsin Fast Plants Program
Booth #410
fastplants.org

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

Explore patterns
Make predictions
Revise their explanations
Grapple with complex science concepts

Explore these innovative models and experience “Aha” moments during our sessions at NABT23!
THANK YOU to our SUSTAINING MEMBERS!

Ad Index
3D Molecular Designs ......................................................... 63
Amplexus (miniPCR) .......................................................... 7
Baron’s Educational Series ................................................ 54
Bedford, Freeman & Worth High School Publishers ........ 38
Bio-Rad Laboratories, Inc. ............................................... 25
Carolina Biological Supply Company .............................. 31
College Board ................................................................. 28
Discovery Education ......................................................... 30
Lab-Aids .......................................................................... 44
University of California Press ........................................ 55

INDEX | PROGRAM PARTICIPANTS

Shay, Daniel ................................................................. 13, 35
Sheely, Katelyn ............................................................ 42
Short, Kristin ................................................................. 45
Shortridge, Erin ............................................................. 43
Siders, Jamie ................................................................. 43
Silver Key, S. Catherine .................................................. 43
Simantis, Maria .............................................................. 42
Sivanathan, Viknesh ....................................................... 43
Smith, Erin .................................................................... 29
Smith, Michelle .............................................................. 42
Smithy, Davida .............................................................. 23, 50
Snodgrass, Helen .......................................................... 29
Sous, Sedra ................................................................. 42
Stark, Louisa A. ............................................................. 40
Stasulli, Nicolas ............................................................. 44
Steinberg, Carisa ......................................................... 13, 49
Strube, Paul K. ............................................................... 32
Sturm, Stephanie ........................................................... 29
Stynen, Sam ................................................................. 43
Suhajda, Kari ............................................................... 37
Swearengen, Vivian ...................................................... 42
Syed, Shifat Bin ............................................................. 42

T
Takacs, Julie ................................................................. 46
Taqieddin, Rany ............................................................ 43
Taylor, Andrew ............................................................. 52
Taylor-Davis, Sophia .................................................... 42

U
Uno, Gordon ............................................................... 23, 30
Urley, Sarah ................................................................. 38

V
Van Hooije, Kathy ......................................................... 24
Van Strij, Melanie ......................................................... 43
Velten-Skretti, Raven .................................................... 13
Veltre-Luton, Nicole ....................................................... 11
Vemula, Sheela ............................................................. 30, 45, 51
Vern, Ally ................................................................. 12, 42

W
Waack, Camilla ............................................................ 13
Walsh, Catherine E ....................................................... 30
Wang, Hong Li .............................................................. 43
Washington, Jacqueline ................................................ 11
Watson, William ......................................................... 44
Weigel, Emily ............................................................... 44
Welsh, Gina ................................................................. 43
White, Peter ................................................................. 44
White, Rebekah ............................................................ 42
Williams, Cody ............................................................. 44
Williamson, Maryann .................................................. 43
Wilkus, Tom ................................................................. 48
Wilton, Mike ............................................................... 43
Wojiski, Sarah ............................................................. 49
Wollet, David ............................................................... 33
Wright, Aali ........................... .............................. 50
Wright, Kendra ............................................................ 42

X
Yang, Suann ............................................................... 30, 42, 43
Yoo, Young ................................................................. 36
Yotam Roth, Michael .................................................... 42

Z
Zimbler-DeLorenzo, Heather ......................................... 30
Zimny, Richard Jacob .................................................. 31
Zippener, Jill ............................................................... 42
INDEX | SESSION BY SUBJECT

Anatomy & Physiology
Exploring the Immune System Using Mini Cases and HHMI Biointeractive

AP Biology
Algae Beads and Brainy Brinzis: Algae Culture Brine Shrimp (Experiment Kit) .......... 37
AP Symposium: Understanding Visual Representations in AP Biology .......... 41
Data and the Science Practices for AP Bio .................. 30
Elevating Student Voice & Choice: Creating an Inquiry-based, NGSS-aligned Project by Examining the Human Microbiome .......... 45
Get AP Biology Right with BFW Publishers ............. 52
Tasks and QR: Deciphering the Science Practices in AP Biology .......... 30
Using NASAs GenLab Platform to Explore Gene Expression .......... 47

Biotechnology
Guiding Light: Measuring and Analyzing Fluorescence with a Serial Dilution .......... 31
Hands-on Activities to Bring CRISPR-Cas9 to Your Class .......... 32
Hands-On Chromosomal Gene Editing with the Out of the Blue CRISPR Kit .......... 29
Introducing Your Students to Gene Editing with CRISPR Editor .......... 29
Meet the 2023 HudsonAlpha Guidebook .......... 29
PCR Amplified: Advanced Topics & Techniques .......... 27
Personalized Medicine: Cell and Gene Therapy in Cancer Treatments! .......... 37
Should We Teach Bioethics Through Mock Senate Hearings .......... 41
Track Mornovirus Spread Using Modeling and Gel Electrophoresis .......... 35
True Blue Bacterial Transformation Made Easy .......... 39
Using eDNA for Project Based Learning .......... 51
Where Does the Pipeline Begin? A Peek into the Start-of-a-Middle School Biotechnology Program .......... 31
Wet and Dry Labs to Introduce CRISPR-Based Gene Editing .......... 33

Committee Meetings
ABT Advisory Committee .......... 32
Awards Committee .......... 36
Informal Science Committee .......... 36
Long Range Planning Committee .......... 32
Justice, Equity, Diversity, & Inclusion (JEDI) Committee .......... 30
Member Resources Committee .......... 47
NABT Board of Directors Meeting & Leader Lunch .......... 23
NABT Book Club .......... 32
NABT Four-Year College & University Executive Committee Meeting .......... 24, 53
NABT Meet & Greet .......... 27
NABT Open Forum .......... 24
NABT Past Presidents Advisory Council Meeting & Reception .......... 24
NABT Two-Year College Section Meeting .......... 53
Nominating Committee .......... 31
OBTA Directors & Regional Coordinators .......... 45
Palm Network Vision and Change Workshop Committee Meeting .......... 23
Professional Development Committee .......... 51
Retired Members Committee .......... 39
Social Media Committee .......... 47

Curriculum Development
The BioGraph1 Curriculum: Valuing Diverse Identities and Fostering Data Literacy in Biology .......... 30
Closing the Equity Gap in Success with Development of an Integrated Biology Course for Non-majors .......... 47

Contextualizing the Social and Cultural Embeddedness of the Nature of Science Using the Lived Experiences and Narratives of Black Heritage .......... 37
Evaluating OER as an Inclusive Teaching Practice in STEM .......... 39
How to Be A Better Teacher Collaborator .......... 31
The Virtual Lab Experience .......... 52
Writing for the American Biology Teacher .......... 33

Ecology / Environmental Science / Sustainability
Citizen Science for Students: Monitoring Marine and Freshwater Microplastics .......... 46
Climate Hope in the Classroom: Using Local Climate Impacts and Environmental Actions to Teach Climate Science .......... 29
Effective Ways To Develop Science Practices For AP® Environmental Science Students, Using A Textbook .......... 51
Engineering in Biology: Free Labs and Project-Based Learning .......... 29
QR@BC Biological and Mathematical Methods to Assess Biodiversity .......... 30
Sea to Sky: Free online educational resources from the National Oceanic and Atmospheric Administration (NOAA) .......... 38
Some Like it Hot: Extremophiles of Yellowstone National Park .......... 51
Strategies for Increasing Diversity and Inclusion and Reducing Bias in AP Environmental Science .......... 38
Tracking Misconceptions in Climate Change: The Power of Place-Based Resources .......... 18, 23
Using Molecular Tools to Identify Antibiotic Resistance Genes in Environmental DNA .......... 36

DataVary: Humanizing and Diversifying Scientific Practices in Science Education .......... 36
Designing a Phenomenon-Based Genetics Learning Sequence with Biointeractive Stickleback Resources .......... 29
Fascinating Catalase: Structure, Function, and Evolution .......... 45

AP® Evolution at Sanger Sequencing to CRISPR-Cas9 to Your Class .......... 45
Evolution with Viruses for ALL Students .......... 47
EvolvingSTEM: A Three-Dimensional Laboratory Evolution Curriculum That Improves Student Learning and Engagement in Life Sciences .......... 37
The Learning Unity & Diversity in Alabama Project: Resources for Teaching Evolution in General Biology .......... 39
Where Are We Now? Evolution Teaching and Learning Across the United States .......... 52
The Wolbachia Project: Student Research Experiences with Global Impact .......... 47

General Biology
Beyond Heterozygote Advantage: Using New Biointeractive Sickle Cell Resources to Explore A Key Human Phenomenon .......... 45
Biodiversity in the Anthropocene: Biodiversity in the Anthropocene: A Guided Inquiry Into Climate Resilience Through Island Biogeography .......... 50
Biointeractive’s New Online Community: A Space to Connect and Learn With Fellow Life Science Educators .......... 52
BIOZONE’s Latest Biology Titles: Learn How These Superb, Interactive Texts Deliver Flexible & Engaging Learning .......... 47
Build It to Understand It: An Active Learning, Low-Cost Approach To Electrophoresis and Micropipetting .......... 47
Crickets for Lunch? - Using 3-D Instruction to Build Science Literacy .......... 47
DataVary: Humanizing and Diversifying Scientific Practice Models in Data Literacy Instruction .......... 36
Designing a Phenomenon-Based Genetics Learning Sequence with Biointeractive Stickleback Resources .......... 29
Fascinating Catalase: Structure, Function, and Evolution .......... 45
Going with the Flow: From Genes to Proteins Using siRNA Modeling Kits .......... 45
Hands-on Activities from Carolina, HudsonAlpha, and Wisconsin Fast Plants .......... 18, 23
Hydrophobic Marvels: Using Water Models to Unravel the Self-Cleaning Secrets of Lotus Leaves .......... 52
Implementing Standards-Based Grading When the Rest of Your School Uses Traditional Grading .......... 39
Introducing OpenSciEd Biology! .......... 58, 23
Lab it Up with National Geographic Learning .......... 46
Learning Cellular Respiration, pH, and Quantitative Skills Together: Curriculum from a Two-Year, Four-Year Faculty Collaboration .......... 48
Lessons from Quantitative Biology @ Community Colleges: Overcoming Barriers to Implementing Open Educational Resources .......... 45
Looking for Patterns in Species Diversity .......... 48
Marginalizing Misinformation & Mentoring Myth Busters .......... 50
Mathematics and Computational Thinking in OpenSciEd High School Biology .......... 57
Mimicry in Velvet Ants: Investigating Evolution through the Practices of Science .......... 50
NABT Biology Education Poster Session & Coffee Break .......... 43, 42, 43, 44
Oh Meso! Modeling The Processes That Create Genetic Diversity .......... 46
Photosynthesis, Cellular Respiration, and Enzymes: Teaching Common Biology Concepts with Alginate Beads .......... 29
Pollin Apparatus: Using Local Phenomena to Teach Climate Science .......... 45
Red-Light, Green-Light: Using Biointeractive Resources to Explore Cancer As A Phenomenon .......... 48
Student-Centered Learning in Biology Content Using the Explorations of Diverse Scientists .......... 33
Sustaining the Commons .......... 41

Teaching the HudsonAlpha: Tools to Bring This Unique Discovery to Life for Your Students .......... 53

Teaching the Molecular Mechanisms of Addiction with Physical Models .......... 48
Uncovering the Truth: Modeling a DNA Replication Error .......... 50
Using Synthetic Biology to Explore the Central Dogma and Protein Structure .......... 30
Tomorrow’s Science is Looking for Leaders .......... 46
Why Representation Matters? Curriculum Reform and Mentoring from an HBCU Perspective .......... 45

Genetics
Teaching the Genome Generation: Investigating Genetic Ancestry in the Biology Classroom Through Data Analysis .......... 49

Instructional Strategies
14th Annual Biology Education Research Symposium .......... 33, 34
Anchored Inquiry Learning: Designing Meaningful Instruction to Make Program Authentic Phenomena .......... 41
Bringing Justice, Equity, Diversity, and Inclusion into Classrooms Through Networking and Take-Away Resources .......... 51
Critical Conversations in Science: A Call to Equitable Practice through Language .......... 38
“Dear Colleague” - Meet Your NSF & Other Website Resources .......... 31
The Empathetic Educator: Tips for Building Relationships in the Classroom .......... 52
How to Focus Questions Work to Make Student Thinking Visible .......... 32
How to Use and Contribute to HHMI Biointeractive’s New Educator Resource Library .......... 46
Fostering Figuring and Fascination .......... 36

Make Tax Anxiety Out of Teaching Population Growth with HHMI Biointeractive’s LifeCoach Click & Learn .......... 32
Teaching Naked: Teaching Naked: Tools to Bring This Unique Discovery to Life for Your Students .......... 53

NABT 2023 PROFESSIONAL DEVELOPMENT CONFERENCE

Baltimore, 2023 | #NABT2023
### Instructional Strategies CONT.

- **HHMI BioInteractive’s Assessment Builder: A Crowdsourced Tool to Facilitate Assessment for Learning** ........................................... 38
- **Insights on Student Success in the Community College Ecosystem** ............ 51
- **The Making of University Life Science Lab: A Vision and Change Transition** ................................................... 39
- **Reaching Every Student in Your Classroom – Culturally and Linguistically Responsive Pedagogy** .............................................. 49
- **Reimagining Scientific Literacy for Community Engagement** ......................... 46
- **Science Communication: It’s Not Just about the Facts!** .................................... 36
- **SCST Symposium: Highlighted Tips, Tools, & TA Professional Development** .................................................. 49
- **Student Poster Practice Session** ................................................................. 39
- **Tools for Biology Education** ................................................................. 48
- **Using Art to Engage Non-Biology Majors** .................................................. 31
- **What are We Learning Again? Reducing Cognitive Clutter to Focus Students on Science Practice** .................. 30

### International / Global Education

- **Inspire Future Changemakers by Discovering Biodiversity Hotspots** ........ 48
- **The Highs and Lows and Joys and Woes of Creating and Maintaining a State NABT Affiliate** ............ 37

### Meal Functions

- **AP Biology Section Luncheon** ................................................................. 19, 33
- **Elementary and Middle-Level Luncheon** .............................................. 19, 33
- **Four-Year College & University Section Luncheon** ................................ 19, 33
- **High School Level Luncheon** ................................................................. 19, 33
- **NABT BioClub Breakfast** ................................................................. 19, 41
- **NABT First Timers’ Coffee Break** .................................................. 27
- **Two-Year College Section Luncheon** .................................................. 19, 33

### Microbiology & Cell Biology

- **The American Association of Immunologists Presents: AAI Teachers Research Program – Immunology Lessons for the Classroom** ................................................... 29
- **Dealing with a Zombie Epidemic: Applying Knowledge of Microbiology, Immunology, and Potential Treatments** ................................................... 50

### National Association of Biology Teachers

**Certificate of Attendance**

is hereby granted to:

- **Exhibit Hall Grand Opening Reception** ........................................... 24
- **Exhibit Hall Closing Experience** .................................................. 39
- **HHMI Night at the Movies** ................................................................. 19, 39
- **NABT Equity Networking Social** .................................................. 52
- **NABT Honors Luncheon** ................................................................. 19, 49
- **Tour of the Institute of Marine and Environmental Technology (IMET)** ........... 18, 23

### Special Speaker

- **Finding Hope: Challenges and Opportunities in Climate Change Communication:**
  - **Lauren Feldman** ................................................................. 24
- **The Future of Exploration in the Greatest Age of Exploration:**
  - **Lee Berger** ................................................................. 53

### Technology in the Classroom

- **Enhancing Biology Education Through the Use of ChatGPT: Exploring the Benefits and Challenges** ........ 36
- **Infuse Active Learning into Biology** .................................................. 41
- **Play, Simulate, and Model - Using the BioGraph Curriculum to Teach Core Biological Concepts** ........ 53
- **The Robots Are Here, Now What? Implications and Uses of AI in the Classroom** .................. 48
NABT is committed to providing a safe, productive, and welcoming environment for all program participants and NABT staff. All participants, including, but not limited to, attendees, speakers, volunteers, exhibitors, NABT staff, service providers, and others are expected to abide by this Meeting Safety & Responsibility Policy.

This Policy applies to all NABT meeting-related events – both in-person and online – and includes those events sponsored by organizations other than NABT but held in conjunction with NABT events, in public or private facilities.

**Personal Safety and Security**
NABT works diligently to provide a safe and secure environment at its meetings and events by working with venue staff to make sure participants are safe. We ask that all attendees report any questionable or concerning activity to NABT staff so that they can take immediate action. No concern is too small, so if you see something, say something.

- Be aware of your surroundings at all times.
- Use the buddy system when walking to and from the event venue and networking event locations during early or late hours.
- Don’t wear your meeting badge on the street. Take it off as soon as you leave the building/venue.
- Don’t carry a lot of cash or credit cards. Leave in your hotel room safe.
- Don’t leave personal property unattended anywhere, anytime.

If there is an emergency or if you need immediate assistance, do not delay in asking any NABT staff member or the on-site security personnel to help you.

**Public Health & Safety**
NABT understands that there is inherent risk in participating in any activity and we do our best to reduce those risks as much as possible. Due to the ongoing COVID-19 pandemic, NABT will adopt measures to mitigate risks based on available guidance from the World Health Organization, Centers for Disease Control, and other public health experts. We appreciate your full compliance with those protocols to help reduce viral transmission.

We also request that you monitor your own health status and forgo attending an NABT event if you suspect exposure or exhibit symptoms of transmissible illness.

**Responsible Drinking**
At NABT receptions, both alcoholic and non-alcoholic beverages are served. NABT expects participants at our events to drink responsibly. NABT and hotel staff have the right to deny service to participants for any reason and may require a participant to leave the event.

**Unacceptable Behavior**
- Harassment, intimidation, or discrimination in any form.
- Physical or verbal abuse of any attendee, speaker, volunteer, exhibitor, NABT staff member, service provider, or other meeting guest.
- Examples of unacceptable behavior include, but are not limited to, verbal comments related to gender, sexual orientation, disability, physical appearance, body size, race, religion, national origin, inappropriate use of nudity and/or sexual images in public spaces or in presentations, or threatening or stalking any attendee, speaker, volunteer, exhibitor, NABT staff member, service provider, or other meeting guest.
- Disruption of presentations at sessions, in the exhibit hall, or at other events organized by NABT at the meeting venue, hotels, or other NABT-contracted facilities.

NABT has zero-tolerance for any form of discrimination or harassment by participants or our staff at our events. This includes but is not limited to sexual harassment or unwelcome conduct based on race, color, religion, sex (including pregnancy), gender identity, nationality, age, disability, or genetic information.

If you experience harassment or hear of any incidents of unacceptable behavior, please inform Jaclyn Reeves-Pepin, the NABT Executive Director at jreevespepin@nabt.org or (888) 501-6228 so that appropriate action can be taken.

NABT reserves the right to take any action deemed necessary and appropriate, including immediate removal from the meeting without warning or refund, in response to any incident of unacceptable behavior, and NABT reserves the right to prohibit attendance at any future meeting.

By registering for an NABT event, you agree to comply with NABT’s Meeting Safety & Responsibility Policy and will take full responsibility for your personal conduct.
NABT empowers the individual educator and fosters a supportive professional environment to create a diverse community who continually improves and enhances biology education.

Help NABT continue to grow.

Donate now at www.nabtdonations.org