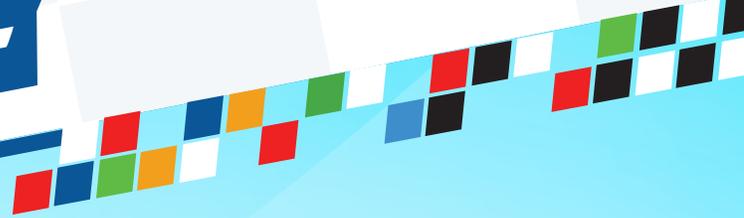




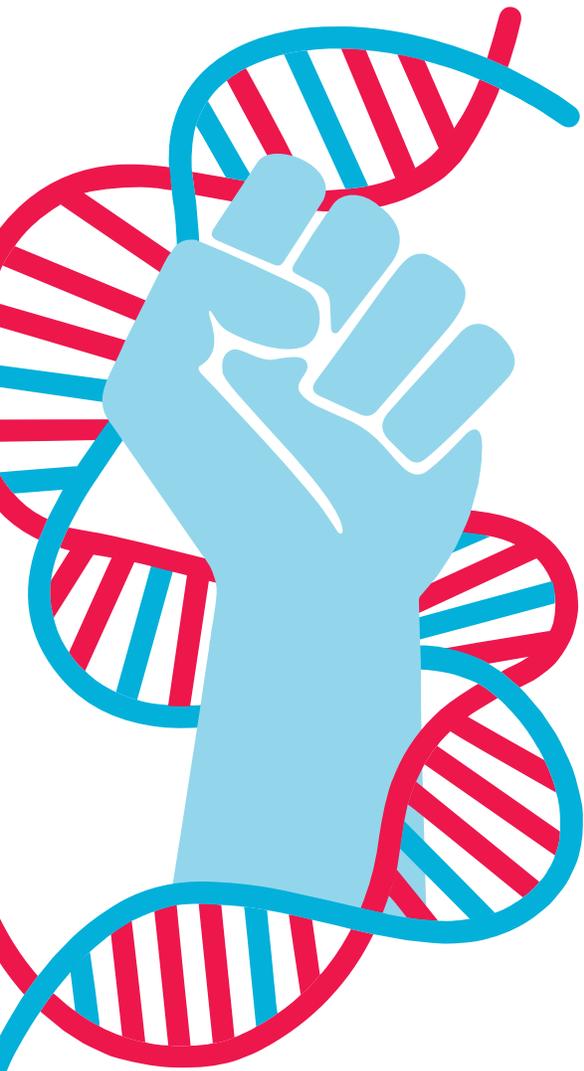
NABT INDY



2022 PROFESSIONAL DEVELOPMENT CONFERENCE

NOVEMBER 10-13 | JW MARRIOTT | INDIANAPOLIS, INDIANA

PROGRAM GUIDE



Attend the miniPCR bio workshops!

—
Location: JW Grand 3



8:00AM - 9:00AM

Build it to understand it:
An active learning, low cost approach to electrophoresis and micropipetting

10:30AM - 11:45AM

Bringing real CRISPR/Cas to your class with accessible tools: *in vivo* and *in vitro*!

12:00PM - 12:30PM

miniPCR Sleep Lab: Are You a Night Owl? Or A Morning Lark? Ask your genes!

12:45PM - 1:45PM

Open house. Peruse our equipment and Learning Labs

2:00PM - 3:15PM

Using synthetic biology to explore the Central Dogma, protein structure, and mechanisms of antibiotic resistance

3:30PM - 4:00PM

Sickle Cell Genetics: Using gel electrophoresis to investigate molecular genetics, inheritance and disease

4:15PM - 5:00PM

Using molecular tools to identify antibiotic resistance genes in environmental DNA (eDNA)



Models give words meaning

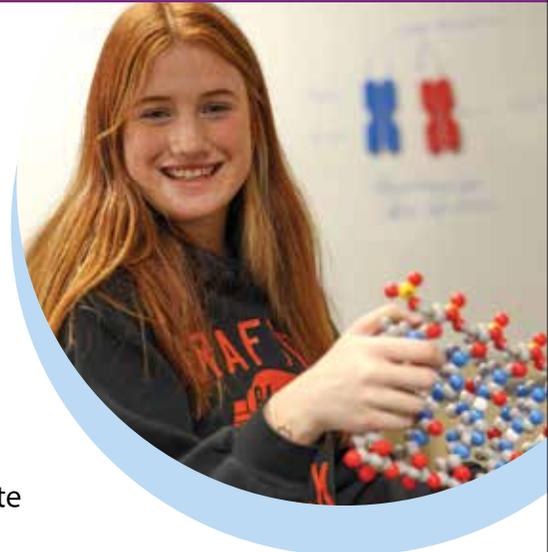
Interactive kits and models invite students to:

- ✓ Explore patterns
- ✓ Make predictions
- ✓ Revise their explanations
- ✓ Grapple with complex biology concepts

Explore these innovative models and experience *Aha* moments during NABT Indy!

Visit **3D Molecular Designs in Booth 219** and during **hands-on sessions held Saturday**. Check out our website for free resources, announcements about unique summer courses, and more info on these amazing kits and models!

www.3dmoleculardesigns.com



Digital Dissection

THE FUTURE OF DISSECTION IS HUMANE.

Pssst ... hey, science teacher!
Let's talk about animal dissection and why it should end.

HERE ARE THE FACTS:

Formaldehyde, a known carcinogen, cannot be completely eliminated from preserved animals with rinsing.



Dissectible Models

Archaic animal dissection exercises haven't changed in over a century.

Curriculum standards do not require or even mention animal dissection.

Ten million animals are killed annually for classroom dissection.

Studies show that students prefer humane science lessons such as interactive computer simulations, they score higher on them, and they're able to repeat the material until they become proficient.

TeachKind can help you replace animals in your classroom with our donations, pilot programs, and more—e-mail us at Info@teachkind.org!

TeachKind

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A SPECIAL THANKS

to Our Generous 2022 Conference Sponsors & Exhibitors!

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FROM THE PRESIDENT

Welcome to Indianapolis for the 2022 NABT Professional Development Conference! I have been looking forward to this event since the 2021 Conference in Atlanta. I want to emphasize that NABT—even with all of the challenges the last two years—is still the place where ALL life science educators can experience high-quality professional development filled with content, pedagogy, and opportunities for networking with like-minded colleagues.

I hope you take full advantage of the sessions and activities during this year’s conference. Here are some of the sessions I feel are a “must.”

On **Thursday, November 10th** I encourage you to stop by the *NABT Open Forum* to learn more about NABT from our leaders. Then programming starts with Dr. Tracie Delgado, our opening session speaker, followed by the *Exhibit Hall Opening Reception*. I want to say a big thank you to our sponsors and exhibitors. Their generous support makes this conference possible.

Everyone remembers their first time at NABT. Mine was in Milwaukee in 2005. If you are a conference newbie, come to the *First Timers’ Coffee Break* on **Friday, November 11th** and meet other NABT members. Friday is full of opportunities to learn and network...did I mention network? Just like last year, NABT is hosting EVERYONE for networking lunches. Friday will have multiple sessions, speakers, and symposiums to check out. Then end your day with two great experiences. Head to the Exhibit Hall for our closing reception and the *Find the President* drawing. And the *HHMI Night at the Movies* is back.

On **Saturday, November 12th** start your morning at the *Biology Education Poster Session*. The posters are a great opportunity to see what research students and fellow educators are doing. Then it is back to sessions before the closing General Session featuring Dr. Michael Osterholm, who will receive the *2022 NABT Distinguished Service Award*.

Conference planning really is a year-round process. But it is not NABT’s only program. Hats off to those members who serve on NABT Committees, the Board, as Regional Directors, State and Provincial Representatives, BioClub Advisors, and with our State Affiliates. Additionally, thank you to our sponsors and donors who help us support our outstanding colleagues throughout the year. Lastly, thanks to our amazing staff and partners. They have worked tirelessly to ensure NABT could have a great meeting this year.

While you are in Indy, take advantage of meeting other passionate professionals who will help guide you on your teaching journey. I look forward to meeting and learning from all of you.

Thank you for attending NABT 2022, and I hope to see you in Baltimore next year!



Chris Monsour
NABT President
2022

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THURSDAY

6:00 am

7:00

8:00

9:00

10:00

11:00

12:00 pm

1:00

2:00

3:00

4:00

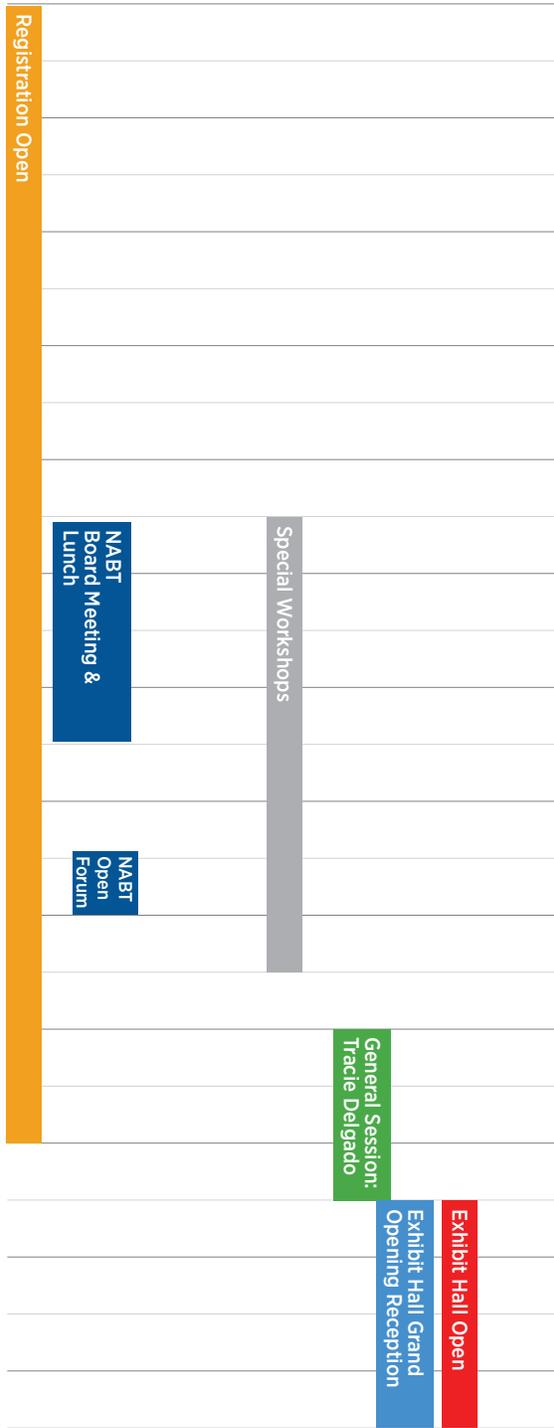
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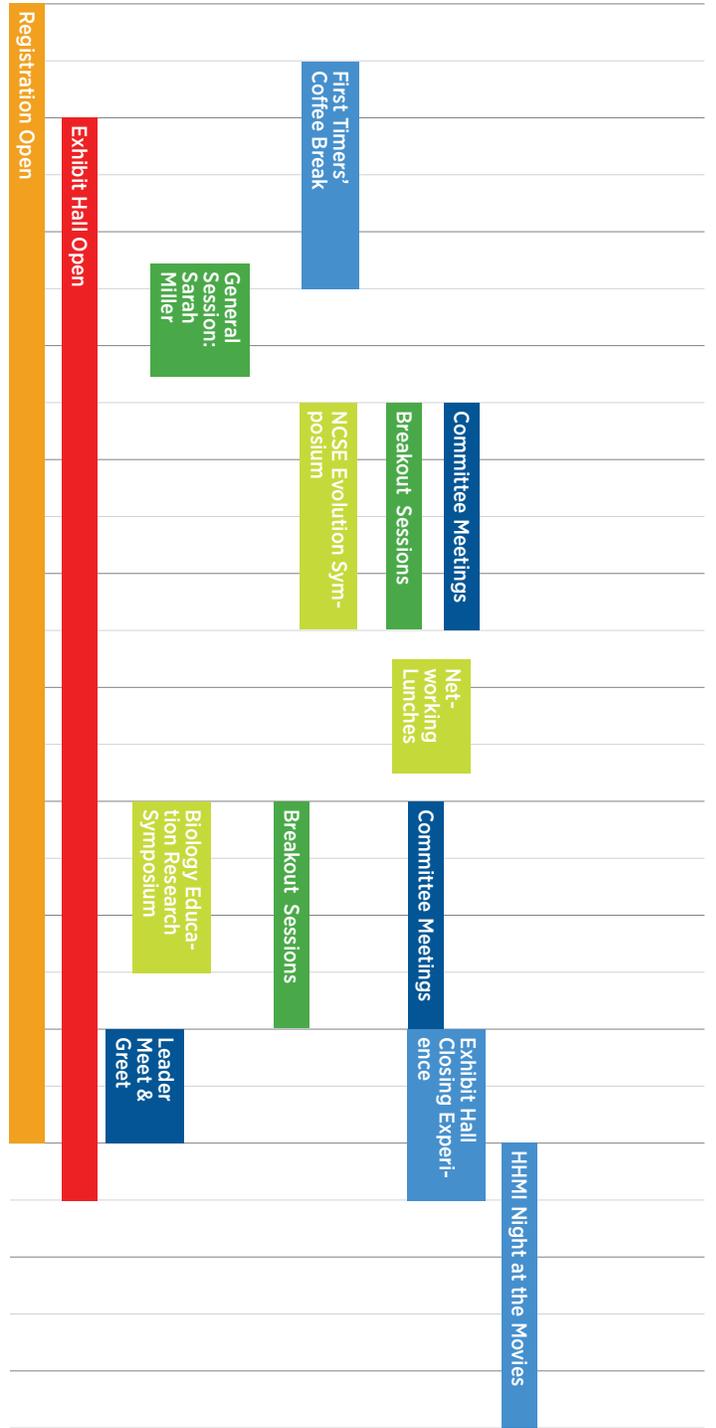
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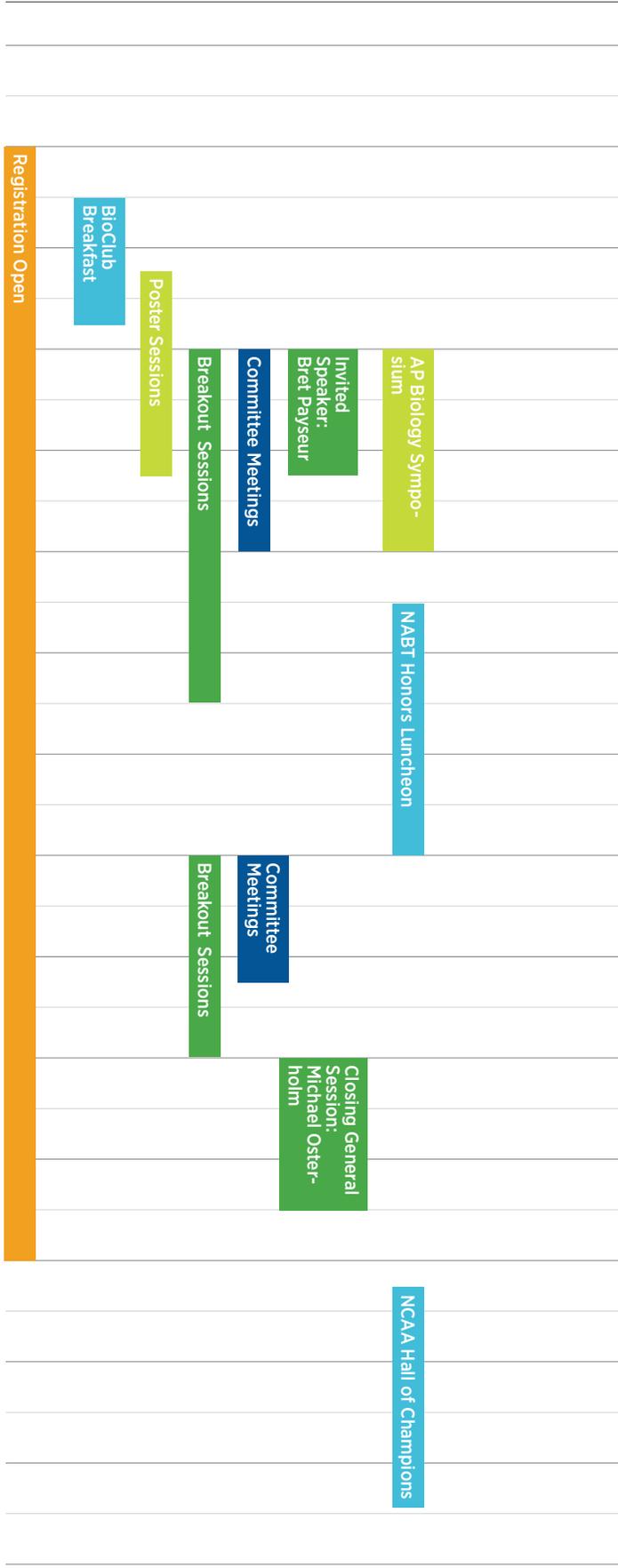


FRIDAY

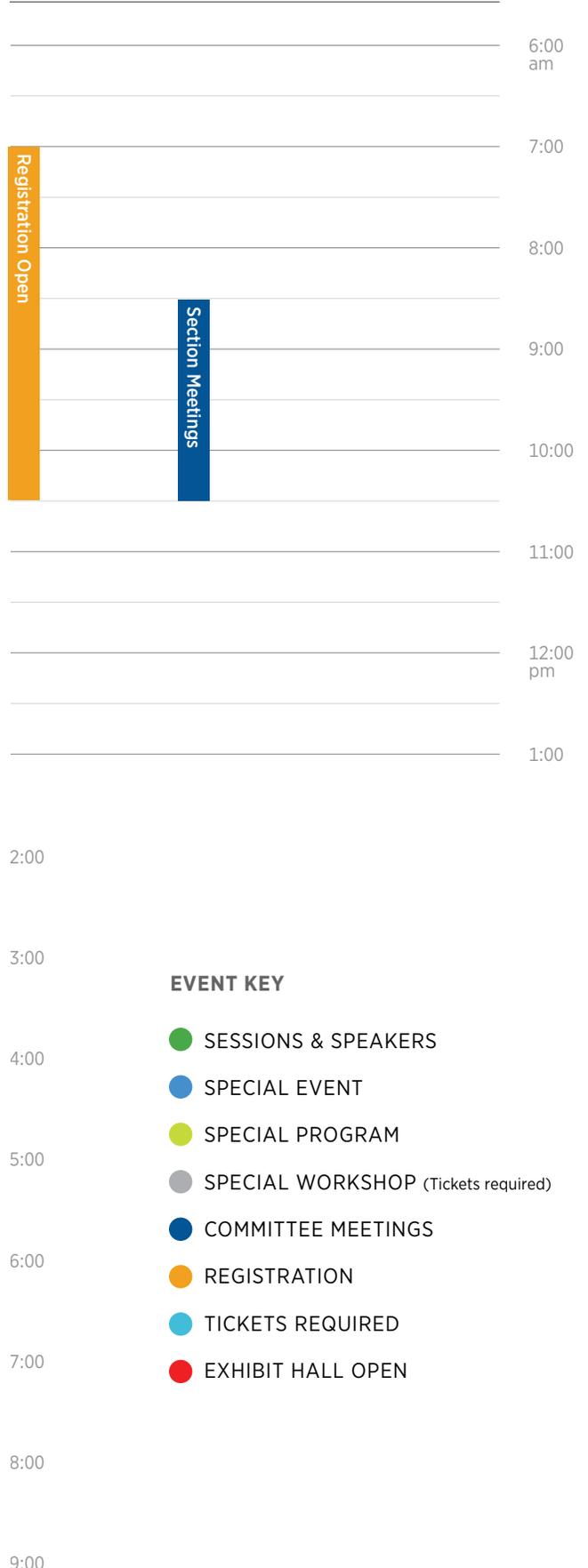




SATURDAY



SUNDAY



EVENT KEY

- SESSIONS & SPEAKERS
- SPECIAL EVENT
- SPECIAL PROGRAM
- SPECIAL WORKSHOP (Tickets required)
- COMMITTEE MEETINGS
- REGISTRATION
- TICKETS REQUIRED
- EXHIBIT HALL OPEN



ABOUT THE PROFESSIONAL DEVELOPMENT CONFERENCE

All functions, meetings, and exhibits will take place at the JW Marriott Indianapolis 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 in Room 307.

CERTIFICATE OF ATTENDANCE

See page 67

REGISTRATION HOURS

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

Thursday, November 10

7:00AM – 5:00PM

Friday, November 11

7:00AM – 5:00PM

Saturday, November 12

7:00AM – 5:00PM

Sunday, November 13

7:00AM – 10:30AM

FUTURE NABT CONFERENCE DATES & SITES

2023 Professional Development Conference

November 2–5, 2023
Baltimore Marriott Waterfront
Baltimore, MD



2022 NABT CONFERENCE APP

Download the Grupio App when you visit the App Store or Google Play. Search for NABT in the App to access the event!



Use #NABT2022 to Tweet from Indianapolis!

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 variety of curriculum publishers, equipment manufacturers, software developers, nonprofit partners, and other organizations with resources to benefit 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.

Thursday, November 10 5:30PM – 7:30PM

Friday, November 11 8:00AM – 5:30PM
(Closing Reception starts at 4:00PM)



WIFI LOG-IN DETAILS

SSID
NABT

Password
Indy

TRANSPORTATION FOR SATURDAY SPECIAL EVENT

A shuttle will be available for the Saturday event at the NCAA Hall of Champions. 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 <https://www.surveymonkey.com/r/2022indy>



Phone: (888) 501-NABT

E-mail: office@NABT.org

Website: www.NABT.org



Let's do science!

Join a free in-person hands-on workshop.

Visit Us
at Booth
#304

NABT Indianapolis Workshop Schedule
Friday, November 11 – JW Grand Ballroom 2

8:00–9:00 am
PCR Amplified: Advanced Topics & Techniques

10:30–11:45 am
Hands-On Chromosomal Gene Editing with the Out of the Blue CRISPR Kit

12:00–12:30 pm
Track Disease Spread using Modeling and Gel Electrophoresis

2:00–3:15 pm
The Plight of the Bumblebee: Studying Bee Genetic Biodiversity using DNA Barcoding

3:30–4:00 pm
Personalized Medicine: CRISPR Therapies Transforming Medicine Now!

We will be following local COVID-19 guidelines to ensure participant safety.

Visit us at bio-rad.com/NABT22
Call toll free at 1-800-424-6723.
Outside the U.S. contact your local sales office.



**BOOTH
211**



HUDSONALPHA
INSTITUTE FOR BIOTECHNOLOGY

HudsonAlpha is inspiring and preparing society to embrace and utilize genomics for health and global sustainability by developing educational programs, materials and experiences. Our latest online game, **FILTERED**, introduces the concepts and tools of bioinformatics to students who attempt to unlock the identity of a mysterious pathogen crisscrossing the globe.

COME EXPERIENCE FILTERED

Session Schedule for SATURDAY November 12

- 10:30 – 11:45 am **FILTERED training**
- 12:00 – 12:30 pm **Meet FILTERED**
- 2:00 – 3:15 pm **Data Science in Biotech: Why Bother?**
- 3:30 – 4:00 pm **Meet FILTERED**



This work is supported by the National Institute of General Medical Sciences of the National Institutes of Health under SEPA Award Number R25GM129867.

For further information, go to hudsonalpha.org/education.


GENERAL SESSION SPEAKER
Tracie Delgado, PhD

Associate Professor, Biology
Seattle Pacific University,
Seattle, WA

Dr. Tracie Delgado was born and raised in Los Angeles, California. She attended UCLA for undergrad where she developed a huge passion for science and UCLA football. While attending UCLA, she did molecular biology, cancer biology, and herpesvirus research. After receiving her BS in Microbiology, Immunology, and Molecular Genetics from UCLA, she moved to Seattle to pursue a PhD degree in Microbiology at the University of Washington. After graduation, Tracie spent 8 years as a biology professor at Northwest University before joining the biology faculty at Seattle Pacific University in 2019.

It is estimated that ~15% of cancers are caused by viral infections. Viruses are intracellular parasites which lack their own metabolism, so they must hijack host cell metabolic machinery to create more energy, proteins, fats, and genetic material necessary to replicate. The

Delgado research lab aims to understand how gammaherpesviruses cause cancer by altering host cell metabolism. Her lab is also working to identify metabolic inhibitors that can provide new forms of antiviral treatments. The experiments in her lab are performed by undergraduate students, and many of her students have won awards for their research at both national and regional conferences.

One of Tracie's passions is to help increase the number of underrepresented minorities in science. Since 2004, Tracie has been a member of the national "Society of Advancement of Chicanos and Native Americans in the Sciences" (SACNAS). Tracie was a speaker at the Seattle March for Science in 2017, where she discussed the need for more underrepresented minorities in the sciences.

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.

FULL MEETING SCHEDULE

Justice, Equity, Diversity & Inclusion (JEDI)	Friday, Nov. 11	10:30AM – 11:45AM	206
Member Resources	Friday, Nov. 11	10:30AM – 11:45AM	308
Awards Committee	Friday, Nov. 11	12:00PM – 12:30PM	308
Retired NABT Members Committee	Friday, Nov. 11	12:00PM – 12:30PM	206
Informal Science Committee	Friday, Nov. 11	2:00PM – 3:15PM	206
OBTA Directors & Regional Coordinators	Friday, Nov. 11	2:00PM – 3:15PM	308
Nominations Committee	Friday, Nov. 11	3:30PM – 4:00PM	308
Professional Development Committee	Friday, Nov. 11	3:30PM – 4:00PM	206
Archival Committee	Saturday, Nov. 12	9:00AM – 10:15AM	206
ABT Advisory Committee	Saturday, Nov. 12	10:30AM – 11:00AM	206
Social Media Committee	Saturday, Nov. 12	2:00PM – 3:15PM	206

Another great place to find out more about NABT programs is the NABT Leader Meet & Greet in the Exhibit Hall from 4:00PM – 5:00PM on Friday, November 11th.

FRIDAY • NOVEMBER 11



GENERAL SESSION SPEAKER

Sarah Miller, MS**Executive Director, Tiny Earth**University of Wisconsin-Madison,
Madison, WI

Sarah has been named a National Academies Education Mentor in the Life Sciences and received the University of Wisconsin-Madison Teaching Academy Distinguished Teaching Award. She is the Executive Director of Tiny Earth at the University of Wisconsin-Madison, overseeing the international network of 700+ instructors who teach an estimated 14,000 students annually in 30 countries. The goal of Tiny Earth is to student-source the discovery of new antibiotics from soil bacteria and increase diversity in STEM.

From 2014-2019, she led REACH, a Provost-level initiative to redesign UW-Madison's highest-enrollment courses to be more active and inclusive, along with a suite of UW-Madison programs that focused on transforming courses to online/blended learning. Prior to that, she built and led the first four cohorts of Madison Teaching and Learning Excellence, an intensive year-long program for UW's early-career faculty. While leading the Wisconsin Program

for Scientific Teaching in the 2000s, she taught multiple graduate-level courses about scientific teaching and mentoring, as well as undergraduate science courses, for 11 years. She has co-authored five publications in *Science* magazine, in addition to other education journals, most recently two articles in *JMBE* about leveraging communities of practice to create antiracist and online curriculum for CUREs. She founded the Scientific Teaching Book Series and is a co-author of the books *Scientific Teaching* and *Entering Mentoring*.

Sarah's professional interests focus on STEM education, with an emphasis on active and inclusive learning, institutional transformation at scale, and faculty development in higher education. She was trained as a plant pathologist and botanist at UW-Madison. For her graduate work, she investigated the environmental impact of genetically modified organisms (GMOs) by analyzing the microbial communities affiliated with plant roots.

INVITED SPEAKER:
SCOTT WILLIAMSON
SPEAKER SERIES**Bret Payseur, PhD****James F. Crow Professor of
Genetics and Medical Genetics**University of Wisconsin-Madison,
Madison, WI

Dr. Bret Payseur received his undergraduate degree in Anthropology and Molecular, Cellular, and Developmental Biology from the University of Colorado at Boulder. Bret earned his PhD. in Ecology and Evolutionary Biology from the University of Arizona and pursued postdoctoral studies at Cornell University. In 2005, Bret founded the Payseur lab at the UW-Madison, where he is now James F. Crow Professor of Genetics and Medical Genetics.

In his research, Bret uses genetics and genomics to understand evolution. Topics of emphasis include the evolution of extreme body size, the origin of species, and the shuffling of DNA during reproduction. Bret supervises a research lab with graduate students, postdoctoral fellows, and research scientists. Bret teaches undergraduate courses in genetics and genomics. He is an active participant in efforts to expand diversity, equity, and inclusion at the UW-Madison.


GENERAL SESSION SPEAKER
Michael Osterholm, PhD, MPH

**Regents Professor, McKnight
Presidential Endowed Chair in Public Health**

**Director, Center for Infectious Disease
Research and Policy (CIDRAP)**

University of Minnesota, Minneapolis, MN

➔ See session details on page 51

NABT IS PROUD TO HONOR

**Dr. Michael Osterholm
with the 2022 NABT Distinguished Service Award.**

Dr. Michael Osterholm is Regents Professor, McKnight Presidential Endowed Chair in Public Health, the director of the Center for Infectious Disease Research and Policy (CIDRAP), Distinguished Teaching Professor in the Division of Environmental Health Sciences, School of Public Health, a professor in the Technological Leadership Institute, College of Science and Engineering, and an adjunct professor in the Medical School, all at the University of Minnesota.

In November 2020, Dr. Osterholm was appointed to President-elect Joe Biden’s Transition COVID-19 Advisory Board and has been a continual source of fact-based information and analysis throughout the pandemic, including via CIDRAP’s weekly “Osterholm Update: COVID-19” podcast.

From June 2018 through May 2019, Dr. Osterholm served as a Science Envoy for Health Security on behalf of the US Department of State. He is also on the Board of Regents at Luther College in Decorah, Iowa.

He is the author of the New York Times best-selling 2017 book, *Deadliest Enemy: Our War Against Killer Germs*, in which he not only details the most pressing infectious disease threats of our day but lays out a nine-point strategy on how to address them, with preventing a global flu pandemic at the top of the list.

Dr. Osterholm has received numerous honors for his work, including an honorary doctorate from Luther College; the Pump Handle Award, CSTE; the Charles C. Shepard Science Award, CDC; the Harvey W. Wiley Medal, FDA; the Squibb Award, IDSA; Distinguished University Teaching Professor, Environmental Health Sciences, School of Public Health, UMN; and the Wade Hampton Frost Leadership Award, American Public Health Association. He also has been the recipient of six major research awards from the NIH and the CDC.

BOARD OF DIRECTORS

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 President-Elect: **Tara Jo Holmberg**
 Past President: **Julie Angle**
 Secretary/Treasurer: **Jacqueline Washington**
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 Director-at-Large: **Anna Hiatt**
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 AP Biology Section: **Mark Little**
 Four-Year College & University Section: **Todd Kelson**
 Two-Year College Biology Section: **Sheela Vemu**

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 Archival Committee: **Vacant**
 Awards Committee: **Jason Crean**
 Finance Committee: **Jacqueline Washington**
 Honorary Membership Committee: **Tara Jo Holmberg**
 Informal Science Education Committee: **Vacant**
 Justice, Equity, Diversity, & Inclusion (JEDI): **Enya Granados**
 Member Resources Committee: **Catherine Ambos**
 Nominating Committee: **Bob Melton**
 Past President Advisory Council: **Tara Jo Holmberg**
 Professional Development Committee: **Vacant**
 Retired Member Committee: **Dennis Gathmann**

BOARD APPOINTED REPRESENTATIVES

OBTA National Coordinator: **Mark Little**
 Introductory Biology Task Force: **Anna Hiatt**
 Social Media Task Force: **John M. Moore & Stacey Kiser**
 Pre-Service Teacher Advisory Committee: **Julie Angle**

Affiliate Members

Biology Teachers Association of New Jersey (**BTANJ**)
 Colorado Biology Teachers Association (**CBTA**)
 Cleveland Regional Association of Biologists (**CRABS**)
 Connecticut Association of Biology Teachers (**CTABT**)
 Delaware Association of Biology Teachers (**DABT**)
 Empire State Association of Two-Year College Biologists (**ESATYCB**)
 Hong Kong Association of Biology Teachers (**HKABT**)
 Illinois Association of Biology Teachers (**IABT**)
 Illinois Association of Community College Biologists (**IACCB**)
 Indiana Association of Biology Teachers (**IABT**)
 Kansas Association of Biology Teachers (**KABT**)
 Louisiana Association of Biology Teachers (**LABT**)
 Massachusetts Association of Biology Teachers (**MABT**)
 Michigan Association of Biology Teachers (**MABT**)
 Mississippi Association of Biology Educators (**MSABE**)
 Missouri Association of Biology Teachers (**MOBioTA**)
 New York Biology Teachers Association (**NYBTA**)
 South Carolina Association of Biology Teachers (**SCABT**)
 Texas Association of Biology Teachers (**TABT**)
 Tennessee Association of Biology Teachers (**TNABT**)
 Virginia Association of Biology Teachers (**VABT**)

BioClub Student Awards

Angie Leckrone

Perkins High School, Sandusky, OH

Jessica Willmore

Snow College, Ephraim, UT

Outstanding student members of a NABT BioClub are eligible for this textbook scholarship, with one student from a BioClub high school chapter and one student from a community college chapter named each year.

Sponsored by Carolina Biological Supply Company

Biology Educator Leadership Scholarship (BELS)

John M. Maddux

Festus High School, Festus, MO

The Biology Educator Leadership Scholarship (BELS) supports teachers who are furthering their education in the life sciences or science education. The award recipient is a practicing educator who has been accepted into a graduate program at a Masters or Doctoral level.

Sponsored by NABT Member Donations

Distinguished Service Award

Michael Osterholm, PhD, MPH

CIDRAP/University of Minnesota, Minneapolis, MN

Established in 1988 to commemorate the 50th anniversary of the NABT, the Distinguished Service Award is presented to a nationally recognized individual who has made major contributions to biology education through their research, writing, and teaching.

Sponsored by the National Association of Biology Teachers

Ecology/Environmental Science Teaching Award

Kirstin Milks, PhD

Bloomington High School South, Bloomington, IN

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

Sponsored by Vernier Software and Technology

Evolution Education Award

Armin Moczek, PhD

Indiana University Bloomington, Bloomington, IN

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 & NCSE

Four-Year College & University Section Biology Teaching Award

Davida Smyth, PhD

Texas A&M - San Antonio, San Antonio, TX

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

Kristy Daniel, PhD

Texas State University, San Marcos, TX

Recognizing innovation in research that furthers our understanding of undergraduate biology teaching, this award is given to an individual who displays creativity in scholarship and research in biology education.

Sponsored by NABT's Four-Year College & University Section

Genetics Education Award

Christine Girtain

Toms River Regional Schools, Toms River, NJ

This award recognizes innovative, student-centered classroom instruction that promotes the understanding of genetics and its impact on inheritance, health, and biological research.

Sponsored by ASHG and GSA

Honorary Membership

John R. Jungck, PhD

University of Delaware, Newark, DE

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 Pfannerstill Travel Award

Brenda Witt

Redlands Community College, El Reno, OK

Established to honor the memory of Jennifer Pfannerstill, this award is a need-based scholarship to support a teacher who has demonstrated a commitment to personal and professional development by helping that individual attend the NABT Conference for the first time.

Sponsored by NABT, BFW, & Donations

The Kim Foglia AP[®] Biology Service Award

Valerie May

Woodstock Academy, Woodstock, CT

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

Sponsored by the Neil A. Campbell Educational Trust and Pearson

Outstanding Biology Teacher Award (OBTA)

See the full OBTA listing for 2022 Honorees

For over 50 years, the Outstanding Biology Teacher Award (OBTA) honors outstanding biology educators from grades 7-12 who are judged on their teaching ability and experience, cooperativeness in the school and community, creativity, inventiveness, initiative, and student-teacher relationships.

Sponsored by Carolina Biological Supply Company, with special consideration from Bio-Rad Laboratories, the Botanical Society of America, miniPCR, and Population Connection.

Outstanding New Biology Teacher Achievement Award

Julia Navarro

Glenbrook South High School, Park Ridge, IL

This award recognizes outstanding teaching in grades 7-12 by a "new" biology/life science instructor within their first three years of teaching biology who has developed an original and outstanding program or technique while also making a contribution to the profession at the start of their career.

Sponsored by the Neil A. Campbell Educational Trust and Pearson

Prof. Chan Two-Year College Award for the Engaged Teaching of Biology

Jayme Dyer, PhD

Durham Technical Community College, Durham, NC

This award recognizes a two-year college faculty member who has successfully developed and demonstrated an innovative, hands-on approach in the teaching of biology and has carried their commitment into the community to promote biology education.

Sponsored by Sarah McBride and John Melville

The Ron Mardigian Biotechnology Teaching Award

Suzanne Fetherling

Hoffman Estates High School, Hoffman Estates, IL

This award recognizes a secondary school teacher or undergraduate college biology instructor who demonstrates outstanding and creative teaching of biotechnology by incorporating active laboratory work in the classroom.

Sponsored by Bio-Rad Laboratories

Two-Year College Biology Teaching Award

Brian Shmaefsky

Lone Star College - Kingwood, Kingwood, TX

This award recognizes a two-year college biology educator who employs new and creative techniques to demonstrate excellence in teaching and scholarship through publications, teaching strategies, curriculum design, or laboratory utilization.

Sponsored by NABT's Two-Year College Section and Cell Zone, Inc.



Outstanding Biology Teacher Award

For 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[®]
www.carolina.com

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.



OBTA Honorees 2022

Region I

Linda Tanini

Chelmsford High School
North Chelmsford, MA

Region II

Haley Mangieri

West Windsor-Plainsboro
HS North
Plainsboro, NJ

Region III

Kathryn Eilert

Middleton High School
Middleton, WI

Brooke Stewart

South Central Jr/Sr High School
Elizabeth, IN

Britt Czupryna

Niles West High School
Skokie, IL

Martin Perlaky

Springfield High School
Holland, OH

Region IV

Jenna Sinner

Webster High School
Webster, SD

Robert Hamilton

Manhattan High School
Manhattan, KS

Erin Beck

De Soto Senior High School
De Soto, MO

Region V

Amy Allen

Southern Lee High School
Sanford, NC

Region VI

Charlie Pozen

Virgin Islands Montessori School
& Peter Gruber International
Academy
St. Thomas, USVI

Amber Kimbrell

Sparkman High School
Harvest, AL

Lesley Meaux

Parkview Baptist School
Baton Rouge, LA

Tiffany Jones

Rockdale Magnet School
for Science and Technology
Conyers, GA

Region VII

Amanda Cherry

Paradise Valley High School CREST
Phoenix, AZ

Demvia Maslian

New Mexico Military Institute
Roswell, NM

Julia Drake

Plano West Senior High
Plano, TX

Region VIII

Jennie Edgar

Eaglecrest High School
Aurora, CO

Region IX

Kelly Kveton

Edison High School
Huntington Beach, CA

PAST PRESIDENTS & CONFERENCE LOCATIONS

- | | | |
|--|--|--|
| 2021 — Julie Angle, Atlanta, GA | 1992 — Alton L. Biggs, Denver, CO | 1963 — Philip R. Fordyce, U of MA, Amherst, MA w/AIBS |
| 2020 — Sharon Gusky, Online Conference | 1991 — Joseph D. McInerney, Nashville, TN | 1962 — Muriel Beuschlein, Corvallis, OR w/AIBS |
| 2019 — Sherry Annee, Chicago, IL | 1990 — Nancy V. Ridenour, Houston, TX | 1961 — Paul V. Webster, Denver, CO w/AAAS |
| 2018 — Elizabeth Cowles, San Diego, CA | 1989 — John Penick, San Diego, CA | 1960 — Howard E. Weaver, New York, NY w/AAAS |
| 2017 — Susan Finazzo, St. Louis, MO | 1988 — Jane Abbott, Chicago, IL | 1959 — Paul Klinge, Chicago, IL w/AAAS |
| 2016 — Bob Melton, Denver, CO | 1987 — Donald S. Emmeluth, Cincinnati, OH | 1958 — Irene Hollenbeck, Washington, D.C. w/AAAS |
| 2015 — Jane Ellis, Providence, RI | 1986 — George S. Zahrobsky, Baltimore, MD | 1957 — John Breukelman, Indianapolis, IN w/AAAS |
| 2014 — Stacey Kiser, Cleveland, OH | 1985 — Thomas R. Mertens, Orlando, FL | 1956 — John P. Harrold, New York, NY w/AAAS |
| 2013 — Mark Little, Atlanta, GA | 1984 — Marjorie King, Purdue Univ., IN | 1955 — Bro. H. Charles Severin, Atlanta, GA w/AAAS |
| 2012 — Donald French, Dallas, TX | 1983 — Jane Butler Kahle, Philadelphia, PA | 1954 — Arthur J. Baker, Berkeley, CA w/AAAS |
| 2011 — Dan Ward, Anaheim, CA | 1982 — Jerry Resnick, Detroit, MI | 1953 — Leo F. Hadsall, Boston, MA w/AAAS |
| 2010 — Bunny Jaskot, Minneapolis, MN | 1981 — Edward J. Kormondy, Las Vegas, NV | 1952 — Harvey E. Stork, St. Louis, MO w/AAAS |
| 2009 — John M. Moore, Denver, CO | 1980 — Stanley D. Roth, Boston, MA | 1951 — Richard L. Weaver, Philadelphia, PA w/AAAS |
| 2008 — Todd Carter, Memphis, TN | 1979 — Manert Kennedy, New Orleans, LA | 1950 — Betty L. Wheeler, Cleveland, OH w/AAAS |
| 2007 — Pat Waller, Atlanta, GA | 1978 — Glen E. Peterson, Chicago, IL | 1949 — Ruth A. Dodge, New York, NY w/AAAS |
| 2006 — Toby Horn, Albuquerque, NM | 1977 — Jack L. Carter, Anaheim, CA | 1948 — Howard A. Michaud, Washington, D.C. w/AAAS |
| 2005 — Rebecca E. Ross, Milwaukee, WI | 1976 — Haven Kolb, Denver, CO | 1947 — E. Laurence Palmer, Chicago, IL w/AAAS |
| 2004 — Betsy Ott, Chicago, IL | 1975 — Thomas J. Cleaver, Portland, OR | 1946 — Prevo L. Whitaker, Boston, MA w/AAAS |
| 2003 — Catherine W. Ueckert, Portland, OR | 1974 — Barbara K. Hopper, New York, NY | 1945 — Helen Trowbridge, St. Louis, MO w/AAAS |
| 2002 — Brad Williamson, Cincinnati, OH | 1973 — Addison E. Lee, St. Louis, MO | 1944 — Merle A. Russell, No Meeting |
| 2001 — Ann S. Lumsden, Montreal, QC, Canada | 1972 — Claude A. Welch, San Francisco, CA | 1943 — Merle A. Russell, No Meeting |
| 2000 — Phil McCrea, Orlando, FL | 1971 — H. Bentley Glass, Chicago, IL | 1942 — Homer A. Stephens, No Meeting |
| 1999 — Richard D. Storey, Ft. Worth, TX | 1970 — Robert E. Yager, Denver, CO | 1941 — George W. Jeffers, Dallas, TX w/AAAS |
| 1998 — VivianLee Ward, Reno, NV | 1969 — Burton E. Voss, Philadelphia, PA | 1940 — Malcolm D. Campbell, Philadelphia, PA w/AAAS |
| 1997 — Alan McCormack, Minneapolis, MN | 1968 — Jack Fishleder, Anaheim, CA | 1939 — Myrl C. Lichtenwalter, Columbus, OH w/AAAS |
| 1996 — Elizabeth Carvellas, Charlotte, NC | 1967 — William V. Mayer, New York, NY w/AAAS | 1938 — First Formal Meeting*, Richmond, VA w/ AAAS |
| 1995 — Gordon E. Uno, Phoenix, AZ | 1966 — Arnold B. Grobman, Washington, D.C. w/AAAS | |
| 1994 — Barbara Schulz, St. Louis, MO | 1965 — L. S. McClung, U of CA, Berkeley w/AAAS | |
| 1993 — Ivo E. Lindauer, Boston, MA | 1964 — Ted F. Andrews, Boulder, CO w/AIBS | |

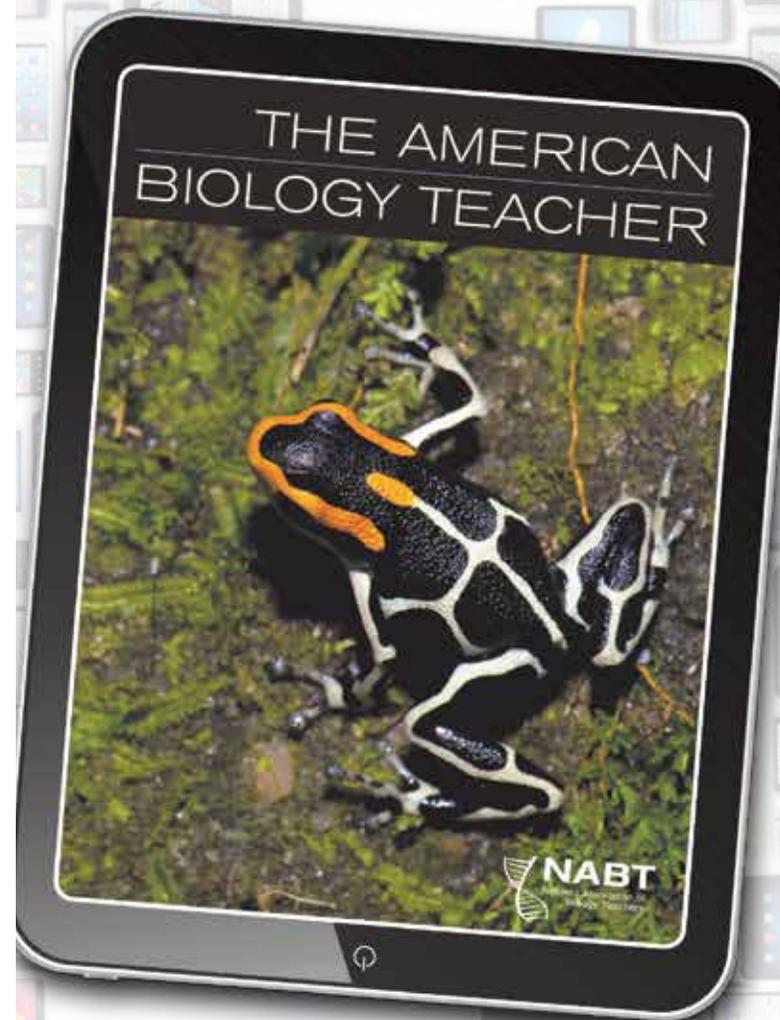
* birth of NABT occurred on July 1, 1938 in New York City, NY

HONORARY MEMBERS

- | | | |
|--|---|--|
| 2021 — Patsy Peebles | 2000 — Elizabeth Carvellas | 1979 — Ingrith Olsen |
| 2020 — Bob Melton | 1999 — NOT AWARDED | 1978 — John A. Moore |
| 2019 — Dennis Gathmann | 1998 — Ivo Lindauer | 1977 — Addison E. Lee |
| 2018 — Michael Sipes | 1997 — Sam Rhine | 1976 — Paul DeHart Hurd |
| 2017 — John M. Moore | 1996 — Kenneth S. House | 1975 — Garrett Hardin, Stanley E. Williamson |
| 2016 — Margaret (Betsy) Ott | 1995 — Joseph D. Novak | 1974 — H. Seymour Fowler |
| 2015 — Sharon Radford | 1994 — Nancy V. Ridenour, Alton L. Biggs | 1973 — William V. Mayer |
| 2014 — Jay Labov | 1993 — George S. Zahrobsky | 1972 — Chester A. Lawson, Paul E. Klinge,
Robert L. Gantert |
| 2013 — Todd Carter | 1992 — Jon R. Hendrix | 1971 — NOT AWARDED |
| 2012 — Maura Flannery | 1991 — Robert E. Yager | 1970 — NOT AWARDED |
| 2011 — Louisa Stark | 1990 — Jane Butler Kahle | 1969 — Arnold B. Grobman |
| 2010 — Patricia Waller, Brad Williamson | 1989 — Joseph D. McInerney | 1968 — NOT AWARDED |
| 2009 — NOT AWARDED | 1988 — Thomas Mertens, Marjorie King | 1967 — NOT AWARDED |
| 2008 — Donald Cronkite | 1987 — Floyd Nordland | 1966 — NOT AWARDED |
| 2007 — William H. Leonard | 1986 — Donald S. Dean | 1965 — John Breukelman, H. Bentley Glass, George W.
Beadle, Paul B. Sears, Brother H. Charles Severin |
| 2006 — Terry Hufford | 1985 — Stanley Weinberg | 1964 — E. Laurence Palmer, Hermann J. Muller,
Roger Tory Peterson, Oscar Riddle,
Helen Irene Battle |
| 2005 — Randy Moore, Eugenie Scott | 1984 — Jack Carter, Samuel Postlethwait | |
| 2004 — John Penick | 1983 — Manert Kennedy | |
| 2003 — Donald Emmeluth | 1982 — Harold “Sandy” Wiper, Jerry P. Lightner | |
| 2002 — Leonard Blessing | 1981 — Sophie Wolfe | |
| 2001 — Gordon E. Uno | 1980 — Sister M. Gabrielle, Ted F. Andrews,
Sister Marian Catherine McGrann | |

NABT DISTINGUISHED SERVICE AWARD RECIPIENTS

- 2021 — Jeff Corwin, Marshfield, MA
2020 — NOT AWARDED
2019 — Bonnie Bassler, Princeton University, Princeton, NJ
2018 — Ed Yong, The Atlantic, Washington, D.C.
2017 — May Berenbaum, University of Illinois Urbana-Champaign, Urbana, IL
2016 — Temple Grandin, Colorado State University, Fort Collins, CO
2015 — Carl Zimmer, Yale University, New Haven, CT
2014 — The Lacks Family (descendents of Henrietta Lacks), Baltimore, MD
2013 — Rita R. Colwell, University of Maryland College Park and Johns Hopkins University Bloomberg School of Public Health, College Park, MD
2012 — Michael Pollan, UC Berkeley Graduate School of Journalism, Berkeley, CA
2011 — Neil Shubin, University of Chicago, Chicago, IL
2010 — Richard Dawkins, The Richard Dawkins Foundation for Reason and Science, Falcon, CO
2009 — Mario Capecchi, University of Utah, Salt Lake City, UT
2008 — Ken Miller, Brown University, Providence, RI
2007 — Sean Carroll, University of Wisconsin — Madison, Madison, WI
2006 — Shirley Malcom, AAAS, Washington, D.C.
2005 — James A. Thompson, University of Wisconsin—Madison, Madison, WI; and Nina Leopold Bradley, Aldo Leopold Foundation, Baraboo, WI
2004 — Barbara Bancroft, RN, CPP Associates, Inc., Chicago, IL
2003 — Roberta Pagon, M.D., Children's Hospital & Regional Medical Center, Seattle, WA
2002 — Thomas E. Lovejoy, The H. John Heinz III Center for Science, Economics and the Environment, Washington, D.C.
2001 — E.O. Wilson, Harvard University, Cambridge, MA
2000 — Roger and Deborah Fouts, Chimpanzee and Human Communication Institute, Ellensburg, WA
1999 — Jack Horner, Museum of the Rockies, Bozeman, MT
1998 — Leroy Hood, University of Washington, Seattle, WA
1997 — Neal Lane, National Science Foundation, Washington, D.C.; and Donald Kennedy, Stanford University, Palo Alto, CA
1996 — Francis Collins, National Institutes of Health, Bethesda, MD
1995 — Carl Djerassi, Stanford University, Palo Alto, CA
1994 — Bruce Alberts, National Academy of Sciences, Washington, D.C.
1993 — Nancy S. Wexler, College of Physicians and Surgeons of Columbia University, New York State Psychiatric Institute, New York, NY
1992 — Paul R. Ehrlich, Stanford University, Palo Alto, CA
1991 — Stephen Jay Gould, Harvard University, Cambridge, MA
1990 — Peter Raven, Missouri Botanical Garden, St. Louis, MO
1989 — Stanley Cohen, Stanford University, Palo Alto, CA
1988 — Lynn Margulis, University of Massachusetts, Boston, MA; and James D. Watson, Cold Spring Laboratory, Cold Spring Harbor, NY



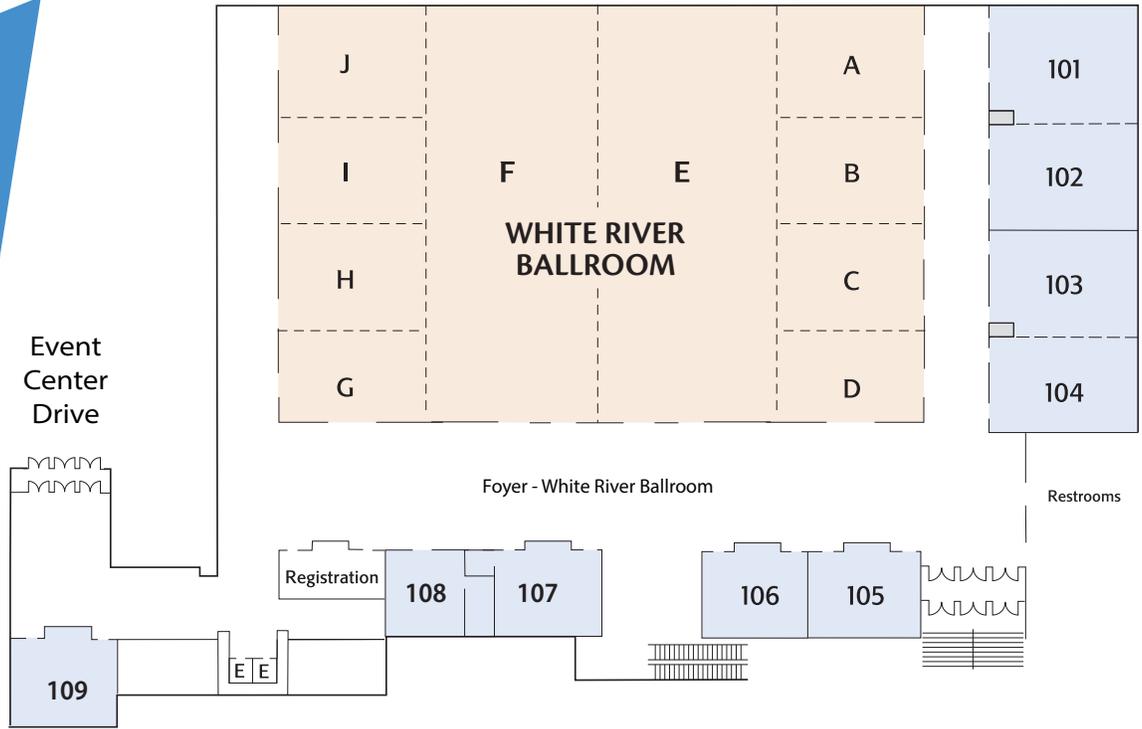
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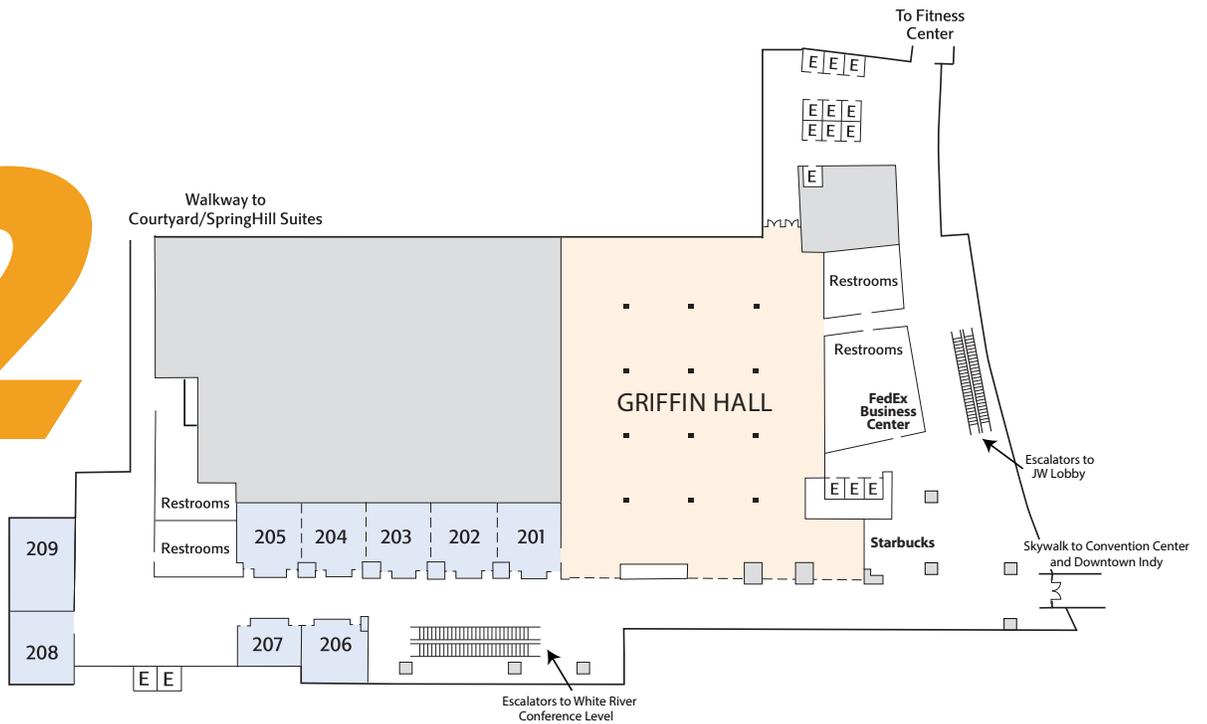
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LEVEL 1



LEVEL 2



LEVEL 3



SPECIAL WORKSHOPS (TICKETS REQUIRED)

Thursday, November 10 | 11:30AM – 3:30PM

HudsonAlpha's FILTERED: A Story-Driven Approach to Bioinformatics Concepts

FREE | Lunch Provided

FILTERED is an online module that introduces students to the biological concepts and logical thinking skills used in bioinformatics and DNA analysis. FILTERED seeks to build a conceptual understanding of the function of commonly used computational tools by engaging students in a series of puzzle games that simulate the computer's function in DNA analysis. Set in a fictitious global pandemic, FILTERED anchors students in biological content that is eerily applicable today.

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Interactions in General Education Life Science Courses (IGELS): Tools, Tips, & Strategies to Enhance Undergraduate Biology for Non-majors

FREE | Lunch Provided

This interactive, inquiry-based workshop will engage participants in practical activities to help students see the relevance and importance of science to their lives and increase their reasoning and science process skills. Presenters will share strategies and practices to enhance the learning of biology through a focus on interactions, DEI considerations, civic engagement, identifying appropriate curricular resources, and alternative assessments. Participants will leave the workshop with ideas and materials they can immediately implement in their own courses, as well as information about becoming part of this growing network of general education instructors and researchers through the NSF-funded IGELS project.

Sponsored by



Writing Selected-Response Items for HHMI BioInteractive's Assessment Builder

FREE | Lunch Provided

Participants will explore effective practices for constructing and reviewing selected-response assessment items. You may submit the items you develop to Assessment Builder, a crowdsourced database of high-quality biology questions.

Sponsored by



Thursday, November 10 | 12:30PM – 3:30PM

Using Guided Inquiry to Teach Anatomy and Physiology Core Concepts

FREE

Participants will explore inquiry-based activities addressing homeostasis and, more specifically, cardiovascular physiology. In these activities, students use scientific process skills to develop understanding of core concepts in anatomy and physiology.

Storylining in Biology for Coherent Instruction

FREE

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.

NABT NETWORKING LUNCHES

Friday, November 11 | 12:45PM – 1:45PM

FREE | Lunch Provided

All attendees are invited to pick up a boxed-lunch 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 in-between, you will want to grab your lunch, grab a seat, and connect with other high school biology teachers in this informal setting.

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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 colleagues in person. The luncheon includes a special presentation of the *Kim Foglia AP Biology Service Award*.

Sponsored by 

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.

Four-Year College & University Section Luncheon

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*.

Friday, November 11
5:00PM – 7:00PM

HHMI Night at the Movies

FREE

Join us for a sneak peek of WILD HOPE, a new series of short films from HHMI Tangled Bank Studios highlighting the intrepid changemakers who are working to restore and protect our planet. Each half-hour episode inspires audiences with stories of bold interventions, unexpected alliances, and nature's resilience. Whether tapping oysters to clean New York City waters and prevent flooding, or growing coffee to save Mozambican rainforests, the series reveals how local action can spark powerful change—and provides a refreshing dose of hope in an increasingly cynical world.

Sponsored by 

Saturday, November 12
7:30AM – 8:45AM

NABT BioClub Breakfast

FREE (Tickets Required)

The BioClub continues to grow, with new chapters being formed at K-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.

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SPECIAL EVENTS

Saturday, November 12
11:30AM – 2:00PM

2022 NABT Honors Luncheon

Tickets Required •
\$50 Advance/ \$60 Onsite

NABT is proud to recognize the 2022 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 12
6:00PM – 8:00PM

NABT at the NCAA Hall of Champions

Tickets Required •
\$35 Advance/ \$45 Onsite

Show your school spirit at this interactive museum where all 24 NCAA sports are represented. Exhibits include trivia challenges, team rankings, video highlights, and artifacts donated from colleges and universities around the nation. There is also a fully interactive area to compete virtually and hands-on through sports simulators, a 1930s retro gymnasium, ski simulator, and more.

The museum is a short walk from the hotel and tickets include admission, light appetizers, and drinks. A shuttle will also be provided.



Abington Heights High School, Clarks Summit, PA
 American International School of Muscat, North Chesterfield, VA
 Arcadia High School, Phoenix, AZ
 Archbishop Curley High School, Baltimore, MD
 Arroyo High School, San Lorenzo, CA
 Athens High School, Troy, MI
 Ayala High School, Chino Hills, CA
 The Barstow School, Kansas City, MO
 Bethlehem High School, Bardstown, KY
 Bishop Garcia Diego High School, Santa Barbara, CA
 Bloomington High School South, Bloomington, IN
 Brentwood Academy, Brentwood, TN
 Broad River Elementary, Beaufort, SC
 Cabarrus Kannapolis Early College High School, Concord, NC
 Canadian Valley Technical Center, OK
 Caney Valley High School, Ramona, OK
 Cardinal Gibbons High School, Raleigh, NC
 Carrboro High School, Carrboro, NC
 Castle Park High School, Chula Vista, CA
 Center for Advanced Professional Studies, Overland Park, KS
 Central Carolina Technical College, Sumter, SC
 Central Falls High School, Central Falls, RI
 Central Magnet School, Murfreesboro, TN
 Charleston High School, Greenup, IL
 Chelan High School, Chelan, WA
 Chester High School, Chester, PA
 Clayton High School, Clayton, MO
 Colonia High School, Colonia, NJ
 Coronado High School, Colorado Springs, CO
 Cuyohoga Community College, Macedonia, OH
 Darnell-Cookman School of the Medical Arts, Jacksonville, FL
 DeVry Advantage Academy, Chicago, IL
 Dora R-III School, Dora, MO

Dougherty Valley High School, San Ramon, CA
 Eastern Mennonite High School, Harrisonburg, VA
 El Centro College, Dallas, TX
 Elkhart High School, Elkhart, IN
 Emmett High School, Emmett, ID
 Fairhaven High School, Fairhaven, MA
 Florida SouthWestern State College, Naples, FL
 Freedom High School, Freedom, WI
 George Washington High, Charleston, WV
 Gillette College, Gillette, WY
 Grafton High School, Grafton, WI
 Grand View University, De Moines, IA
 Grandville High School, Grandville, MI
 Greater Lowell Technical High School, Tyngsborough, MA
 Greater New Bedford Regional Vocational Technical High School, New Bedford, MA
 Greensburg Salem High School, Greensburg, PA
 Harmony School in Innovation, Katy, TX
 Heathwood Hall Episcopal School, Columbia, SC
 Hillsboro High School, Hillsboro, OR
 Hilltop High School, Chula Vista, CA
 Holt High School, Holt, MI
 The Independent School, Wichita, KS
 Interboro High School, Prospect Park, PA
 Kenmore West High School, Buffalo, NY
 Kent County High School, Worton, MD
 Kettle Run High School, Nokesville, VA
 Lake Metroparks, Concord, OH
 Lakeville North High School, Lakeville, MN
 Lexington High School, Mansfield, OH
 Los Fresnos High School, Los Fresnos, TX
 Martin Luther College, New Ulm, MN
 Mary Persons High School, Forsyth, GA
 Marysville High School, Marysville, KS
 McDowell Intermediate High School, Erie, PA
 Metropolitan Community College, Omaha, NE
 Midland Park High School, Midland Park, NJ
 Minnetonka High School, Minnetonka, MN
 Morganton, NC West Mifflin Area High School, West Mifflin, PA
 Moscow High School, Moscow, ID
 Mount Abraham Union High School, Bristol, VT
 Nassau Community College, Garden City, NY

Northampton Area High School, Northampton, PA
 Olivet Nazarene University, Bourbonnais, IL
 Palm Tree School, Fairfax, VA
 Panorama High School, Panora, IA
 Perkins High School, Sandusky, OH
 Pike High School Freshman Center, Indianapolis, IN
 Pikeview High School, Princeton, WV
 Putnam City High School, Oklahoma City, OK
 Riverside City College, Riverside, CA
 Salem High School, Salem, IN
 Saltsburg High School, Saltsburg, PA
 Seabury Hall, Makawao, HI
 Seneca East High School, Attica, OH
 Sherando High School, Winchester, VA
 Skyline High School, Sammamish, WA
 Snow College, Ephraim, UT
 Southeast Community College, Lincoln, NE
 South Central Jr Sr High School, Elizabeth, IN
 Southern Wells High School, Poneto, IN
 Sprague High School, Salem, OR
 St. Andrew's Episcopal School, Potomac, MD
 St. Clair High School, St. Clair, MI
 State Library of PA, Lykens, PA
 Stillwater High School, Stillwater, OK
 Stouffville District Secondary School, Whitchurch-Stouffville, ON, Canada
 The Summit County Day School, Cincinnati, OH
 Sunlake High School, Land O'Lakes, FL
 Tiffin Columbian High School, Tiffin, OH
 Unionville High School, Kennett Square, PA
 University Christian High School, Hickory, NC
 Ursuline Academy, Dedham, MA
 Valley View High School, Archbald, PA
 Vincennes University, Vincennes, IN
 Visitation Academy - Saint Louis, St. Louis, MO
 Walters State Community College, Morristown, TN
 Western Piedmont Community College, Morganton, NC
 West Mifflin Area High School, West Mifflin, PA
 Wheeling Park High School, Wheeling, WV
 Worthington Christian High School, Worthington, OH
 York Community High School, Marion, IL



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

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

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EDITED BY DAN BARRETT SHENANIGANS COURTESY JULIUS PEPPERWOOD AND SARA BEAR MUSIC BY 80S MIX TAPES

BASED ON THE ORIGINAL WORK BY BARB HOLMBERG AND GARY HOLMBERG DIRECTED BY JACKI REEVES-PEPIN



THURSDAY

DAY



**11:30AM - 1:30PM****NABT Board of Directors Meeting & Leader Lunch**

204-205 (Level 2) • Committee Meeting
• Invitation Only

11:30AM - 3:30PM

3416 Interactions in General Education Life Science Courses (IGELS): Tools, Tips, & Strategies to Enhance Undergraduate Biology for Non-majors

201-203 (Level 2) • Instructional Strategies • Special Workshop (Tickets Required) • 2Y, 4Y

This interactive, inquiry-based workshop will engage participants in practical activities to help students see the relevance and importance of science to their lives and increase their reasoning and science process skills. Presenters will share strategies and practices to enhance the learning of biology through a focus on interactions, DEI considerations, civic engagement, identifying appropriate curricular resources, and alternative assessments. Participants will leave the workshop with ideas and materials they can immediately implement in their own courses, as well as information about becoming part of this growing network of general education instructors and researchers through the NSF-funded IGELS project.

Bryan Dewsbury, Florida International University, Miami, FL; Sam Donovan, BioQUEST, Pittsburgh, PA; Karla Fuller, Gutmann Community College, New York, NY; Tamar Goulet, University of Mississippi, MS; Justin Hoshaw, Waubensee Community College, Sugar Grove, IL; Kristin Jenkins, University of Texas at Austin, Austin, TX; John Moore, Taylor University, Upland, IN; Heather Rissler, North Iowa Area Community College, Mason City, IA; Davida Smyth, Texas A&M University-San Antonio, San Antonio, TX; Gordon Uno, University of Oklahoma, Norman, OK

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SPECIAL PROGRAMMING PRESENTED BY HUDSONALPHA

3411 HudsonAlpha's FILTERED: A Story-Driven Approach to Bioinformatics Concepts

JW Grand 3 (Level 3) • General Biology • Special Workshop (Tickets Required) • HS, 2Y

FILTERED: a story-driven digital learning platform for bioinformatics is an online module that introduces students to the biological concepts and logical thinking skills used in bioinformatics and DNA analysis. **FILTERED** seeks to build a conceptual understanding of the function of commonly used computational tools by engaging students in a series of puzzle games that simulate the computer's function in DNA analysis. Set in a fictitious global pandemic, **FILTERED** anchors students in biological content that is eerily applicable today.

Madelene Loftin, Michele Morris, and Neil Lamb, HudsonAlpha Institute for Biotechnology, Huntsville, AL

Sponsored by



3425 Writing Selected-Response Items for HHMI BioInteractive's Assessment Builder

JW Grand 4 (Level 3) • Curriculum Development • Special Workshop (Tickets Required) • HS, 2Y, 4Y

We will explore effective practices for constructing and reviewing selected-response assessment items. You may submit the items you develop to Assessment Builder, a crowdsourced database of high-quality biology questions.

Rebecca Orr, Collin College, Plano, TX and Peggy Brickman, University of Georgia, Athens, GA

Sponsored by



12:30PM – 3:30PM

3362 Using Guided Inquiry to Teach Anatomy and Physiology Core Concepts

JW Grand 1 (Level 3) • Anatomy & Physiology • Special Workshop (Tickets Required) • HS, 2Y, 4Y

Participants will explore inquiry-based activities addressing homeostasis and, more specifically, cardiovascular physiology. In these activities, students use scientific process skills to develop understanding of core concepts in anatomy and physiology.

Murray Jensen, University of Minnesota, New Brighton, MN and Kerry Hull, Bishop's University, Sherbrooke, QC, Canada

3408 Storylining in Biology for Coherent Instruction

JW Grand 2 (Level 3) • Instructional Strategies • Special Workshop (Tickets Required) • HS

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.

Jason Crean, All Species Education Consulting, Orlando, FL and Kristin Rademaker, All Species Education Consulting, Freeport, IL

2:30PM – 3:00PM

NABT Open Forum

204-205 (Level 2) • Committee Meeting • GA

The NABT Board of Directors and Executive Director will lead this interactive discussion focused on the current state of the association. They will also share updates on the strategic planning process that has been initiated. Everyone is invited to learn more about our operations, provide feedback on the programs we support, and get involved with NABT.

4:00PM – 5:30PM

GENERAL SESSION

Tracie Delgado

➔ See biography on page 8

Mentoring Strategies That Promote Diversity & Inclusion in the Sciences

White River Ballroom (Level 1) • Special Speaker (90 min) • GA

As a Latina who grew up in poverty, the cards were stacked against Tracie Delgado to attend college and reach her dreams of becoming a scientist. Dr. Delgado will share the struggles she encountered and the role of mentors in her life that have allowed her, and others like her, to obtain advanced degrees in the sciences. As a teacher-scholar, she values the opportunity to mentor undergraduate students both in the classroom and in the lab.

The Delgado research lab aims to understand how gammaherpesviruses cause cancer by altering host cell metabolism, and experiments are completely undergraduate student-driven. Her student-researchers lead their own independent research projects, search literature in the field, ask questions, write experimental protocols, generate data, and present their findings at research conferences. Dr. Delgado will share her inclusive mentoring strategies in developing independent scientists and her efforts to promote diversity and inclusion in the sciences.

5:30PM – 7:30PM

Exhibit Hall Grand Opening Reception

JW Grand 5-6 (Level 3) • Special Event • GA

We welcome you to Indy with a special opening of the 2022 NABT Exhibit Hall. Our vendor and partner community will showcase the latest and greatest resources for teaching biology, helping you find those familiar favorites and new innovations.

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6:30PM – 7:30PM

NABT Past President's Advisory Council Meeting & Reception

Presidential Suite • Invitation Only

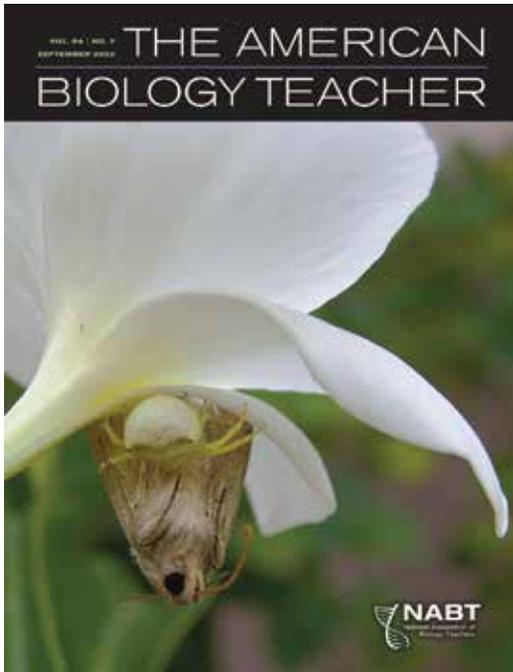
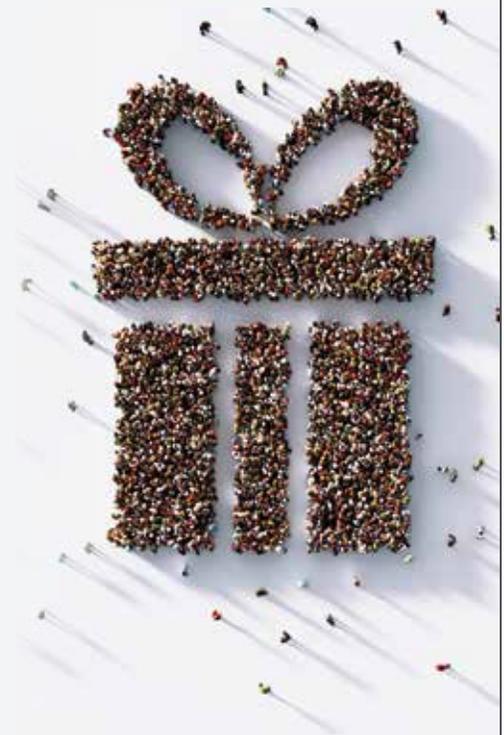


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FRI DAY





7:30AM – 8:30AM

NABT First Timers' Coffee Break

JW Grand 7 (Level 3)

• Special Event • GA

First-time attendees are invited to learn more about NABT, the 2022 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 Indianapolis.

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



8:00AM – 9:00AM

SPECIAL PROGRAMMING PRESENTED BY MINIPCR

3444 Build It to Understand It: An Active Learning, Low-Cost Approach to Electrophoresis and Micropipetting

JW Grand 3 (Level 3) • Biotechnology • MS, HS, GA

The new Bandit™ STEM Electrophoresis Kit allows students to assemble and use a high-quality electrophoresis system with well-thought-out labs, all at a price you didn't think was possible!

Bruce Bryan, miniPCR bio, Cambridge, MA

SPECIAL PROGRAMMING PRESENTED BY BIO-RAD

3439 PCR Amplified: Advanced Topics & Techniques

JW Grand 2 (Level 3) • Biotechnology • Hands-on Workshop (60 min) • HS, 2Y, 4Y

From dyes to droplets, learn what's new in PCR including quantitative PCR (qPCR, aka real-time PCR), droplet digital PCR (ddPCR), and applications for studying gene expression, disease outbreaks, and more.

Cassy Granieri, Damon Tighe, and Leigh Brown, Bio-Rad Laboratories, Hercules, CA

9:15AM – 10:15AM

GENERAL SESSION

Sarah Miller

➔ See biography on page 9

Inclusive Learning through Scientific Teaching

White River Ballroom (Level 1) • Special Speaker (60 min) • GA

Achieving equity in science requires attracting and retaining students from diverse backgrounds. Despite decades of calls for action, change has been slow. Recommendations have largely focused on members of underrepresented groups themselves rather than on fixing the classrooms that drive many students out of science. Miller will shed light on how instructors can leverage scientific teaching practices and AJEDI (antiracist, just, equitable, diverse, and inclusive) principles to foster inclusive learning in biology.

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

Lab-aids
Proven Science Programs

Visit us at Booth #410, in our NABT workshops, or online at lab-aids.com/SGI

10:30AM - 12:30PM

Chewing on Change

2022 NABT Evolution Symposium Presented by NCSE

201-203 (Level 2) • Evolution • Symposium (120 min) • HS, 2Y, 4Y

The Tales Teeth Tell Us: Decoding the Ancient Lives of Mammals

Teeth come in a variety of shapes and sizes and help us understand the evolutionary history of mammals. In addition, they can also paint a more vivid picture of the ecology of ancient mammals. By examining tooth shape and size, their chemical signatures, and even the microscopic wear patterns on teeth, paleontologists can assess the types of plants or prey consumed by prehistoric mammals. Using examples from ancient horses, tapirs, sabertooth cats, and marsupial lions, this session will explore ways we infer the ecology of extinct mammals, highlight how these efforts are relevant when assessing impacts of climate change on mammalian communities, and reveal cautionary conservation lessons that are of direct relevance to today.

Larisa DeSantis, Vanderbilt University, Nashville, TN

NCSE Teacher Workshop: Straight from the Horse's Mouth

Gallop through time to explore how variation within a population is an essential driving factor in natural selection. Teachers will explore a free lesson set highlighting the evolution of horses. Investigate how significant ecological change can result in dramatic speciation events by using an extensive collection of fossil evidence—horse teeth. Walk away with a hands-on activity grounded in primary evidence that utilizes a genuine paleontological scientific practice for analyzing how change occurs in a taxon over time. This NGSS-aligned storyline also works to resolve common misconceptions about orthogenetic evolution frequently reinforced on social media and inadvertently perpetuated in some educational settings.

Jennifer Broo, Mariemont High School, Cincinnati, OH and Lin Andrews, National Center of Science Education, Oakland, CA

2022 NABT EVOLUTION SYMPOSIUM



NCSE National Center for Science Education

Chewing on Change



The Tales Teeth Tell Us: Decoding the Ancient Lives of Mammals

Dr. Larisa DeSantis, *Vanderbilt University, Nashville, TN*

Join Dr. Larisa DeSantis, a vertebrate paleontologist, as she explores ancient teeth as a window into the evolutionary history of mammals and the relevance of that history today.

NCSE TEACHER WORKSHOP: Straight from the Horse's Mouth

Jennifer Broo, Lin Andrews

Investigate how significant ecological change can result in dramatic speciation events by using an extensive collection of fossil evidence—horse teeth—as part of a freely available NCSE lesson set.





10:30AM – 11:45AM

3434 Writing for the ABT

104 (Level 1) • Curriculum Development
• Hands-on Workshop (75 min) • HS, 2Y, GA

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

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

3278 American Association of Immunologists Teachers Research Program – Immunology Lessons for the Classroom

White River A (Level 1) • Curriculum Development • Hands-on Workshop (75 min) • ML, HS, 2Y

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

Mike Criscitiello, American Association of Immunologists, College Station, TX

3296 Teaching Human Ecology with Models and Simulations

White River B (Level 1) • Ecology / Environmental Science / Sustainability
• Hands-on Workshop (75 min) • ML

Discover inquiry-based simulations and modeling activities that explore complex interactions between people and the environment, including population growth, global land and water use, wildlife habitats, and interdependent relationships in ecosystems.

Marni Landry, Grand Canyon University, Phoenix, AZ

SPECIAL PROGRAMMING PRESENTED BY PIVOT

3440 Phenomena-Based, Active Learning with Pivot Interactives

White River C • Technology in the Classroom • Demonstration (75 min) • MS, HS, GA

See the newest ways Pivot Interactives gives biology teachers tools to actively engage students in science practices through phenomena.

Eric Friberg, Pivot Interactives, Mendota Heights, MN

3329 Student Designs for a Sustainable Future – Explore Biodiversity Conservation in a Place You Choose

White River D (Level 1) • Ecology / Environmental Science / Sustainability
• Hands-on Workshop (75 min) • ML, HS, 4Y

Explore the Half-Earth Map and a new feature that lets you and your students draw or paste your own area of interest to decide about its conservation potential.

Dennis Liu, E.O. Wilson Biodiversity Foundation, Potomac, MD and Selim Tlili, Rudolph Steiner School, New York, NY

3384 Formative Assessment: The Other F Word

White River G (Level 1) • Instructional Strategies • Hands-on Workshop (75 min) • ML, HS

Learn examples of fun, fast, and easy formative assessments to use in the classroom for AP and on-level. You won't see shoulder partners or think-pair-share here.

Julia Drake and Linda Alloju, Plano West Senior High School, Plano, TX

3361 Teaching AP Biology in Community for Social Justice: Authentic Science and Justice-oriented Approaches Through Inquiry

White River J (Level 1) • AP Biology • Hands-on Workshop (75 min) • HS

Join us for uplifting, interactive discussion featuring AP Bio-aligned lessons that engage students in collaborative, meaningful ways so the AP science practices can become a personal toolkit of empowerment.

Kirstin Milks, Bloomington High School South, Bloomington, IN and David Upegui, Central Falls High School, Central Falls, RI

SPECIAL PROGRAMMING PRESENTED BY BFW PUBLISHERS

3453 Efficiently Teaching the Science Practices in AP® Biology

204-205 (Level 2) • AP Biology • Hands-on Workshop (75 min) • HS

This session will provide AP® Biology teachers ideas, bell ringers, and activities for numerous opportunities to practice the process of science and much more (assessment etc!) throughout the school year.

Jim Smanik, Sycamore High School, Montgomery, OH

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

206 (Level 2) • Committee Meeting (75 min) •

Enya Granados, Committee Chair

SPECIAL PROGRAMMING PRESENTED BY HUDSONALPHA

3366 Challenge Accepted!!

302-303 (Level 3) • General Biology • Hands-on Workshop (75 min) • ML, HS

Utilize a single digital resource to address both agricultural and human health challenges. Participants will rotate through a smorgasbord of HudsonAlpha's Biotech Timeline-based lessons.

Jennifer Hutchison and Madelene Loftin, HudsonAlpha Institute for Biotechnology, Huntsville, AL

10:30AM – 11:45AM CONT.

3323 Student Success in the Community College Ecosystem**304-306 (Level 3) • Science Practices • Symposium (75 min) • 2Y**

A panel of two-year college faculty will share how they promote student success and faculty scholarship at their institutions, providing recommendations to those looking to do similar work.

Cleo Rolle, Capital Community College, CT; Vedham Karpakakunjaram, Montgomery College, MD; Jayme Dyer, Durham Technical Community College, Durham, NC; Ranya Taqieddin, St. Charles Community College, St. Louis, MO; Merrie Richardson, Southcentral Kentucky Community & Technical College, Bowling Green, KY; Sheela Vemu, Waubesa Community College, Aurora, IL; Andrew Lee, Northern Virginia Community College, Alexandria, VA

Member Resources Committee**308 (Level 3) • Committee Meeting (75 min) • GA**

Catherine Ambos, Committee Chair

3322 Climate Anxiety? You're Not Alone: Teaching Climate Science While Addressing Student Environmental Despair**309-310 (Level 3) • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • ML, HS**

Attendees will walk through a climate change task designed to teach an already anxious generation of future scientists while addressing environmental despair with a toolkit of trauma-informed practices.

Erin Capra, West High School, Salt Lake City, UT; Erin Smith, Berkeley High School, Berkeley, CA; Lucas Risinger, West Albany High School, Albany, OR

SPECIAL PROGRAMMING PRESENTED BY BIO-RAD**3457 Hands-On Chromosomal Gene Editing with the Out of the Blue CRISPR Kit****JW Grand 2 (Level 3) • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

CRISPR's most relevant uses require more than just knockouts! In this hands-on workshop, you'll use CRISPR-Cas9 to cut and repair an E.coli chromosomal gene while learning about essential experimental controls.

Cassy Granieri, Damon Tighe, and Leigh Brown, Bio-Rad Laboratories, Hercules, CA

3432 Interactive Video Builder: A New HHMI BioInteractive Tool for Enhancing Learner Engagement**JW Grand 4 (Level 3) • Instructional Strategies • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

We will introduce a tool for creating interactive videos that ask learners about their thinking. We will also experience, build, and design a lesson plan that integrates an interactive video.

Annie Prud'homme-Généreux, Capilano University, North Vancouver, BC, CAN and Mark Nielsen, HHMI BioInteractive, Fort Collins, CO

12:00PM – 12:30PM

SPECIAL PROGRAMMING PRESENTED BY XR GURU**3462 Using Virtual Reality for Science Education****104 (Level 1) • General Biology • Hands-on Workshop (30 min) • ML, HS, 4Y**

Learn about best practices for integrating virtual reality in your science class, and personally view the VR content in a headset.

Doug Smith, XR Guru, Dublin, OH

3307 A Cancer Case Study Storyline and PLC Research Lesson**White River A (Level 1) • General Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y**

Enjoy conversation about our Cancer Storyline and PLC research lesson collaboration with the University of Chicago Comprehensive Cancer Center EYES (Educators and Youth Enjoy Science) teacher research experience.

Steven Rogg, Coherent Learning Design, Lindenhurst, IL; Basia Galinski, University of Chicago, Chicago, IL; Pam Wagner, Chicago Public Schools, Chicago, IL

SPECIAL PROGRAMMING PRESENTED BY MINIPCR**3443 Bringing Real CRISPR-Cas9 to Your Class with Accessible Tools: In vivo and In vitro!****JW Grand 3 (Level 3) • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

See our multiple approaches to CRISPR-Cas9 Alter DNA and change a phenotype in bacteria with Knockout!™. Manipulate DNA *in vitro* with Chopped!™. Try our free resources too!

Bruce Bryan, miniPCR bio, Cambridge, MA



12:00PM – 12:30PM CONT.

3394 Some Like it Hot: Extremophiles of Yellowstone National Park

White River B (Level 1) • Ecology / Environmental Science / Sustainability • Hands-on Workshop (30 min) • ML, HS, GA

Engage students in evidence-based argumentations using extremophiles of Yellowstone National Park. This presentation describes a lesson designed to strengthen students' understanding of resource availability, even in the harshest of ecosystems.

Julie Angle, Oklahoma State University, Stillwater, OK

3297 Budburst Community Science: Observing Plants in a Changing World

White River C (Level 1) • General Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Budburst is a community science project that engages people in investigating local plant phenomena. Learn how your class can participate in authentic research while exploring plants, ecosystems, and climate change.

Sarah Jones, Chicago Botanic Garden, Glencoe, IL

3313 Bringing Mock Surgeries to Dissection

White River D (Level 1) • Anatomy & Physiology • Demonstration (30 min) • HS

In this session, we will discuss how we add mock surgeries and suturing to our dissections of hearts, lungs, kidneys, cow eyes, and fetal pigs.

Ken Bateman and Carolyn Spangler, Wellesley High School, Wellesley, MA

3420 Operating Without a Net: Using Drones and Other Technologies to Provide Course-Based Undergraduate Research Experiences

White River G (Level 1) • Instructional Strategies • Demonstration (30 min) • 4Y

This session will explore novel approaches to the use of technology as a tool to help develop research skills in undergraduate biology courses. This is special presentation from the winner of the 2021 NABT Four-Year College & University Biology Teaching Award.

Jason Bruck, Stephen F. Austin State University, Nacogdoches, TX

3330 Breaking Bonds Does NOT Release Energy: Addressing Misconceptions About Energy in Biology

White River J (Level 1) • General Biology • Demonstration (30 min) • ML, HS, GA

Biology often takes shortcuts that foster misconceptions about energy. Wendy Johnson will share examples from the course she created to help 9th graders develop an accurate understanding of energy in biological processes.

Wendy Johnson, Kentwood Public Schools, Kentwood, MI

SPECIAL PROGRAMMING PRESENTED BY BFW PUBLISHERS

3452 On Time: A Hands-On Workshop Exploring the History of Earth and Life

204-205 (Level 2) • Evolution • Hands-on Workshop (30 min) • HS, 4Y, GA

In this workshop, we will do an activity together that introduces students to the long sweep of Earth's history, key events in evolution, and a sense of time and scale.

James Morris, Brandeis University, Waltham, MA

Retired NABT Members Committee

206 (Level 2) • Committee Meeting (75 min) • GA

Dennis Gathmann, Committee Chair

3271 Hot and STEAM-Y: The "A" in STEAM: Expanding Vision of How Science is Taught

302-303 (Level 3) • Instructional Strategies • Hands-on Workshop (30 min) • GA

Participants will learn art integration strategies to enhance student engagement. The strategies are from the ARTeacher program developed by the University of Arkansas and Crystal Bridges museum.

Linda Stocker and Matthew Holden, Fayetteville High School, Fayetteville, AR

3325 Disabilities and the Life Sciences: Equity, Inclusion, and Universal Design

304-306 (Level 3) • Instructional Strategies • Paper (30 min) • HS, 2Y, 4Y

Universal Design is a collection equity-driven strategies, techniques, and practices that assist educators in providing inclusive opportunities to diverse learners in the classroom, including disabled students.

Tara Jo (TJ) Holmberg, Northwestern Connecticut Community College, Winsted, CT

Awards Committee

308 (Level 3) • Committee Meeting (75 min) • GA

Jason Crean, Committee Chair

3310 Connecting Scientific Learners through Science Buddies

309-310 (Level 3) • Curriculum Development • Hands-on Workshop (30 min) • ELEM, HS, GA

Bringing science into the classroom is important, why not bring high school and elementary students together to teach, foster relationships, and add excitement into the classroom?

Alyce Myers, Lafayette Jefferson High School, Lafayette, IN

12:00PM – 12:30PM CONT.

SPECIAL PROGRAMMING
PRESENTED BY BIO-RAD**3459 Track Disease Spread
Using Modeling and Gel
Electrophoresis****JW Grand 2 (Level 3) •
Biotechnology • Hands-on
Workshop (30 min) • HS, 2Y, 4Y**

Put your epidemiologist hat on and determine the transmission mode of a new virus using molecular data, patient histories, and clues hidden in a restaurant.

Cassy Granieri, Damon Tighe, and Leigh Brown, Bio-Rad Laboratories, Hercules, CA

SPECIAL PROGRAMMING
PRESENTED BY MINIPCR**3445 miniPCR Sleep Lab:
Are You a Night Owl? Or
a Morning Lark? Ask
Your Genes!****JW Grand 3 (Level 3) •
Genetics • Hands-on Workshop
(30 min) • HS, GA**

Link the genetics of circadian rhythms to students' own DNA. Use PCR and gel electrophoresis to connect a complex trait to an engaging phenotype in this authentic research investigation.

Bruce Bryan, miniPCR bio, Cambridge, MA

**3433 HHMI BioInteractive's
Assessment Builder: A
Crowdsourced Database
to Facilitate Assessment
for Learning****JW Grand 4 (Level 3) • Instructional
Strategies • Hands-on Workshop
(30 min) • HS, 2Y, 4Y**

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

12:45PM – 1:45PM

NABT Lunch Break**Griffin Hall (Level 2) • Meal Function (60 min) • Free • GA**

Everyone is invited to pick up a boxed-lunch in Griffin Hall (2nd Floor) and join a section event, meet up with friends, or find a quiet spot to relax and recharge.

**BE SURE TO GRAB YOUR LUNCH IN GRIFFIN HALL
BEFORE HEADING TO THE SECTION & LEVEL LUNCHEONS!****Elementary & Middle-Level
Teachers Luncheon****JW Grand 1 (Level 3) • Meal
Function (60 min) • Free •
ELEM, ML**

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.

**AP Biology
Section Luncheon****JW Grand 7 (Level 3) • Meal
Function (60 min) • Free • AP**

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 Foglia AP Biology Service Award*.

Sponsored by  miniPCR bio®

**High School
Teachers Luncheon****JW Grand 8 (Level 3) • Meal
Function (60 min) • Free • HS**

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.

Sponsored by  HUDSONALPHA
INSTITUTE FOR BIOTECHNOLOGY

**Two-Year College
Section Luncheon****JW Grand 9 (Level 3) • Meal
Function (60 min) • Free • 2Y**

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.

**Four-Year College
& University Section
Luncheon****JW Grand 10 (Level 3) • Meal
Function (60 min) • Free • 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*.



2:00PM – 3:30PM

13th Annual Biology Education Research Symposium

201-203 (Level 2) • Instructional Strategies • Symposium (120 min) • 2Y, 4Y, GA

NABT is proud to present the 13th Annual Biology Education Research Symposium. Presentations were accepted through a double-blind review process that was open to biology instructors and education researchers at all levels. The format for the symposium is a traditional presentation of papers by individual or co-authors lasting 15 minutes each.

See page 34 for the full listing

3377 Creating and Implementing Quantitative Biology Lessons with QB@CC, Beneficial for Both Faculty and Students

304-306 (Level 3) • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Experience quantitative biology Open Educational Resources first as learners and educators, and then as creators. Learn about the QB@CC community and ways to collaborate with the network.

Jennifer Adler, Maysville Community and Technical College, Cynthiana, KY; Melanie Lenahan, Raritan Valley Community College, Branchburg, NJ; Sarah Prescott, BioQUEST/University of New Hampshire, Raymond, NH; Vedham Karpakakunjaram, Montgomery College, Rockville, MD

2:00PM – 3:15PM

SPECIAL PROGRAMMING PRESENTED BY BIOZONE

3466 BIOZONE Showcase NEW titles for AP Biology, NGSS Biology, and APES

104 (Level 1) • General Biology • Demonstration (75 min) • HS

BIOZONE's new worktexts for AP Biology, NGSS Biology, and APES provide a robust alternative to the traditional textbook paradigm. Attendees receive a FREE print copy plus a one-year eBook licence.

Richard Allan, BIOZONE International, Hamilton, Waikato, NZ

3294 Isn't It Just XX and XY? Helping Students Build Scientific Models of Human Assigned Sex

White River A (Level 1) • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

High school and college students actively build and refine models to explore high-interest scientific data, leverage critical reasoning, and uncover how assigned sex and gender are culturally situated globally.

Kirstin Milks, Bloomington High School South, Bloomington, IN; Brittany Franckowiak, Wilde Lake High School, Columbia, MD; Enya Granados, Russell County High School, Seale, AL

3291 "Place Based Wikis" - Get Students Excited about Collaborative, Ongoing Ecology Fieldwork

White River B (Level 1) • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • ML, HS, 4Y

Ever struggle getting an authentic fieldwork project off the ground? Setting up an easy "Wiki" using Google Sites can help students engage in meaningful, collaborative research year after year!

Erika Mitkus, Governor's Academy, Byfield, MA and Sara Abeita, Lawrence Free High School, Lawrence, KS

SPECIAL PROGRAMMING PRESENTED BY EDVOTEK

3436 Teaching the Polymerase Chain Reaction in One Lab Period

White River C (Level 1) • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y

Want to learn today's top biotechnology techniques? Join us for a hands-on exploration of PCR and electrophoresis in one hour using the EdvoCyclerJr and the EDGE!

Maria Dayton and Danielle Snowflack, Edvotek, Washington, DC

3391 Beyond Mitosis: Utilizing Cancer Case Studies to Explore Cell Growth and Health Inequities

White River D (Level 1) • General Biology • Hands-on Workshop (75 min) • HS

Discover cancer-based lesson plans and teaching resources that engage students and support opportunities for student voice and discourse.

Regina Wu and Jeanne Chowning, Fred Hutch Cancer Center, Seattle, WA

3385 Strategies to Improve Student Writing in Biology

White River G (Level 1) • Instructional Strategies • Hands-on Workshop (75 min) • HS, 2Y, 4Y

To develop student scientific writing skills related to the science practices, participants will engage as learners to explore classroom-ready strategies and resources, and as educators to reflect and share ideas.

Ann Brokaw, Rocky River High School, Rocky River, OH

13th Annual Biology Education Research Symposium

2:00PM – 3:00PM
201-203 (Level 2)

The symposium is coordinated by the NABT Four-Year College & University Section's Research Committee

Papers will be posted online at nabt.org/Proceedings-Research-Symposium

SPECIAL PRESENTER

Kristy L. Daniel

Texas State University, San Marcos, TX

Recipient of the 2022 NABT Four-Year College & University Section's Research in Biology Education Research Award.

Do You See What I See?

Researchers often use visual representations (e.g., graphs, diagrams, pictures) to communicate scientific data, especially when supporting instruction. This style of visual communication relies on the intended receiver's ability to make sense of the visual inputs in manners consistent with scientific thinking. Unfortunately, learners are not always comfortable communicating with visualizations, and they do not always interpret and understand the represented science as intended. We refer to how well learners make sense of and use visual depictions of science as their representational competence. Low levels of representational competence can limit learning outcomes. Ignoring students' self-efficacy and ability to use and develop scientific representations can prevent them from developing expertise in their field. I developed and tested a 20-item Likert-type instrument to measure participant self-efficacy in their communication of scientific visualizations (ECSV). I used rigorous approaches to establish content and face validity and reliability ($\alpha \geq 0.95$) of the instrument. I used biology student mean scores on the ECSV pre/post instruction to document statistically significant differences in science communication self-efficiency using visualizations. By identifying self-efficacy involved in communicating science visualizations, we can better inform instructional practices. Improvements in representational competence are one step in maximizing our potential to improve science literacy.



ARES (Authentic Research Experience in Science): An Assessment of their Effect on High School Students' Self Efficacy and Perceptions of Science

Daniel Shay and Teresa Eggleston, North Central High School, Spokane, WA

In order to improve persistence in STEM careers, STEM teachers need to apply methods that build confidence and an appreciation for the nature of science. While it is well documented that inquiry driven, project-based learning improves a number of these student outcomes, there is no clear framework in place for the development of new project-based learning curricula. The Authentic Research Experiences in Science (ARES) framework was developed by North Central High School educators to help create long-term, project-based modules that

reflect the teacher's specific research interest and technological capacity. This study tested the effect an ARES-aligned project had on student confidence and perceptions of biology. Using the ARES framework, we developed a semester-long, project-based curriculum in which students investigated the microbiome of local mosquitoes using an Oxford Nanopore minION sequencer. A 24-item self efficacy survey and a 31-item science perceptions survey (CLASS-Bio) were administered before and after the project, and the normalized change analyzed. We found that the average normalized change for each of the three categories of student confidence grew from the pre-survey to the post-survey, and the most notable shifts in perceptions were those pertaining to the strategies used to solve biological problems and the connections biology has to the real world.

The Impact of Practice Exams on Undergraduate Biology Majors

Kendra Wright, University of Memphis, Memphis, TN

Metacognition is the act of thinking about thinking. The way students think about what they learn and how they learn affects their overall cognitive process. Students who are aware of their understanding and how to regulate their metacognition are more likely to change their studying habits. Practice exams contribute to how students gauge their understanding and in what ways students reevaluate their studying habits. Being able to identify what you know versus what you do not know is one way that practice exams provide guidance to students. Through deliberate

practice, students can test their knowledge and focus their studying on certain material. In this study, we examine whether students' attitudes towards practice exams change as they progress to upper-division courses. Study findings show that students used practice exams in various ways in introductory biology courses. Findings also showed that upper-division students relied on their prior experiences with practice exams to help build upon their critical thinking skills to answer higher Bloom's level questions. Further, practice exams had a long-lasting impact on how students learn. These findings describe how providing students with practice exams not only builds their metacognitive skills but also contributes to what information they accept in their working memory.

Patterns for Managing Potential Conflict Between Religion and Evolution Among Muslim Undergraduate Biology Students

Rahmi Aini, Middle Tennessee State University, Murfreesboro, TN; Sara Brownell, Arizona State University, Tempe, AZ; and M. Elizabeth Barnes, Middle Tennessee State University, Murfreesboro, TN

Evolution is foundational to biology and yet controversial among undergraduate biology students. However, no research has explored views within Muslim student populations in the United States and patterns for how they may manage potential conflict between their religion and evolution. Using a mixed-method approach, undergraduate Muslim students enrolled in 47 introductory biology classes, filled out surveys of evolution acceptance, evolution

understanding, and perceived conflict between their religion and evolution (n=270). Further, students explained their views on the relationship between religion and evolution (n=180). We conducted a k-means cluster analysis and qualitatively analyzed open-ended responses to examine how Muslim students manage potential conflict. We found three groups that represent the patterns of these students. First, the reconciliation group consists of 14% students who had high evolution acceptance and understanding and low perceived conflict between their religious beliefs and evolution, 2) the conflicted group consists of 26% of students who had low evolution acceptance and understanding and high perceived conflict between their religious beliefs and evolution, and 3) the uncertain group contains 60% of students who had average scores for all variables. This indicates that Muslim students may benefit from evolution instruction that incorporates religious cultural competence in evolution education.

2:00PM – 3:15PM CONT.

3418 Task Verbs: Helping Students Understand Them and Use Them in FRQs**White River J (Level 1) • AP Biology • Demonstration (75 min) • HS, GA**

The 2019 Course-and-Exam-Description contains definitions of verbs used in exam items. Learn how to help students respond to FRQs using the task-verb descriptions.

Catherine Walsh, College Board, New York, NY

SPECIAL PROGRAMMING PRESENTED BY EXPERT TA**3461 An Online Homework Solution and an Ecosystem of Assignable Shared Resources for Intro Biology****204-205 (Level 2) • General Biology • Demonstration (75 min) • 2Y, 4Y, GA**

Join us to see an overview of the Expert TA Introductory Biology online homework platform that pairs with OpenStax Biology. We will also introduce our ecosystem of assignable shared resources.

Jeremy Morton, Expert TA, Tulsa, OK

Informal Science Committee**206 (Level 2) • Committee Meeting (75 min) • GA**

Committee chair to be named.

3397 Race, It's Not a Thing: Facing Racism Through the Study of Genetics**302-303 (Level 3) • Genetics • Demonstration (75 min) • ML, HS, 2Y**

Leverage prior knowledge and teach complex themes in genetics while facing racism head-on. Explore methods of teaching through the lens of social justice.

Bonnie Nieves, Nipmuc Regional High School, Upton, MA

OBTA Directors & Regional Coordinators**308 (Level 3) • Committee Meeting (75 min) • GA**

Mark Little, Committee Chair

3287 Using BLAST and CLUSTALW as a Model for Evolution**309-310 (Level 3) • AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

BLAST and CLUSTALW model evolution by aligning DNA or protein sequences. Students will use online databases, analyze sequence alignments, compare local and global alignment, and create and compare phylogenetic trees.

Kaitlan Hinesley, Roncalli High School, Indianapolis, IN

SPECIAL PROGRAMMING PRESENTED BY BIO-RAD**3460 The Plight of the Bumblebee: Studying Bee Genetic Biodiversity Using DNA Barcoding****JW Grand 2 (Level 3) • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

Taxonomy in action: use visual cues and biotechnology techniques to sort bumblebees into separate species. Experience how PCR, sequencing, and bioinformatics help scientists distinguish bee species.

Cassy Granieri, Damon Tighe, and Leigh Brown, Bio-Rad Laboratories, Hercules, CA

SPECIAL PROGRAMMING PRESENTED BY MINIPCR**3446 Using Synthetic Biology to Explore the Central Dogma, Protein Structure, and Mechanisms of Antibiotic Resistance****JW Grand 3 (Level 3) • Genetics • Hands-on Workshop (75 min) • HS, 2Y, GA**

Use the cell-free BioBits® system to experiment directly with concepts that have previously been inaccessible in most high school laboratories. Simple to implement, authentic molecular investigations with bright fluorescent readouts!

Bruce Bryan, miniPCR bio, Cambridge, MA

3429 Developing and Using Models with HHMI BioInteractive Resources to Understand Systems at Varying Scales**JW Grand 4 (Level 3) • Science Practices • Hands-on Workshop (75 min) • HS**

Modeling helps students gain a deep understanding of complex systems across scales. Using cellular/molecular biology and ecology activities, we will explore using models to construct explanations and make predictions.

Christina Bowers, Amherst College, Amherst, MA and Jeannie Long, Girls Preparatory School, Chattanooga, TN

3:30PM – 4:00PM

3346 Blood Sugar Balance - A Glucose Metabolism Model for Diabetes Education**White River A (Level 1) • General Biology • Hands-on Workshop (30 min) • HS, 2Y, 4Y, GA**

The Blood Sugar Balance is a web-based glucose metabolism model that allows for acquisition of game data that allows students to understand the interplay of diabetic status, food choices, and accessibility

Atom Lovecloud and Joan Griswold, University of Washington, Seattle, WA

3305 3D Learning for a Sustainable World**White River B (Level 1) • Ecology / Environmental Science / Sustainability • Hands-on Workshop (30 min) • HS**

Engage in inquiry-based, hands-on activities to explore human ecology topics including population, resource use, climate change, and ecosystem health. Receive practical lessons to go beyond the textbook.

Norman Leonard, Pike High School, Indianapolis, IN



3:30PM – 4:00PM CONT.

3360 “The Tree of Life” A Game to Develop Scientific Argumentation of Evolution Among University Students

White River C (Level 1) • Evolution • Paper (30 min) • 2Y, 4Y, GA

A board game designed to overcome obstacles to understand biological evolution among university students. Using the Evolution Theory as a tool to develop scientific argumentation in future teachers.

Roger Araujo Llamas, Stockholm University-Uppsala, Uppsala, SE

3372 Simple Tools to Demonstrate Ventilation Changes in Restrictive and Obstructive Pulmonary Diseases

White River D (Level 1) • Anatomy & Physiology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Readily available items are used to demonstrate the changes in ventilation due to restrictive and obstructive pulmonary diseases. Lung volumes and capacity will be investigated; spirometry data will be assessed.

Pat Clark, IUPUI, Indianapolis, IN

3381 Evaluating Student Work in the Science Classroom: Standards-Based Scoring & Teacher Calibration

White River G (Level 1) • Science Practices • Demonstration (30 min) • HS

Attendees will see how we selected and scaled our standards for SBG and how we assess students. We will also share teacher calibration strategies.

Karen O'Connor and Brett Erdmann, Stevenson High School, Lincolnshire, IL

3319 Who Do You Turn To? High School Students' Sources of Knowledge about Science

White River J (Level 2) • Nature of Science • Paper (30 min) • ML, HS, GA

This research examined how high school science students chose sources of knowledge for science-related questions during a card sort activity. We'll share how students think about expertise, science, and controversy.

Kathryn Green and Claude Gonzalez, Clarke Central High School, Athens, GA; Lisa Borgerding, Kent State University, Kent, OH

SPECIAL PROGRAMMING PRESENTED BY EXPERT TA

3463 Custom Digital Publishing for Instructors and Building Editable Interactive Textbooks with Expert TA

204-205 (Level 2) • Curriculum Development • Demonstration (30 min) • 2Y, 4Y, GA

Join to learn about Expert TA's approach to custom digital publishing and the ability for instructors to create a custom, interactive textbook based on the current OpenStax Biology text.

Jeremy Morton, Expert TA, Tulsa, OK

Professional Development Committee

206 (Level 2) • Committee Meeting (30 min) • GA

Committee chair to be named.

3327 Starting Simple with Cladistics

302-303 (Level 3) • Evolution • Demonstration (30 min) • HS, 2Y

Explore how to have students dive into cladistics. After explaining the basics of cladistic vocabulary to students, we dive right in with characteristics of dogs.

Alice Scheele, Patrick Henry High School, Ashland, VA

Nominations Committee

308 (Level 3) • Committee Meeting (75 min) • GA

Bob Melton, Committee Chair

3269 A Model for Recruiting and Retaining Hispanic Students in STEM Fields

309-310 (Level 3) • General Biology • Paper (30 min) • ML, HS, 2Y

Learn how to create a pipeline, beginning in elementary school, to engage Hispanic students in STEM fields.

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

NABT Book Club: FUZZ

Alcove (Level 3) • Special Program • Discussion (30 min) • GA

Join the inaugural NABT Book Club. This year we are reading *FUZZ: When Nature Breaks the Law* by Mary Roach. Mary will also participate in an online Q&A on December 9th. This meeting will help determine format and formality for the community read.

SPECIAL PROGRAMMING PRESENTED BY BIO-RAD

3458 Personalized Medicine: CRISPR Therapies Transforming Medicine Now!

JW Grand 2 (Level 3) • Biotechnology • Hands-on Workshop (30 min) • HS, 2Y, 4Y

Discover some of the most exciting CRISPR medical applications in development, including those for CAR-T and immunotherapies, and how students can model CRISPR-Cas9 chromosomal gene editing to treat disease.

Cassy Granieri, Damon Tighe, and Leigh Brown, Bio-Rad Laboratories, Hercules, CA

3:30PM – 4:00PM CONT.

SPECIAL PROGRAMMING
PRESENTED BY MINIPCR**3447 Sickle Cell Genetics:
Using Gel Electrophoresis
to Investigate Molecular
Genetics, Inheritance, and
Disease****JW Grand 3 (Level 3) •
Genetics • Hands-on Workshop
(30 min) • ML, HS**

Help a fictional family obtain a molecular diagnosis using gel electrophoresis. In the process, explore connections to protein structure, Mendelian genetics, mutations, genetic disease, evolution, and more!

Bruce Bryan, miniPCR bio,
Cambridge, MA

**3431 Modeling Epidemics:
Using an HHMI
BioInteractive Simulator
to Study Real Outbreaks****JW Grand 4 (Level 3) • General
Biology • Hands-on Workshop
(30 min) • HS, 2Y, 4Y**

We will use an online simulator to model and visualize the spread of an infectious disease in a population. We will build and analyze graphs using data from authentic outbreaks.

Nadeene Riddick, HHMI BioInteractive,
Chevy Chase, MD and Annie
Prud'homme-Généreux, Capilano
University, North Vancouver, BC, CAN

4:00PM – 5:00PM

NABT Leader Meet & Greet**JW Grand 5-6 (Level 3) • Committee
Meeting (60 min) • GA**

This is your chance to get more involved with the NABT Community. Learn more about different opportunities from NABT committee chairs, section chairs and regional coordinators.

4:00PM – 5:30PM

Exhibit Hall Closing Reception**JW Grand 5-6 (Level 3) • Special
Event • GA**

It's last call in the NABT Exhibit Hall. It is also your last chance to visit booths, talk to exhibitors, and get those freebies for the classroom. This special reception will include drawings for the *Treasure Hunt* and *Find the President Contest*.

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4:15PM – 5:00PM

SPECIAL PROGRAMMING
PRESENTED BY MINIPCR**3448 Using Molecular
Tools to Identify Antibiotic
Resistance Genes in
Environmental DNA (eDNA)****JW Grand 3 (Level 3) • Ecology
/ Environmental Science /
Sustainability • Demonstration (45
min) • HS, 2Y, GA**

Contribute to a national monitoring program tracking the spread of antibiotic resistance in the environment. Choose locations, collect soil, and probe for genetic signatures of common antibiotic resistance genes.

Bruce Bryan, miniPCR bio,
Cambridge, MA

5:00PM – 7:30PM

**HHMI Night at the Movies:
WILD HOPE****White River Ballroom
(Level 1) • Special Event
(Dinner Provided) • GA**

Join us for a sneak peek of *WILD HOPE*, a new series of short films from HHMI Tangled Bank Studios highlighting the intrepid changemakers who are working to restore and protect our planet. Each half-hour episode inspires audiences with stories of bold interventions, unexpected alliances, and nature's resilience. Whether tapping oysters to clean New York City waters and prevent flooding, or growing coffee to save Mozambican rainforests, the series reveals how local action can spark powerful change—and provides a refreshing dose of hope in an increasingly cynical world.

Following the screening, join HHMI Vice President of Science Education and Head of Tangled Bank Studios, Sean B. Carroll, and scientists from the films for a lively discussion about the importance of showcasing successes, and the power of positive storytelling to change the narrative, create a sense of community, and inspire hope.

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SATURDAY DAY





7:30AM – 8:45AM

NABT BioClub Breakfast

JW Grand 7 • Meal Function
(Tickets Required) • GA

The BioClub continues to grow, with new chapters being formed at K-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.

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8:15AM – 10:15AM

NABT Biology Education Poster Session & Coffee Break

**JW Grand 9-10 (Level 3) • General
Biology • 2Y, 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 poster listing on page 42

9:00AM – 11:00AM

2022 AP Biology Symposium: Emphasizing Science Practices in AP Biology Through Reading Primary Literature

**JW Grand 2 (Level 3) • AP Biology
• Symposium (120 min) • HS, 2Y**

This session will focus on how to guide the teaching of students to read and deconstruct primary scientific literature. It will include bridging the gap between understanding the story told by the literature and the message conveyed in the data.

Lee Ferguson and Maureen Jimenez,
NABT AP Biology Section Coordinators

9:00AM – 10:15AM

SCOTT WILLIAMSON SPEAKER SERIES:

Bret Payseur

➔ See biography on page 9

The Evolution of Giants on Islands

201-203 (Level 2) • Evolution • Special Speaker • GA

Organisms that colonize islands routinely evolve unusual body sizes. Small-bodied species tend to increase in size, whereas large-bodied species often decrease in size. This pattern, known as the “island rule”, presents an opportunity to understand general mechanisms of evolution. Dr. Bret Payseur will share progress from his lab toward deciphering the genetic basis of the island rule, using the largest wild house mice on record as a study system. He will show how a combination of strategies ranging from statistical modeling to molecular biology is leading us closer to the identification of genes involved in the island rule.

NABT Archival Committee

206 (Level 2) • Committee Meeting
(75 min) • GA

Committee chair to be determined.

3331 System Modeling: Constructing and Simulating Computational Models Using Stock-and-Flow Diagrams

**White River A (Level 1) • Science
Practices • Hands-on Workshop (75
min) • HS, 2Y, 4Y**

Build system models using stock-and-flow diagrams. Bring your own device (laptop/Chromebook) to construct and simulate computational models of growth, negative feedback, and natural selection models using free online tools.

Jon Darkow, Seneca East High School,
Attica, OH

3370 Immersive Online Escape Rooms Promote Student Collaboration and Enhance Learning

**White River B (Level 1) • Instructional
Strategies • Hands-on Workshop**
(75 min) • HS, 2Y, 4Y

Promote collaboration, communication, and critical thinking skills by engaging students in creative online escape rooms made using Google Forms and Zoom to develop scientific inquiry skills and enhance learning.

Tanya Watts, Waubonsee Community College,
Rockton, IL

3421 Design for Doing with Data – Using Student Outcomes to Design an Action-Based STEM Classroom

**White River C (Level 1) • Curriculum
Development • Hands-on Workshop**
(75 min) • ML, HS

Data analysis is at the core of STEM practice. This workshop will focus on the power of data to design instruction and assessment.

Mitch Price and Karen Lionberger, The College
Board, New York City, NY

3378 Bringing Data and Quantitative Reasoning into an Anatomy and Physiology Course

**White River D (Level 1) • Anatomy
& Physiology • Hands-on Workshop**
(75 min) • HS, 2Y, 4Y

We will focus primarily on NGSS Practices 4 and 5, Analyzing and Interpreting Data and Using Mathematics and Computational Thinking, but in the context of an Anatomy and Physiology course.

Paul Strode and Andy Feeney, Fairview
High School, Boulder, CO

**BIOLOGY EDUCATION
RESEARCH COMPETITION
(GRADUATE STUDENTS)****1. Addressing Student Engagement and Comprehension Within Online Versus In-person Discussions**

Kylea Garces, Aaron Sexton, Nathan Steffens, Abigail Hazelwood, and Natalie Christian, University of Louisville, Louisville, KY

2. Biological Thinking: A Comparison Between Major and Non-major Mindsets

Kendra Wright and Jaime Sabel, University of Memphis, Memphis, TN

3. Discussion Modality and Exam Performance in Introductory Environmental Biology

Nathan Steffens, Natalie Christian, Kylea Garces, and Abigail Hazelwood, University of Louisville, Louisville, KY; Aaron Sexton, Centre de Synthèse et d'Analyse sur la Biodiversité, Montpellier, France

4. Exploring the Impact of Peer-Led Team Learning on the Science Identity of Undergraduate Biology Students

Mariah Maxwell and Jason Wiles, Syracuse University, Syracuse, NY

5. High School STEM Teacher's Motivation for Reading and Teaching with Primary Scientific Literature

Ashli Wright and Melissa McCartney, Florida International University, Miami, FL

6. Impacts of an Introduction to Primary Literature Course on First-year Undergraduate Biology Students' Science Identity and Interest in Research

Takunda Maisva, Mariah Maxwell, and Jason Wiles, Syracuse University, Syracuse, NY

7. Public Perceptions of Spiders and Identifying Trends in Community Science Participation

Bria Marty and Kristy Daniel, Texas State University, San Marcos, TX

8. Student Reports of Religious Cultural Competence in Evolution Education (ReCCEE) is Associated with Gains in Students' Evolution Acceptance

Rahmi Q. Aini, Alexa Summersill, and M. Elizabeth Barnes, Middle Tennessee State University, Murfreesboro, TN; K. Supriya, UCLA Center for Education Innovation and Learning in the Sciences, Los Angeles, CA; Baylee Edwards and Sara Brownell, Arizona State University, Tempe, AZ

9. Understanding the Effects of Administration Stakes and Setting on Biology Concept Assessment Scores

Crystal Uminski and Brian Couch, University of Nebraska-Lincoln, Lincoln, NE; Joanna Hubbard, Truman State University, Kirksville, MO

**BIOLOGY EDUCATION
RESEARCH COMPETITION
(UNDERGRADUATE STUDENTS)****10. Application and Refinement of the Protein Landscape**

Cole Dwyer, University of Arkansas at Little Rock, Little Rock, AR; Lydie Guercin, Emory University, Atlanta, GA; L. Kate Wright and Dina Newman, Rochester Institute of Technology, Rochester, NY

11. Evaluating a Specialized Skills Workshop for Introductory Majors General Biology Lab

Mary Amato and Jeanette Gore, University of Tampa, Tampa, FL

12. How Much Has the COVID-19 Pandemic Disrupted Undergraduate Learning?

George Konstantinou, Miranda Fanara, and Suann Yang, SUNY Geneseo, Geneseo, NY

13. Inclusion in STEM

Taylor Arnold and Michael E. Moore, University of Arkansas at Little Rock, Little Rock, AR

14. Pandemic-related Changes in Assessment Methods Including the Use and Efficacy of Open-Note, Open Computer Testing in Introductory Classes

Sydney Wurth, Aubrey Weinstein, Rakesh Murugesan, and Sameer Parashar, The Ohio State University, Columbus, OH

15. Students' Perceptions of Bring Your Own Device (BYOD) Clickers in an Introductory Biology Course

Seanice Beard and Eva Nyutu, University of Detroit Mercy, Detroit, MI

16. What Factors Shape Undergraduate Students' Perceptions of Scientists?

Mouhamad Berte, Syndou Cisse, and Suann Yang, SUNY Geneseo, Geneseo, NY



MENTORED STUDENT RESEARCH COMPETITION (UNDERGRADUATE STUDENTS)

17. Acne Case Study and Minimum Inhibitory Concentration of Its Treatment Compounds

Jinoh Jang, Nalini Broadbelt, Michelle Young, and Crystal Ellis, Massachusetts College of Pharmacy and Health Sciences, Boston, MA

18. Antibacterial Effect of Allium sativum (garlic) Extract Against Methicillin-Resistant Staphylococci aureus

Jimena Hernandez and Banhi Nandi, Georgia Highlands College, Cartersville, GA

19. Changes in Student Vaccination Reasoning as the Pandemic Progresses

Ana Evenson and Kimberly Booth, North Dakota State University, Fargo, ND

20. Developing Sustainable Urban Farming Model Using a Greenhouse, Hydroponics, and Battery Bank Charged by Solar Panel Array

April Nguyen, Jayden Morton, and Parag Muley, Middlesex College, Edison, NJ

21. Neighborhood Competition Between Co-occurring Native and Invasive Species

Kaitlin Murphy, Karissa Michel, and Suann Yang, SUNY Geneseo, Geneseo, NY

GENERAL (NON-COMPETITION) CATEGORY

22. A Small Intervention Can Make a Big Difference in Scientific Writing in a Biology Course

Bin Zhu, University of Hartford, West Hartford, CT

23. Building a Research Network for Undergraduate Opportunities in Molecular Biochemistry

Michele Morris, HudsonAlpha Institute for Biotechnology, Huntsville, AL; Jeremy Prokop, Michigan State University, Lansing, MI

24. Development, Implementation, and Analysis of a Module on Osmosis which Incorporates Math Core Competencies in Introductory, College-level Biology Courses Across Multiple Institutions

Evdokia Kastanos, Montgomery College, Rockville, MD; Julie Takacs, Anne Arundel Community College, Arnold, MD; Tory Williams, University of Maryland Baltimore County, Baltimore, MD

25. Do Kahoot Test Review Sessions Improve Exam Grades?

Lynn Ulatowski, Ursuline College, Pepper Pike, OH

26. Does Humanizing Scientists Increase Student Science Identity and Quantitative Skills?

Sara Sawyer, Glenville State University, Glenville, WV; Elizabeth Hamman, St. Mary's College of Maryland, St. Mary's City, MD; Rachel Hartnett, Mount St. Mary's University, Emmitsburg, MD; Rebecca McHugh and Denise Piechnik, University of Pittsburgh at Bradford, Bradford, PA

27. Educators' Views on the Use of Dissection and Dissection Alternatives in American Biology Classrooms

Pamela Osenkowski, Ignas Karaliunas, and Merari Diorio, National Anti-Vivisection Society, Chicago, IL

28. Exploring Interdisciplinary Professional Development Opportunities through QB@CC

Sheela Vemu, Waubensee Community College, Sugar Grove, IL; Beatriz Gonzalez and Irene Corriette, Santa Fe College, Gainesville, FL; Daniela Kitanska and Henriette Mozsoltis, Passaic County Community College, Paterson, NJ

29. Filtered - Discover Bioinformatics and Save the World!

Madelene Loftin, Michele Morris and Neil Lamb, HudsonAlpha Institute for Biotechnology, Huntsville, AL

30. For a Racially-Just, Inclusive, Open, STEM Education: The RIOS Institute Imagines an Open Education as the Radical Idea that Education Should be Affordable, Accessible, Equitable, Inclusive, and Relevant to Everyone

Kaitlin Bonner, St. John Fisher University, Rochester, NY; Carrie Diaz Eaton and Krystie Wilfong, Bates College, Lewiston, ME; Karen Cangialosi, Keene State College, Keene, NH; Bryan Dewsbury, Florida International University, Miami, FL; Sam Donovan, BioQUEST, Pittsburgh, PA

31. Investigating the Impacts of a Semester-Long Growth Mindset Intervention on Students' Academic Success in a Human Anatomy Course

Parker Stuart and Daniel Wolcott, University of Central Missouri, Warrensburg, MO

**GENERAL (NON-COMPETITION)
CATEGORY CONT.****32. Lessons from Teaching Data Exploration and Visualization to Biology Students**

Kristine Grayson and Angela Hilliker,
University of Richmond, Richmond, VA

33. Leveraging a Two-Year / Four-Year Partnership to Develop Shared Curricula for Quantitative Skill-Building in an Introductory Biology Course

K. Rebecca Thomas, Montgomery College, Rockville, MD; Laura Ott, University of North Carolina at Chapel Hill, Chapel Hill, NC

34. Spaced Retrieval Practice has Variable Effects on Student Learning in Introductory Biology

Shira Rabin, Rachel Pigg, Ryan Patrick, Patricia Ralston, Jason Immekus, and Campbell Bego, University of Louisville, Louisville, KY

35. STEP BIO, A Summer Bridge Program to Help Students Succeed in Introductory Biology

Emily Rauschert, Shamone Gore Panter, Andrea Corbett, and Meagan Harless, Cleveland State University, Cleveland, OH

36. Student Attitudes and Perceptions of Biology Labs Across Modalities

Carrie Bucklin, Jennifer Mraz-Craig, and Sierra Marines, Southern Utah University, Cedar City, UT

37. The Bean Beetle Microbiome Project: An Instrument to Teach about Hypothesis Forming and Microorganism Taxa Identification in Biolabs

Thalita Abrahao, Georgia State University Perimeter College, Atlanta, GA

38. The Biologists and Graph Interpretation (BioGraphI) Project: Professional Development for a Curriculum to Both Value Diverse Identities and Foster Data Literacy

Suann Yang, SUNY Geneseo, Geneseo, NY; Rachel Pigg, University of Louisville, Louisville, KY; Brent Allman, University of Texas at Austin, Austin, TX; Derek Braun, Gallaudet University, Washington, DC; Kristen Butela, University of Pittsburgh, Pittsburgh, PA; Robert Furrow, University of California Davis, Davis, CA; Elizabeth Hamman, St. Mary's College of Maryland, St. Mary's City, MD; Dmitry Kondrashov, University of Chicago, Chicago, IL; Stanley Lo, University of San Diego, San Diego, CA; Patricia Marsteller, Emory University, Atlanta, GA; Catherine Quinlan, Howard University, Washington, DC; Merrie Richardson, Southcentral Kentucky Community and Technical College, Versailles, KY; Sheela Vemu, Waubonsee Community College, Aurora, IL

39. The Genomics Education Partnership: Democratizing Genomics Research Experiences Nationwide

Katie Sandlin, Genomics Education Partnership, Tuscaloosa, AL; Wilson Leung, Washington University in St. Louis, St. Louis, MO; Chinmay Rele and Laura Reed, The University of Alabama, Tuscaloosa, AL

40. Using LEGO® to Model Evolution of Fruit Color: An Inter-institutional Effort to Improve Quantitative Competency in Core Biology Courses

Kelly Livernoche and Gina Wesley, Montgomery College, Rockville, MD; Kiersten Newtoff, Montgomery College, Germantown, MD

41. What Students Think They Know: Identifying Non-major Biology Students' Cardiovascular System Alternative Conceptions

Parker Stuart, University of Central Missouri, Warrensburg, MO

42. A Mixed-methods Study of Louisiana K-12 Education Administrators' Knowledge, Perceptions, and Influence of the Teaching of Evolution

Blake Touchet, National Center for Science Education, Oakland, CA

43. A Virtual Study Abroad Development: Environmental Science through Experiential Learning in The Bahamas

Athertina Steinau, Georgia State University, Decatur, GA

44. Using Breast Cancer to Teach Evolution in Introductory College Biology

Peter White, David Filice, Joe Riedy, Merle Heidemann, and Jim Smith, Michigan State University, East Lansing, MI

45. Who's Afraid of Peer Review? Activities to Teach Undergraduate Biology Students About Authorship and the Peer Review Process

Melissa Haswell, Delta College, University Center, MI

9:00AM – 10:15AM CONT.

3326 Supporting Student Development and Recovery: Leveraging Science Practices in the Post-quarantine Biology Classroom**White River G (Level 1) • Instructional Strategies • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

Learning disruptions and pandemic modalities made our classrooms even more stratified. Come hear how these challenges manifest from 9th grade inclusion to college-level biology, and get tools for your classroom.

Stephen Traphagen and Pat McCormack, Oak Park and River Forest High School, Oak Park, IL; Kirstin Milks, Bloomington South High School, Bloomington, IN; Julie Minbirole, Columbia College Chicago, Chicago, IL

3300 Invasive Mussel Project 2.0**White River J (Level 1) • Biotechnology • Demonstration (75 min) • HS, 2Y, 4Y**

Come learn about the Invasive Mussel Project and how you and your students can use gel electrophoresis and PCR to identify and combat invasive species in your own backyard.

Sam Garson, Friday Harbor High School, Friday Harbor, WA

SPECIAL PROGRAMMING PRESENTED BY CAROLINA BIOLOGICAL SUPPLY COMPANY**3449 Using Real Data to Help Explain Climate Change and Model Inheritance Patterns****204-205 (Level 2) • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

Data analysis provides evidence for posing scientific arguments and models. Tree ring and Fast Plant data are collected then used to make arguments about climate change and inheritance patterns.

Julie Stubbs and Crystal Risko, Carolina Biological Supply Company, Burlington, NC

SPECIAL PROGRAMMING PRESENTED BY LAB-AIDS**3441 Cell Differentiation and Gene Expression****302-303 (Level 3) • General Biology • Hands-on Workshop (75 min) • HS**

Students often struggle to conceptualize how selective gene expression works. We will use unique models to teach this concept and explain how it is connected to genetic engineering.

Wendy Jackson, Lab-Aids, Ronkonkoma, NY

3403 Science Can Make You Strong!**304-306 (Level 3) • Nature of Science • Hands-on Workshop (75 min) • HS**

Join the National Center for Science Education (NCSE) to help students distinguish between valid, evidence-based science and unintentional or misleading misinformation. Additionally, strategies to inoculate students against pseudoscience will be provided.

Lin Andrews, Cari Herndon, and Blake Touchet, National Center for Science Education, Oakland, CA

3395 What a Mess We've Made! How Human Impacts Lead to Harmful Algal Blooms**309-310 (Level 3) • General Biology • Hands-on Workshop (75 min) • ML, HS, 2Y, 4Y**

As agricultural runoff infringes on aquatic ecosystems, learn how to introduce your students to the microcosms of freshwater communities.

Jennifer Hofeld and Julie Angle, Oklahoma State University, Stillwater, OK

SPECIAL PROGRAMMING PRESENTED BY 3D MOLECULAR DESIGNS**3455 CRISPR: Isn't it Time We fixed Your Genome?****JW Grand 1 (Level 3) • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

CRISPR technology allows eukaryotic genome editing -- including the human genome. Explore the Cas9 protein, how it functions as an adaptive immune system in bacteria, and modifications for genome editing.

Tim Herman, 3D Molecular Designs, Milwaukee, WI

SPECIAL PROGRAMMING PRESENTED BY HUDSONALPHA**3413 HudsonAlpha Presents: FILTERED Mini-Training****JW Grand 3 (Level 3) • Biotechnology • Hands-on Workshop (75 min) • HS, 2Y**

Learn more about a game-based method to introduce computational biology concepts in your classes. The comic-style FILTERED puzzles help students grasp the function of programs used to analyze DNA.

Madelene Loftin and Michele Morris, HudsonAlpha Institute for Biotechnology, Huntsville, AL

3428 Engaging in Science Practices Using HHMI's BioInteractive Skin Color Resources**JW Grand 4 (Level 3) • AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

We will explore a scaffolded set of activities based on HHMI BioInteractive's "Human Skin Color: Evidence for Selection" resource to engage students in data analysis, modeling, and constructing explanations.

Britt Czupryna, Niles West High School, Skokie, IL and Heather Peterson, Holt High School, Holt, MI

10:30AM – 11:00AM

3308 Exploring Animal Behavior in the Classroom or Lab**White River A (Level 1) • Instructional Strategies • Hands-on Workshop (30 min) • HS, 2Y, 4Y**

Using *Exploring Animal Behavior in Laboratory and Field, 2nd edition*, several hands-on activities will be explored: data collection using cricket observations, the prisoner's dilemma, and how to read primary literature.

Heather Zimble-DeLorenzo and Christine Patrum, Georgia State University Perimeter College, Decatur, GA

3469 STEM Educators as Civic Educators**White River B (Level 1) • Instructional Strategies • Hands-on Workshop (30 min) • 2Y, 4Y**

How teaching through issues of waste, exposure to toxic chemicals, and emerging diseases can help students understand and engage with the dynamic process of science.

Davida Smyth, Texas A&M-San Antonio, San Antonio, TX

3312 Climate Change: Transforming the Classroom Environment by Assessing Instructor Immediacy and Exploring Student Emotions**White River C (Level 1) • Instructional Strategies • Hands-on Workshop (30 min) • 2Y, 4Y, GA**

Class climate is the environment created in the space where students learn. Join us in exploring behaviors that contribute to class climate while reflecting on your own classroom management.

Ben England, Saint Louis University, St. Louis, MO

3388 Giving Non-biology Majors the Option to Put the "A" in STEAM**White River D (Level 1) • Instructional Strategies • Hands-on Workshop (30 min) • HS, 2Y, 4Y**

This session discusses how student learning can be assessed in a more equitable manner, allowing students the option to communicate comprehension using non-traditional responses.

Heather Wols, Columbia College Chicago, Chicago, IL

3303 Between a Rock and a Hard Place: Teaching Evolution with Phage Steering**White River G (Level 1) • Microbiology & Cell Biology • Paper (30 min) • HS, 2Y, 4Y**

Bacteriophages can kill bacteria and select for antibiotic-sensitive bacteria concurrently. Come learn how high school student researchers are using the NGSS science practices to address the antibiotic resistance crisis.

Zachary Pratt, Parker High School, Janesville, WI

3367 Now Stream-ing! Course-based Undergraduate Research Experiences (CUREs) in Aquatic Ecology**White River J (Level 1) • Ecology / Environmental Science / Sustainability • Demonstration (30 min) • HS, 2Y, 4Y**

Authentic and relevant examples of CUREs for introductory biology or ecology courses that can be conducted in most local streams or that utilize online data sources where access is limited.

Johnathan Davis, Young Harris College, Young Harris, GA

ABT Advisory Committee Meeting**206 (Level 2) • Committee Meeting (75 min) • GA**

William McComas, ABT Editor

3273 Rise of the Mutant Weed: Using DNA Analysis Tools to Identify Mutations that Create Superweeds**302-303 (Level 3) • Evolution • Hands-on Workshop (30 min) • HS, 2Y, 4Y**

Artificial selection has led to the development of herbicide resistance in several weed species. This session uses DNA analysis to identify resistance using a step-by-step process with an online database.

Jane Hunt, EducationProjects.org, Dublin, OH and Zack Bateson, National Agricultural Genotyping Center, Fargo, ND

SPECIAL PROGRAMMING PRESENTED BY CAROLINA BIOLOGICAL SUPPLY COMPANY**3450 Introducing a New Tool for Teaching Selection to Both Intro and AP Biology Students****204-205 (Level 2) • Evolution • Hands-on Workshop (30 min) • MS, HS, 2Y**

Carolina and Wisconsin Fast Plants are introducing a new, easy tool to observe trait that can be used to perform selection experiments. Options for 4-day and 50-day experiments will be demonstrated.

Julie Stubbs and Crystal Risko, Carolina Biological Supply Company, Burlington, NC

3353 Diverse Voices in Nature Writing Brings Biophilia to Students Across Disciplines for Broader Inclusion**304-306 (Level 3) • Instructional Strategies • Hands-on Workshop (30 min) • ML, HS, 2Y**

Explore diverse voices for protecting nature with an emphasis on graphic novels featuring key passages, reading rubrics, and supporting hands-on activities for STEM and other disciplines.

Dennis Liu, E.O. Wilson Biodiversity Foundation, Potomac, MD

3284 Plant-Derived Drug Discovery: Student Research in an Introductory Biology Lab Course**309-310 (Level 3) • General Biology • Demonstration (30 min) • HS, 2Y, 4Y**

To spark student interest in plants and introduce them to research, we have developed an educational module that is based on testing plant extracts for various medicinal properties.

Tatiana Kuzmenko, Loyola Marymount University, Los Angeles, CA

10:30AM – 11:00AM CONT.**SPECIAL PROGRAMMING
PRESENTED BY 3D
MOLECULAR DESIGNS****3464 Unraveling
Chromosomes Through
Modeling****JW Grand 1 (Level 3) • General
Biology • Hands-on Workshop (30
min) • HS**

Mitosis, meiosis, chromosome structure, and crossing over will be explored in this hands-on modeling event. Bring your student hat and be ready to engage.

Keri Shingleton, 3D Molecular Designs, Milwaukee, WI

**SPECIAL PROGRAMMING
PRESENTED BY HUDSONALPHA
3424 Meet HudsonAlpha's
FILTERED****JW Grand 3 (Level 3) •
Biotechnology • Demonstration (30
min) • HS, 2Y, GA**

FILTERED, an online game using puzzles to introduce the concepts and tools of bioinformatics, has students attempt to unlock the identity of a mysterious pathogen crisscrossing the globe.

Madelene Loftin and Michele Morris, HudsonAlpha Institute for Biotechnology, Huntsville, AL

**3430 HHMI BioInteractive's
Online Course on Inclusive
Teaching****JW Grand 4 (Level 3) • Instructional
Strategies • Hands-on Workshop
(30 min) • HS, 2Y, 4Y**

We will explore BioInteractive's new online course, which is loosely built on liberatory pedagogy and brings together dynamic approaches to fulfill the promise and practice of inclusive teaching.

Bryan Dewsbury, Florida International University, Miami, FL

11:15AM – 11:45AM**3417 Using Data from the
AP Exam to Reveal Common
Misconceptions****JW Grand 2 (Level 3) • Instructional
Strategies • Paper (30 min) • HS, 2Y, 4Y**

This discussion illuminates our data regarding students' answers to multiple-choice questions and what it reveals about student-held misconceptions. We'll discuss solutions to alleviate these misconceptions.

Catherine Walsh, The College Board, New York, NY

11:15AM – 12:30PM**3317 Using the Three-
Dimensional Learning
Assessment Protocol to
Develop Undergraduate
Biology Exams that Target
Scientific Practices****White River A (Level 1) • Science
Practices • Demonstration (75 min) •
HS, 2Y, 4Y**

Learn how to use the Three-Dimensional Learning Assessment Protocol to modify and create exam items that explicitly engage undergraduate biology students in scientific practices.

Crystal Uminski, University of Nebraska-Lincoln, Lincoln, NE

**3314 Cancer-Fighting Proteins
Found in Nature: Modeling
Protein Folding and Brain
Surgery****White River B (Level 1) • General
Biology • Hands-on Workshop (75
min) • HS**

Violets, scorpions, sea slugs, potatoes, and more are candidates in the fight against cancer. Join us to construct 3D cancer-fighting peptide models and perform simulated brain surgery with nature-based guides.

Rebecca Brewer, Troy High School, Troy, MI; Regina Wu and Jeanne Chowning, Fred Hutchinson Cancer Center, Seattle, WA

**3355 Scaffolding Scientific
Inquiry, Quantitative Skills, and
Collaborative Writing within a
Course-based Undergraduate
Research Experience (CURE)****White River D (Level 1) • General
Biology • Demonstration (75 min)
• 2Y, 4Y**

In this session, we will demonstrate how we used a soil microbiome CURE to teach experimental design, statistics, and collaborative writing of scientific reports in college-level introductory biology laboratory courses.

Rachel Pigg, Natalie Christian, Mikus Abolins-Abols, and Jeffery Masters, University of Louisville, Louisville, KY

3368 Our Classes are Pointless**White River G (Level 1) • Instructional
Strategies • Hands-on Workshop (75
min) • HS, 2Y, 4Y**

Join us in a discussion on running your classes without points, in a low stress environment, and where student focus is on learning and not grades.

Paul Strode, Fairview High School, Boulder, CO and Aaron Mathieu, Acton-Boxborough Regional High School, Acton, MA

**3351 Teaching Beyond Insulin:
Exploring Environmental
Contributions to Type 2
Diabetes****White River J (Level 1) • General
Biology • Hands-on Workshop (75 min)
• ML, HS, GA**

You've used blood glucose regulation to teach homeostasis. Extend those lessons with classroom-ready strategies that address how policy and place contribute to Type 2 Diabetes.

Joan Griswold and Atom Lesiak, University of Washington, Seattle, WA

11:15AM – 12:30PM CONT.

3304 Reflecting on Who's Coming to Dinner: Broadening Participation vs. Inclusion in Biology Education**201-203 (Level 2) • Instructional Strategies • Hands-on Workshop (75 min) • 2Y, 4Y, GA**

Come join the iEMBER network to discuss how teaching is impacted when changing from a broadening participation to an inclusion mindset, and then work on a lesson for your classroom.

Michael Moore, University of Arkansas at Little Rock, Little Rock, AR; Jana Marcette, Montana State University Billings, Billings, MT; Gary McDowell, Lightoller LLC, Chicago, IL; Emily Weigel, Georgia Tech, Atlanta, GA

3386 Creation of Maker Science Artifacts - Formative and Summative Assessments in the Biology Classroom**204-205 (Level 2) • Instructional Strategies • Hands-on Workshop (75 min) • ML, HS, GA**

Incorporating authentic maker projects into curriculum allows students to creatively demonstrate their knowledge offering teachers alternative assessments. This session offers examples of projects, rubrics, and a hands-on engineering design activity.

Catherine Bischoff, Rye Country Day School, Rye, NY and Charaun Wills, Potomac School, McLean, VA

SPECIAL PROGRAMMING PRESENTED BY LAB-AIDS**3442 Exploring the Evolutionary Connection between Cystic Fibrosis and Tuberculosis****302-303 (Level 3) • General Biology • Hands-on Workshop (75 min) • HS**

Use a computer simulation to analyze and interpret mathematical data that explores the evolutionary connection between cystic fibrosis (a genetic disease) and tuberculosis (an infectious disease) and evaluate mathematical representation.

Wendy Jackson, Lab-Aids, Ronkonkoma, NY

3383 Improving Science Practices with Scientific Journal Articles**304-306 (Level 3) • AP Biology • Hands-on Workshop (75 min) • HS, 2Y**

We will provide concrete, scaffolded methods for teaching students to effectively and thoroughly understand text, evaluate data, and model design presented in scientific journal articles.

Karen O'Connor and Eric Brown, Stevenson High School, Lincolnshire, IL

3357 Biophilia Effects on Long-Term Concept Retention, Academic Achievement, and Intrinsic Motivation in Secondary Science Classrooms**309-310 (Level 3) • Instructional Strategies • Hands-on Workshop (75 min) • HS, 4Y, GA**

Our study is one of many in ten years of research protocols in Midwestern PK-12 classrooms. E.O. Wilson's definition of biophilia is "the urge to affiliate with other forms of life."

Noah Christians, Clear Lake High School, Clear Lake, IA and Michael Bechtel, Wartburg College, Waverly, IA

SPECIAL PROGRAMMING PRESENTED BY 3D MOLECULAR DESIGNS**3456 COVID-19: Science to the Rescue****JW Grand 1 (Level 3) • General Biology • Hands-on Workshop (75 min) • HS, 2Y**

Explore the components of the coronavirus using a 3D-printed physical model and explain how a vaccine protects us from infection. Discuss novel vaccine platforms that promise to prevent future pandemics.

Tim Herman, 3D Molecular Designs, Milwaukee, WI

3426 Teaching Biology Beyond the Binary with HHMI BioInteractive's Sex Verification Testing of Athletes Resource**JW Grand 4 (Level 3) • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

We will explore the biology of sex determination and development in humans as it applies to historical and present-day sex verification tests in athletic competitions.

Morgan Heinz, University of Washington Tacoma, Tacoma, WA and Catherina Sammons, Tates Creek High School, Lexington, KY

11:30AM – 1:45PM

2022 NABT Honors Luncheon**JW Grand 7-8 (Level 3) • Tickets Required • GA**

NABT is proud to recognize the 2022 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.

2:00PM – 3:15PM**3342 Teaching the Genome Generation: Incorporating Data Analysis and Quantitative Skills into Biology Classrooms through Bioinformatics****White River A (Level 1) • Genetics • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

In this hands-on workshop, participants will engage with genetics curriculum focused on data analysis and quantitative skills framed around cancer and comparative genomics.

Sarah Wojiski, Erica Gerace, and Alexa Wnorowski, The Jackson Laboratory, Farmington, CT

3332 Shipping Science - A Hands-on Laboratory for Students in an Online Elementary Teacher Education Program**White River B (Level 1) • General Biology • Hands-on Workshop (75 min) • 2Y, 4Y**

Come learn about our remote Introductory Biology course for pre-service elementary teachers that engages students in science processes using extended hands-on labs, not online simulations.

Jennifer Hofeld, Harrah High School, Harrah, OK; Donald French and Aimee Elmquist, Oklahoma State University, Stillwater, OK

3400 Back to the Future: Climate Edition**White River C (Level 1) • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS**

Join the National Center for Science Education to explore how proxies are used to gather evidence for past climate events in order to understand current and future climates.

Lin Andrews, DeeDee Wright, Cari Herndon, and Blake Touchet, National Center for Science Education, Oakland, CA

3293 Teaching the Next Generation: Finding Success, Sustainability, and Sanity in Teaching**White River D (Level 1) • Instructional Strategies • Symposium (75 min) • HS, GA**

Join other teachers like you (newbies, old hats, and everywhere else in between) for Tips, Tricks, and Techniques to being a successful, sustainable, and sane teacher.

Julie Angle, Oklahoma State University, Stillwater, OK and Carrie Bucklin, Southern Utah University, Cedar City, UT

3387 Anchored Inquiry Learning: Designing Meaningful Instruction to Explore Phenomena and Problems**White River G (Level 1) • Instructional Strategies • Hands-on Workshop (75 min) • HS, GA**

Experience firsthand how the Anchored Inquiry Learning instructional model can be used to design learning experiences that motivate students to engage with significant, real-world phenomena and problems in biology!

Cindy Gay, BSCS Science Learning, Steamboat Springs, CO

3275 Tick-Borne Diseases and One Health: Connecting Humans, Animals, and the Environment**White River J (Level 1) • General Biology • Hands-on Workshop (30 min) • HS, 2Y**

Investigate the spread of tick-borne diseases in humans and animals. Experience hands-on, minds-on, NGSS practice-based lessons related to One Health – the connections between human, animal, and environmental health.

Dina Markowitz, University of Rochester, Rochester, NY and Lisa Brosnick, Buffalo State College, Buffalo, NY

3334 Investigating “Humanity” Using Skulls, Hands, Feet, Maps, Tools, and the History of Science**201-203 (Level 2) • Evolution • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

We model an engaging, active-learning lesson through which high school and college students practice science with real data, develop critical thinking skills, consider bias, and have fun exploring biology.

Armin Moczek, Indiana University Bloomington, Bloomington, IN and Kirstin Milks, Bloomington High School South, Bloomington, IN

SPECIAL PROGRAMMING PRESENTED BY VERNIER**3467 Let’s Get Physical: Human Physiology Experiments****204-205 (Level 2) • Anatomy & Physiology • Hands-on Workshop (75 min) • HS**

Explore limb position, grip strength, heart rate, and EKGs/EMGs. Experiments are designed to encourage students to think about the physiology of human organ systems. Human physiology has never been easier.

John Melville and Sara Tallarovic, Vernier Software & Technology, Beaverton, OR

NABT Social Media Committee**206 (Level 2) • Committee Meeting (30 min) • GA**

John Moore and Stacey Kiser, Committee Chairs

3338 Refresh Your Biology Relationship: How to Bring the Love (Back) to Your Classroom!**302-303 (Level 3) • Instructional Strategies • Hands-on Workshop (75 min) • ELEM, ML, HS**

Build a yearlong, scaffolded routine that authentically increases student engagement by empowering yourself to reignite your passion for teaching biology! Reflect/share your Biology Love Story. Bring your best bio jokes.

Bethany Cates, Western Sierra Collegiate Academy, Rocklin, CA

2:00PM – 3:15PM CONT.

3389 Strategies to Improve Student Scientific Reasoning and Writing**304-306 (Level 3) • General Biology • Hands-on Workshop (75 min) • HS, GA**

Practical tips for teaching, practicing, and assessing student writing for standards-based grading models, AP free response questions, lab conclusions, argumentation, and CER.

Amy Inselberger, Adlai E. Stevenson High School, Lincolnshire, IL and Christine Lesh, Winters Mill High School, Westminster, MD

3376 Justice, Equity, Diversity, & Inclusion (JEDI) Work In Our Science Teaching Practices**309-310 (Level 3) • Instructional Strategies • Symposium (75 min) • GA**

Presenters share their experiences of how JEDI values are demonstrated in their teaching practices. Participants engage through reflecting, sharing, and exploring ideas of implementing JEDI values in their contexts.

Enya Granados, Alabama Connections Academy, Athens, AL

SPECIAL PROGRAMMING PRESENTED BY 3D MOLECULAR DESIGNS**3465 Discovering Dynamic DNA: More Than Just As, Ts, Gs, and Cs****JW Grand 1 (Level 3) • General Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

Transition between an assortment of physical DNA models and discover student-centered activities that explore the structure and function of this amazing biomolecule.

Kris Herman, 3D Molecular Designs, Milwaukee, WI

3298 Labs from the AP Environmental Science Lab Manual**JW Grand 2 (Level 3) • Ecology / Environmental Science / Sustainability • Hands-on Workshop (75 min) • HS**

Participants will engage with labs from the new lab manual. Participants will discuss how integrating these activities into environmental science and biology courses of any level can support all students.

David Hong, College Board, La Habra Heights, CA and Sarah Utley, New Trier Township High School, Winnetka, IL

SPECIAL PROGRAMMING PRESENTED BY HUDSONALPHA**3423 HudsonAlpha Presents: Data Science in Biotech: Why Now? Why Bother?****JW Grand 3 (Level 3) • Biotechnology • Symposium (75 min) • HS, 2Y, 4Y**

Today's genomic and biotechnology experiments routinely generate terabytes of information. This entry-level conversation will highlight how HudsonAlpha is working with today's algorithms. We'll also identify informatic tools accessible to students.

Neil Lamb, HudsonAlpha Institute for Biotechnology, Huntsville, AL

3427 Teaching Population Growth Concepts Using HHMI BioInteractive's Ecological Case Studies**JW Grand 4 (Level 3) • AP Biology • Hands-on Workshop (75 min) • HS, 2Y, 4Y**

We will explore ecological case studies used to teach exponential and logistic growth, including examples with lionfish, an invasive species in Atlantic ecosystems.

Mara Evans, UNC-Chapel Hill, Chapel Hill, NC and Kristine Grayson, University of Richmond, Richmond, VA

3:30PM – 4:00PM

Announcement of the 2022 Poster Winners**White River Ballroom (Level 1) • Special Event • 2Y, 4Y, GA**

Join us for this special announcement of the student winners of the Biology Education Research and Mentored Student Research Competitions.



4:15PM – 5:30PM

GENERAL SESSION:
 & PRESENTATION OF THE 2022 NABT DISTINGUISHED SERVICE AWARD

Michael Osterholm

See biography on page 10

A Conversation with Michael Osterholm: Public Health & Preparing for the Next Pandemic

White River Ballroom (Level 1) • Special Speaker • GA

Dr. Osterholm is one of the world's foremost experts on infectious diseases in the world. As the SARS-CoV-2 outbreak evolved into a global pandemic, Dr. Osterholm became one of the most trusted and popular communicators on the pandemic. Drawing from his vast experience as a state epidemiologist, principal investigator, author, and educator, Dr. Osterholm has been a continual source of fact-based information and analysis, including via CIDRAP's weekly "Osterholm Update: COVID-19" podcast.

In this informal format, Dr. Osterholm will discuss some of the most rewarding and challenging aspects of his work, discuss the most pressing infectious disease threats and strategies on how to face them, and finally what gives him hope for a healthy future. Have your questions ready for this interactive session.

NABT is proud to name Dr. Michael Osterholm the recipient of the 2022 Distinguished Service Award for Enhancing Education through Biological Research.

6:00PM – 8:00PM

NABT at the NCAA Hall of Champions

Offsite Event • Tickets Required • GA

Show your school spirit at this interactive museum where all 24 NCAA sports are represented. Exhibits include trivia challenges, current team rankings, video highlights, and artifacts donated from colleges and universities around the nation. There is also a fully interactive area to compete virtually and hands-on through sports simulators, a 1930s retro gymnasium, ski simulator, and more.

The museum is a short walk from the hotel and tickets include admission, light appetizers, and drinks. A shuttle will also be provided.

SUNDAY



8:30AM – 10:30PM

Four-Year College & University Section Meeting

308 (Level 3) • Committee Meeting • 4Y, GA



GREATER COMPREHENSION.

Give your students the convenience of accessing their textbook and homework from one online platform with Enhanced Biology from Expert TA. In addition to end-of-chapter problems and instructor test-bank questions from OpenStax Biology 2e, we partnered with the authors to bring enhanced learning exercises to your students, including advanced graphical questions, interactive exercises, and fill-in-the-blank chapter summaries. To learn more, find us in the exhibitor hall at Booth 305.



<http://theexpertta.com/biology> | main@theexpertta.com

EXHIBIT HALL HOURS

Thursday

5:30PM - 7:30PM

Exhibit Hours
& Exhibit Hall Opening Reception

Friday

8:00AM - 5:30PM

Exhibit Hours

4:00PM - 5:00PM

Meet & Greet
with NABT Leaders

4:00PM - 5:30PM

Exhibit Hall Closing Reception

EXHIBITOR KEY

Sponsorship Tiers

- Diamond
- Gold
- Silver
- Treasure Hunt Exhibitors

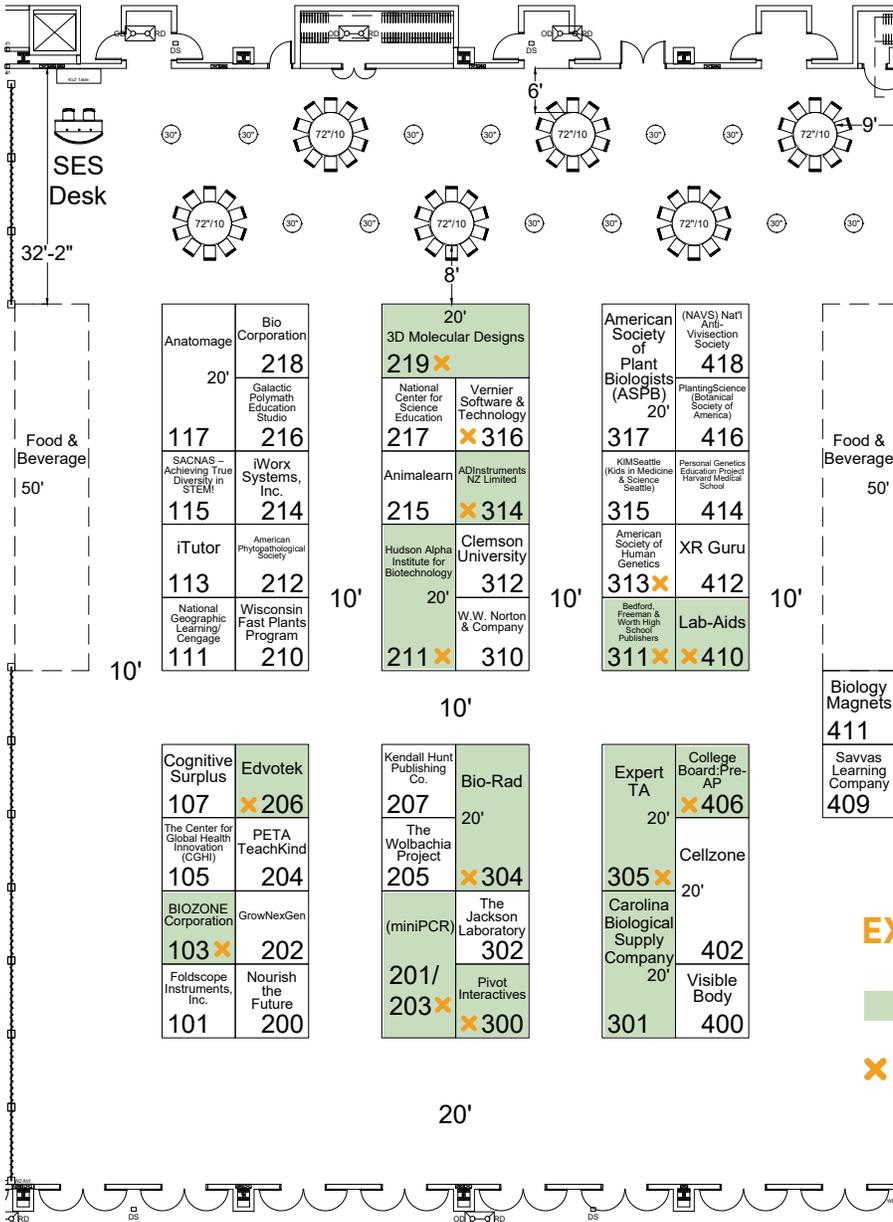


EXHIBIT HALL MAP KEY

- SPONSOR BOOTHS
- X TREASURE HUNT EXHIBITORS

A03
ENTRANCE

● 3D Molecular Designs

Booth 219

3dmoleculardesigns.com

Our models give words meaning! Engaging kits and models invite students to explore patterns, make predictions, and revise their explanations while grappling with complex science ideas. Teachers play key roles in the design, field testing, and activity development of all our models so you can be sure learning is successful in the classroom. Our recent merger with CBM means continued innovation and professional learning. Watch our newsletter for 2023 summer courses.

● ADInstruments

Booth 314

adinstruments.com

ADInstruments is committed to its goal of making science easier for educators worldwide. We focus on fully-customizable, ready-to-use solutions to help keep your students engaged. Our Lt Biology Collection, developed in partnership with Vernier and Bio-Rad™ Laboratories, addresses core concepts in first-year undergraduate introductory biology. The collection introduces a variety of concepts fundamental to biology and biochemistry.

The American Phytopathological Society (APS)

Booth 212

apsnet.org

The American Phytopathological Society, (APS) advancing the science of plant health.

American Society of Human Genetics

Booth 313

ashg.org

ASHG is a global community of genetics and genomics researchers. Our mission is to advance the field in science, health, and society through excellence in research, education, and advocacy. ASHG's educational programs include contests, videos, fact sheets, and networking opportunities with geneticists. The goal of these programs is to enable people everywhere to better understand their genetic composition and basic genetics concepts and gain a new appreciation of humanity's diversity and our shared genetic heritage as a single species.

American Society of Plant Biologists (ASPB)

Booth 317

aspb.org

The American Society of Plant Biologists promotes the growth and development of plant biology, encourages and publishes research in plant biology, and provides vital supports for plant scientists. The Society actively works to increase awareness of the significance of plants, support educators, and increase student interest in STEM by promoting scholarly teaching, active learning, effective mentoring, and evidence-based public engagement.

● miniPCR bio (Ampliyus)

Booth 201/203

minipcr.com

At miniPCR bio, we reimagine what is possible in the biology classroom. We design equipment and curriculum for affordable, hands on, truly engaging biology education for learners from middle school through college. Our DNA Discovery System, which combines miniPCR and blueGel electrophoresis, offers teachers and students unprecedented access to complete DNA analysis, and our curriculum products bring biology out of the black box by rendering complex concepts visible and tangible.

Anatamage

Booth 117

anatamage.com

Anatamage is a medical company, driving innovation through advanced solutions in hospitals and educational institutions. Our digital cadaver table, the Anatamage Table, allows a hands-on approach to learning the human body through unique visualization options, dissection tools, and quiz mode features, making it a strong asset to any anatomy class.

Animalearn

Booth 215

animalearn.org

Animalearn works to end the harmful use of animals in science education by providing non-animal resources to make positive change. We offer humane dissection alternatives, expert information, and advocacy tools. Animalearn's one-of-a-kind lending library, The Science Bank, is home to hundreds of high-quality, animal-friendly humane science education products that can be borrowed for FREE.

● Bedford, Freeman & Worth High School Publishers

Booth 311

highschool.bfwpub.com

BFW Publishers is proud to publish the groundbreaking AP® Biology program: *Biology for the AP® Course*. Aligned to the AP® Biology CED, this program includes integrated skills practice, AP®-specific features, online homework, and unmatched teacher resources. Stop by our booth to see samples, receive a demo, and explore more.

Bio Corporation

Booth 218

biologyproducts.com

Bio Corporation specializes in preserved specimens for all your dissection needs. Want to save money? Need top quality specimens? We got you! Come check us out at booth 218. See our quality, check out our prices, and best of all, request a FREE sample specimen to ship to you after the show. Hope to see you soon.

Biology Magnets

Booth 411

biologymagnets.com

Biology Magnets is a company producing manipulative educational tools that allow teachers and students to physically model biological and chemical processes and molecular interactions on magnetic white boards in the classroom. Immediately increase student understanding and questioning, and easily identify student misconceptions. Modules cover all major units of Biology for middle school through college curriculum. Chemistry and Environmental Science modules are also available. Modules are affordable, easy to store, and will last indefinitely. Add another dimension to your teaching!

● Bio-Rad

Booth 304

bio-rad.com

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

● **BIOZONE Corporation** 

Booth 103

thebiozone.com

BIOZONE has more than 30 years' experience in the development of engaging and effective resources for science teaching and learning. Our resources are unlike any you've seen before, and a departure from the traditional basal textbook paradigm. We take a "worktext" approach, combining the very best features of a traditional textbook with an interactive workbook. The resulting hybrid provides well designed, compact lessons that engage students and provide a rigorous yet accessible program of work.

Our extraordinary suite of resources meet the challenges of teaching today's students, whether they be in a traditional classroom environment, an informal teaching setting, or learning remotely.

● **Carolina Biological Supply Company** 

Booth 301

carolina.com

Carolina Biological Supply Company is a worldwide leader in science education, providing top-quality, innovative materials for educators. Carolina serves the K-16 market with everything needed to equip science laboratories and classrooms. Products, kits, NGSS lab solutions, and free teacher resources are available at carolina.com. Carolina™ Science catalog available upon request.

Cell Zone

Booth 402

cellzone.org

Cell Zone offers hands-on classroom materials that are easily cleaned for safe, active learning activities. Have you been looking for a way to make your classroom more active and include more learners? Our products help students learn about cells, biological molecules, histology, diversity and food webs, and mitosis in a fun and interactive way. Founded by a teacher, Cell Zone products transform any classroom into a student-centered learning environment. Come by our booth to see our products and enter our drawing.

The Center for Global Health Innovation (CGHI)

Booth 105

innovatebio.org

The Center for Global Health Innovation (CGHI), a 501c3 at the nexus of collaboration and discovery in public health, is establishing a life sciences workforce pipeline. The National Science Foundation awarded CGHI a grant to anchor a unified credentialing system within the industry by expanding state-level adoption of the Biotechnician Assistant Credentialing Exam (BACE), which is an industry-recognized credential that has gained traction to provide program and hiring managers a tool to identify qualified candidates.

Clemson University

Booth 312

clemson.edu

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

Cognitive Surplus

Booth 107

cognitive-surplus.com

We are fascinated by and curious about the science in the world around us. We love everything from physics jokes to the exquisite beauty of early scientific etchings and illustrations. We're inspired by a sense of wonder for our universe and a desire to look closer. We think gazing up at the night sky, watching leaves turn color in the fall, and the way magnets work is intriguing and kinda magical, and we hope that we're able to share some of our excitement through our designs.

● **College Board: Pre-AP** 

Booth 406

collegeboard.org

The Pre-AP program, including Pre-AP Biology, is designed to increase access and opportunities for all students to engage in meaningful, grade-level coursework. Back-mapped from AP Course Expectations, Pre-AP courses provide students with the content, skills, and practices for success in AP, college, and career. Teachers focus instruction through using the course framework, model lessons, classroom assessments, and an optional final exam.

● **EDVOTEK®** 

Booth 206

edvotek.com

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

● **Expert TA** 

Booth 305

theexpertta.com

Expert TA was designed with the help of Dr. Jung Choi, Georgia Tech, and Dr. Mary Anne Clark, Texas Wesleyan, senior authors of OpenStax Biology. The two authors, and the Expert TA content team, have created additional learning exercises to accompany the end-of-chapter and instructor test bank questions from the OpenStax Biology textbook to create a default library of questions for biology instructors. The library offers 3,400+ questions. The additional exercises include interactive graphical questions designed to bring concepts to life and test students' understanding.

Foldscope Instruments Inc.

Booth 101

foldscope.com

At Foldscope Instruments Inc, we provide innovative and powerful low-cost tools, educational services, and online community platforms.

We believe access to science and education is a human right. That is why we aim to break down the price barrier between people and science by providing products that are both low-cost and high-quality. Affordable STEM tools are important not only for reaching settings with little to no resources, but also for improving the state of science education in general. Across all of our products and services, we strive to promote equity and accessibility, and will continue to create tools and environments that foster curiosity, openness, and collaboration.

Galactic Polymath Education Studio

Booth 216

galacticpolymath.com

We translate current research into creative, interdisciplinary lessons for grades 5+ that are *free for everyone.* Instead of charging teachers and schools for access to curricula, we work to mobilize knowledge on behalf of researchers, nonprofits, and other organizations that seek a more science-engaged public. Over many weeks, we co-develop rich learning experiences for middle and high school classrooms that help students achieve standards-based learning objectives through immersion in real-world problems and authentic data sets.

GrowNextGen

Booth 202

grownextgen.org

Visit GrowNextGen to learn more about how to access excellent resources provided free to biology teachers. We are teachers creating exceptional learning experiences for teachers.

HudsonAlpha Institute for Biotechnology

Booth 211

hudsonalpha.org

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

iTutor

Booth 113

itutor.com

iTutor is a leader in online education, bringing instructional solutions to school districts and college access programs nationwide. We are a team of educators, administrators, operators, and international professionals, all unified around the relentless pursuit of advancing student achievement and providing equal educational opportunity to all. We improve student achievement and school district performance outcomes by providing the highest quality educational support everywhere at any time.

iWorx Systems, Inc.

Booth 214

iworx.com

iWorx helps educators teach physiology. We help engage your students with laboratory kits that contain all the sensors, software, and lab write-ups to perform hands-on experiments in cardiovascular, neuromuscular, and respiratory physiology. We focus on simplifying your life while maximizing student inquiry based learning and aligning with national curriculum standards. Each exercise is laid out in a simple step-by-step fashion, allowing your students to easily perform hands-on experiments, easily analyze their findings, and generate reports.

The Jackson Laboratory

Booth 302

jax.org

The Jackson Laboratory (JAX) is an independent, nonprofit biomedical research institution which aims to discover precise genomic solutions for disease and empower biomedical researchers to improve human health. JAX Genomic Education develops NGSS-aligned lessons, activities, and hands-on laboratory protocols for teaching and learning about genetics and genomics. Our Teaching the Genome Generation™ professional development program provides teachers with the content knowledge, teaching strategies, and resources needed to implement molecular genetics labs, bioinformatics activities, and bioethics lessons that effectively engage students.

Kendall Hunt Publishing Co.

Booth 207

k12.kendallhunt.com

Kendall Hunt has a 75-year history of providing innovative educational solutions. *BSCS Biology: Understanding for Life* is a full-year, high school level program and *inquiryHub Biology* is freely available digitally 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 eight science and engineering practices. For more information, visit: <https://k12.kendallhunt.com/>.

KIMSeattle (Kids in Medicine & Science, Seattle)

Booth 315

kimseattle.org

KIMSeattle (Kids in Medicine & Science, Seattle) is an exciting, educational nonprofit innovating Career-Connected Classroom™ labs with authentic, high-quality, reusable materials. Labs are attention-grabbing and scenario-based and include laminated protocols, slides with lecture notes for pre-lab didactics, teacher's guides with exhaustive background info, lab equipment/materials, and downloadable datasheets, ready to use. Visit our booth to try Heart Dissection using non-preserved anatomical tissue, Facial Reconstruction, Forensic Anthropology, and Wildlife Skull Identification.

Lab-Aids

Booth 410

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

National Anti-Vivisection Society (NAVS)

Booth 418

navs.org

The National Anti-Vivisection Society (NAVS) is dedicated to advancing science that does not harm animals. NAVS funds smarter, human-relevant research; helps educators implement humane replacements for classroom dissection; promotes animal-friendly changes to laws and policies; and provides support for research animals living in sanctuaries or looking for adoptive homes. As part of BioLEAP, our program for educators, NAVS provides innovative resources, including classroom grants, replacements for traditional classroom dissection, and a new 3Rs curriculum. Learn more at BioLEAP.org.

National Center for Science Education (NCSE)

Booth 217

ncse.ngo

The National Center for Science Education (NCSE) works to ensure that what is taught in science classrooms and beyond is accurate and consistent with the current best understanding in the scientific community. Currently, NCSE focuses on climate change and evolution—well-established areas of science that are societally controversial. Additionally, NCSE works to provide nature of science resources to teachers during a time when understanding the process of science has never been more critical.

National Geographic Learning/Cengage

Booth 111

cengage.com

National Geographic Learning, a part of Cengage Group, is a K-12 publisher focusing on college and career readiness with content and interactive learning and a new focus in on-level and AP science. 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.

Nourish the Future

Booth 200

nourishthefuture.org

Nourish the Future is a national science education initiative developed by science teachers for science teachers. We want to inspire a network of educators to foster critical thinking and provide science-based resources that meet teachers' needs in the classroom. Visit booth #200 to join the movement!

Personal Genetics Education Project Harvard Medical School

Booth 414

pped.org

Founded in 2006 at Harvard Medical School, the Personal Genetics Education Project (pgEd) increases awareness and conversation about the benefits and ethical, legal, and social implications of genetics. pgEd creates curricula that inspire curiosity through stories of people impacted by new genetic technologies and real-world ethical dilemmas. Our thought-provoking lesson plans and workshops place genetics in a broader societal context through the lenses of history, culture, ethics, policy, and law, helping students connect the science of genetics to real-world problems.

PETA TeachKind

Booth 204

teachkind.org

TeachKind-PETA's humane education division-helps schools integrate compassion for animals into existing curricula through free lesson plans, presentations, and more. As former classroom teachers, we know that educators have the power to plant seeds of kindness, and we want to make humane education easy! TeachKind also partners with school districts to replace outdated animal dissections with superior, trauma-free, cutting-edge learning tools and support educators nationwide. Check out TeachKind.org and start building empathy for *all* right now!

Pivot Interactives

Booth 300

pivotinteractives.com

Pivot Interactives is the only platform for authentic, interactive video-based science activities in biology, environmental science, chemistry, earth and space science, and physics. The extensive library of activities crafted by veteran science educators makes it easy for teachers to actively engage students in the exploration of scientific phenomena while developing their skills in the science practices. Students make observations, form and test predictions, design and execute experiments, collect and analyze data, and draw conclusions from interactive videos. Transform how your students learn science with active learning through scientific phenomena.

PlantingScience (Botanical Society of America)

Booth 416

plantingscience.org

PlantingScience is a free online resource for teachers and schools. We are a learning community where scientists provide online mentorship to student teams as they design and think through their own inquiry projects. The open education resources (OER) support NGSS-aligned plant investigations that integrate scientific practices and big ideas in biology.

SACNAS – Achieving True Diversity in STEM!

Booth 115

sacnas.org

There is a future where STEM (science, technology, engineering, and math) reflects the diverse demographics of our country, so the field is better equipped to solve our world's most pressing problems. Through our people, programs, and partnerships, SACNAS has taken a radical approach to lead with culture and identity as the means to achieve true diversity in STEM.

Savvas Learning Company

Booth 409

savvas.com

At Savvas, we believe learning should inspire. By combining new ideas, new ways of thinking, and new ways of interacting, we design next-generation K-12 learning solutions that help all students discover their greatness. Our award-winning, standards-aligned programs — developed by leading authors and educators and used by more than 40 million students — leverage the power of adaptive learning and advanced technology to deliver immersive, personalized, and engaging content that maximizes learning, anytime, anywhere. To learn more, visit www.savvas.com.

Vernier Software and Technology

Booth 316

vernier.com

Vernier Science Education is committed to using our experience, knowledge, and passion to create the best and most reliable solutions for biology education. Our comprehensive solutions include hardware, software, content, assessment, professional development, and technical support. We are dedicated to partnering with biology educators and communities to build a STEM-literate society where students grow up to become knowledgeable citizens who can solve problems, fully contribute to their communities, and drive innovation.

Visible Body

Booth 400

visiblebody.com

Visible Body's 3D biology and AR human anatomy and physiology apps, labs, and teaching and learning 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 auto-graded labs and homework, customize 3D models and flashcards, and easily share them with students.

Read how students and professors feel about Visible Body: visiblebody.com/customer-stories.

W.W. Norton & Company

Booth 310

books.wwnorton.com

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

Wisconsin Fast Plants

Booth 210

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.

The Wolbachia Project

Booth 205

vu.edu/wolbachia

Discover the Microbes Within: The Wolbachia Project is an integrative lab series that empowers students and teachers with real-world skills and experience in biodiversity, biotechnology, and bioinformatics. We invite your 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*.

XR Guru

Booth 412

xrguru.com

XR Guru, a product by HoloPundits, is a next-generation education application designed to bring learning, content creation, and distribution together into one easy-to-use platform. XR Guru helps educators to assign content and track student progress; to teach complex concepts in an engaging way using curated Extended Reality (XR) content; to integrate engaging XR content into their curriculum as supplemental content; and to increase student confidence, attention, and engagement in the classroom using immersive XR technology.

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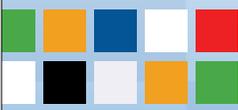
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#NABT2022



THANK YOU

TO THE MANY VOLUNTEERS

WHO WORKED SO HARD TO MAKE THE 2022 CONFERENCE A SUCCESS!



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National Association of Biology Teachers

Certificate of Attendance

is hereby granted to:

to certify that they attended the

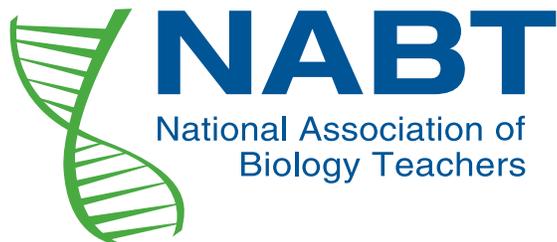
NABT PROFESSIONAL DEVELOPMENT CONFERENCE

November 10-13, 2022

Indianapolis, Indiana



Chris Monsour
NABT President-2022



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 to SARS-CoV-2 or exhibit symptoms.

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.

Adopted by the NABT Board of Directors, 2022.

SAVE THE DATE



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NOVEMBER 2-5, 2023



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