You are invited – attend one or more of the summer 2018 workshops!

Dear Science, Agriculture Education, Family and Consumer Sciences, and Extension and Outreach Educators:

It is with great pleasure that I invite you to attend one or more of the biotechnology or bioethics workshops offered in Ames this summer. Educators in public and private schools or those who work with youth in 4-H or other community programs can strengthen and update their STEM-based curriculums with modern content, techniques, and activities in biotechnology and bioethics, while earning professional development or Iowa State University graduate credits at the workshops.

The workshops, instructed by Clark Wolf and myself, will be held in the Biotechnology Outreach Education Center (BOEC) on the Iowa State campus. Iowa teachers can receive stipends of $100 per day to help cover their costs of attending. ISU Extension and Outreach educators or personnel can receive travel reimbursements of up to $100 per day to help cover their expenses. Materials and stipends for the workshops are funded by Iowa State's Office of Biotechnology and by the Iowa Biotechnology Association. Upon completion of any of the workshops, Iowa teachers and ISU Extension and Outreach educators are eligible to receive free supplies and equipment for specific lab protocols from the Office of Biotechnology.

Please share this invitation with your colleagues. I hope to see you in Ames this summer!

Sincerely,
Mike Zeller
Biotechnology Outreach
Education Coordinator

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Iowa Biotech Opportunities

Biotechnology education workshops

Biotechnology Education Workshop I
Iowa State University, Ames
June 11-14, 2018

This workshop course is directed at science, agriculture, family and consumer sciences, and ISU Extension and Outreach educators who want to gain the basic knowledge and laboratory skills necessary to teach biotechnology in their classrooms.

Teachers will learn how to prepare and instruct the laboratories in DNA extraction and quantification from various sources, DNA transformation, DNA fingerprinting, antibiotic resistance, biofuels, and more. Educators will prepare and perform the lab protocols as the students would do in class.

Credits
• 2 professional development credits – $70
• 2 ISU graduate credits – cost to be announced

Stipend
• $400 stipend for Iowa teachers ($100 per day) funded by the Iowa Biotechnology Association

Travel
• Travel reimbursement available for ISU Extension and Outreach educators/personnel (up to $100 per day)

Registration deadline
May 21, 2018

Bioethics Workshop I
Iowa State University, Ames
June 18-21, 2018

This course is designed for educators who want to incorporate discussion of ethical issues into existing science courses. Participants will create case studies designed to integrate ethical content in the science curriculum, and which also might be used to address such issues for extension audiences. The focus will be on ethical issues in science education, including especially agricultural biotechnology. Several other bioethics topics will also be covered.

Participants will work through activities and case studies that they can take home and use in their classes. During the workshop, participants will be divided into groups. Each group will develop a study on a topic relevant to students who take their classes.

The workshop will also address some pedagogical issues, including appropriate objectives for bioethics units; alternative approaches to bioethics pedagogy; how to relate bioethics issues to personal ethical issues familiar to students; how to help students identify ethical issues; how to address bioethics while respecting diversity of views in the classroom; and assessment for bioethics units. Participants will leave with classroom-ready case study exercises for use in their own classes.

Credits
• 2 professional development credits – $70
• 2 ISU graduate credits – cost to be announced

Stipend
• $400 stipend for Iowa teachers ($100 per day)

Questions? Contact Mike Zeller, 515 294-5949, or mzeller@iastate.edu

Stipends for the two biotechnology education workshops generously were provided by the Iowa Biotechnology Association.
Travel

- Travel reimbursement available for ISU Extension and Outreach educators/personnel (up to $100 per day)

Registration deadline

May 21, 2018

Questions? Contact Clark Wolf at 515 294-3068 or e-mail jwcwolf@iastate.edu.

Want to do PCR? Borrow a thermal cycler from the BOEC!

Do you want to do PCR (polymerase chain reaction) in your Advanced Placement and/or Advanced Biology classes, but expensive equipment has deterred you? The Biotechnology Outreach Education (BOEC) program can help.

For several years, the BOEC has made available reagents and supplies to educators who have the expensive equipment needed to complete the PCR protocol. For those who do not, Iowa State University's Biotechnology Council recommended funding last spring for the BOEC to purchase PCR equipment for educators to borrow.

Protocols

The TPA-25 Alu sequence protocol on the BOEC website (http://biotech.iastate.edu/laboratory-protocols) was written to use either 1) one size (P20) micropipettors found in the DNA fingerprinting kit in combination with various sizes of transfer pipets or 2) a combination of micropipettor sizes (P10, P20, P200 and P1000) that educators may already have available in their labs. When ordering a thermal cycler, a DNA fingerprinting kit, and a mini-microcentrifuge (if needed) from the BOEC, educators should be ready to provide information about the amount of equipment and supplies they require for their classes.

Equiment:

- Bio-Rad thermal cycler programmed for TPA-25 Alu sequence and the most popular Bio-Rad and Carolina Biological PCR kit protocols
- Mini-microcentrifuge (if needed) with 12 positions
- Assorted disposable plasticware – transfer pipets, 1.5 ml tubes, 15 ml tubes, etc.
- Carolina Blu DNA staining supplies or migration dye with Gel Red DNA stain for use with a UV transilluminator

Also needed:

- DNA fingerprinting kit from the BOEC
- The TPA-25 Alu protocol is designed to use the P20 micropipettors, electrophoresis chambers, and power supply that are provided in the DNA fingerprinting kit.

Contact for information or to order

Lori Miller: lorimill@iastate.edu
Mike Zeller: mzeller@iastate.edu

The BOEC is providing educators free access to the reagents/supplies, thermal cyclers, and mini-centrifuges (left to right below) needed to do the TPA-25 Alu protocol with their students.
Mike’s message . . .

By Mike Zeller
Outreach Education Center Coordinator

The Winter 2018 edition of the Iowa Biotech Educator serves to officially announce the dates, location, and where to find specific information about our summer Biotechnology Education Workshops. All this information can be found on page 2.

The workshops offer you a chance to experience the most modern STEM techniques and concepts in life sciences. After completing a workshop(s), you will be eligible for free equipment and supplies for specific lab protocols. Please share this issue with your colleagues and/or direct them to our website (www.biotech.iastate.edu/for-k-14-educators) so they, too, can benefit from the resources the Biotechnology Outreach Education Center (BOEC) can offer educators.

BOEC’s role in STEM
I want to remind you that the BOEC is here to help you enhance your STEM initiatives in life sciences with biotechnology resources. Just contact Lori Miller, lorimill@iastate.edu, or me anytime to order supplies or equipment, to schedule a visit to the BOEC, or to have your questions answered. I have arranged my schedule so that most days I am exclusively available from 7:00-8:30 a.m. weekdays, except when I travel. For immediate questions, my office phone is 515 294-5949 or e-mail me at mzeller@iastate.edu.

This fall, I was kept busy teaching pre-service teachers from agricultural education and family and consumer sciences programs here on campus. Along with teaching, I presented to 25 school groups and nearly 1,000 students, either in the BOEC or at Iowa schools. Typically, the demand for the BOEC outreach services is very high in the spring. Please order supplies and schedule visits as soon as your schedule allows for your spring classes. For more information about event visits or field trips to the BOEC on Iowa State’s campus, please contact Lori or me to answer questions and/or schedule a date.

Attending a state conference
It was good seeing many of you at the Iowa Academy of Sciences Iowa Science Teaching Section conference at DMACC’s FFA Center in Ankeny, Iowa. We were pleased to introduce our new PCR equipment for loan and PCR activity that are available to schools. It’s always great to hear from the group of you who were able to attend the conference.

What’s new at the BOEC
The BOEC is now making available thermal cyclers and high-speed mini-centrifuges to teachers to do PCR activity(ies) in their advanced biology curriculums (see article page 3). Depending on your individual equipment situations/needs, the BOEC can loan you the equipment and offer supplies to complete the TPA-25 Alu sequence PCR activity.

In addition, each of the four thermal cyclers has been programmed with the most popular PCR activities that are available for purchase from Bio-Rad and Carolina Biological. This flexibility allows you to use the Iowa State equipment to do these science supply companies’ PCR activities. As always, I will be available to answer any questions.

Planning for the spring semester
Remember, if you are planning a visit to the BOEC or need supplies, contact Lori or me as soon as you can to reserve dates and/or schedule deliveries. The spring schedule traditionally fills up fast, so please plan ahead. I hope you will let the BOEC and the Office of Biotechnology assist you in your life science STEM endeavors by bringing biotechnology into your classroom. Have a great start to the spring semester.

PHOTOS: MIKE ZELLER

Are you looking for hands-on experience with classroom tested biotech lab protocols? Educators can find it at the summer 2018 workshops. See page 2 for details.
**Iowa STEM Competitions**

Major award programs for which Iowa science educators or their students are eligible are featured below. For other award, competition, and grant opportunities for educators or students, visit the Office of Biotechnology's educational funding website at [www.biotech.iastate.edu/educational-awards-and-funding-sources](http://www.biotech.iastate.edu/educational-awards-and-funding-sources).

**State Science and Technology Fair March 22 – 23**

The State Science and Technology Fair of Iowa (SSTFI) will be held in Ames on Thursday and Friday, March 22-23. The fair is open to any student in grades 6-12 residing in or attending school (public, private, parochial or home school) in the state of Iowa.

The SSTFI is affiliated with the Intel International Science and Engineering Fair. All high school exhibitors at the fair are eligible for college scholarships. In addition, the top two individuals, the top team project, and their teachers will be awarded trips to the Intel International Science and Engineering Fair in Pittsburgh, Pennsylvania, in May. All exhibitors in grades 6-12 are eligible for prizes and other special awards.

As one of the fair sponsors, the Iowa Biotechnology Association (IowaBio) will be making five scholarship awards at the 2018 fair. The IowaBio scholarships will be awarded to the five students who exhibit the best use of biotechnology with their projects.

All Iowa high school students who exhibit projects at the fair are eligible for the IowaBio scholarships, which are $2,000 if used at an Iowa school of higher education or $1,000 if used at an out-of-state institution of higher education.

The 2017 winners were Mason Burlage, Beckman Catholic High School, Dyersville; Pranav Chhaliyil, Maharishi School of the Age of Enlightenment, Fairfield; Manasa Pagadala, Rivermont Collegiate, Bettendorf; Aaron Wills, Central Lee High School, Donnellson; and Justin Wessel, Beckman Catholic High School, Dyersville.

In addition to the five IowaBio scholarships, the Association is working with the Biotechnology Institute, an educational foundation headquartered in Washington D.C., to award an Iowa BioGENEius Challenge Winner. The Iowa BioGENEius Challenge winner will compete at the International BioGENEius challenge in Boston, Massachusetts, next summer. The 2017 BioGENEius winner was Pranav Chhaliyil.

For more information about the SSTFI, visit [www.extension.iastate.edu/sstfi](http://www.extension.iastate.edu/sstfi) or contact board chair Jay Staker, e-mail jstaker@iastate.edu.

Volunteers are being recruited to judge at this year's event. For details, contact Vicki Speake, phone 515 294-5738.

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**Ames Lab / Iowa State host science bowls**

**The Iowa Regional High School Science Bowl**

This year’s Iowa Regional High School Science Bowl is scheduled for Saturday, January 27, 2018, on the Iowa State University campus in Ames. The event is hosted by the U.S. Department of Energy’s Ames Laboratory and Iowa State University.

During the competition, teams of up to five students, including one alternate, answer questions from categories such as biology, chemistry, mathematics, physics, earth and space sciences, and energy.

The regional winning team is awarded an all-expenses-paid trip to compete in the Department of Energy’s National Science Bowl® in Washington, D.C., from April 26 - 30, 2018. The 2017 champion of the Regional High School Science Bowl was Valley High School of West Des Moines.

**The Iowa Regional Middle School Science Bowl**

The science bowl for grades 6-8 will be Saturday, February 24, 2018, on the Iowa State University campus in Ames. This event also is hosted by the U.S. Department of Energy’s Ames Laboratory and Iowa State University.

Participants will compete in a question-and-answer contest about life science, physical science, earth and space science, energy, mathematics, and general science. The winning academic team of the 2018 competition will receive an all-expenses-paid trip to the National Middle School Science Bowl® in Washington, D.C., to compete from April 26 - 30, 2018. Ames Middle School was the champion of the 2017 Middle School Science Bowl.

For more information
To learn more about the science bowls, go to [www.ameslab.gov/education/science-bowl](http://www.ameslab.gov/education/science-bowl) or contact Deb Samuelson at 515 294-9557, [debsam@ameslab.gov](mailto:debsam@ameslab.gov), or Steve Karsjen at 515 294-5643, [karsjen@ameslab.gov](mailto:karsjen@ameslab.gov).
Beginning February 1, nominations from administrators, colleagues, or self-nominations will be accepted by the Iowa Academy of Science for one of the 2018 Excellence in Science Teaching Awards. These awards honor outstanding science teachers in Iowa’s K-12 schools. The deadline for completed application packets is January 31, 2019.

Iowa teachers of all grade levels in all science areas are eligible to be nominated in one of the seven nomination categories: elementary science, earth/space science/environmental science, general/multiple science, life science, middle school/junior high science, physical science, and science supervisor. For details, e-mail iascience@uni.edu or visit the website at www.scienceiniowa.org/awards.

**I.O.W.A. STEM Teacher Award concludes 2018 competition**

Nominations and applications for the 2018 I.O.W.A. STEM Teacher Award sponsored by Kemin Industries and the Iowa Governor’s STEM Advisory Council have closed.

The award recognizes one teacher from each of the six STEM regions for their dedication and contributions to science, technology, engineering, and math (STEM) education for Iowa’s K-12 students.

Each recipient receives a $1,500 award and an additional $1,500 to be used in their classroom. The 2018 recipients will be recognized during events at their respective schools in January and at a statewide event in February.

For a full list of final recipients of the 2018 I.O.W.A. STEM Teacher Award, visit www.stemaward.fluidreview.com for details at the end of January.

Nominations for the 2019 I.O.W.A. STEM Teacher Award will open in the fall.

**National STEM Competitions**

**March 15 deadline for biology teacher awards – take the time to nominate**

Biology teachers of grades 7-12 have until March 15 to nominate a colleague or themselves for this year’s Outstanding Biology Teacher Award, sponsored by the National Association of Biology Teachers (NABT).

Nominees are judged on their teaching ability and experience, cooperativeness in the school and community, and student-teacher relationships.

Please take the time to nominate a deserving colleague or yourself.

Nomination instructions can be found in the Awards section of the NABT website at www.nabt.org. The deadline for Outstanding Biology Teacher Award nominations and most other 2018 NABT awards is March 15, 2018.

For more information, contact Iowa’s director for the award Doug Herman, Herman.Doug@iowacityschools.org, or Mike Zeller, mzeller@iastate.edu.

**April 1 and May 1 deadlines for presidential awards**

April 1 is the deadline for online nominations of math and science teachers of grades K-6 for a Presidential Award for Excellence in Mathematics and Science Teaching.

This award is the highest recognition that a mathematics or science teacher in the United States can receive and is presented in Washington, D.C.

The competition alternates each year between teachers of grades K-6 and
National STEM Competitions

teachers of grades 7-12. Up to two winners in mathematics or science are named from each state or jurisdiction. For details, e-mail info@paemst.org or visit www.paemst.org.

Congratulations to the four state finalists for grades 7-12 who were announced by the Iowa Department of Education last September. The math finalists are Rachel Giesmann, Mediapolis High School, Mediapolis, and Maria “Gabby” Granadillo, McKinley Middle School, Cedar Rapids. The science finalists are Mike Todd, Ames High School, Ames, and Mike Wedge, Sibley-Ocheyedan High School, Sibley.

Free Biotech Resources

Top 10 biotechnology discoveries for 2017
http://hudsonalpha.org/the-annual-guidebook

Educators looking for an easy way to stay up-to-date on new discoveries in genetics, genomics, and biotechnology should check out the Education section of the HudsonAlpha Institute for Biotechnology. This non-profit institute located in Huntsville, Alabama, publishes an annual Biotechnology Guidebook describing new research discoveries. The guidebook can be downloaded as a free PDF file.

Although the articles are linked to the Alabama Course of Study for courses in high school biology, genetics, AP biology, and multiple career and technical education courses, they can be integrated with similar course objectives from other states and systems. In the 58-page guidebook, recent research findings are grouped into two sections.

In the first section, a page of science snapshots provides one-paragraph descriptions of 10 of the past year’s genetics and biotechnology stories. Following the snapshots are short article updates on new findings in the fields of genetics, genomics, and biotechnology and how they translate into discoveries, treatments, or applications that have been announced during the past year. Topics include chromosomal neighborhoods, DNA replication, bacterial growth in space, using helpful bacteria to treat eczema, and many more.

In the second section of the guide, each new finding connects to key technologies or concepts described in detail, using language and concepts intentionally geared to a high school or public audience. Key technologies explained include DNA sequencing, RNA and protein analyses, and bioinformatics. Illustrated one-page articles describe the application of such technologies in the fields of agriculture, cancer research, comparative genomics, criminal justice and forensics, and 16 more fields.

Howard Hughes Medical Institute resources
www.hhmi.org/biointeractive

The Howard Hughes Medical Institute (HHMI) offers hundreds of free interactive science resources for educators.

Topics range from scientific processes, organismal biology, genetics, the chemistry of life, and the biology of cells to the diversity of life on earth and the environment.

A collection of 3-D models allows students and teachers to examine molecular structures and viruses. Each model is based on current research data and is linked to related resources, such as short films, lectures, and classroom activities.

High-quality animations help students learn about a broad range of topics, including DNA replication, DNA transcription, the molecular mechanism of synaptic functions, and many more.

Classroom resources include activities, articles, and posters. The collections section groups all available resources on a certain topic together, for educators’ convenience.

The data points resource helps students discuss and interpret a graph or figure from a scientific journal article. The graph or figure is accompanied by a student handout and an educator guide, including discussion questions.

Films include animated short films, feature films, and short films on science topics. There also are videos of scientists at work, science lectures, and more.

Interactive media and short courses provide even more variety for learning about science.
About Iowa State’s Public Education Program in Biotechnology...

Iowa State University’s Public Education Program in Biotechnology thanks donors for their generous support:
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