

Iowa Biotech Educator

A newsletter of the Iowa State University Office of Biotechnology • Volume 22 • Number 1 • Winter 2014

This Is Your Invitation to Attend Summer 2014 Workshops

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

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 ISU 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 \$50 per day to help cover their costs of attending. ISU Extension and Outreach educators or personnel can receive travel reimbursements of up to \$50 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. For workshop details and registration information, see the article below.

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

Sincerely,
Mike Zeller
Biotechnology Outreach
Education Coordinator

Summer Workshop Descriptions

For more information about the biotechnology education workshops see the descriptions on the next page, contact Mike Zeller or Lori Miller toll-free in Iowa

at 800 643-9504, or e-mail mzeller@iastate.edu or lorimill@iastate.edu. For more information about the bioethics workshop, please contact Clark Wolf at 515 294-3068 or e-mail jwcwolf@iastate.edu.

The deadline for registering for the 2014 summer workshops offered by the Office of Biotechnology at Iowa

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IOWA STATE UNIVERSITY
Helping educators become their best.

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Information and Free Lab Supplies for Iowa Educators
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Expert Answers to Questions
Mike Zeller
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State University is May 16, 2014. To register for any workshop, please contact Lori or use the online registration form available at www.biotech.iastate.edu/summer-training-courses-for-educators. Please submit your registration to arrive by May 16, 2014.

June 9-12, 2014

Biotechnology Education Workshop I for Science, Agriculture, Family and Consumer Sciences, and ISU Extension and Outreach Educators

Iowa State University, Ames, Iowa

- 2 professional development credits - \$25
- 1-2 ISU graduate credits - cost to be announced
- \$200 stipend for Iowa schoolteachers (\$50 per day) funded by the [Iowa Biotechnology Association](http://www.iowa-biotech.org)
- Travel reimbursement available for ISU Extension and Outreach educators/personnel (up to \$50 per day)
- Registration deadline - May 16, 2014



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, and more. Educators will prepare and perform the lab protocols as the students would do in class.



June 16-19, 2014

Bioethics Workshop I

Iowa State University, Ames, Iowa

- 2 professional development credits - \$25
- 2 ISU graduate credits - cost to be announced
- \$200 stipend for Iowa schoolteachers (\$50 per day)
- Travel reimbursement available for ISU Extension and Outreach educators/personnel (up to \$50 per day)
- Registration deadline – May 16, 2014

This course is designed for educators who want to incorporate discussion of ethical issues with students, to integrate some ethical content in the science curriculum, or to address such issues for extension audiences. The focus will be on ethical issues in science education, including agricultural biotechnology. 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. In the course of the workshop, participants will be divided into groups to develop their own case studies on topics relevant to their courses. The workshop will also address 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.



June 23-26, 2014

Biotechnology Education Workshop II – Advanced Workshop for Science, Agriculture, Family and Consumer Sciences, and ISU Extension and Outreach Educators

Iowa State University, Ames, Iowa

- 2 professional development credits - \$25
- 1-2 ISU graduate credits - cost to be announced
- \$200 stipend for Iowa schoolteachers (\$50 per day) funded by the [Iowa Biotechnology Association](http://www.iowa-biotech.org)
- Travel reimbursement available for ISU Extension and Outreach educators/personnel (up to \$50 per day)
- Registration deadline – May 16, 2014



This advanced workshop is open to science, agriculture, family and consumer sciences, and ISU Extension and Outreach educators who have attended one of the previous biotechnology workshops. Educators will learn how to prepare and instruct advanced biotechnology laboratories in their classrooms. Activities will include marker assisted selection, DNA isolation, recombinant DNA techniques, DNA amplification, restriction analysis of DNA, bioinformatics, sequencing, genomics, and more. Educators will prepare and perform the lab protocols as their students will do in class.



— Educational Opportunities —

Summer Research Internship for High School Ag and Biology Teachers

Iowa State University is offering 9th -12th grade agriculture and biology teachers the opportunity to participate in a seven-week training and research internship in molecular biology, biotechnology, and genomics to be held in Ames from June 9 - July 25, 2014 (contingent on unforeseeable snow days!).

No prior biotechnology training is necessary to be accepted into this program. Teachers will conduct an independent research project under the supervision of an ISU faculty member. Curriculum and instruction staff at ISU, together with master teachers, will help teachers develop classroom activities in molecular biology, biotechnology, and genomics.

The internship program is supported by the National Science Foundation, and stipends of \$5,600 will be given to successful candidates. Participants who live farther than 30 miles from the ISU campus will be offered furnished housing at University Village at no additional cost. Participants will receive up to \$500 to cover travel expenses.

For further details, please visit www.eeob.iastate.edu/plantgenomeoutreach/7-12teachers.html or contact program director Dr. Adah Leshem at 515 294-8453 or e-mail her at adah@iastate.edu. Applications are due March 1, 2014. Offers will be sent out to potential candidates beginning April 1, 2014.

Summer Academy on Biorenewables for Middle School Science Teachers

Iowa State University is offering middle school science teachers the opportunity to participate in a three-week professional development workshop to study the methods of biomass utilization to produce biorenewable products, including biofuels and bio-materials. The Summer Academy will be held on the Iowa State campus in Ames from July 8 - July 25, 2014. Participants will be eligible for either continuing education or graduate credit.

No prior knowledge in this area is necessary to be accepted into this program. Teachers will be introduced to cutting-edge research under way at Iowa State to address the global challenges facing society's dependence on finite sources of fossil based energy. The Summer Academy will include STEM curricula associated with this topic applicable to the Iowa Core Curriculum and middle school science standards and benchmarks.

The three weeks will include presentations by faculty and staff, hands-on lab activities, and field trips to Iowa's biorenewables-related research facilities and bio-based industries. Teachers will collaborate and develop classroom material to present to their students about biorenewables and associated careers. The program will be facilitated by Eric Hall, Hoover High School, Des Moines.

The Summer Academy is supported by the National Science Foundation. Stipends of \$2,400 and up to \$500 to cover travel expenses will be given to successful candidates. Teachers who live farther than 30 miles from the Iowa State campus will be offered furnished housing at University Village at no additional cost.

Further details can be found at www.cbirc.iastate.edu/education/precollege/summer-academy, or contact program director Dr. Adah Leshem at 515 294-8453 or e-mail her at adah@iastate.edu. Applications are due March 1, 2014. Offers will be sent out to potential candidates beginning April 1, 2014.

— Awards/Competitions/Grants —

Awards for Iowa Educators

For more award opportunities, visit www.biotech.iastate.edu/educational-awards-and-funding-sources.

Iowa Academy of Science

Excellence in Science Teaching Awards

For 60 years, the Iowa Academy of Science has recognized outstanding science teachers in Iowa's K-12 schools through the Excellence in Science Teaching Awards Program. Iowa teachers of all grade levels in all science areas are eligible to be nominated by administrators, colleagues, or by self-nomination. The seven nomination categories are elementary science, earth/space science/environmental science, general/multiple science, life science, middle school/junior high science, physical science, and science supervisory. Winners receive \$200, a plaque, and recognition at a luncheon during the Iowa Academy of Science annual meeting. Applications are accepted from February 1 through the following January 31. For more information, e-mail iascience@uni.edu or visit the website at www.iacad.org/recognize.html.

National Science Foundation Seeks Nominations for Presidential Teaching Awards

The National Science Foundation is accepting online nominations of teachers of grades K-6 for the 2014 Presidential Awards for Excellence in Mathematics and Science Teaching. Enacted by Congress in 1983, this award is the highest recognition that a mathematics or science teacher in the United States can receive. The competition

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alternates each year between teachers of grades K-6 (2012) and teachers of grades 7-12 (2013).

The award includes \$10,000, a citation signed by the President of the United States, a paid trip for two to Washington, D.C., and more. For details, e-mail info@paemst.org or visit the website at www.paemst.org. Online nominations opened this fall and close April 1, 2014. The application deadline for nominated teachers is May 1, 2014. Nominations of teachers should be done early enough to allow the nominated teacher time to thoroughly prepare an application before the May 1 deadline.

Congratulations to the 2012 Iowa winner in science Mason Kuhn, Shell Rock Elementary School, Waverly-Shell Rock, and to the 2012 state finalist Shelly Bromwich, Malcolm Price Laboratory School, University of Northern Iowa, Cedar Falls.

Congratulations also to the 2013 state finalists in science for Iowa – Shannon McLaughlin, Norwalk High School and Marcia Powell, West Delaware High School, Manchester.

Nominate a Colleague or Yourself for the NABT Outstanding Biology Teacher Award

Every year, the Outstanding Biology Teacher Award (OBTA) program of the National Association of Biology Teachers (NABT) plans to recognize an outstanding biology educator (grades 7-12) in each of the 50 states; Washington, D.C.; Canada; Puerto Rico; and overseas territories.

Candidates for this award do not have to be NABT members, but they must have at least three years of public, private, or parochial school teaching experience. A major portion of the nominee's career must have been devoted to the teaching of biology/life science.

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

OBTA recipients are special guests at the Honors Luncheon held at the NABT Professional Development Conference, receive microscopes from Leica Microsystems, gift certificates from Carolina Biological Supply Company, and award certificates and complimentary one-year membership from NABT.

To nominate a colleague or yourself, follow the nomination instructions found in the Awards and Opportunities section of the NABT website at www.nabt.org. The deadline for 2014 nominations is March 15, 2014.

For more information, contact Iowa's OBTA Awards Directors Mike Zeller, mzeller@iastate.edu, or Doug Herman, herman.doug@iccsd.k12.ia.us.

State Science and Technology Fair March 27-28

The 2014 State Science and Technology Fair of Iowa (SSTFI) will be held in Ames on Thursday and Friday, March 27-28. The competition is open to any student (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 senior high projects will compete at the Intel International Science and Engineering Fair in Los Angeles, California, in May. All exhibitors in grades 6-12 are eligible for trophies, medals, and other special awards.

As one of the fair sponsors, the [Iowa Biotechnology Association \(IowaBio\)](http://www.iowabio.org) will be making five scholarship awards at the 2014 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 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 2013 winners were Bo Fan, Ames High School; Lily Friedrichsen, South O'Brien Secondary School, Paullina; Ethan Hellweg, Central Lee High School, Donnellson; Priya Khanolkar, Keokuk High School; and Abby Walling, West Senior High School, Iowa City.

For more information, visit www.sciencefairiowa.org or contact fair director Andrea Spencer (phone 515 460-5559, e-mail aspence@iastate.edu) or chairman of the board Jay Staker (phone 515 294-8417, 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, e-mail speake@iastate.edu.

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Editor

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Ames Lab/ISU Science Bowls

The Iowa Regional High School Science Bowl hosted by the U.S. Department of Energy's Ames Laboratory and Iowa State University is scheduled for Saturday, January 25, 2014, on the Iowa State University campus in Ames. During the competition, teams of four students, plus 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 24-28, 2014. The 2013 champion of the Regional High School Science Bowl was Pleasant Valley High School of Bettendorf.

The Iowa Regional Middle School Science Bowl for grades 6-8 will be Saturday, February 22, 2014, 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 2014 competition will receive an all-expenses-paid trip to the National Middle School Science Bowl® in Washington, D.C., to compete from April 24-28. Central Lee (Donnellson) Middle School was the champion in the 2013 Middle School Science Bowl.

For more information about the science bowls, visit <https://www.ameslab.gov/education/science-bowl> or contact Deb Samuelson at 515 294-9557, debsam@ameslab.gov, or Steve Karsjen at 515 294-5643, karsjen@ameslab.gov.

Outreach News



By Mike Zeller
BOEC Coordinator

Biotechnology Outreach Education Center

Welcome to the Winter 2014 edition of the *Iowa Biotech Educator* newsletter. This issue is full of information that can help you, your curriculum, and your school teach the most modern STEM techniques and concepts in life sciences. Please share the newsletter with your colleagues and/or direct them to our website so they, too, can benefit from the resources the Biotechnology Outreach Education Center (BOEC) can offer educators.

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 or me anytime you need supplies, equipment, to schedule a visit to

the BOEC or your classroom, and/or need questions answered. Phone us at the toll free number 800 643-9504 or e-mail lorimill@iastate.edu or mzeller@iastate.edu. You can call or e-mail anytime with questions and requests. I have arranged my schedule so that most days I am exclusively available from 7-8:30 a.m. weekdays, except when I travel.

This edition of the *Iowa Biotech Educator* officially announces the dates and contains information about this summer's Biotechnology Education Workshops, including how to register (see p. 1). Every couple of years, we add new activities and speakers to the workshop schedule. If it has been a few years since you have taken a workshop and feel you need a review, or if you are ready for the advanced



There's no substitute for the hands-on experience educators receive at the summer workshops offered by the Office of Biotechnology.

Photo by Mike Zeller

workshop, please register as soon as possible and encourage a colleague to attend. You can find the 2014 summer workshops information and registration information on our website at www.biotech.iastate.edu/summer-training-courses-for-educators.

Typically, the outreach programs are very busy in the spring and the demand for the BOEC outreach services has increased steadily. Please order supplies as soon as your schedule allows for your spring classes. If you are planning to take advantage of the BOEC's unique on- and off-campus outreach education program, please contact Lori or me to schedule a date. Last year, more than 3,000 students either visited the BOEC or had the BOEC make presentations at their schools.

BOEC at Home and on the Road

This fall, I was kept busy teaching ISU pre-service teachers from agricultural education, family and consumer sciences,

and the Master of Arts in Applied Teaching (MAT) degree program, while still presenting to 39 groups either in the BOEC or at Iowa schools. For more information about classroom and event visits or field trips to the Iowa State campus, please contact Lori Miller or me.

BOEC State and National Conference Participation

October and November found me traveling to state and national science education conventions. We made our annual appearance at the Iowa Science Teachers Section (ISTS) of the Iowa Academy of Science at the Scheman Conference Center on the ISU campus in Ames. It was great to see many of our Iowa teaching colleagues and past workshop participants at our booth and at presentations throughout the day. It is always exciting to visit with Iowa teachers who are searching for ways to bring biotechnology and the most modern STEM initiatives and teaching methods into their classrooms.

I also attended the National Association of Biology Teachers (NABT) convention in Atlanta, Georgia. Attending state, regional, and national science teacher conventions gives me an opportunity to gain new knowledge in the most recent science education trends, legislation, standards, and pedagogy. My goal is to gain new knowledge, ideas, methods, techniques, and activities that I can share with you.

Make Plans Today

Remember, if you are planning a visit to the BOEC or would like the BOEC to come to your classroom, contact Lori or me as soon as you can to reserve a date. The spring schedule traditionally fills up fast, so please plan ahead. We have groups now scheduling into February and have received inquiries about available dates in April and May. I hope you will let the BOEC and the Office of Biotechnology assist you in bringing biotechnology into your classroom.

Have a great spring semester.

Biotech on the Internet

BOEC Web Pages Have New Look

The Office of Biotechnology's website design has been updated and a few things have moved, including Web pages related to the Biotechnology Outreach Education Center. To find them again, go to the Office of Biotechnology main website at www.biotech.iastate.edu and click on **For K-14 Educators** at the left side of the page. That's it! All your favorite pages from the Biotechnology Outreach Education Center are there.

Here's a brief roadmap to help you find what you are looking for under **For K-14 Educators**.

Bioethics Case Studies

case studies for the classroom focusing on agriculture, animals, biotechnology, environment, humans, plants, research ethics, teaching ethics, and veterinary medicine

Bioethics Program

Iowa State University's Bioethics Program, directed by Clark Wolf

Biorenewables Curriculum Modules

curriculum unit that investigates the processing of biofuels.

Biotechnology Outreach Education Center (BOEC)

overview of this Iowa State University center and its services

Biotechnology-related Links

links to resources about biotechnology education, foods, media stories, and research

Careers in Biotechnology

publication about career opportunities in biotechnology

Curriculum Units for K-14 Educators

curriculum resources supported by ISU Extension-Science, Engineering, and Technology (E-SET) and the ISU Office of Biotechnology

Educational Competitions and Funding

Iowa and national award competitions for teachers and students in STEM-related areas

Free Assistance from Experts

contact information for Master Biotechnology Teachers around Iowa and experts at Iowa State University

Free Supplies and Instructional Materials for Iowa Educators

free laboratory supplies and/or instructional materials for 27 laboratory protocols that are available to Iowa educators

Iowa Biotech Educator Newsletter

current and past issues of a newsletter to help Iowa educators incorporate biotechnology into their curriculums

Laboratory Protocols

step-by-step protocols for selected lab activities, available as PDF files

Laboratory Tutorials

more step-by-step tutorials for selected lab activities designed by Mike Zeller, available in PowerPoint® format, with a link to free PowerPoint® viewers

Summer Training Courses for Educators

hands-on laboratory experience with professional development and graduate credit available for teachers

A Tour of the Cell

<http://1.usa.gov/175861C>

The National Science Foundation's multimedia gallery includes an interactive tour of a cell. Students view a colorful illustration of a cell and its parts, including the cell membrane, nucleus, DNA, RNA, ribosome, protein, endoplasmic reticulum, and mitochondria.

By clicking on the label for each cell part, students can read an explanation of what the cell part does in the body. Each explanation includes the methods that scientists are using to study how that cell part functions.

HHMI Holiday Lectures Focused on Medicine in the Genomic Era

www.hhmi.org/biointeractive

The Howard Hughes Medical Institute's 2013 Holiday Lectures on Science were titled **Medicine in the Genomic Era**. Charles L. Sawyers of Memorial Sloan-Kettering Cancer Center and Christopher A. Walsh of Boston Children's Hospital discussed discoveries about the genetic causes of various types of cancers and diseases of the nervous system and the impact of those discoveries. Free resources for teachers are available from the site. For more information, visit www.BioInteractive.org.

STEM-Works

www.stem-works.com

The STEM-Works website was developed to support local community volunteers, teachers, and others working with youth to increase their skills in science, technology, engineering and mathematics (STEM). The website has activities and projects that are organized into subject areas such as the animal kingdom, crime scene investigation, extreme weather, medical innovations, robotics, space, and under the sea.

The "Locations" part of the website has suggestions for STEM-related places to visit, groups to join, and events happening in 29 major U.S. cities. Under "Articles," educators will find STEM news from media sources such as National Public Radio, National Geographic, Science Daily, and many more. Want to check out STEM jobs or advocacy opportunities? There are tabs for those, as well.

The STEM-Works program was founded by engineer and scientist Delores M. Etter, director of Southern Methodist University's Caruth Institute for Engineering Education and the Texas Instruments Distinguished Chair in Engineering Education. The STEM-Works program is sponsored by the Department of Defense and Southern Methodist University.

Plant Biotechnology Companies Launch Information Website

www.GMOAnswers.com

Announced in a news release last summer, agricultural biotechnology companies that develop genetically modified seeds (GMOs) have launched a new initiative to provide accurate information and answer tough questions about GMOs and how food is grown. The news release defines GMO Answers (www.GMOAnswers.com) as "a new conversation, public Q&A, and central online resource for information on GMOs, their background, use in agriculture, and research and data in one easy-to-access public resource for the first time." Questions submitted through the website will be answered by scientists, academics, farmers, and other experts.

The GMO Answers website is funded by members of the Council for Biotechnology Information, which included BASF, Bayer CropScience, Dow AgroSciences, DuPont, Monsanto Company, and Syngenta.

USDA Food System Education Booklet

<http://1.usa.gov/1g0Ap1P>

The Natural Resources Conservation Service in the United States Department of Agriculture has prepared a 32-page booklet with fun facts about how American farmers and ranchers produce food, fiber, fuel, and other agricultural products for consumers around the world. The booklet, titled **For the Good of the People**, is written at a fifth-grade reading level, contains plenty of colorful illustrations, and is packed with information.

Readers learn about the percentage of total income that goes toward food in the United States compared to other countries, the importance of soil and water conservation, U.S. food exports, land ownership statistics, family farms, alternative energy sources, and more.

The booklet can be read online or downloaded as a free PDF file at <http://1.usa.gov/1g0Ap1P>.

Too Much Paper in Your Life?

If you are receiving your issues of the **Iowa Biotech Educator** as printed copies through the mail, you can go paperless. Read each issue online at www.biotech.iastate.edu/iowa-biotech-educator-newsletter, or receive each issue by e-mail as a PDF attachment. To start your e-mail subscription, please send your e-mail address to Lori Miller (lorimill@iastate.edu) at the Office of Biotechnology.

About the ISU Public Education Program in Biotechnology. . .

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