This Is Your Invitation to Attend
Summer 2012 Workshops

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

You are invited to attend one or more of the biotechnology or bioethics workshops offered in Ames this summer. Educators in public or private schools or those who work with youth in 4-H or other community programs can update their biotechnology and bioethics teaching skills 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 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 2012 summer workshops offered by the Office of Biotechnology at Iowa State University is June 1, 2012.

(continued on p. 2)
To register for any workshop, please contact Lori, complete and mail the form on p. 7, or use the online registration or PDF forms available at [www.biotech.iastate.edu/ed_resources/regis_form_summer2012.html](http://www.biotech.iastate.edu/ed_resources/regis_form_summer2012.html). Please submit your registration to arrive by June 1, 2012.

**June 11-14**  
**Biotechnology Education Workshop I for Science, Agriculture, and Family and Consumer Sciences 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  
Travel reimbursement available for ISU Extension and Outreach educators/personnel (up to $50 per day)  
Registration deadline - June 1, 2012

This workshop course is directed at science, agriculture, and family and consumer sciences 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, bioinformatics, and more. Educators will prepare and perform the lab protocols as the students would do in class.

**June 18-21**  
**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 - June 1, 2012

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, with attention to agricultural biotechnology. However, other topics relevant to both agriculture and human health will also be covered. Participants will work through activities and case studies that they can take home and use in their classes. Pedagogical issues in teaching bioethics will also be covered, including appropriate objectives for bioethics units; various 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.

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**June 25-28**  
**Biotechnology Education Workshop II – Advanced Workshop for Science, Agriculture, and Family and Consumer Sciences 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  
Travel reimbursement available for ISU Extension and Outreach educators/personnel (up to $50 per day)  
Registration deadline - June 1, 2012

This advanced workshop is open to science, agriculture, and family and consumer sciences 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.

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Too Much Paper in Your Life? Get This Newsletter Online or By E-Mail

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/publications/IA_biotech_educator/default.html](http://www.biotech.iastate.edu/publications/IA_biotech_educator/default.html), or receive each issue by e-mail as a PDF attachment. To start your e-mail subscription, please notify Lori Miller (lorimill@iastate.edu) in the Office of Biotechnology and tell her the e-mail address you want to use. Thanks!
High School Students Can Take Cytogenetics Crash Course in Summer

High school students can participate in a one-week crash course in cytogenetics at Iowa State University in Ames from June 4-8, 2012. This course is supported by a grant from the National Science Foundation, and there is no charge to students. Students will be responsible for their own transportation to and from the course and for their lunches. There is no housing provided; students who live outside the Ames area who wish to take the course will need to make their own arrangements for housing and transportation.

The course will begin daily at 9:00 a.m. and conclude at 4:30 p.m., with a 60-minute lunch break. The course will be taught by Professors Thomas Peterson and Jack Girton (Iowa State University), and David F. Weber (Illinois State University). The instructors are experienced researchers with complementary expertise in cytogenetic and molecular genetic theory and techniques. Lectures will cover chromosome biology and cytogenetic theory in various model organisms and humans. Specific lecture topics will include chromosome structure, mitosis, meiosis, euploidy, and aneuploidy. Laboratory training will include visualization and analysis of chromosomes from maize (corn) and Drosophila. Students will prepare and examine Drosophila polytene chromosomes, identify specific meiotic stages of maize, and study the structures of normal and aberrant chromosomes. Students will also complete an in-class cytogenetics-based project, and they will learn about college and career opportunities in genetics from Dr. Lois Girton, Genetics Program Coordinator. Prior completion of AP Biology is recommended.

The crash course will provide students with an excellent foundation in cytogenetic analysis. This experience can be valuable preparation for college coursework and research. Students will receive a certificate of completion upon successful completion of the course. High school teachers may also be admitted to the course at no charge, pending space availability.

For further information or to receive an application form, please contact program director Dr. Adah Leshem at (515) 294-8453, adah@iastate.edu, or contact program director Dr. Adah Leshem at (515) 294-8453 or e-mail her at adah@iastate.edu. Applications are being accepted on a first-come, first-served basis. Offers will be sent out to potential candidates beginning April 1, 2012. Placements will be made by May 1, 2012.

Summer Research Internship for 7-12 Grade Biology Teachers

Iowa State University is offering 7-12 grade biology teachers the opportunity to participate in a six-week training and research internship in molecular biotechnology and genomics to be held in Ames from June 13 - July 27, 2012 (contingent on unforeseeable snow days!).

No prior biotechnology training is necessary to be accepted into this program. Teachers new to the program will be expected to complete a three-day theory and technique training workshop (June 10-12, 2012), after which they 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 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 being accepted on a first-come, first-served basis. Offers will be sent out to potential candidates beginning April 1, 2012. Placements will be made by May 1, 2012.

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 9 - July 27, 2012. 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 Dr. Jackie Baughman, Department of Agricultural and
awards/competitions

awards recognize outstanding iowa educators

three major award programs for which iowa science educators are eligible are featured below. for other award, competition, and grant opportunities for educators or their students, visit the office of biotechnology's educational funding website. brief descriptions of each opportunity and links to more information are online at www.biotech.iastate.edu/publications/ed_resources/ed_funding.html.

iowa academy of science excellence in science teaching awards

for more than 50 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 six nomination categories are physical science, life science, earth/space science/environmental science, general/multiple science, middle school/junior high science, and elementary science. 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.

congratulations to the 2011 winners david d. langtimm, elementary science, riverdale heights elementary school, bettendorf; justin r. johnson, middle/junior high science, central middle school, muscatine; aileen mahood sullivan, physical science, ames high school, ames; teri l. wise, life science, north high school, davenport; jesse l. wilcox, general/multiple science, valley southwoods high school, west des moines; and kathy d. hobson, earth/space/environmental science, atlantic high school, atlantic.

nsf seeks nominations for presidential teaching awards

the national science foundation is accepting online nominations of teachers of grades k-6 for the 2012 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 alternates each year between teachers of grades 7-12 (2013) and teachers of grades k-6 (2012). 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 last fall and close april 1, 2012. the application deadline for nominated teachers is may 1, 2012. nominations of teachers should be done early enough to allow the nominated teacher time to thoroughly prepare an application before may 1.

congratulations to recent iowa winners barbara leise, downtown school, des moines, (k-6 math) and brandon schrauth, beaver creek elementary, johnston, (k-6 science).

nominate a colleague or yourself for the obta award

every year, the outstanding biology teacher award (obta) program of the national association of biology teachers (nabt) tries 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 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 honored at a special event during the nabt professional development conference sponsored by biozone and receive microscopes from leica microsystems, inc., and

iowa biotech educator

volume 20, number 1
winter 2012

published three times a year by the office of biotechnology, 1210 molecular biology building, iowa state university, ames, iowa 50011-3269. to subscribe, phone (515) 294-9818, fax (515) 294-4629, or e-mail lorimill@iastate.edu.

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certificates and a complimentary one-year membership from the 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 2012 nominations is March 15, 2012. For more information, contact Iowa's OBTA Awards Directors Mike Zeller, m.zeller@iastate.edu, or Doug Herman, herman.doug@iastate.edu. Congratulations to the 2011 Iowa winner, Kacia Cain, Central Campus, Des Moines.

### State Science and Technology Fair

The 2012 State Science and Technology Fair of Iowa (SSTFI) will be held in Ames on Friday and Saturday, March 30-31. 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 Pittsburgh, Pennsylvania, in May. All exhibitors in grades 6-12 are eligible for awards.

As one of the fair sponsors, the Iowa Biotechnology Association (IBA) will make five scholarship awards at the 2012 fair. The IBA 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 IBA 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 2011 winners were Chase Gross, Solon High School; Surekha Mullangi, Burlington Community High School; Crystal Owens, Valley High School, West Des Moines; Meghana Pagadala, Rivermont Collegiate, Bettendorf; and Daniel Weinand, Burlington Community High School.

For more information, visit www.sciencefairofiowa.org/ or contact fair director Andrea Spencer, phone (515) 460-5559, e-mail aspence@iastate.edu. Volunteers are being recruited to judge at this year's event. To register online to be a judge, go to www.sciencefairofiowa.org/judges.html.

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**Outreach News**

### Biotechnology Outreach Education Center

Welcome to the Winter 2012 edition of the Iowa Biotech Educator Newsletter. As you have already noticed, this issue is jammed full of information that can help you, your curriculum, and your school teach the most modern techniques and concepts in life sciences. Please share the newsletter with your colleagues so they, too, can benefit from this information.

I do want to emphasize that the Biotechnology Outreach Education Center (BOEC) is here to help you meet your biotechnology curriculum and resource needs. 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 anytime with questions. I have arranged my schedule so that most days I am available from 7-8:30 a.m. and 11:30-1:00 p.m. for questions, except when I travel.

As the winter weather improves and the spring semester moves forward, the demand for the BOEC outreach services increases. Make sure you order supplies as soon as your schedule allows for your spring classes. If you are planning to take advantage of the BOECs unique on- and off-campus outreach education program, please contact Lori or me to schedule a date. Typically, the outreach programs are very busy in the spring. In past years, between 1,000-1,200 students will either visit the BOEC or have the BOEC make presentations at their schools. This past year, the BOEC provided supplies and equipment for biotechnology experiments to 123 Iowa schools, serving 13,225 students. In addition, I had direct contact with 2,612 students through on and off-campus presentations.

### BOEC at Home and on the Road

During the fall, we were kept busy hosting 23 groups and visiting schools in Iowa. Some school groups visiting the BOEC were Marshalltown Middle and High School; West Marshall High School from State Center; GMG Schools from Green Mountain and Garwin; South Hardin Middle School; Vinton-Shellsburg High School; and Guthrie Center Middle School's talented and gifted program. In that same time, I made visits to Scavo High School in Des Moines, Walnut Creek Middle School in West Des Moines, Hancock County Extension in Garner, West Hancock Middle and Elementary schools in Kanawha and Britt, Maquoketa High School, and Clinton Community College. Iowa State groups that visited the BOEC included the Freshman Honors Program, the pre-service teacher classes in Agricultural Education and Curriculum and Instruction's 593C Biotechnology Education course section, presentations to the “Taking the Road Less Traveled” conferences offered by the Program for Women in Science and Engineering and another visit from their 3rd-5th grade WisExploration camp, and ISU Admissions. 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 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 my presentations. It is always exciting to visit with teachers who are searching for ways to bring biotechnology into their classrooms.

I also attended and presented at the National Association of Biology Teachers (NABT) convention in Anaheim, California. 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 ideas, methods, techniques, and activities that I can share with you.

**What's Happening in 2012?**
It's not too early to start thinking about attending one or more of our 2012 summer workshops. This edition of the Iowa Biotech Educator 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 the workshop and feel you need a review, or if you are ready for the advanced workshop, please register as soon as possible and encourage a colleague to attend. You can find the 2012 summer workshops information on our website at [www.biotech.iastate.edu/ed_resources/Workshops.html](http://www.biotech.iastate.edu/ed_resources/Workshops.html).

**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. 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.

**Outreach News**

**New 1X TBE Procedure**
A new powder for making the 1X TBE electrophoresis buffer is now available. In the past, the 10X TBE solution would precipitate solutes over time and under cold shipping conditions. The powder was developed by Iowa State's Biotechnology Outreach Education Center to help eliminate this problem. The powder is shipped in a packet that can be dissolved in 1 liter of distilled water. Teachers will need to allow time for the powder to completely dissolve (overnight is recommended), but no other adjustments to the protocol are needed. You can request either 10X TBE solution or the TBE powder when ordering from Lori Miller, lorimill@iastate.edu, through this spring.

**Biotechnology Applications Update**

**DID YOU KNOW . . .**

1) **that between 1988 and 2003, the U.S. government invested $3.8 billion ($5.6 billion in 2010 $) into the Human Genome Project (HGP)?** Since that time, the companies spawned from the genomics field, along with other supporting industries, have generated $796 billion in economic output and 310,000 jobs. This means every $1 of federal funding for the project helped generate $141 in the economy. Reference: Battelle Technology Partnership Practice. Economic Impact of the Human Genome Project. May 2011.

2) **that the genomes of 30,000-year-old bacteria contained all the key genes needed to resist antibiotics?** This confirms the theory that antibiotic resistance is not a modern response to medical usage, but is an ancient, naturally occurring environmental defense mechanism. It is a relatively straightforward process for bacteria to “swap” genetic information, allowing resistance genes to move across multiple bacterial strains. Consequently, the widespread use of antibiotics in both medical and agricultural settings must be handled with oversight and care. Reference: D’Costa, VM, et al., Antibiotic resistance is ancient. Nature, published online August 31, 2011.

3) **that a new study in mice reduces the activity of a gene linked to amyloid plaque development in Alzheimer's disease?** The researchers used small interfering RNAs (siRNAs) – tiny double-stranded RNA fragments complementary to the transcript of a specific gene. The siRNAs cause the transcript to be degraded, reducing the level of translated protein produced. The siRNAs were targeted against BACE1 – a gene involved in the formation of amyloid plaques symptomatic of Alzheimer's disease. The siRNAs were carried into the brains of mice by tiny vesicles called exosomes. The researchers saw a tissue-specific decrease in BACE1 activity and encouragingly, a significant decrease in the levels of a major component of the amyloid plaques. Additionally, the injections did not invoke cellular toxicity or an immune response. Reference: Alvarez-Erviti, L., et al., Delivery of siRNA to the mouse brain by systemic injection of targeted exosomes. Nature Biotechnology 29:341-345 (2011).

4) **that in 2000 it took $10,000 to sequence one million base pairs?** Today the third generation sequencers can do it for just $1.

Questions? Contact Mike Zeller, mzeller@iastate.edu
Registration Form for 2012 Biotechnology Education Summer Workshops

Registrations are due by JUNE 1, 2012, for all workshops.

Name ___________________________________________________________________________________________________

School district or extension area ____________________________________________________________________________

Subject areas taught_______________________________________________________________________________________

Home (summer) mailing address ____________________________________________________________________________

Work phone ____________________    E-mail__________________________________    Home phone __________________

I would like to register for the following Biotechnology Education Workshop(s) to be held at Iowa State University in Ames:

_____ June 11-14 Biotechnology Education Workshop I
       for Science, Agriculture, and Family and Consumer Sciences Educators

_____ June 25-28 Advanced Biotechnology Education Workshop II for Science, Agriculture, and Family and Consumer Sciences Educators

_____ June 18-21 Bioethics Workshop I

Credit available: 1-2 professional development credits AND/OR 1-2 graduate credits

(See workshop descriptions on p. 1-2.)

Credit payment and local hotel information will be sent to you when your registration is received.

Register early! Class sizes are limited. Return this registration form by mail or fax before the deadline to:

Lori Miller
Office of Biotechnology
1210 Molecular Biology Building
Iowa State University
Ames, Iowa  50011-3260

Fax:    (515) 294-4629 • Phone:  (515) 294-9818 or toll-free in Iowa 1-800-643-9504 • E-mail: lorimill@iastate.edu

Online registration available at www.biotech.iastate.edu/ed_resources/regis_form_summer2012.html

Publicity/Image/Voice Permission

The Office of Biotechnology normally takes photographs, video, and/or tape recordings of our programs. During these workshops, a photograph or video/audio recording may be taken of you. Unless you request otherwise, your application will be considered permission for Iowa State University and the Office of Biotechnology to photograph, film, audio/video tape, record and/or televise your image and/or voice for use in any publications or promotional materials, in any medium now known or developed in the future without any restrictions. If you object to ISU using your image or voice in this manner, please notify the Office of Biotechnology, in writing, at the time of your application.

Iowa State University does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Director of Equal Opportunity and Compliance, 3280 Beardshear Hall, (515) 294-7612.
About the ISU Public Education Program in Biotechnology...

Iowa State University's Public Education Program in Biotechnology thanks donors for their generous support:
Sustaining donor: Iowa Biotechnology Association
Major donors: Ajinomoto Food Ingredients, LLC/Ajinomoto Heartland, LLC; Bayer CropScience; Cargill; Genencor International, Inc.; Golden Harvest Research; Growmark; the Greater Cedar Rapids Foundation–Diamond V Mills Donor-Advised Fund; the Iowa Farm Bureau Federation Agricultural Foundation; the Iowa Soybean Promotion Board; Iowa State University Extension and Outreach; Kemin Americas; MBS Genetics, LLC; Pioneer Hi-Bred International, Inc.; the Roy J. Carver Charitable Trust; Syngenta Seeds, Inc.; West Central Cooperative; and private individuals.

To Contact the Program
Phone: (515) 294-9818 or, toll-free in Iowa, (800) 643-9504
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