Register by June 3 for Summer Biotechnology Education Workshops

June 3 is the registration deadline for the 2005 summer workshops offered by the Office of Biotechnology at Iowa State. Teachers in Iowa's public or private schools and extension educators who work with youth in 4-H or other community programs are invited to attend one or more of the workshops. Educators can update their biotechnology and bioethics teaching skills, while earning staff development or graduate credits.

The workshops will be held in the Biotechnology Outreach Education Center (BOEC) on the Iowa State campus in Ames. Iowa teachers can receive stipends of $50 per day to help cover their costs of attending. ISU Extension educators/personnel can receive travel reimbursements of up to $50 per day to help cover their expenses. After completing any of the workshops, Iowa teachers are eligible to receive free supplies and equipment for lab protocols available from ISU.

Workshop descriptions are below. For more information about the biotechnology education workshops, please contact Mike Zeller or Lori Miller toll-free in Iowa at 1-800-643-9504, or e-mail mzeller@iastate.edu or lorimill@iastate.edu. For more information about the bioethics workshops, please contact Kristen Hessler at the toll-free number, or e-mail khessler@iastate.edu.

To register for any workshop, please contact Lori, complete the registration form on p. 7, or use the online registration or pdf forms available at http://www.biotech.iastate.edu/ed_resources/reg_form_summer2005.html. Please submit your registration to arrive by June 3.

June 14-17
Biotechnology Education Workshop I for Science Educators
Iowa State University, Ames, Iowa
2 staff development credits - $20 and/or 1-2 ISU graduate credits - $318 per credit $200 stipend available for Iowa teachers ($50 per day)
Travel reimbursement available for ISU Extension educators/personnel (up to $50 per day)

This workshop course is directed at teachers who want to gain a basic knowledge of biotechnology. 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. Techniques for encouraging classroom bioethics discussions will be featured.

(continued on p. 2)
June 22-24
Bioethics Workshop I
Iowa State University, Ames, Iowa
1 staff development credit - $20 and/or
1 ISU graduate credit - $318 per credit
$100 stipend available for Iowa teachers ($50 per day)
Travel reimbursement available for ISU Extension educators/personnel (up to $50 per day)

This course is designed for educators who are interested in discussing bioethics with their students or extension audiences. The focus will be on ethical issues in biotechnology, especially agricultural biotechnology, but other topics relevant to both agriculture and human health will be covered. Students will work through activities and case studies that they can take home and use with their classes. Pedagogical issues in teaching bioethics also will 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.

June 27-29
Biotechnology Education Workshop I for Family and Consumer Sciences Educators
Iowa State University, Ames, Iowa
1 staff development credit - $20 and/or
1 ISU graduate credit - $318 per credit
$150 stipend available for Iowa teachers ($50 per day)
Travel reimbursement available for ISU Extension educators/personnel (up to $50 per day)

This workshop course focuses on the basics of biotechnology and how it can be applied in human nutrition and health. The basic technical knowledge and skills in this workshop will be useful in helping family and consumer sciences educators better understand and deliver information about biotechnology to their students. Techniques for encouraging classroom bioethics discussions and information about GMO testing in food will be featured.

June 30-July 1
Biotechnology Education Workshop I for Agriculture Educators
Iowa State University, Ames, Iowa
1 staff development credit - $20 and/or
1 ISU graduate credit - $318 per credit
$100 stipend available for Iowa teachers ($50 per day)
Travel reimbursement available for ISU Extension educators/personnel (up to $50 per day)

This course is a workshop focused on the basics of biotechnology and how it can be applied to agriculture. The basic technical knowledge and skills in this workshop will be useful in helping agricultural educators better understand biotechnology and how it will affect their curriculum and profession. Laboratory investigations and instruction will give educators experience with DNA extraction and transformation, DNA fingerprinting, chymosin, Bt corn, GMO testing, marker-assisted selection, and more. Techniques for encouraging classroom discussions of bioethics and issues surrounding biotechnology will be featured.

July 11-14
Biotechnology Education Workshop II – Advanced Workshop for Science, Agriculture, and Family and Consumer Science Educators
Iowa State University, Ames, Iowa
2 staff development credits - $20 and/or
1-2 ISU graduate credits - $318 per credit
$200 stipend available for Iowa teachers ($50 per day)
Travel reimbursement available for ISU Extension educators/personnel (up to $50 per day)

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 laboratories in biotechnology. Activities will include showing marker gene expression, DNA isolation, recombinant DNA techniques, DNA amplification, restriction analysis of DNA, bioinformatics, sequencing, genomics, and more. Educators will prepare and perform the lab protocols that their students could do in class. Techniques for encouraging advanced classroom bioethics activities will be featured.

July 20-22
Bioethics Workshop II – Advanced
Iowa State University, Ames, Iowa
1 staff development credit - $20 and/or
1 ISU graduate credit - $318 per credit
$100 stipend available for Iowa teachers ($50 per day)
Travel reimbursement available for ISU Extension educators/personnel (up to $50 per day)

This advanced workshop is open to educators who have attended one of the previous bioethics workshops. Assuming familiarity with ethical arguments, utilitarianism, and rights-based theories, this workshop will focus on substantive analysis of current controversies in bioethics. We also will discuss bioethics pedagogy, including strategies for encouraging students to participate in bioethics units, scholarly debates about teaching bioethics, and empirical research about the impacts of bioethics education on student learning.
Online Bioethics Courses Offered in June and July

Three online bioethics courses will be offered by the Office of Biotechnology at Iowa State University this summer. The courses are Teaching Bioethics, offered June 13-July 1, and Ethics and Biotechnology and Ethics and Animals, offered concurrently from July 11-29. The courses are designed for teachers, extension personnel, and others who educate youth and adult audiences about life sciences, including biotechnology, and who are interested in incorporating bioethics into their life sciences education.

Each course requires a minimum of 15 hours online, plus an additional 15 hours of reading, writing, and research. Teaching Bioethics is a prerequisite for the other two courses. Course participants can earn one graduate credit for each course from Iowa State University. Two staff development credits for each course are available for participants from Iowa and may be available for those from other states. The courses are being offered in cooperation with Area Education Agency 11, Johnston, Iowa, and Iowa State University in Ames. Dr. Kristen Hessler, bioethics outreach coordinator at Iowa State University, is the instructor.

To register for one or more courses, please contact Lori Miller, 515-294-9818, toll-free in Iowa 800-643-9504, e-mail lorimill@iastate.edu. You also may register by using the printed registration form on p. 7 or the online registration or pdf forms available at http://www.biotech.iastate.edu/ed-resources/regis_form_summer2005.html. Class enrollment for each course is limited to 20.

Brief descriptions of each course and the registration deadlines are below. For more information about course content, please contact Hessler at 515-294-7576, e-mail khessler@iastate.edu, or visit the web page: http://www.bioethics.iastate.edu/activities/biotechnology_ethics.html.

Teaching Bioethics
Date: June 13 - July 1, 2005
Registration deadline: June 3

This course is designed for any science or social studies teacher interested in teaching bioethics. Topics include advantages of incorporating bioethics in science and social studies courses, appropriate objectives for bioethics units, a brief study of ethical theory, 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.

Ethics and Biotechnology
Date: July 11-29, 2005 (offered concurrently with Ethics and Animals)
Prerequisite: Teaching Bioethics
Registration deadline: June 30

Modern biotechnology is as controversial as it is promising. Teaching the associated ethical issues can help engage students to learn the relevant science concepts and to learn the skills necessary to contribute to ongoing social dialogue about science and society. Topics include an overview of ethical controversies about biotechnology and specific ethical issues in plant, animal, and human biotechnology.

Ethics and Animals
Date: July 11-29, 2005 (offered concurrently with Ethics and Biotechnology)
Prerequisite: Teaching Bioethics
Registration deadline: June 30

This course will enable participants to recognize and distinguish views about the moral status of animals; to articulate and defend their own ideas about the moral status of using animals for food, research, and education; and to incorporate ethical issues concerning animals in their courses. This course will benefit educators who discuss or use animals in their courses or outreach efforts, as well as social studies teachers interested in current controversies about society’s uses of animals.

More Education Opportunities

Project BIO Online Courses

Project BIO is a partnership of biology educators and students at Iowa State University, Iowa community colleges, Iowa high schools, and Iowa industries. The project develops and shares biotechnology education resources on the Internet. Project BIO offers teachers and high school students ISU college credits online. For more information, check the Project BIO web site at http://project.bio.iastate.edu and follow the Online Courses link, or contact Dr. Tom Ingebritsen, phone 515-294-9432, e-mail tsingebr@iastate.edu. Iowa high school students who want to take the courses under the Postsecondary Enrollment Options Act will find details at http://project.bio.iastate.edu/Courses/hsinfo.htm. Three-credit science courses offered in summer and fall are listed below. Course numbers change for fall 2005 and are in parentheses.

- Biol 109 Introductory Biology (Fall–Biol 101)
- Biol 123/Env S 123 Environmental Biology (Fall–Biol 173)
- Biol 201 Principles of Biology 1 (Fall–Biol 211)
- Gen 308/508 Biotechnology in Agriculture, Food and Human Health (Fall–Gen 308/GDCB 508)
As you prepare for the end of the school year and the beginning of summer break, I want to take this opportunity to remind you of the ISU Office of Biotechnology's commitment to you, the teachers of Iowa. For the rest of this school year, summer, and the 2005-2006 school year, the Biotechnology Outreach Education Center (BOEC) again will offer free training, equipment, and supplies to Iowa teachers. Consider attending a summer workshop to learn new materials and techniques or as a refresher. Please share this newsletter with colleagues who might be interested in examining how to bring the newest life science principles and techniques into their classrooms while earning staff development or graduate credit. For further information about our summer workshops see the story on p. 1.

**Bioinformatics Workshop in Minnesota Offered by Cold Spring Harbor Lab**

Iowa educators are invited to attend Bioinformatics in the Classroom, a July 25-29 workshop at the University of Minnesota taught by Drs. Uwe Hilgert and Craig Hinkley of Cold Spring Harbor Laboratory's Dolan Learning Center.

Bioinformatics integrates biology and computer sciences, aiming to identify the information contained in DNA and protein sequences. In biology education, bioinformatics holds promise as a versatile tool to illustrate basic biological principles, as a portal to inquiry-based learning, as a platform for independent research, and as a way to provide students with the skills needed to succeed in increasingly technology-dependent workplaces.

Bioinformatics in the Classroom will introduce educators to hands-on, cutting-edge biology teaching modules. Integrating wet labs with computer labs, workshop participants use bioinformatics tools to analyze DNA, RNA, and proteins. Workshop participants will:

- Use computers to perform analysis routines that, until recently, could only be done in wet labs, such as electronic PCR, restriction digests, and gel electrophoresis
- Sleuth genomes for genes
- Study the folding of proteins using 3-D imaging technology
- Determine how changes in DNA alter proteins, radically affecting their function
- Discover how jumping genes continuously alter the landscape of our genomes

The workshop is hosted by the Department of Agronomy and Plant Genetics; College of Agricultural, Food and Environmental Sciences; at the University of Minnesota. Funding for this event is provided by the U.S. Department of Agriculture's Initiative for Future Agriculture and Food Systems program and the Center for Microbial and Plant Genomics at the University of Minnesota.

Participants will receive course materials, meals, parking, and a stipend. To register online for this course, go to [http://www.cbs.umn.edu/hawk/2005teachercourses](http://www.cbs.umn.edu/hawk/2005teachercourses). For a paper registration form, please contact Shelly Christman, 123 Snyder Hall, 1475 Gortner Avenue, St. Paul, MN 55108, phone 612-624-8816. You are encouraged to register before April 15 or as soon thereafter as possible.

For additional workshop information, please contact Mary Brakke, Department of Agronomy and Plant Genetics, 411 Borlaug Hall, 1991 Upper Buford Circle, University of Minnesota, St. Paul, MN 55108, phone 612-625-1251, e-mail brakk001@umn.edu.

**BOEC in Action**

The BOEC has been very busy the past few months. Schools or groups that took advantage of the onsite and outreach components of the BOEC included Roosevelt Elementary Science Night in Ames, Dowling High School Advanced Placement Biology of Des Moines, Ackley-Geneva-Wellsburg-Steamboat Rock Middle School of Wellsburg, St. Pius of Urbandale, Cedar Rapids Science Station for Iowa Corn, Marion High School, ISU's Program for Women in Science and Engineering, ISU's Toying with Technology, Biol 155 Human Biology, a survey course including principal structures and functions of body systems and associated diseases and disorders, will be offered this fall.
Please Recycle Lab Supplies

Before leaving for the summer, please recycle any free biotechnology lab supplies that you ordered from the ISU Office of Biotechnology. The 10X TBE bottles, Carolina Blu DNA Stain, and unused pipette tips and boxes are refilled or reused for other teachers. To help keep costs down, please return these items to Lori Miller, Office of Biotechnology, 1210 Molecular Biology Building, ISU, Ames IA 50011-3260. Please empty and rinse the 10X TBE bottles before returning. Thanks and enjoy your summer!

Pre-Service Workshops
The BOEC is in its fourth year of offering workshops for pre-service teachers throughout the year. During this school year, 98 pre-service teachers in agriculture education, biology, family and consumer sciences, and elementary education received hands-on experience in the principles and techniques of biotechnology and how they might incorporate these activities into their future classrooms.

On the Road
In late March and early April, I attended the National Association of Science Teacher's (NSTA) national convention in Dallas, Texas. Attending national education conventions allows helps me to keep in touch with science educators from across the nation, especially the ones involved with biotechnology education. It also allows me to experience the technologies available to schools, learn about new and changing education policies and issues, and attend sessions on new developments in science education related to biotechnology. I always bring back ideas for new activities and gain a perspective of where science education is headed as it relates to biotechnology.

Finally, I want to wish you a great and restful summer break. I hope to see many of you this summer in the workshops and look forward to helping you bring biotechnology into your classrooms for the 2005-06 school year.

Online courses that we'll offer over the summer. (See p. 2-3 for more information!)

In April, I will visit science teachers and students in Bettendorf, Iowa, at an event organized by Scott County Extension. I'll be visiting a few classes to talk with students and presenting a bioethics workshop for teachers in the afternoon. If you find a group of 10 teachers in your area who are interested in attending a bioethics workshop, I will travel to you!

New Extension Bulletin on Ethics
I am also proud to announce a new Extension Bulletin developed by the bioethics outreach program. It covers basic issues in ethics, such as what grounds might serve as the basis for ongoing discussion among people who disagree about ethical issues. It also contains an exercise – analyzing ethical arguments in a newspaper column – that might be helpful in introducing ethical issues to your students. The bulletin, titled Bioethics Outreach: About Ethics, is publication number PM 1988a. It can be downloaded from the Internet at http://www.extension.iastate.edu/pubs/. Click on the “Biotechnology” link under the “Other Interests” section.

Bioethics Module
Finally, keep your eye out for a new bioethics module on pre-implantation genetic diagnosis (PGD). It is part of the new curriculum produced by the Office of Biotechnology on marker-assisted selection. The bioethics module contains background information on in vitro fertilization techniques, the use of pre-implantation genetic diagnosis, and the history of the eugenics movement. It also contains an activity in which students role-play members of a hospital ethics committee. Students have to debate and decide on hospital policy regarding different applications of PGD.

I hope to see you at ISU over the summer for a bioethics workshop, or in one of our online bioethics courses. Better yet, I hope to see you in your area for a workshop one of these days! Have a great summer.

Please Recycle Lab Supplies

Before leaving for the summer, please recycle any free biotechnology lab supplies that you ordered from the ISU Office of Biotechnology. The 10X TBE bottles, Carolina Blu DNA Stain, and unused pipette tips and boxes are refilled or reused for other teachers. To help keep costs down, please return these items to Lori Miller, Office of Biotechnology, 1210 Molecular Biology Building, ISU, Ames IA 50011-3260. Please empty and rinse the 10X TBE bottles before returning. Thanks and enjoy your summer!
New Bioethics Extension Bulletin

A new bulletin titled Bioethics Outreach: About Ethics has been written by Kristen Hessler, bioethics outreach coordinator at Iowa State University, and published by ISU Extension. The free bulletin can be downloaded from the ISU Extension Publications web site at http://www.extension.iastate.edu/pubs/. Click on the “Biotechnology” link under the “Other Interests” section. The publication number is PM-1988a. For more details, see Kristen Hessler’s column on p. 5 of this issue.

NSTA Standards-Based Service

A new professional development initiative by the National Science Teachers Association soon will help teachers and administrators evaluate and strengthen science instruction. The NSTA’s Science Program Improvement Review (SPIR) evaluates a school’s science program across all grade levels. Facilitators trained by the NSTA work with a school’s teachers and administrators to construct a comprehensive written assessment and recommendations for improvement. The goal is to align science instruction with the standards in five areas: teaching, professional development, assessment, content, and program.

Schools interested in learning more about SPIR may contact Amy Bluestein at 703-312-9227, e-mail Amy_b@nsta.org, or visit http://science.nsta.org/nstaexpress/nstaexpress_2005_02_22_spir.htm. A short inquiry form can be submitted from http://science.nsta.org/survey_spir.

Shoestring Biotechnology

The National Association of Biology Teachers (NABT) and GIBCO BRL: Life Technologies, Inc. (LTI), have co-produced a book of low-cost biotechnology activities for two-year college and high school students, titled Shoestring Biotechnology – Budget-Oriented High Quality Biotechnology Laboratories for Two-Year College and High School.

The activities emphasize the role of biotechnology in the future of the environment and medicine and the effect biotechnology has on preserving plant species and enriching agriculture. The activities are designed to help schools with limited budgets provide students with a solid scientific background in biotechnology techniques and concepts.

Shoestring Biotechnology can be purchased from the NABT’s web site at http://portal.nabt.org/PortalTools/Shopper/Index.cfm.

Cloning in Focus

http://gslc.genetics.utah.edu/

The Genetic Science Learning Center at the University of Utah has a web site to help people understand how genetics affects their lives and society. A “Cloning in Focus” section explores the science of cloning, its potential uses, and associated ethical issues.

Click on the “Basics and Beyond” section for basic information about DNA and genes. The “Genetic Disorder Corner” is all about the causes of genetic disorders and the role of genetic counselors. In the “Biotechniques Laboratory,” visitors can practice gel electrophoresis or DNA microarray skills. Other sections of the web site explore stem cells, pharmacogenomics, and gene therapy. A “Do Try This at Home” section has DNA extraction activities and an enzyme activity.

Dolan DNA Learning Center

http://www.dnalc.org

The Dolan DNA Learning Center is associated with the Cold Spring Harbor Laboratory in New York. This web site features free resources such as DNA from the Beginning, an animated primer on the basics of DNA, genes, and heredity.

Your Genes, Your Health is a companion site to DNA from the Beginning and contains information about genetic disorders. The biology animation library allows teachers and students to view online or download animations of DNA science concepts like polymerase chain reaction or polymorphisms. A sidebar on the site links to genetic stories in the news.

American Society for Investigative Pathology

http://www.asip.org/edu/highschool.htm

The American Society for Investigative Pathology has established a web site of educational resources for high school science teachers. Teachers can download free PowerPoint® presentations for classroom use.

Titles include From Doughnuts to Diabetes: Obesity and Its Complications, Infectious Disease: Natural Emerging Dangers, The Power of Molecular Biological Techniques, and more. Each presentation was authored by one or more experts in the field.

*PowerPoint is a registered trademark of Microsoft Corporation.
Registration Form for 2005 Biotechnology Education Summer Workshops and Summer Online Bioethics Courses

Registrations due by JUNE 3, 2005, for biotechnology education workshops. Registrations due by JUNE 3 and JUNE 30, 2005, for summer online courses.

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 ISU in Ames:

_____ Workshop I for Science Educators, June 14-17    _____ Workshop I for Agriculture Educators, June 30 - July 1

_____ Bioethics Workshop I, June 22-24    _____ Advanced Workshop II for Science, Agriculture, and Family and Consumer Science Educators, July 11-14

_____ Workshop I for Family and Consumer Science Educators, June 27-29    _____ Bioethics Workshop II – Advanced, July 20-22

I would like to register for the following online course(s) that I can take on the Internet from home:

_____ Teaching Bioethics, June 13 - July 1    _____ Ethics and Biotechnology, July 11-29

Registration deadline: June 3    Prerequisite: Teaching Bioethics

_____ Ethics and Animals, July 11-29    Prerequisite: Teaching Bioethics

Registration deadline: June 30

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

(See workshop descriptions on p. 1 and online course descriptions on p. 3 for details.)

Credit payment and housing 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 deadlines 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

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.
About the ISU Public Education Program in Biotechnology...

Iowa State University’s Public Education Program in Biotechnology is supported by 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 Biotechnology Association; the Iowa Farm Bureau Federation Agricultural Foundation; the Iowa Soybean Promotion Board; 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.

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