Spring Bioethics Course and Summer Biotech Education Workshops Scheduled

Register by Jan. 6 for Online Bioethics

If you want to improve your skills in leading classroom or community discussions of the ethical questions about biotechnology, consider taking an Internet course developed at Iowa State University.

The online course, “An Introduction to Biotechnology Ethics,” will be offered from January 20 through April 25, 2003. This course, taught entirely on the Internet, will give teachers and extension professionals the background, resources, and confidence they need to lead ethics discussions with their classes or extension audiences. The course requires a minimum of 15 hours online, plus an additional 15 hours of reading, writing, research, and taking exams. Participants can earn one graduate credit from Drake University in Des Moines ($90). Staff development credit is available for Iowa participants and also may be available for those from other states.

All class work can be done on a home computer. Course participants will be introduced to moral philosophy and influential moral theories as tools to evaluate biotechnology issues. The course incorporates activities on topics such as stem cell research and golden (vitamin A) rice for course members to participate in and evaluate for their own use. There will be lots of online discussion with other educators. The ethical theories learned in the course also can be applied to topics other than genetic engineering.

Kristen Hessler, a faculty member of the Department of Philosophy and Religious Studies and bioethics outreach (continues on p. 2)

Summer Biotech Workshop Dates Set

Think summer and mark your 2003 calendar for Iowa State’s biotechnology education workshops. K-12 school teachers or those who work with youth in 4-H or other community programs are invited to attend one or more of these workshops in Ames. There will be a stipend for all attendees. Staff development or graduate credits will be offered. Watch for more details in the March issue of this newsletter.

June 9-13 Biotechnology Education Workshop I for Science Educators
June 17-19 Biotechnology Education Workshop I for Family and Consumer Sciences Educators
June 25-27 Bioethics Workshop for Educators
July 9-11 Biotechnology Education Workshop I for Agriculture Educators
July 14-18 Biotechnology Education Workshop II – Advanced Workshop for Science, Agriculture, and Family and Consumer Science Educators

ISU Is Your Biotech Connection

For General Information or Free Lab Supplies for Iowa Educators: Contact Lori Miller, Office of Biotechnology, 1210 Molecular Biology Bldg, ISU, Ames, IA 50011-3260, phone 515-294-9818 or toll-free in Iowa 1-800-643-9504 from 8:00 a.m. to 5:00 p.m. weekdays, excluding university holidays, fax 515-294-4629, or e-mail lorimill@iastate.edu.

For Educational Resources: Visit the ISU Office of Biotechnology’s Internet homepage at http://www.biotech.iastate.edu.

For Expert Answers to Biotech Questions: Contact Mike Zeller, Biotechnology Outreach Education Coordinator, or Kristen Hessler, Bioethics Outreach Coordinator, at the Office of Biotechnology or e-mail mzeller@iastate.edu or khessler@iastate.edu.
Online Bioethics Course — continued from p. 1

coordinator at Iowa State University, is the course instructor. For more information about course content, please contact Hessler at 515-294-7576 or e-mail her at khessler@iastate.edu.

To register for the course, please contact Lori Miller, 515-294-9818, toll-free in Iowa 1-800-643-9504, or send an e-mail message to lorimill@iastate.edu.

The class enrollment is limited to 20. The registration deadline is January 6, 2003.

Iowa State University does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, sex, marital status, disability, or status as a U.S. Vietnam Era Veteran. Any persons having inquiries concerning this may contact the Director of Affirmative Action, 318 Beardshear Hall, 515-294-7612.

This online course received support through a grant from the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 00-52100-9617. Any opinions, findings, conclusions, or recommendations expressed during the course are those of the instructor and participants and do not necessarily reflect the view of the U.S. Department of Agriculture.

Project BIO Offers Five Online Science Courses for Spring 2003

Teachers and high school students can earn college credits online through Iowa State University's Project BIO. Science-related courses offered for three credits this spring are:

• Biol 109 Introductory Biology
• Biol 123 Environmental Biology
• Biol 202 Principles of Biology II
• Zool 155 Basic Human Physiology and Anatomy
• Gen 308/508 Biotechnology in Agriculture, Food and Human Health

For more information, check the Project BIO web site at http://project.bio.iastate.edu and follow the Online Courses link, or contact Tom Ingebritsen, phone 515-294-9432, e-mail tsingbr@iastate.edu.

High school students in Iowa who want to take the courses under the Postsecondary Enrollment Options Act will find details about this program at http://project.bio.iastate.edu/Courses/hssinfo.htm.

E-Mail Notification for Teachers

Teachers who want to be notified about biotechnology education workshops and other events by e-mail can sign up for the ISU Office of Biotechnology's teacher e-mail list by sending a message to Lori Miller, lorimill@iastate.edu.

News from the Biotechnology Outreach Education Center

I hope all of you will have a great winter break and return refreshed for the second semester. The spring semester is a busy time in education, and the Biotechnology Outreach Education Center (BOEC) is no exception. Traditionally, more than 1,000 people visit the center during April and May. If you plan to visit the center this spring or want us to visit your school, please contact us now. Regrettably, every year I have to turn down some last-minute requests for school visits because of scheduling conflicts. Electrophoresis kits and free lab supplies also are in great demand during the spring. Get your supply orders to Lori Miller early (see contact info. on p. 1), and reserve a kit well ahead of time at your AEA or regional extension office. Planning ahead will allow us to serve you better.

Summer Biotechnology Workshops

The dates for the 2003 summer biotechnology workshops are now official (see article on p. 1). We hope to see you on campus in June or July. Space is limited, so give Lori a call at 800-643-9504 or 515-294-9818 to reserve a spot. For more details about the workshops, keep checking our web site at www.biotech.iastate.edu and click on the education icon.

BOEC in Action

It was good to see many of you at the National Association of Biology Teachers (NABT) National Conference in Cincinnati. Since returning from the conference, things have been busy. School groups from Davenport Assumption; Sac City; Wauzeka, Wisconsin; West Marshall of State Center; West Point, New York; Ballard; Guthrie Center; and Southeast Polk of Runnells spent time in the center. Besides these schools, the BOEC hosted a three-day ISU Extension workshop and welcomed visitors from Bulgaria, the ISU Microbiology Club, and the University of Wisconsin Biotechnology Center. Visits away from the center included a trip to the University of Wisconsin for an agricultural biotechnology extension conference and three Saturdays working with 6th-9th grade talented and gifted students in Des Moines.

In October, Iowa State's Office of Biotechnology provided funding for the BOEC to purchase 12 iMac computers to help develop curriculum and train educators in bioinformatics. I attended several bioinformatics sessions at the NABT Conference in Cincinnati that gave me many new ideas involving silicogenetics, a term that means using computers (silicon chips) to do genetics. To date, we are testing four activities. If you are interested in testing these activities with your students,
give Lori or me a call, and we’ll be happy to send you a copy of the activities (see story on p. 6).

**New Resources**

Two new protocols using the Quickstix™ test have been developed for seed testing and are now available. The test can be run with Bt corn or Roundup Ready® soybeans. Contact Lori or me for more details.

I would like to draw your attention to two new links on the Biotechnology Education homepage at http://www.biotech.iastate.edu/Educational_resources.html titled “Articles About Teaching Biotechnology” and “Links to Current News in Biotechnology.” We look forward to posting more articles about what our fellow educators are doing in biotechnology. If you review or write an article about teaching biotechnology that you believe belongs on the site, please let us know.

**Important Date in Science History**

Friday, April 25, 2003, has been designated as National DNA Day in honor of the 50th anniversary of the geometric description of the double helix by James Watson and Francis Crick. Watch our web site and future issues of this newsletter for special events/activities to commemorate this moment in science.

**BOEC Celebrates Third Anniversary**

January will mark the third anniversary of the opening of the Biotechnology Outreach Education Center. It’s been a busy three years of hosting groups for hands-on activities, preparing and sending out free supplies and equipment, developing and testing activities, and helping write curriculums for K-12 and extension educators who are interested in bringing biotechnology to their audiences.

**Happy Holidays**

All of us at the BOEC wish all of you the merriest of holidays! Remember, plan early so we can see you at our lab or yours this spring.

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**Biotechnology Ethics**

By Kristen Hessler
Bioethics Outreach Coordinator

If you’re interested in incorporating bioethics into your courses, we’re here to help! Here are a few options you may be interested in:

**Online Bioethics Course**

It’s not too late to register for the spring offering of our online course in bioethics! We’ve got a new streamlined version of the course available this spring (see story on p. 1). It’s easier to manage and features more activities for you to use in class or workshops. All the materials are online and you can work on the course at any hour of the day from your home computer. We’ll focus on how to use ethical theory to lead discussions of bioethics. You’ll be able to pick one of the following topics for more in-depth attention: plant biotechnology, human genetics, or transgenic animals. Tell a friend!

**Activities Under Development**

Several new activities on ethics and animals are currently in the testing stage. These include a study of transgenic pigs, ethical treatment of laying hens, what to do about goose populations in urban areas, and ethical issues associated with animals raised for food. I hope to post these and other activities soon on the bioethics web page (http://www.biotech.iastate.edu/Bioethics.html).

**Bioethics Workshop**

We have picked a date for next summer’s Bioethics Workshop. It will be held at ISU from noon on June 25 through noon on June 27. We’ll feature expert speakers from the ISU faculty and activities you can use in class. Save the date!

**How Can I Help?**

If you have bioethics needs or interests that are not being met by these programs, please feel free to e-mail or call me to let me know what I can do for you. I’ll be happy to listen to your ideas for projects or activities, work with you to develop a curriculum, or even visit you to help run a bioethics session.

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**Biotechnology Education Reports**

**Nov. Extension Workshop Hits the Mark**

Iowa State University Extension staff members attended a biotechnology workshop from Nov. 6-8 in Ames. The workshop, designed to provide background information on biotechnology, was co-sponsored by ISU Extension and the Office of Biotechnology and was held in the Biotechnology Outreach Education Center on the ISU campus. Those attending included campus and county staff ranging from accountants to county extension education directors.

Through doing a range of educational laboratory activities, workshop participants developed a conceptual understanding of the processes used in biotechnology. The labs included...
DNA fingerprinting, DNA extraction, an immunochromato-
graphic test for Bt corn and Roundup Ready® soybeans, thin-
layer chromatography for high sucrose soybeans, and some of
the molecular biology principles that are the foundation of
biotechnology.

The workshop was coordinated by Jay Staker, ISU Extension,
and Mike Zeller, Office of Biotechnology. Guest speakers from
Iowa State's faculty and staff addressed current issues that are
on the cutting edge of the biotechnology debate.

John Obyrcki, professor of entomology, discussed ecological
perspectives on Bt corn. Fred Kirschenmann, director of the
Leopold Center for Sustainable Agriculture, spoke on sustain-
able agriculture in Iowa. Kristen Hessler, bioethics outreach
coordinator, discussed ethical theory as it applies to extension
and used human stem cell research as a case study. Lisa
Lorenzen, director of industrial relations and biotechnology
liaison, dealt with consumer issues in biotechnology. Don
Sakaguchi, associate professor of zoology and genetics, shared
current scientific developments in stem cell research.

“The workshop produced a greater awareness of issues related
to the science and ethics of biotechnology,” Staker said.
“Those attending left the workshop feeling that they had
attained valuable factual information, as well as a deeper
understanding of the ongoing issues related to the science.”

– Jay Staker, contributing author

From Bugs to Biotech: Biology Intern Helps Teach Teachers in BOEC

When young Arlene D'Souza was chasing bugs and caterpillars
that wandered onto her family's lawn in Rockford, Illinois, she
never guessed that she was chasing her future career.

Now a junior at Iowa State University, D'Souza's interest in all
things natural has led her to a future teaching career in high
school biology and an internship at Iowa State's Biotechnology
Outreach Education Center. While D'Souza finishes the
courses she needs for her teaching certificate, her intern duties
include helping other pre-service and long-time teachers learn
about biotechnology.

“When teachers bring their classes to the center or attend
workshops here, I help with preparing and instructing the
DNA labs they do,” D'Souza said. “I'm gaining a lot of
experience in preparing for labs, working with kids and
answering their questions.”

D'Souza's supervisor, Mike Zeller, appreciates the fresh
perspective that she brings to the lab protocols and curriculum
development he does as Iowa State's biotechnology outreach
education coordinator.

“Arlene has a knack for finding lab directions or explanations
that might be confusing for teachers who haven't taught much
biotechnology,” Zeller explained. “She has contributed to
making our materials more user-friendly for everyone.”

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U.S. Department of Agriculture.
Next semester, D'Souza will become a student in the outreach center where she works. Her learning community will take a pre-service course in teaching biotechnology that will be taught by Zeller. The learning community, dubbed Biology Education Teachers and Learning (BETAL), was the brainchild of Jim Colbert, an associate professor of botany at Iowa State.

D'Souza says that this year's BETAL group has six students who want to be biology teachers. “We take two classes together every semester, meet for discussions and presentations, study together, and generally encourage each other to stay focused on developing our teaching skills.”

D'Souza has no problem keeping her focus. Although the average Iowa State student changes majors several times, D'Souza has not wavered from biology. Not even once.

Career Day Highlights Iowa’s Biotech Job Opportunities

Finding the right job or internship was made easier for more than 150 undergraduate and graduate students who attended the fourth annual Biotechnology Career Day.

The students met with nine of Iowa's top biotechnology companies and three academic organizations to plan their occupational future. Companies attending included Diamond V Mills, ExSeed Genetics, Fort Dodge Animal Health, Iowa Human Resources Consortium, Kemin Industries, Lab Support, Phytodyne, Pioneer Hi-Bred International, Proliant, and ViraQuest. The University of Iowa Carver College of Medicine, ISU Interdepartmental Graduate Majors, and ISU Career Services also attended the event.

“This event continues to be well received by both student and industry participants. It’s encouraging for Iowa's biotechnology industry to see students interested in working for our companies,” said Lisa Lorenzen, director of industrial relations and biotechnology liaison.

She added that industry representatives were pleased with the quality of students who came to the event. “Talking to students is an important way for companies to meet future employees beyond traditional resume gathering.”

Biotechnology Career Day is co-sponsored by the Office of Biotechnology and the Iowa Biotechnology Association.

– Dena Huisman, Office of Biotechnology

ISU’s Science in Agriculture Day

Tuesday, April 22, 2003, will mark the 16th anniversary of Science in Agriculture Day at Iowa State University. The event is sponsored by the College of Agriculture for students in grades 9-12 who are nominated by their science or agriculture teachers. Students will have the opportunity to learn how science interacts with agriculture, while exploring Iowa State's campus, the agriculture curriculum, and career opportunities in agriculture.

The event will begin at 9:00 a.m. and end at 2:30 p.m. Students will be offered a variety of hands-on sessions from which they can choose three to attend. Last year's sessions included Promise and Problems of Genetically Modified (GM) Foods, The Invisible Made Visible, Farming for Fun and Profit, Food Science in Space, Adding Value with Steel, The Iowa Farm Equipment Industry, DNA in My Food? – The Making of a Smoothie, Leading with Style, and more. A separate session for teachers only will be offered again.

High school science and agriculture teachers will receive nomination materials by mail in January. Nominations are due by March 7, 2003. For more information or to obtain nomination materials, please contact event coordinator Beth Foreman at 515-294-4548 or e-mail bforeman@iastate.edu.

Career Conferences for Young Women

This spring, the career conference Taking the Road Less Traveled will help Iowa young women in grades 6-12 explore nontraditional careers for women in math, science, engineering, and technology. For grades 6-9, the spring conference dates are April 10 and 17, 2003. For grades 9-12, the spring conference date is April 3.

The conferences are sponsored by ISU’s Program for Women in Science and Engineering (PWSE). Registration forms will be available on the PWSE web site at http://www.iastate.edu/~pwse_info/. For more information, e-mail conference coordinator Linda Dutton at ldutton@iastate.edu or contact her at PWSE, 210 Laboratory of Mechanics, ISU, Ames, IA 50011-2131, ph. 515-294-5319, fax 515-294-6582.
**New iMac Computers for BOEC**

Twelve new iMac desktop computers have brought expanded bioinformatics capabilities to the Biotechnology Outreach Education Center (BOEC) of Iowa State's Office of Biotechnology. The computers connect to the Internet through wireless technology, making it much easier for the center to offer hands-on experience in bioinformatics topics such as searching databases for DNA sequences.

Mike Zeller, biotechnology outreach education coordinator, is developing bioinformatics units for high school students that are based on the BLAST software program. BLAST is the acronym for Basic Local Alignment Search Tool, a standard software tool that compares gene and protein sequences against others in public databases. BLAST can be found on the National Center for Biotechnology Information web site at [http://www.ncbi.nlm.nih.gov/Tools/index.html](http://www.ncbi.nlm.nih.gov/Tools/index.html). Zeller also is developing a Gene Challenge web site to provide enrichment activities and problems that will complement the BLAST units.

If you and your class would like to visit the BOEC to help test the bioinformatics activities being developed, please contact Zeller toll-free in Iowa at 1-800-643-9504 or send him an e-mail at mzeller@iastate.edu.

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**Teaching Biotechnology in Agricultural Education**

[http://www.biotech.iastate.edu/Educational_resources.html#articles](http://www.biotech.iastate.edu/Educational_resources.html#articles)

Thanks to the folks who publish Agricultural Education Magazine, three articles about teaching biotechnology to agricultural classes now are posted on the Office of Biotechnology's web site. The articles are from Vol. 74 - Issue 5 of the magazine, originally published in March-April 2002. The articles can be downloaded as pdf files from the web address above.

- “Agricultural Biotechnology Education” by Michael Zeller, Iowa State University
- “Debunking the Myths of Science Integration into Agricultural Education” by Robert A. Martin, Iowa State University
- “It's Not Rocket Science. It’s Better!” by Dale Gruis, Iowa Department of Education

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**Forensics in the Classroom**


This free three-unit curriculum provides an easy, intermediate, and advanced mystery that high school students can solve in the classroom. The units, which can be downloaded as pdf files, use standard high school chemistry lab experiments and forensic techniques. Court TV developed the curriculum in partnership with the American Academy of Forensic Sciences.

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**Exploring Our Molecular Selves**

[http://www.genome.gov/Pages/EducationKit](http://www.genome.gov/Pages/EducationKit)

The Human Genome Project first released the multimedia kit Exploring Our Molecular Selves in February 2001. Since then, the kit has been reformatted and made available on the above web site for online viewing or as downloadable modules.

Modules include Milestones in Genetics; Genes, Variation, and Human History; How to Sequence a Genome; Ethical, Legal, and Social Implications; Glossary of Genetic Terms; and Exploring Our Molecular Selves (3D computer-animated video). Available for online viewing only are the video The Secrets of Our Lives, two essays titled “The Future of Research and Medicine,” and the informational brochure Genetics: The Future of Medicine.
Tips for Teachers

Teaching About Ethics While Respecting Religious Beliefs

by Kristen Hessler, Bioethics Outreach Coordinator

Many teachers and extension educators worry that they cannot teach ethics without teaching religion. This tip will explain how you can teach about ethics while respecting the diversity of religious viewpoints in your audience.

The philosopher John Rawls described what he called an “overlapping consensus” about political morality in the United States and other pluralistic, democratic societies. The term refers to the idea that people from different religious and cultural backgrounds can agree on a variety of ethical principles. Indeed, Rawls thought that developing an overlapping consensus on basic principles of justice is essential to peace and stability in pluralistic democracies like the United States. For example, if people from different religious and cultural backgrounds in the U.S. could not agree that rights to freedom of speech and religion are basic ethical rights, as well as Constitutionally protected rights, our society would be in deep trouble!

In teaching ethics, it is important to emphasize that there are many ethical principles that are accepted by a great number of people from different cultural and religious backgrounds. Here are just a few examples:

• We should protect the vulnerable and innocent from harm.
• We should take responsibility for our own actions.
• We should not hurt others for our own amusement or benefit.
• We should respect people's rights.

While these ethical principles need more explanation and qualification, they can form the basis of fruitful and open discussions about many ethical issues, possibly ones you want to address with your classroom or extension audience. When you as an educator focus on ideas that are part of an overlapping consensus, you are not assuming that everyone in your audience comes from the same background, nor are you trying to get your audience to accept particular religious or cultural beliefs. What you are doing is trying to get your audience to think critically for themselves about right and wrong.

Your focus on ideas in an overlapping consensus shouldn't imply to students that they must never base their ideas of right and wrong directly on religious beliefs, if that seems appropriate to them. However, when a student offers an explicitly religious belief in support of an ethical conclusion, you might ask whether the same point could be stated in a way that would appeal to others who do not share those religious beliefs. It is appropriate to acknowledge that the student's religious beliefs provide one line of support for the ethical conclusion, but you should also point out that others may not be persuaded by this line of reasoning if they don't share the same religious beliefs.
About the ISU Public Education Program in Biotechnology.

Iowa State University’s Public Education Program in Biotechnology is supported by AgrEvo/Plant Genetic Systems; Ajinomoto U.S.A., Inc./AJINOMOTO HEARTLAND, Inc.; 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, L.L.C.; Pioneer Hi-Bred International, Inc.; the Roy J. Carver Charitable Trust; Syngenta Seeds, Inc.; West Central Cooperative; and private individuals.

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