HIGHLIGHTS

The Fralin Biotechnology Center and Virginia Tech Outreach Program Development are proud to announce the 8th Biotechnology 2003 Educators' Conference. Our goal is to provide technical and content updates for science educators. New applications in medicine, agriculture, and the environment continue to be discovered and discussed.

On Wednesday Afternoon, we will offer a Pre-conference Biotechnology Boot Camp for participants new to the field. On Wednesday Evening, everyone will be welcomed at the Fralin Biotechnology Center to register, socialize, and tour the building. On Thursday Evening, we will continue the successful Roundtable Discussions. On Friday Evening, join us for food and socializing at a catered buffet dinner at the German Club of Virginia Tech. After dinner on Friday, we will feature the first-ever Iron Biotech Teacher! M oded after the Exploratorium's Iron Science Teacher program, competitors will use a secret ingredient (TBA on the first night of the conference) to teach a biotechnology concept of their choice.

The pre-conference Biotechnology Boot Camp will be held at the Fralin Biotechnology Center. The Symposium will be held at the Donaldson Brown Hotel and Conference Center on Thursday and Friday mornings. Workshops will be held on Thursday and Friday afternoons and all day Saturday at locations on the Virginia Tech campus. Maps will be posted in the Fralin Biotechnology Center.

LOCATION and LODGING

The Donaldson Brown Hotel and Conference Center is located on the Virginia Tech campus in Blacksburg, Virginia. The facility borders the downtown area and is two blocks off Main Street at the end of College Avenue. Parking instructions will be available at check-in.

Lodging at the Donaldson Brown Hotel is available Wednesday, July 16 through Saturday, July 19 at a rate of $74 per night plus tax, single or double. To reserve a room, call toll-free (877) 200-3360 or (540) 231-5156 by June 16.

Dorm rooms are available. Room rates for air-conditioned rooms are $22.50 per person (double occupancy) and $32.25 per person (single occupancy), plus applicable taxes. For rooms without air-conditioning, rates are $17.25 per person (double occupancy) and $21.75 per person (single occupancy), plus tax. For online dorm lodging reservations, please visit the website at www.rdp.vt.edu/summer/reservations.html. For dorm stays from Wednesday to Saturday, the required meal ticket is $20.75, which covers meals not included in the conference (breakfast on Thursday, Friday, and Saturday, and dinner on Thursday).

Please visit the Biotech 2003 conference website at www.biotech.vt.edu for more details, including links to local accommodations.

HOW TO REGISTER

The fee for the conference is $195 for registrations postmarked on or before May 31, $225 for registrations postmarked after May 31. This includes lunch and snacks on all three days and Friday evening's Social/Dinner ($16 each for additional tickets to Social/Dinner). The full-time student fee is $30 for Thursday and Friday speakers only (lunch not included). Please complete the attached registration form and return with payment by July 4, 2002. After this date, registration should be confirmed by phone with the Conference Registrar at (540) 231-5182. You may also register online at www.biotech.vt.edu.

NOTE: Payment of registration fees is required prior to program attendance. Registration will be processed when payment is received.

REFUND POLICY: Requests for refunds will be honored when received seven calendar days prior to the program. However, another person may be substituted at any time for this program. A $25 administrative fee will be deducted for cancellations. In the unlikely event that this program is canceled or postponed due to insufficient enrollments or unforeseen circumstances, the university will fully refund registration fees but cannot be held responsible for any other expenses, including cancellation or change charges assessed by airlines, hotels, travel agencies, or other organizations.

CONTINUING EDUCATION UNITS (CEUs)

CEUs are awarded for successful completion of this course. Continuing Education Units are awarded based on the number of contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction. They may be used for professional advancement or as evidence of increased abilities, but not for credit toward terminal degree programs. Outreach Program Development at Virginia Tech maintains a cumulative record of participation in all CEU offerings.

FOR MORE INFORMATION

For further information about the conference, please contact Erin Dolan at (540) 231-2692, BIO outreach@vt.edu, or fax at (540) 231-7126.

Virginia Tech does not discriminate against employees, students, or applicants on the basis of race, color, sex, sexual orientation, disability, age, veteran status, national origin, religion, or political affiliation. Anyone having questions concerning discrimination should contact the Equal Opportunity/Affirmative Action Office.

If you are a person with a disability and require any auxiliary aids, services, or other accommodations for this workshop, please discuss your accommodation needs with Susan Hilton at (540) 231-9617 by two weeks prior to the course.
from solution as floating white strands. The mass of DNA strands
will gain practical knowledge by conducting a real-world laboratory procedure that is used to extract DNA from many different organisms for a variety of applications. You will extract genomic DNA from your own cheek cells and watch it precipitate
Teacher will be revealed!
Fralin Biotechnology Center laboratories. Also, the secret ingredient for Iron Biotech
is then easily collected and transferred to a glass vial, and the vial is fashioned into a really cool necklace! Seeing is believing.
pGLO Bacterial Transformation and Protein Purification Kits: Have you ever seen a gene at work? Now you can. Integral to new standards for life science education is understanding how foreign DNA can be inserted into bacterial cells to alter their genetic makeup, encode the expression of new proteins and produce novel biomedical and agricultural products. We will explore genetic engineering and the creation of genetically modified organisms. In this activity, we will apply these real-world biotechnology processes and principles in the classroom! We will transform bacteria with a gene from a bioluminescent jellyfish. The flow of new genetic information from DNA to RNA to protein to trait results in the expression of Green Fluorescent Protein (GFP), causing the bacteria to glow fluorescent green under UV light - just like the jellyfish. Then we will use column chromatography to purify the jellyfish protein from the transformed bacteria. The ultimate “oooh, ahhh” lab experience! explorer.bio-rad.com
#2 Learn How To Fingerprint Your Own DNA
Thomas Cynkar, EDVOTEK, Inc.
2-5 pm (laboratory)
DNA Fingerprinting is a common application of biotechnology used to determine paternity and in forensics. This SAFE procedure, adapted from FBI protocols employs DNA Fingerprinting by extraction without sputum sample collection and PCR amplification of DNA from hair. In this workshop, participants will fingerprint their own DNA and perform Polymerase Chain Reaction (PCR) and electrophoresis. This lab demonstrates the various steps for this classroom DNA fingerprinting experiment. Workshop participants will receive a manual related to the DNA fingerprinting activities and a photograph of their DNA fingerprint. www.edvotek.com
#3 Genome-wide Linkage Mapping
Samantha Messier and Kristin Swihart, Biological Sciences Initiative, University of Colorado at Boulder.
2-5 pm (laboratory/computer)
In this session, participants will conduct a paper-based and computer activity using genome-wide linkage mapping to find the location of a gene responsible for atrial septal defect — a common congenital heart defect. In order to do this activity, participants should be familiar with meiosis/crossing-over, constructing pedigrees, and determining patterns of inheritance. After completing the activity, participants should understand how genomic markers can be used to determine the location of a gene, even if the gene itself has not been identified. As a final step, participants will use online bioinformatics resources to examine possible candidate genes at the location determined by the linkage mapping. If time and facilities permit, the workshop will include running electrophoresis gels. www.colorado.edu/OBSI/index.html
#4 Bioethics in the Biology Curriculum? How and Why?
Ellen Lamb, Mills Godwin High School, Virginia.
2-5 pm (discussion/computer)
Incorporating bioethics into the biology curriculum need not be a lesson on morals, nor need it be an addition to our already packed syllabus. Rather, bioethics can be an effective way for students to examine scientific principles and concepts, while considering the impact of new discoveries and the controversial options that usually accompany such new knowledge. Participants in this workshop will experience a bioethics lesson and learn how to set up and guide such a lesson on their own. In addition, we will examine appropriate links in the biology curriculum using online, print, and other resources. Handout packets will be provided.
#5 Exploring Bacterial Bioluminescence and the Lux Operon
Kristen Yost, FOTODYNE, Inc.
2-5 pm (laboratory)

Come and explore the phenomenon of bacterial bioluminescence and the lux operon in this two part, hands-on workshop. You will discover the principles behind bioluminescence, the biological significance of this unique ability and how you and your students can easily isolate bioluminescent bacteria from fresh seafood. You will also transform bacteria with a complex mixture of recombinant DNA molecules containing the lux operon and produce a mixture of blue, white and bioluminescent colonies. You’ll take home GLOWING results and all of the protocols needed to bring these experiments to your classroom. www.fotodyne.com/epd.html

#6 Modern Genetics For All Students
Elmer Kellmann, Parkway West High School, and Susan Flowers, Washington University.
2-6 pm (laboratory)

Modern Genetics For All Students is a curriculum unit developed by Washington University Science Outreach Office with the aid of a team of scientists, teachers and science writers. The big ideas of classical genetics as presented in traditional textbooks are integrated with basic principles of molecular biology to yield the following core concepts: DNA: The Hereditary Molecule; Passing Traits from One Generation to the Next; How Genes Mutate, Interact With The Environment And Influence Our Health; Controlling Our Genetic Futures. There are 10 hands on inquiry based labs in the unit. In this mini course, we will do as many of these labs as time allows. www.so.wustl.edu

#7 DNA Isolation from Plants
Maureen Dolan, Fralin Biotechnology Center, and Cindy Bohland, Roanoke Valley Governor’s School.
2-6 pm (laboratory)

How is DNA isolated from various plant sources? You will isolate DNA from different plant tissues using everyday materials and using science research kits (Q Iagen DNA easy), as well as learn strategies for executing the labs in the classroom. Then, you will examine and compare your samples using agarose gel electrophoresis. We will discuss mechanisms of DNA extraction, DNA and cell structure, enzyme activity, and polyploidy in plants. www.qiagen.com/literature/genomlisp

#8 Mystery of the Crooked Cell
Don DeRosa, Carla Romney, Jonas Cantakos, Danielle Fedor, Sheena McGee, Melissa Scavo, CityLab, Boston University School of Medicine.
2-5 pm (laboratory)

Are you looking for new ways to inspire your students? Let us show you how our data collection Mystery of the Crooked Cell is an inquiry-based investigation of the molecular basis of sickle cell anemia. A progression of inquiry modeled on the 5 E instructional strategy guides students to develop an explanatory model for the mechanism of the disease. Hemoglobin electrophoresis is used as a tool to diagnose a fictional patient for sickle cell anemia. Connections will be made to genetics, evolution, natural selection and random mutation. www.bumc.bu.edu/citylab

#9 Bacterial Transformation with and Purification of Green Fluorescent Protein
Elizabeth Paine and LaLonnie Walker, Carolina Biological Supply Company.
2-5 pm (laboratory)

Perform a bacterial transformation with a plasmid expressing Green Fluorescent Protein (GFP), a green protein from the jellyfish Aequorea victoria. GFP is visible under white light and fluoresces under UV light. You will also purify the GFP protein using a simple, streamlined chromatography method. This laboratory can be used to teach students about the molecular basis of heredity and the relationship between genes and proteins. The laboratory also provides a fun and simple example of genetic engineering and provides a tool for class discussion on the importance, potential, and controversial nature of this powerful technology. www.carolina.com

#10 Incorporating Biotechnology into the Biology Curriculum
Jennifer Visconti and Claudine Weiner, LIGASE, SUNY Stonybrook.
2-5 pm (laboratory)

This workshop is designed to introduce teachers to the basic concepts and practices of biotechnology. Participants will extract DNA using a fast, easy and safe technique designed specifically for the high school classroom. Objectives will be met through hands-on and computer-based experiences. naples.cc.sunysb.edu/CAS/ligase.nsf

Thursday Evening
Round Table Discussions 7:30-9:30 pm
A. Community College Biotechnology Programs
B. AP Biology
C. Science Magents and Specialized Secondary Schools
D. Outreach Programs
E. Starting a High School Biotechnology Program
F. Biotech Experiments for Science Fairs

Friday Morning, July 18
Donaldson Brown Hotel and Conference Center
Registration & Refreshments 7:30-8:30 am

Speakers
8:30 am Conference Announcements
Erin Dolan
8:45 am Applying Knowledge From the Lessons of Nature
Rich Helm, Fralin Biotechnology Center
Malcolm Potts, Department of Biochemistry, Virginia Tech
Richard Helm, Fralin Biotechnology Center
9:45-10:00 am Break
10:00 am Strange Intelligence
BAPA’s Imagination Stage
A theater presentation about biotechnology that provides information and prompts discussion about ethical questions that new technologies raise. Followed by a moderated panel discussion.
12:30 pm Luncheon, Commonwealth Room, Donaldson Brown Hotel and Conference Center

Friday Afternoon Workshops 2-5 or 6 pm
#11 DNA Fingerprinting: The biotechnology of modern forensics solves human problems
Bio-Rad.
2-5 pm (laboratory)

Who done it? Who am I? Are you my mother? The biotechnology of modern forensics can answer these questions. Real world applications for electrophoresis and restriction analysis of DNA are integral to the new national content standards for life science education. With this kit, you will use endonucleases to digest six DNA samples and electrophoresis to separate and visualize the resulting DNA fragments. You will learn how and why restriction enzymes are used to cleave DNA, and how these fundamental techniques are used in biotechnology to generate DNA fingerprints, and to construct recombinant DNA molecules. explorer.bio-rad.com
#12 Ecotechnology at the Organismic and Molecular Levels
Thomas Cynkar, EDVOTEK, Inc.
2-5 pm (laboratory)
This workshop links biotechnology to ecology and the environment. Explore the effect of pollution on organisms due to toxicants in freshwater. Daphnia magna will be exposed to various concentrations of simulated toxicants that will be correlated to the release of a fluorescent substrate observed using long wave ultraviolet light. At the molecular level, a second experiment will focus on the damaging effects of UV light on DNA. We’ll also study “Oleophilic” (oil-eating) bacteria and their role in cleaning oil spills. Participants will receive resource materials to help integrate ecotechnology into the classroom. www.edvotek.com

#13 Genome-wide Linkage Mapping
Samantha Messier and Kristin Swihart, Biological Sciences Initiative, University of Colorado at Boulder.
2-5 pm (laboratory/computer)
See Workshop #8 for description.

#14 Forensic Science: DNA fingerprinting
Zuzana Zuchar, LIGASE, SUNY Stonybrook.
2-5 pm (discussion/laboratory)
Forensic science DNA fingerprinting is a laboratory designed to simulate forensic identification of an individual. The techniques used are restriction digest, gel electrophoresis and AFLP analysis. The concepts included in the laboratory are use of the scientific method to evaluate evidence, hypothesis formulation and testing, analysis and presentation of results. We have developed versions appropriate to three different age groups: 6th-8th grade (general science), 10th grade (introductory biology) and 12th grade/community college (AP biology). In addition to the hands-on techniques component, the workshop will include presentations and discussions of how to run this laboratory with different age groups. naples.cc.sunysb.edu/CAS/ligase.nsf

#15 BLAST for Beginners and Finding Genes with Entrez
Sandra Porter, Geospiza, Inc.
2-5 pm (computer)
This workshop features an introduction to sequence comparison using BLAST, including a short description of “what is bioinformatics?”, an overview of what BLAST does, and a hands-on activity where participants get a sequence from our website, do a BLAST search, and answer questions about the sequence. Participants will get an overview of various databases at NCBI and a discussion of strategies for finding information and determining if what you’ve found is what you were looking for. Participants will also brainstorm to identify genes of interest in plants and then use various strategies to find them in GenBank. www.geospiza.com/outreach/index.htm

#16 Modern Genetics For All Students
Elmer Kellmann, Parkway West High School, and Susan Flowers, Washington University.
2-6 pm (laboratory)
See Workshop #6 for description.

#17 Advanced DNA Isolation to Identify and Characterize Genetically-modified Plants
Maureen Dolan, Fralin Biotechnology Center.
2-6 pm (laboratory)
Once DNA is isolated, how is it used? You will isolate DNA from different plant tissues using science research kits and examine and compare specific genes in your samples using PCR and agarose gel electrophoresis. We will discuss mechanisms of DNA extraction, plant transfection and transformation, DNA replication, and genetic modification in plants. www.qiagen.com/literature/genomlit.asp

#18 Chances Are?
Don DeRosa, Jeff Bowen, Michael Carson, CityLab, Boston University School of Medicine.
2-5 pm (laboratory)
Participants will develop and analyze a pedigree for sickle cell syndrome, decide which family member(s) should be tested and run a diagnostic test using PAG-electrophoresis. The “Chances Are?” curriculum supplement is a great follow-up activity to the popular sickle cell module, Mystery of the Crooked Cell, running at CityLab facilities across the country. This module allows students to play the role of genetic counselors, apply concepts in Mendelian genetics, construct a medical pedigree, and evaluate the risks of passing this genetic disease to an unborn child. Participants perform polyacrylamide gel electrophoresis on “hemoglobin samples” to detect the presence or absence of abnormal hemoglobin. www.bumc.bu.edu/citylab

#19 Using PCR to Track *P. infestans* the Irish Potato Famine Pathogen!
Elizabeth Paine and LaLonnie Walker, Carolina Biological Supply Company.
2-5 pm (laboratory)
This laboratory is a great way to integrate history and science. Isolate DNA and perform PCR to determine if the pathogen infecting a preserved potato leaf is *P. infestans*, the pathogen that caused the Irish potato famine and that is a reemerging problem for crops today. This linkage to history as well as modern agriculture provides an ideal hook to catch students’ interest in learning important biotechnology techniques and concepts and their importance to society. It also teaches students about the complex interplay between significant events in human history and seemingly insignificant organisms around us. www.carolina.com

Friday Evening
6:30-9:30 pm Social/Dinner and Iron Biotech Teacher at the German Club.

Saturday Morning, July 19
Morning refreshments and Box lunch in Fralin Biotechnology Center

Saturday Morning Workshops 8-11 am

#20 PV92 PCR/Informatics Kit: How do you fit in?
Bio-Rad.
8-11 am (laboratory/computer)
Where do your genes fit in? Explore evolution, population genetics and human migration patterns using the polymerase chain reaction. PCR and Informatics represent the cutting edge in life science education and are widely used in medical, forensic, archeological, and ecological procedures. In this activity, you will extract genomic DNA from their cheek cells and amplify a specific region of DNA on chromosome 16. In this region, some people have an insertion called Alu, and some do not. Following DNA extraction and amplification you will learn to analyze your own DNA samples and look at the individual genetic variations that exist within the classroom population and test Hardy-Weinberg equilibrium theory. Then, using the Internet, you can compare their own classroom population data to the genetic compositions of classrooms and populations around the world. explorer.bio-rad.com
Biotechnology Beyond the Classroom!
Myron E. Blosser and High School Biology Students, Eastern Mennonite High School.
8-11 am (discussion/presentation)

See ways to involve students in research that goes beyond what can happen in the classroom. This presentation, featuring students that have conducted real biotech research outside of the classroom, will encourage you to look for ways to integrate students in 'biotech beyond the classroom' and give you some real examples of what is possible and the impact it can have on students. Hear it straight from the students' mouths!

The Case of the Crown Jewels
Betty Brown and Christine Muth, DESTINY, University of North Carolina at Chapel Hill.
8-11 am (laboratory)

Make a date with Destiny! Don your gloves and safety goggles and board the UNC-CH Traveling Science Laboratory (DESTINY) to learn about DNA restriction analysis, also known as DNA fingerprinting. The instructions on the 40 ft bus use an inquiry approach developed by Boston University School of Medicine's CityLab. During the pre-lab activities, participants will manipulate paper models to simulate DNA restriction analysis and illustrate its underlying concepts. Then working in teams, you will complete the wet-lab experiment using the same techniques and equipment used in modern biotechnology laboratories. The objectives of the wet lab are for participants to cut DNA using restriction enzymes, complete gel electrophoresis, and measure the distance of each resulting band. Upon completion of the lab, everyone should be able to solve the mystery which revolves around a fictional crime: "The Case of the Crown Jewel". Emphasis will be placed on methodologies and teaching strategies for all levels of biology and how the lab correlates to the National Standards. Participants will receive a lab manual and pre-lab materials to use in their classrooms.

Gene Gateway: A Web Companion to the Human Genome Landmarks Poster
Jennifer Bownas, U.S. Department of Energy Genome Programs.
8-11 am (computer)

Gene Gateway is a Web-based collection of guides and tutorials designed to help students learn about genetic disorders, genes, and proteins. Starting with a genetic disorder learn how to identify associated genes and find summaries of related research. Access and make sense of sequence data for disorder genes and proteins. Explore the 3-D structure of a gene's protein product. This workshop brings together different bioinformatics resources that can be used to gain a better understanding of the science behind genetic disorders.

PCR Detection of Genetic Modification in Foods
Kristen Yost, FOTODYNE, Inc.
8-11 am (laboratory)

In this hands-on workshop you will use polymerase chain reaction (PCR) to test familiar, plant-derived foods for genetic modification. You will learn about some of the techniques used to create genetically modified plants and the methods used to test foods for genetic modification. You will use PCR to amplify a region of DNA from a promoter sequence found in many genetically modified (GM) plants. Following separation by gel electrophoresis, the PCR products will be analyzed to determine which foods may be genetically modified.

Allelic Variants of Superoxide Dismutase in Lou Gehrig's Disease
Sandra Porter, Geospiza, Inc.
8-11 am (computer)

Learn how to use NCBI's Locuslink and Genes and Disease databases to research different aspects of an inherited disease. Participants will find information about Lou Gehrig's disease, use OMIM to find a list of alleles, and use Cn3D to identify where the mutations are located in the three-dimensional structure of the enzyme superoxide dismutase, with the goal of trying to develop a hypothesis to explain why a particular amino acid change affects the activity of the enzyme.

It's in the Design... Science Fair Experiments and Data Analysis
Ron Lamb, Mills Godwin High School, Virginia.
8-11 am (discussion/computer)

Students often do experiments, gather data, and then have no idea how to use the data. A well-designed experiment produces useful data. Participants will learn how to design research experiments that will yield useful data. Various methods of data analysis will also be explained demonstrated. Handout packets will be provided.

Investigative Cases in Agribusiness: Got Milk? (rBGH Labeling), Family Trees (Citrus Canker), and Feast to Famine (Potato Late Blight)
Ethel Stanley, BioQUEST Curriculum Consortium, Beloit College, Margaret Waterman, Southeast Missouri State University, Linda Weinland, Edison Community College.
8-11 am (computer)

Please join us as we explore case-based biology modules designed for learners in two-year colleges. In this workshop, participants will use investigative case based learning strategies to probe rBGH labeling, citrus canker, and potato late blight. Materials will be provided on site. More cases are available at the LifeLines OnLine Project Web Site. We will work in small groups to pursue our own questions, explore internet resources including computational tools and databases, utilize simulations, and present our "solutions" as well as strategies and reasoning in a mini-poster session. At the end of the session, participants are invited to share insights and discuss strategies for implementing case-based teaching in their own classrooms.

Using PCR to Perform Genetic Analysis of Arabidopsis thaliana Plants
Elizabeth Paine and LaLonnie Walker, Carolina Biological Supply Company.
8-11 am (laboratory)

This is a great lab for increasing students' understanding of the relationship between genotype and phenotype! Isolate DNA from Arabidopsis thaliana plants with either a curly leaf or wild type phenotype and perform PCR to determine the genotype of the plant with respect to the relevant gene. The mutation creating the curly leaf phenotype was created by a transposon and is recessive. Thus, at the more advance level this kit may also be used to teach students genetics, the effects of mutations, and the concept of transposons. Developed in cooperation with the Dolan DNA Learning Center at Cold Spring Harbor.

Bioquest.org lifelines
www.carolina.com
#29 Protein Fingerprinting Kit: A snapshot of evolution
Bio-Rad.
12 noon-3 pm (laboratory)
Can molecular evidence be used to determine the evolutionary relationships of species? Take a snapshot of evolution and discover for yourself. Finally, an inquiry-based wet lab that explores evolution at the biochemical level. DNA is sexy and fashionable and it gets a lot of attention, but proteins do all the work. Proteins are what give an organism its form and function (phenotype) - proteins are the raw material of evolution! Natural selection acts on phenotypes, but over time this can lead to accumulated changes in genotypes, and ultimately to changes in species. With this kit you will extract muscle proteins from different species of fish and use protein electrophoresis to generate their muscle protein fingerprints. Now you and your students can explore anatomy, phylogeny and evolution within the context of the molecular framework of biology. DNA > RNA > Protein > Trait! http://explorer.bio-rad.com

#30 Molecular Modeling of Proteins
David Bevan, Department of Biochemistry, Virginia Tech.
12 noon-3 pm (computer)
In this workshop, you will engage in hands-on activities related to computer-based visualization and analysis of protein structure. The workshop will cover (1) principles of protein structure, (2) how to access protein structure databases on the internet, (3) software tools for visualizing protein structures on desktop computers, and (4) how to incorporate protein structures in web pages. www.biochem.vt.edu/faculty/bevan.html

#31 Domesticating the Gene
John Jelesko, Fralin Biotechnology Center, Virginia Tech.
12 noon-3 pm (laboratory/demonstration/discussion)
We will explore both how and why humans have managed plant genes since prehistoric times to create the "monsters" that we affectionately call our traditional crop species. By examining the evolution of genetic technologies from human prehistory through the Green Revolution, one will gain a greater appreciation for the profound transformations found in our domesticated crops. Specific domesticated plant genes will be highlighted. The workshop will suggest how these concepts and examples may be used to teach basic genetic and evolutionary principles to a high school or junior college audience and/or provide a fuller historical context from which to critically evaluate genetically modified crops.

#32 Studying Maternal Inheritance Through Mitochondria
Sandra Porter, Geospiza, Inc.
12 noon-3 pm (computer)
Mitochondrial DNA sequences are widely used as tools for identifying maternal ancestors and studying human migration. Participants will use mitochondrial sequences from different regions of the world to determine if they can confirm the origin of these sequences, and then identify the maternal origin of an unknown sequence. www.geospiza.com/outreach/index.htm

#33 Scientific Thinking and Internet Learning Technologies
Anne Scuderi and John Settlage, University of Utah.
12 noon-3 pm (discussion/computer)
With financial support from the National Institutes of Health, we have created three biology units that are available over the Internet. The topics are Learning & Memory, The Science of Addiction, and Circadian Rhythms. Each unit focuses upon the nature of science presenting: change in scientific explanations represents a strength, scientific interpretations are influenced by the scientists’ prior experiences, and scientific ideas are revised in response to new data or fresh interpretations. The unit assumes intermittent access to a computer lab for the entire class and makes use of the 5E instructional model. stilt.genetics.utah.edu

#34 Gene Gateway: A Web Companion to the Human Genome Landmarks Poster
Jennifer Bownas, U.S. Department of Energy Genome Programs.
12 noon-3 pm (computer)
See Workshop #23 for description.

#35 HHMI Biomedical Science DVDs and Multimedia Resources in the Classroom
Satoshi Amagai, Howard Hughes Medical Institute.
12 noon-3 pm (computer)
HHMI produces an annual lecture series on a topic in biomedical research. Resources including DVDs, VHS tapes, animations and virtual laboratories on topics in the series are available free. Participants in this workshop will take a quick tour of the new DVD on Genomic Science with its many extra features, and of two other DVD’s with teacher-developed lesson plans and activities. In addition, we will view a virtual laboratory in which an unknown pathogen is identified through PCR amplification and a BLAST search. Both high school and college faculty have been incorporating these materials into their courses. www.biointeractive.org www.holidaylectures.org

#36 Bioinformatics in the Curriculum: Forensics, HIV Sequence Data, and Evolution
Etzel Stanley, BioQUEST Curriculum Consortium, Beloit College, Margaret Waterman, Southeast Missouri State University, Linda Weinland, Edison Community College.
12 noon-3 pm (computer)
Anyone with an internet connection now has access to the rich data and powerful tools used in the analysis of molecular sequences and structures. The resulting challenge to educators is deciding how to engage students in biological problem solving that makes use of these new resources in meaningful ways. Our approach to developing bioinformatics education materials emphasize the central role of evolutionary theory as a powerful heuristic for identifying and interpreting homology; the integration of bioinformatics across the introductory biology curriculum; and opportunities to engage in realistic problem solving with rich data resources. The workshop will feature both introductory activities and more open-ended research investigations using HIV patient data sets. We will use several on-line computational tools and resources including Biology WorkBench in addition to hands-on materials. At the end of the session, participants are invited to share insights and discuss strategies for implementing bioinformatics teaching in their own classrooms. workbench.sdsc.edu bioquest.org/lifelines
CONFERENCE REGISTRATION FORM
Biotechnology Conference 2003
July 16-19, 2003

Please print or type - complete a separate form for each participant.

Name ____________________________________________
Social Security No. __________________________________
Title ____________________________________________
Organization ______________________________________
*Organization’s FID No. _____________________________
Address __________________________________________
City __________________________ State ________ Zip ________
Daytime Phone No. ________________________________
Fax No. __________________________________________
E-mail address ____________________________________
Signature _________________________________________

* Necessary to process a refund payable to any company, agency, or government.

Registration Fees: □ $195 postmarked on or before May 31
□ $225 postmarked after May 31
□ $30 Full-time student (lectures only, no meals)

□ Will be attending Wednesday afternoon Pre-conference Biotechnology Boot Camp
   Workshop registration fee $50 (includes lab materials, certificate, and snacks)
□ Will be attending Friday Evening Social/Dinner
□ Extra tickets for Friday Evening Social/Dinner: ___________ tickets @ $16 each
   Name(s) _______________________________________

□ Would like Continuing Education Units for attending the Biotechnology 2003 Conference
   (3.0 units for Conference; 3.5 units for Conference plus Boot Camp). CEU processing fee
   $10. CEU requests must be made prior to the conference or at the time of registration.
   Requests for CEU’s will not be accepted after registration closes.

Total amount enclosed: $ __________________

Method of Payment: (Registration will be processed when payment is received.)
□ Check enclosed
   Make payable to: Treasurer, Virginia Tech, Continuing Education
□ Credit card: □ Mastercard □ VISA □ AmEx
   Card No. __________________________ Exp. Date ____________
   Name of Cardholder ____________________________________________

Return by July 4 (no staple, tape, or paper clips, please) to:
Conference Registrar
Outreach Program Development
Virginia Tech, MC 0272
810 University City Blvd., Suite D
Blacksburg, VA 24061
phone (540) 231-5182
fax (540) 231-3306 (for credit card registrations only)

Please make workshop choices on the reverse side.
Wednesday Evening Registration/Refreshments/Tours  6-8 pm

_______  I plan to attend

Thursday Evening Roundtable Discussions  7:30-9:30 pm

I plan to attend (check one):

_____ A. Community College Biotechnology Programs
_____ B. AP Biology
_____ C. Science Magnets and Specialized Secondary Schools
_____ D. Outreach Programs
_____ E. Starting a High School Biotechnology Program
_____ F. Biotech Experiments for Science Fairs

Please indicate your workshop selections for Thursday afternoon, Friday afternoon, Saturday morning, and Saturday afternoon in the boxes below: (1=first choice, 2=second choice, 3=third choice, 4=fourth choice)

Thursday afternoon

_______ 1. Genes in a Bottle & pGLO Bacterial Transformation and Protein Purification
_______ 2. Learn How to Fingerprint Your Own DNA
_______ 3. Genome-wide Linkage Mapping
_______ 5. Exploring Bacterial Bioluminescence and the Lux Operon
_______ 6. Modern Genetics for All Students
_______ 7. DNA Isolation from Plants
_______ 8. Mystery of the Crooked Cell
_______ 9. Bacterial Transformation with and Purification of Green Fluorescent Protein
_______ 10. Incorporating Biotechnology into the Biology Curriculum

Friday Afternoon

_______ 11. DNA Fingerprinting: The biotechnology of modern forensics solves human problems
_______ 12. Ecotechnology at the Organismic and Molecular Levels
_______ 13. Genome-wide Linkage Mapping
_______ 14. Forensic Science: DNA fingerprinting
_______ 15. BLAST for Beginners and Finding Genes with Entrez
_______ 16. Modern Genetics for All Students
_______ 17. Advanced DNA Isolation to Identify and Characterize Genetically-modified Plants
_______ 18. Chances Are?
_______ 19. Using PCR to Track P. infestans the Irish Potato Famine Pathogen!

Saturday Morning

_______ 20. PV92 PCR/Informatics Kit: How do you fit in?
_______ 21. Biotechnology Beyond the Classroom!
_______ 22. The Case of the Crown Jewels
_______ 23. Gene Gateway: A web companion to the human genome landmarks poster
_______ 24. PCR Detection of Genetic Modification in Foods
_______ 25. Allelic Variants of Superoxide Dismutase in Lou Gehrig’s Disease
_______ 26. It’s in the Design... Science Fair Experiments and Data Analysis
_______ 27. Investigative Cases in Agribusiness
_______ 28. Using PCR to Perform Genetic Analysis of Arabidopsis thaliana Plants

Saturday Afternoon

_______ 29. Protein Fingerprinting Kit: A snapshot of evolution
_______ 30. Molecular Modeling of Proteins
_______ 31. Domesticating the Gene
_______ 32. Studying Maternal Inheritance Through Mitochondria
_______ 33. Scientific Thinking and Internet Learning Strategies
_______ 34. Gene Gateway: A web companion to the human genome landmarks poster
_______ 35. HHMI Biomedical Science DVDs and Multimedia Resources in the Classroom
_______ 36. Bioinformatics in the Curriculum: Forensics, HIV sequence data, and evolution