TEDCO Federal Lab Program Presents:
The Henry A. Wallace
Beltsville Agricultural Research Center's

Bioscience for Life Showcase

TEDCO Federal Lab Program presents:

"The Beltsville Agricultural Research Center's (BARC) Bioscience for Life Showcase"

May 3, 2001
8:30 am-3:00 pm

Beltsville Agricultural Research Center
Building 003

$40 per person

Directions: Take I-95 to 495 toward College Park. Take Exit 25 onto Route 1 North. After 1/2 mile, you will see the 14-story National Agricultural Library on the right. BARC is on the left, but no left turn is allowed. Instead, turn right onto the small service road to the Library. Immediately turn left and cross Route 1 at the stoplight. Turn right onto Circle Drive.

Register at www.mdhitech.org by April 26, 2001.

For registration information, contact Filomena Thompson at 240-453-6200.

For showcase information, contact Caroline Worrall at 410-715-4165 or cworrall@marylandtedco.org

For information about BARC, log onto their website at www.ba.ars.usda.gov

Schedule of Events:

8:30 am-9:30 am	**Informal Networking and Continental Breakfast**
9:30 am	**Opening Remarks and Memorandum of Understanding Signing**
10:00 am-11:00 am	**Session I Presentations**
11:15 am-12:15 pm	**Session II Presentations**
12:15 pm	**Poster Sessions and Lunch**
1:30 pm-3:00 pm	**Center and Laboratory Tours (Tour seating is limited, please register early.)**

Maryland TEDCO Technology Development Corporation

ars USDA

ASME International

HIGH TECHNOLOGY Council of Maryland

MARYLAND Department of Business & Economic Development

The Prince George's County High-Technology Council

SBDC Small Business Development Center

PRINCE GEORGE'S COUNTY MARYLAND

These technologies have helped improve humanity, the environment and the economy through agricultural research.

Now, they can help improve your company.

One of the largest and most diversified agricultural research complexes in the world, the Beltsville Agricultural Research Center (BARC) is committed to developing the technology necessary to solve broad-scope problems facing the agricultural industry. BARC technologies help ensure the production of high-quality agricultural products to meet the nutritional needs of the American consumer, as well as sustain a viable agricultural economy in a way that is beneficial to both the environment and natural resource base.

Now, this world leader in agricultural research is available for your private sector company.

See what BARC can do for you at the Bioscience for Life Showcase.

Presentations

SESSION 1

Animal Improvement through Genetic Engineering, *Bob Wall, Animal and Natural Resources Institute*
- Beneficial genes can be found in very strange places
- Genetic engineering is moving good genes around with precision
- Impacts on animal well-being, food supply and the environment

Plants as Factories for Producing Pharmaceuticals, *Rose Hammond, Plant Sciences Institute*
- Plant virus-based vectors; expression of proteins in industrial quantities in plants
- Safe, economical solutions for production of new generation pharmaceuticals
- Plants can serve as both production and delivery systems

Suppression of Gene Expression in Transgenic Soybean Seed Removes a Major Allergen, *Eliot Herman, Plant Sciences Institute*
- Soybean food allergies occur in 8% of humans
- Suppression of gene expression to alter protein composition
- A major soybean seed allergen is now null for the allergen in transgenic seeds

Insect Cell Culture: Uses in Biocontrol and Medicine, *Dwight Lynn, Plant Sciences Institute*
- Over 20 unique insect cell lines developed
- Cell lines used for insect control
- Cell lines used to produce recombinant proteins in the Baculovirus
- New vectors for transforming insects and insect cells
- New genes for insect control through genetically modified plants

Application of Microarrays to Agricultural Problems, *Ben Matthews, Plant Sciences Institute*
- Microarrays used to study the expression of many genes simultaneously
- Genes involved in defense against pests and pathogens
- Soybean genes defending against the soybean cyst nematode

Sequencing the Genome of a Plant Pathogenic Microbe: Potentials for Disease Control, *Bob Davis, Plant Sciences Institute*
- Whole genome sequencing for gene discovery
- Functional genomics for determining pathogen capabilities
- Identifying molecular targets for disease control
- Corn stunt spiroplasma: an example in progress

SESSION 2

Embryo Preservation: Maintaining Germplasm Resources and Genetic Diversity, *John Dobrinsky, Animal and Natural Resources Institute*
- Embryo preservation applications for production, research and medicine
- Preservation for acquisition and characterization of potentially useful germplasm

Chemicals Affecting Insect Behavior, *Jeff Aldrich, Plant Sciences Institute*
- Isolation, identification and synthesis of insect bioactive natural attractants and repellents
- Detection of nanogram quantities of bioactive compounds by gas chromatography-electroantennogram
- Wind tunnel and video motion detector bioassay capabilities
- Organic synthesis expertise, in chiral synthesis and reaction scale-up

Rapid and Extremely Sensitive Diagnostic Assays for Plant Pathogens, *John Hartung, Plant Sciences Institute*
- High-speed, sensitive detection of bacteria in environmental plant samples
- Detection of pathogens in plant samples using real time, quantitative polymerase chain reaction assays

Identification and Development of Natural Plant Products as Biopesticides, *Jim Locke, U.S. National Arboretum*
- Plants contain many biologically active constituents
- Plant oils can be extracted and used as biopesticides
- Biopesticides are naturally biodegradable

Identifying Food Components and Nutrient Intakes for a Healthy Diet, *Janet Novotny, Beltsville Human Nutrition Research Center*
- Delineating affects of food components on human health and risk of disease
- Elucidating factors which influence nutrient bioavailability
- Determination of optimal nutrient intakes for promoting health

Composting as Part of the Solution, *Larry Sikora, Animal and Natural Resources Institute*
- Composting to transform organic wastes into multiple use value-added products
- Composting for controlling human pathogens in animal manures
- Blending by-products in composts provide unique opportunities to form products with the specific purpose of enhancing the quality of land affected by past practices
- Opportunities to improve the composting process design and operation are bountiful as the demand grows for variations to suit the need

Poster Presentations

The Good Scum of the Earth, *Sarah Wright, Animal and Natural Resources Institute*
- Discovered one of the most abundant compounds in soil
- Origin of compound traced to group of fungi that grows on roots of plants
- Compound important to soil stabilization

Technologies for Automated On-Line Inspection, *Yud-Ren Chen, Animal and Natural Resources Institute—Poultry Inspection*
- Poultry Inspection
- Visible/Near-Infrared Spectrophotometer
- Multispectral Imaging
- Apple Inspection
- Hyperspectral/Multispectral Imaging

A Natural Herbicide for Broadleaf Weeds, *Brian Bailey, Plant Sciences Institute*
- The protein Nep2 kills plant cells
- Nep1 defoliates dicot weed species when applied as a foliar spray
- Nep1 enhances weed control when co-applied with some chemical and biological herbicides

Novel Approaches to Food Safety of Fresh-Cut Produce, *Bill Conway, Plant Sciences Institute*
- Biocontrol of foodborne human pathogens on fresh-cut produce
- Reduction in populations of Salmonella and Listeria monocytogenes on apples and honeydew melons using bacteriophages

Sex Pre-Selection of Farm Livestock Offspring Before Breeding, *Dave Guthrie, Animal and Natural Resources Institute*
- Sex pre-selection based on the difference in DNA content of X and Y chromosome
- Sperm separation > 95% purity using a fluorescence activated cell sorter
- No abnormalities found in hundreds of sex pre-selected offspring

Plant Genetic Marker Technologies—Genome Mapping and DNA Fingerprinting, *Perry Cregan, Plant Sciences Institute*
- A microsatellite-based map of the soybean genome
- Single nucleotide polymorphism (SNP) DNA markers in soybeans
- DNA fingerprints of crop varieties

Food Safety and Meat Tenderization, *Morse Solomon, Animal and Natural Resources Institute*
- Hydrodynamic pressure reduces gram-negative bacteria
- Successful synergistic nonthermal improvements in food/meat safety
- Hydrodymanic pressure processing improves meat tenderness

Use of Electron Microscopy in Agricultural Problems, *Eric Erbe, Plant Sciences Institute*
- Low Temperature Scanning Electron Microscopy
- Transmission electron microscopy for resolution of internal cellular structure
- Insects, mites, nematodes, fungi, bacteria and other agricultural pests

Parasites & Water Systems, *Mark Jenkins, Animal and Natural Resources Institute*
- Safe drinking water by detecting and removing microbial pathogens
- Rapid concentration and molecular techniques developed to meet regulatory standards for detection of microbial pathogens in water

Carbohydrate Modifications to Improve Produce Quality and Processing, *Ken Gross and Dave Smith, Plant Sciences Institute*
- Family of seven galactosidase genes were characterized from tomato (patent pending)
- Useful for attenuating fruit ripening and developing high viscosity vegetable products
- Seeking a partner to determine the product potential of these genes

Enzyme-linked In-Vitro Assays for Assessing Poultry Immunity and Health, *Hyun Lillehoj, Animal and Natural Resources Institute*
- Development of monoclonal antibodies specific for chicken cytokines
- Use of in vitro enzyme assays to detect levels of chicken cytokines
- Development of enzyme-linked immunoassays for ready-made kits in commercial application

Identification and Development of New Ornamental Germplasm-Ornithogalum, *Rob Griesbach, U.S. National Arboretum*
- Develop a tissue-culture procedure to rescue embryos from aborted seeds of inter-species crosses
- Create complex hybrids with unique flower colors and growth/flowering habits
- Select seedlings for registration, patenting and release

Application of Satellite Images to Assess Regional Agricultural Crop Yields, *Paul Doraiswamy, Animal and Natural Resources Institute*
- Processing of satellite imagery acquired during the growing season identifies crop types and acreages at the State and county levels
- Satellite images used to obtain crop biophysical information
- Crop growth simulation models to assess the regional crop yields

Monoclonal Antibodies in Plant Virology: Re-Agents for Virus Detection and Characterization and Expression in Transgenic Plants as Another Step Towards Virus Disease Control, *Ramon Jordan, U.S. National Arboretum*
- Hybridoma monoclonal antibodies for plant viruses
- A broad-spectrum reacting monoclonal antibody patented and commercially licensed in a diagnostic kit for the detection of most potyviruses
- Cloning and expression of monoclonal antibody genes

Quantitative Trait Loci (QTL) Mapping and Marker: Assisted Selection, *Tad Sonstegard and Curt Van Tassell, Animal and Natural Resources Institute*
- Finding of genes underlying QTL
- Unique gene discovery

Swine and Cattle Immune and Genetic Resources Available Through IDRL, ANRI Scientists, *Joan Lunney, Animal and Natural Resources Institute*
- Development of DNA based-diagnostic tests for foodborne Toxoplasma and Trichinella in swine, and for parasites of cattle
- Production of DNA and protein-based immune reagents from large animals to develop biotherapeutic reagents for treating livestock diseases
- Development of a vaccine for curing chronic cases of mastitis

An Integrated Pest Management Strategy for Lyme Diease, *Dolores Hill, Animal and Natural Resources Institute*
- A 4-poster deer self-treatment device for tick control
- Other biological control agents being tested including fungi and nematodes

Algae Recovery of Nitrogen and Phosphorus from Dairy Manure, *Walter Mulbry, Animal and Natural Resources Institute*
- Development of algal turf scrubber technology
- Laboratory scale scrubber units show high recoveries of manure nitrogen and phosphorus; field scale experiments are underway
- Potential for on-farm recycling of manure nutrients now exists yielding biomass for use as animal feed supplements

Poster Showcase of Successful Technology Transfer at BARC

Feather Fiber Formulations: Paper or Plastic? *Walter Schmidt, Animal and Natural Resources Institute*
- Feather fiber can be incorporated with wood cellulose as pulp to make paper products
- Quill byproduct plus synthetic polymers make fiber or filler in plastics
- Marketing and product design adds value to the end-product