

MANY THANKS TO ALL WHO SPONSORED
THIS YEAR'S TEEN BIOTECH CHALLENGE!



Bayer CropScience



ERNST & YOUNG

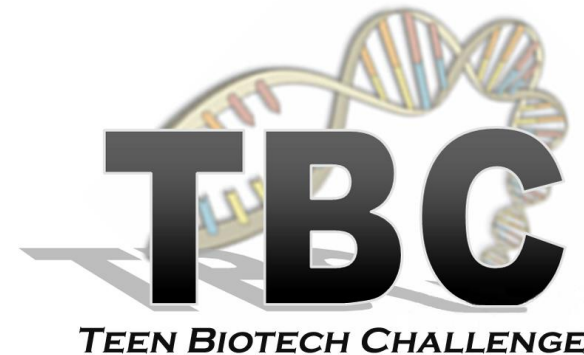


ROGER NIELLO

Bosley Business Law

GARY SIMON

2014 Teen Biotech Challenge Awards Banquet



University of California, Davis
Freeborn Hall
May 23, 2014
5:30 – 9:30 pm

2014 Teen Biotech Challenge Awards Banquet Program

Registration & Booth Viewing: 5:30 - 6:30 pm

Dinner & Raffle: 6:30 – 7:30 pm

Keynote Address: 7:30 – 8:00 pm

Jennifer Lee, Dr. Maelene Wong & Dr. Gina MacBarb (ViVita Technologies)

Kristen Beck (Girls Who Code)

Dr. Lucas Arzola (Inserogen)

Awards & Student Presentations: 8:00 – 9:30 pm

Agricultural Biotechnology

Presenter: Dr. Tim Conner, Site Director, Calgene-Monsanto Campus, Davis, CA

Computational & Systems Biology

Presenter: Dr. Ken Kubo, Prof. Biology/Biotechnology, American River College, Sacramento, CA

Drug Discovery & Biomanufacturing

Presenter: Sarah Demshar, R&D Specialist I, Bayer CropScience, Davis, CA

Environmental Biotechnology

Presenter: Dr. Debbie Yaver, Director, Novozymes, Inc., Davis, CA

Nanobiotechnology

Presenter: Dr. Judy Kjelstrom, UC Davis Biotechnology Program

Personal Genomics & Human Health

Presenter: Kim O'Bryan, UC Davis School of Veterinary Medicine

Regenerative Medicine

Presenters: Jeni Lee, Maelene Wong, Gina MacBarb (Keynote speakers)

CIRM Research Scholar Awards

Presenter: Gerhard Bauer, UCDCM Institute for Regenerative Cures

Grand Prize Winner, Oral Presentation Winner(s) & Closing Remarks

Presenter: Dr. Denneal Jamison-McClung, Associate Director, UC Davis Biotechnology Program & Director, BioTech SYSTEM

Which items in the supermarket contain GMOs?

It is easy to figure out which foods contain “GMOs” because only a handful of biotech crops are currently grown and sold in the US:

Soybeans/soybean oil

Corn (maize)

Canola oil

(derived from GM Canola this oil is chemically identical to oil derived from conventional canola plants)

Sugar

(derived from GM Sugar Beets, this sugar is chemically identical to sugar derived from other plant sources)

Papaya *(virus resistant)*

Squash *(virus resistant yellow squash & zucchini)*

Sweet Corn *(Bt)*

The first biotech crop, the Flavr'Savr tomato, was invented right here in Davis, CA, at the Monsanto Calgene Campus in 1995. The Flavr'Savr was a biotech tomato with delayed ripening and sold well in town. But, due to price competition and market forces, this particular biotech crop is not currently on the market.

Other widely grown biotech crops are herbicide tolerant alfalfa and Bt cotton. The Bt gene allows crops to resist “hungry, hungry caterpillars” (herbivory). Research studies have confirmed that Bt crops improve insect biodiversity through reduction in field applications of insecticide.

What's in the works? Scientists are developing useful crops that grow well in drought conditions and saline soils, crops that need much less fertilizer, and biofortified crops that have been engineered to provide essential nutrients and minerals (like Golden Rice, which produces beta carotene).



Mythbusting Agriculture!

Consumers are exposed to a ton of misinformation about GM crops, agricultural production systems and nutrition in the popular press. Here are two of the most common myths:

Myth: *GMOs are untested and unregulated.*

Facts: *GMOs are the most carefully studied and analyzed plants in the history of mankind, with regulatory oversight by the USDA, EPA and FDA. They have the same nutritional value and safety as similar conventional crop plants.*

Myth: *Organic farming is pesticide-free and better for the environment.*

Facts: *Like all farmers, those using organic systems must use pesticides to overcome pests. Organic farmers choose pesticides from an approved list, including some very toxic metals. Yields are lower with organic farming and we cannot feed global populations with this approach, nor preserve wild lands and forests (would need to plough all land for farming).*

For science-based answers to general questions about GMO's in food and agriculture, these sites provide the most accurate information for teachers, students and curious consumers:

- Best Food Facts – <http://www.bestfoodfacts.org>
- Biology Fortified – <http://www.biofortified.org>
- GMOAnswers – <http://gmoanswers.com>
- UCBiotech.org – <http://ucbiotech.org>

For information on humanitarian GM Crop Projects:

- Golden Rice <http://www.goldenrice.org/>
- Water Efficient Maize for Africa (WEMA)
<http://wema.aatf-africa.org/about-wema-project>
- Banana 21
<http://www.banana21.org/projects-biofortification.html>

WELCOME TO TBC 2014

Welcome to the Teen Biotech Challenge Symposium and Awards Banquet! This evening, we are celebrating academic excellence and the dedication of students that have built impressive websites on a wide range of biotech topics. We are also here to thank teachers, parents and family members that have encouraged and supported these young people in their educational achievements, including the TBC.

In 2014, 353 Northern California students participated in building a TBC website. Of those forwarded after a preliminary round of school site judging, 94 websites from 12 California high schools were entered in the final judging round. TBC judges had a difficult job, narrowing down the top entries, as all were impressive!

Biotech Community Sponsors Make TBC Possible

We would like to offer warm thanks to our Event Partners, Genentech, SARTA and the UC Davis Biotechnology Program, as well as community sponsors for making the Teen Biotech Challenge possible. Please share your personal thanks with the sponsors joining us this evening.

Sincere Congratulations,

Dr. Denneal Jamison-McClung
Director, BioTech SYSTEM
Associate Director, UC Davis Biotechnology Program

Teen Biotech Challenge is the primary outreach activity of the BioTech SYSTEM, a regional Northern California consortium for promoting education in science, technology, engineering and mathematics (STEM). The BioTech SYSTEM is administered by the UC Davis Biotechnology Program.

STEM CAREERS (Cont.)

TBC2014 is 100% sponsor supported, including student prizes and this lovely awards event, has been provided by the following generous sponsors:

Event Partners: \$3,000-\$10,000

- UC Davis Biotechnology Program
- Genentech, Inc.
- SARTA – Sacramento Regional Technology Alliance

Platinum Sponsors: \$1,000 - \$2,999

- Ernst & Young LLP (CJ Obmann)
- Monsanto
- North Valley Biotechnology Center at American River College
- Novozymes, Inc.
- UC Davis School of Veterinary Medicine

Silver Sponsors: \$250 - \$499

- Reilly Realtors
- Carey Adams, Doug Bosley, SMUD (Greg Hribar), Todd Michaud, Roger Niello, Tony O'Donnell, Gary Simon, Bob Whitson, Rob Winkler

Thank you all for recognizing the hard work and commitment of the teachers and students we celebrate this evening. We are truly grateful for your on-going support of science education. Together we can build a community of science and technology innovators!

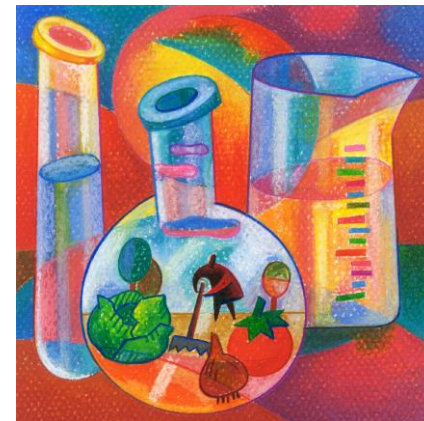
The majority of biotechnology jobs require a **Bachelors of Science (BS) college degree**. In addition to positions requiring a BS degree, there are a significant number of entry-level biotechnician jobs in California with a minimum requirement of the **Associates of Science (AS) degree or Program Certificate**.

We have several excellent community college biotechnology programs in our region, some of whom are here this evening. Please visit the information booths for more information on 2-year and 4-year academic programs in biotechnology, related life sciences and engineering. Across the nation, the average salary for researchers or technical employees in biotechnology, whether working in healthcare, agriculture or the environment, is about \$65,000 per year.

Online Resources

For a list of useful resources to find detailed information on careers and training in biotechnology, please see the BioTech SYSTEM "Careers and Training" website at:

http://biotechsystem.ucdavis.edu/biotech_training.cfm



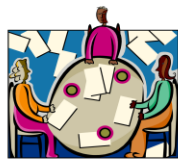
STEM CAREERS

Careers in Science, Technology, Engineering and Math (STEM) will be thriving for years to come and educating students in these fields will allow us to tackle global challenges in healthcare, agriculture and the environment. In addition to helping humanity solve major problems, students choosing STEM career paths are entering a healthy job market. Science and technology are strong drivers of economic growth and we want your students to share in this regions prosperity. **Northern California is the birthplace of biotechnology, also called life science**, and we have a special opportunity to participate in the biotechnology community centered in the San Francisco Bay Area. Look around at the informational booths here this evening and ask booth participants about their career journeys in biotechnology.

When people think of **biotechnology jobs**, most envision a scientist in a laboratory. However, specific jobs requiring biotechnology training may include teaching, sales, government policy analysis, project management, clinical work and practice of law.



Research



Administration



Teaching



Sales & Marketing



Patent Law



Government
Regulatory Affairs



Technical Writing



Health Care

See the State of California Employment Development Department on Biotechnology jobs for the latest job market projections:

http://www.labormarketinfo.edd.ca.gov/Biotechnology_in_California.html#OccData

TBC 2014 WINNERS

Focus Area 1: Agricultural Biotechnology

1st – Ryan La, Tim Derebinskiy, and Edrees Yaqubi, “Genetically Modified Crops: Nature Improved and Accelerated” (Sheldon HS)

2nd – Insu Jung, “Agricultural Biotechnology: Marker Assisted Selection” (Sheldon HS)

3rd – Gabrielle Jee and Maria Maguire, “Biopesticides: Nature’s Pest Control” (Davis HS)

Honorable Mention – Melissa Teuber, “GM Mosquitos: Manipulating a Corner of the Ecosystem to Halt the Transmission of Malaria” (Davis HS)

Honorable Mention – Rushali Manhas, “The Impact of Biotechnology on Animals: A Journey Through the Lives of Animals and How They Benefit Humans...” (Sheldon HS)

Focus Area 2: Computational & Systems Biology

1st – Jing-Yi Lin, “Microbes: Invisible Invaders, Amazing Allies” (Sheldon HS)

2nd – Cindy Truong “Epidemiology: Disease Detectives” (Sheldon HS)

3rd – Monica Nasser, “The Application of Metabolic Pathways in Biotechnology” (Sheldon HS)

Honorable Mention – Dylan Santana, “Comparative Genomics” (Christian Brothers HS)

Honorable Mention – Brittney Barron and Taylor Skala, “What Makes Us Human?” (El Camino HS)

Honorable Mention – Vincent DeJesus and Bianca Cortez, “Model of Biology” (Rodriguez HS)

Honorable Mention – Kevin Kicin, “Model of Biology” (Rodriguez HS)

Honorable Mention – Dandel Sison and Josua Pambid, “Comparative Genomics: What Makes Us Human?” (Vallejo HS)

TBC 2014 WINNERS (Continued)

Focus Area 3: Drug Discovery & Biomanufacturing

1st – Yimin Yang and Siruo Zhang, “The Amazing World of Biologic Drugs”

(Davis HS)

2nd – Matthew Paterno, “Protein Therapeutics Drug Discovery” (Inderkum)

3rd TIE - LC Perez Shorter, “Antiretroviral Therapy” (Christian Brothers HS)

3rd TIE – Danielle Baldwin, “Solving Some of the World’s Most Challenging Diseases” (Sheldon HS)

Honorable Mention – Gurmun Singh, “Gene Therapy: A Medical Revolution” (Sheldon HS)

Honorable Mention – Aldrin Catap, Michelle Smith, and Catherine Jovez, “Genetically Modified Antibiotics” (Vallejo HS)

Focus Area 4: Environmental Biotechnology

1st – Angad Singh and Gregg Borden, “A Bright Future With Biofuels”

(Sheldon HS)

2nd TIE– Nathan Lemus, “Bioremediation” (Sheldon HS)

2nd TIE - Rachel Wolff, “Defying Climate Change” (Sheldon HS)

3rd TIE- Ian Logan, James Omand, and Tyler Perata, “Biodiesel, the Fuel of the Future” (El Camino HS)

3rd TIE- Holly Martin, “Biofiltration: Stopping Pollution, the Natural Way” (Christian Brothers HS)

Honorable Mention – Julianna Guerrero, “Breaking Down Bioplastics: A Greener, Cleaner Earth” (Christian Brothers HS)

Focus Area 5: Nanobiotechnology

1st – Revekka Kostoeva, “Nanomedicine: A Seemingly Small Yet Promising Future” (Sheldon HS)

2nd TIE – Maya Varma, “Liposomes: Drug Delivery Vehicles of the Future” (Presentation HS)

2nd TIE – Audrey Cheng, “Carbon Nanotubes” (Gunn HS)

3rd – Maya Holikatti, “Nanomedicine: Nanobiopharmaceutics” (Mira Loma HS)

Biotechnology to Meet Global Challenges



Biotechnology is an applied field of science that uses our knowledge of living systems and engineering principles to create solutions for complex local and global challenges in agriculture, health care and the environment.

So... what are the biggest challenges for most global communities today? The United Nations has set Millennium Development Goals (MDG’s) in eight key areas to improve the everyday lives of millions of people in developing countries:

- End Poverty and Hunger
- Universal Education
- Gender Equality
- Child Health
- Maternal Health
- Combat HIV/AIDS
- Environmental Sustainability
- Global Partnership

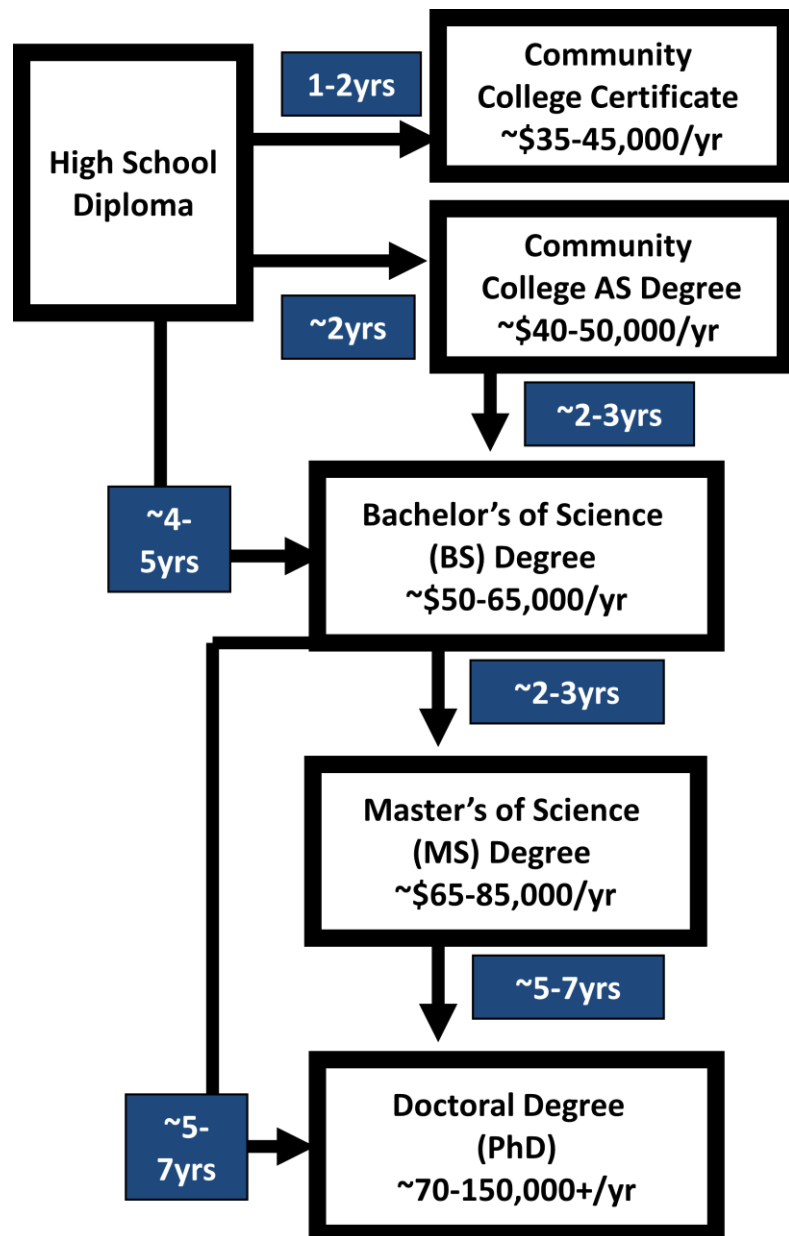
Locally, at the state and national levels, we see similar challenges in our “own backyard”. Biotechnology has a key role to play in meeting many of the UN Millennium Development Goals, especially those related to human health and food security.

The winning TBC websites are a great educational resource for learning about specific biotechnology research approaches that will help address the MDG’s, such as the development of cost-effective vaccines and drug treatments, the use of biotech crops to increase food security and emerging technologies to convert plant biomass into renewable liquid biofuels.

We hope that the Teen Biotech Challenge has opened your eyes to some of the amazing advances we are making through science and engineering!

<http://www.un.org/millenniumgoals/>

Education & Average Salary Ranges for Biotechnology Careers



TBC 2014 WINNERS (Continued)

Focus Area 5: Nanobiotechnology (Cont.)

Honorable Mention – Natalie York, Hannah Twomey, and Elle Harlow, “Biomimetics: Design By Nature” (El Camino HS)

Honorable Mention – Jennifer Park and Hyemin Yoo, “Nanobiopharmaceutics” (Davis HS)

Honorable Mention – Josh Cruz, Dominique Elayda, and Olivia Devera, “Biomimetics: Nature’s Inspiration” (American Canyon HS)

Honorable Mention – Jacob Roberts, “Nanotechnology” (Sheldon HS)

Honorable Mention – Lyna Khuu, “Molecular Medical Imaging: Capturing the Image of the Future” (Sheldon HS)

Honorable Mention – Emmett Ryan, “Nanotechnology” (Sheldon HS)

Honorable Mention – John Ednilao and Daniel Salinas, “DNA Sequencing” (Vallejo HS)

Focus Area 6: Personal Genomics & Human Health

1st – Minh Nguyen and Jesse Slaton, “Epigenetics At A Glance” (Sheldon HS)

2nd – Amanda Nguyen and Duc (David) Nguyen, “The Future of Neuroscience” (Sheldon HS)

3rd – Christina Yoakam, “Designer Babies: Where Genetic Testing Prevents Diseases” (Sheldon HS)

Honorable Mention – Jenny Wu, “Cloning: We’re Already Doing It” (Sheldon HS)

Honorable Mention – Rachel Kan, “Future of Forensics” (Sheldon HS)

Honorable Mention – Arshdeep Chauhan, “Gene Therapy: Revolution of Medicine” (Sheldon HS)

Honorable Mention – Rajdeep Narwal, “Genetic Testing” (Inderkum HS)



TBC 2014 WINNERS (Continued)

Focus Area 7: Regenerative Medicine

1st – Joni Yang and Melanie Sou, "Regenerative Medicine: A Revolutionary Approach to the Future of Medicine" (Sheldon HS)

2nd – Hailey Farrell, "Regenerative Medicine: The Future of Healing" (Sheldon HS)

3rd TIE – Yuexin Xiang and Van Hsieh, "Stem Cell: The Cure for the Future" (Davis HS)

3rd TIE – Ciara Ayers, "Beginning to an End: The Advancements of Stem Cell Research with Regenerative Medicine" (American Canyon HS)

Honorable Mention – Karla Bernardo, "The Walking On Sunshine Project: A Quest to Have Spinal Cord Injury Patients Walking Again" (Christian Brothers HS)

Honorable Mention – Raiza Balancio and Brandon Balatbat, "The Future of Regenerative Medicine: Stem Cells" (Rodriguez HS)

Honorable Mention – Rg Noymie Legaspi, Wing Yan Chiu, and Andrea Arguel, "Regenerative Medicine: Artificial Organs & Artificial Limbs" (Vallejo HS)



Science and Social Media



Have you ever been curious about the latest discoveries in biotechnology? What's new with stem cells? Biofuels? GMOs? The human microbiome? What do the experts think about the latest controversies in biotech?

An excellent way to keep up is by using Twitter as a science newsfeed. Some of our winning TBC websites have incorporated a Twitter feed and it is quite a handy tool. My Twitter handle is @yggdrasil13751, and several of our keynote speakers and awards presenters also use Twitter for science communication (@jeniklee, @theladybeck, @LucasArzolaPhD, @kmkubo).

One of the best things about Twitter, and other social media platforms, is the ability to connect with like-minded people from around the world. On Twitter, one can follow posts by the governmental bodies (National Science Foundation, CDC, WHO), philanthropists (Bill & Melinda Gates Foundation), well known scientific journals (PLOS, BMC Genomics, Nature), popular science magazines (National Geographic, Scientific American, Popular Science) and recognized experts in many science and engineering fields.

Check out Twitter, if you haven't already...The reward will be a treasure trove of great science information streaming to your mobile device!



Awesome TBC Sponsor Teachers!

Each year, a few intrepid students enter the TBC as individual contestants, but the majority of our entries are facilitated by the extraordinary dedication and encouragement of TBC Sponsor Teachers through incorporation of TBC as a class project. We applaud the following California educators for their commitment to science education and for striving to keep their classrooms on the “cutting edge”, through activities like the TBC, and on-going professional development through BioTech SYSTEM membership:

American Canyon High School - Elizabeth Hawkins
Christian Brothers High School - Nicole Brousseau & Holly Keller
Davis Sr. High School - Linda Hussman, Ann Moriarty, Tim Peevyhouse, Wayne Raymond & Scott Richardson
El Camino High School - Louis Diaz
Henry Gun High School - Elana Zizmor
Inderkun High School - Elizabeth Henderson
Mira Loma High School - Colleen Kelly & Rochelle Jacks
Mission San Jose High School - Arshiya Sultana
Presentation High School - Corina Rahmig
Rodriguez High School - Kevin Scully
Sheldon High School - Jason Brennan, Justin Cecil, Bob Fendall, Leeann O’Bear & Laura Ziegenhirt
Vallejo High School - Lilibeth Pinpin
Gretchen Whitney High School - Paul Bender

CIRM Research Scholar Awards

TBC Winners meeting minimum eligibility requirements for the UCDCM Volunteer Services program were invited to apply for a Research Scholar Award. Based on a competitive application process, the following students have been invited to participate as Summer Research Scholars under the tutelage of leading stem cell scientist, Gerhard Bauer, Director of the GMP Laboratory. Students will conduct research in laboratories affiliated with the UC Davis Institute for Regenerative Cures (Director, Dr. Jan Nolte).

- Ciara Ayers, American Canyon HS
- Chetanjot Bhatti, Sheldon HS
- Tim Derebenskiy, Sheldon HS
- Maria Maquire, Davis Sr. HS
- Rushali Manhas, Sheldon HS
- David (Duc) Nguyen, Sheldon HS
- Matt Paterno, Inderkun HS
- Anabela Peralta, American Canyon HS
- Cindy Truong, Sheldon HS
- Jane Wanyera, Davis Sr. HS

This summer research experience has been made possible by a Creativity Award (PI-Gerhard Bauer) from the California Institute for Regenerative Cures (CIRM). Research Scholars will present their research posters to members of CIRM at the Creativity Award Poster Symposium in mid-August 2014.

BOOTHS

(Booth A) American River College hosts two related biotechnology programs, the North Valley Biotechnology Center and the ARC Biotechnology Program. The North Valley Biotechnology Center provides training and support for the biotechnology industry in the Sacramento region and Northern California. The ARC Biotechnology program trains community college students through both in-class and online courses to achieve a solid understanding of biotechnology and its applications in areas such as medicine, agriculture, forensics, and diagnostics.

(Booth B) Bayer Crop Science's "Making Science Make Sense" Program – Bayer has a strong stake in helping to improve science education and to ensure that all individuals are scientifically literate. Bayer demonstrates this commitment with its national award-winning Making Science Make Sense® program, a company-wide initiative that advances science literacy across the United States through hands-on, inquiry-based science learning, employee volunteerism and public education. For more visit their website at: <http://www.bayercropscience.us/our-commitment/education/making-science-make-sense>

(Booth C) SWE (Society of Women Engineers) was founded in 1950, is a not-for-profit educational and service organization. SWE is the driving force that establishes engineering as a highly desirable career aspiration for women. SWE empowers women to succeed and advance in those aspirations and be recognized for their life-changing contributions and achievements as engineers and leaders. As a local Sacramento organization, SWE provides outreach to K-12 students, and support, mentoring, and scholarships for collegiate students pursuing engineering degrees. SWE also provides professional development and networking opportunities. More information is available at: <http://societyofwomenengineers.swe.org/> and www.swesfs.org

BOOTHS (Cont.)

(Booth D) UC Davis Plant Sciences & Biotechnology Majors are housed in the College of Agricultural and Environmental Sciences. Biotech majors build a solid academic foundation in biology during their first two years on campus, including coursework in genetics, molecular biology, cell biology and recombinant DNA technology. As upper division students, biotech majors choose an option for more focused study: animal biotech, plant biotech, microbial biotech, or bioinformatics, with emphasis on acquiring related laboratory expertise. Research internships are required for all students in the program and allow students to hone problem-solving and technical skills necessary for success in industry and academic research settings.

(Booth E) The UC Davis Young Scholars Program offers summer research opportunities in the biological and natural sciences to 40 high achieving students during the summer between their sophomore and junior or junior and senior years. Selected on the basis of a competitive application, successful applicants reside in university dormitories for six weeks. Participants in this program work closely with university research faculty on individual projects. All research is conducted under the supervision of UC Davis research faculty and will take place in UC Davis campus laboratories and related field stations. In addition, participants enjoy weekend field trips to points of interest throughout Northern California, a lecture series on current issues in scientific research, and opportunities to work and live with other talented students with similar interests. Additional information, online application materials, and information about fees and *need based financial assistance* are available at the program web site <http://ysp.ucdavis.edu>.

