

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



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# 2013 Teen Biotech Challenge Awards Banquet



*University of California, Davis*  
*Freeborn Hall*  
*May 31, 2013*  
*5:30 – 9:30 pm*

## 2013 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

Prof. Jonathan Eisen, UC Davis Genome Center

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

### **Agricultural Biotechnology**

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

### **Computational & Systems Biology**

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

### **Drug Discovery & Biomanufacturing**

**Presenter:** Christopher Flask, Genentech, Inc., S. San Francisco, CA

### **Environmental Biotechnology**

**Presenter:** Dr. Feng Xu, Novozymes, Inc., Davis, CA

### **Nanobiotechnology**

**Presenter:** Dr. Judy Kjelstrom, UC Davis Biotechnology Program

### **Personal Genomics & Human Health**

**Presenter:** Dr. Judy Kjelstrom, UC Davis Biotechnology Program

### **Regenerative Medicine**

**Presenter:** Dr Jan Nolta, UCDMC Institute for Regenerative Cures

### **CIRM Research Scholar Awards**

**Presenter:** Gerhard Bauer, UCDMC 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

## STEM CAREERS (Cont.)

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](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

“California is home to over 2,000 biomedical companies employing over 274,000 people. The average wage for a biomedical industry employee in California is \$75,000.” (AB1733) **Agenda Item # 4 Document C 4/5/10 Legislative Subcommittee Meeting Fact Sheet from office of Assembly Member Jerry Hill**

## WELCOME TO TBC 2013

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 2013, 438 Northern California students participated in building a TBC website. Of those forwarded after a preliminary round of school site judging, 100 websites from 20 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 Rotary Club of Sacramento, and additional 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.*

100% of TBC2013 financial support, 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
- Rotary Club of Sacramento

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

- North Valley Biotechnology Center at American River College
- Novozymes, Inc.

**Gold Sponsors: \$500 - \$999**

- CleanStart (Gary Simon)
- Ernst & Young LLP (CJ Obmann)
- Five Star Bank (Mike Rizzo)
- ioSafe (Robb Moore)
- Roger Niello
- SMUD (Greg Hribar)

**Silver Sponsors: \$250 - \$499**

- Bio-Rad (Ingrid Miller)
- Bosley Business Law (Doug Bosley)
- Marrone Bio Innovations (Julie Morris)
- MedForce Accelerator, LLC (Cary Adams)
- White Star Enterprises (Dan Koellen)
- WorldBridge Partners (Dave Sanders)

*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!*

## Science and Social Media



Have you ever been curious about the latest discoveries in biotechnology? What's new with stem cells? Biofuels? 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, our guest speaker today, Prof. Jonathan Eisen is @phylogenomics and awards presenter Prof. Ken Kubo is @kmkubo. We all use Twitter to communicate with other scientists and educators 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:

Annie Clegg - Antelope High School  
Jennifer Bilka – Arthur A. Benjamin Health Professions School  
Armando Gonzales – CA Academy of Math & Science  
Nicole Brousseau - Christian Brothers High School  
Holly Keller – Christian Brothers High School  
Andy Sigears - Crystal Springs Uplands High School  
Ann Moriarty - Davis Senior High School  
Wayne Raymond – Davis Senior High School  
Louis Dias - El Camino High School  
Vlastimil Krbecsek - Hiram W. Johnson High School  
Elizabeth Henderson – Inderkum High School  
Scott McMillan – Inderkum High School  
Lori Steward – Linden High School  
Megan Shuff – Los Altos High School  
Amanda Alonso – Lynbrook High School  
Patrick Roisen – Menlo Atherton High School  
Mark Porter – Mira Loma High School  
Hope Hauptman – Miramonte High School  
Corina Rahmig – Presentation High School  
Alan Beamer – Sacramento Country Day High School  
Jason Brennan - Sheldon High School  
Justin Cecil – Sheldon High School  
Bob Fendall – Sheldon High School  
Leeann O’Bear – Sheldon High School  
Laura Ziegenhirt – Sheldon High School  
Jennifer Gerlach – Valley Christian High School  
Lilibeth Pinpin - Vallejo High School  
Anne Bestgen – West Campus High School

## TBC 2013 WINNERS

### Focus Area 1: Agricultural Biotechnology

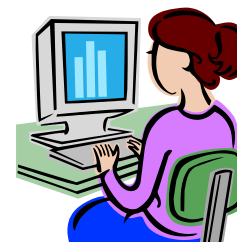
**1<sup>st</sup>** – Alfonso Barraza, “G.M. Crops: A Revolution in Farming and Productivity” (Sheldon HS)

**2<sup>nd</sup>** - Hailey Eddenfield, McKenzie King, & Christine Wiley, “Learning About Post-Harvest Food Safety” (El Camino HS)

**3<sup>rd</sup>** - Ahyeon Hwang, Christopher Chan, & Sandy Dao, “GM Plants: A Breakthrough in Agricultural Biotechnology” (California Academy of Mathematics and Science - CAMS)

**Honorable Mention** – Cameron Bizeau, “Genetically Modified Organisms: A Scientific Revolution” (Sheldon HS)

**Honorable Mention** - Ashley Kim & Theresa Tran, “Genetically Modified Animals, Bacteria, and Crops” (Sheldon HS)



### Focus Area 2: Computational & Systems Biology

**1<sup>st</sup>** - Jacqueline Liu & Ted Xiao, “Synthetic Biology” (Davis HS)

**2<sup>nd</sup>** - Timothy Yambao & Brandon Truong “Technology Comes to Life: Synthetic Microbes” (Sheldon HS)

**3<sup>rd</sup>** – Rana Eser, “The World of Microbiomes: Zooming In on the Bigger Picture” (Sheldon HS)

**Honorable Mention** - Charleen Duong, “Microbes” (Sheldon HS)

**Honorable Mention** - Hannah Smith, “Microbes in Warfare: Fighting With Germs” (El Camino HS)

**Honorable Mention** - Marielena Encinas, “The Human Genome Project” (Christian Brothers HS)

## TBC 2013 WINNERS (Continued)

### **Focus Area 3: Drug Discovery & Biomanufacturing**

**1<sup>st</sup>** – Maya Varma, “Phage Therapy” (Presentation HS)

**2<sup>nd</sup>** – Ryan Fong, “Aptamers: Going Where Antibodies Cannot” (Sheldon HS)

**3<sup>rd</sup>** - Pooja Chebolu & Katrine Usi “Superbiotics: Preventing the Next Global Pandemic” (CAMS)

**Honorable Mention** - Katherine Liu & Veronica Mark, “High-Content Screening: Bringing Changes in Drug Discovery” (Los Altos HS)

### **Focus Area 4: Environmental Biotechnology**

**1<sup>st</sup>** – Andrew Le, “Bioremediation: Nature's Way to a Cleaner Environment” (Sheldon HS)

**2<sup>nd</sup>** – Hanna Dokter & Nima Singh, “Bioenergy: A Cleaner, Greener Future” (Sheldon HS)

**3<sup>rd</sup>** - Erin Geluz, Rochelle Keo, & Ruth Guerra, “Biodiesel” (Vallejo HS)

**Honorable Mention** - Maggie Miller & Rachel Lucchini, “Algae Biofuels” (El Camino HS)

**Honorable Mention** – Safa Qasmi, “Biofuels and the Future” (Inderkum HS)

### **Focus Area 5: Nanobiotechnology**

**1<sup>st</sup>** – Nancy Tran, “Nanoparticles: Extensive Work Through a Small Scale” (Sheldon HS)

**2<sup>nd</sup>** - Matt Paterno & Niko Chapman, “NanoBioTechnology: Big Things Come in Small Packages” (Inderkum HS)

**3<sup>rd</sup>** – Elora Paule, “Nanobiopharmaceutics” (Sheldon HS)

**Honorable Mention** - Anne Bounthisane, “Medical Nanobots” (Sheldon HS)

**Honorable Mention** – Emma Atkins, “DNA Computing” (El Camino 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!

## 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) Partnership for Biotechnology & Genomics Education (PBGE)** promotes education in the area of modern biotechnological research, focusing on secondary students and their teachers. PBGE has been providing biotechnology educational resources to secondary teachers since 1992 in the form of interactive software, professional development opportunities, and equipment loan programs. <http://pbge.ucdavis.edu>

**(Booth C) 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 D) CBS Undergraduate Advising**, The College of Biological Sciences provides a comprehensive advising program for undergraduates. Major Advisers are out in the College's departments and provide guidance for completion of major requirements. The Dean's Office Advisers help students with many things including: help with general education and college requirements; academic difficulties; forms and petitions; graduation and commencement. Well-trained Peer Advisers also provide guidance for undergraduates in CBS and who are available tonight to answer questions you may have.

**(Booth E) Bio-Rad Biotechnology Explorer** – Stop by to pick up a catalog and information on classroom activities.

## TBC 2013 WINNERS (Continued)

### Focus Area 6: Personal Genomics & Human Health

**1<sup>st</sup>** - Siruo Sarah Zhang & Yimin Yang, "Genetic Testing 101" (Davis HS)

**2<sup>nd</sup>** – Dan Bui, "The Genetic Revolution" (Sheldon HS)

**3<sup>rd</sup>** – Ivy Nguyen & Misty Lam, "Epigenetics Unraveled - It's Getting Epic!" (Sheldon HS)

**Honorable Mention** - An Tran, Nicholas Hutchins & Monica Loza, "Genomics: Designer Babies" (CAMS)

### Focus Area 7: Regenerative Medicine

**1<sup>st</sup>** – Anna McDermott, "The Next Revolution In Medicine: Stem Cells" (Menlo Atherton HS)

**2<sup>nd</sup>** – Dhruva Biswas, "Stem Cells: A Frontier in Regenerative Medicine" (Mira Loma HS)

**3<sup>rd</sup>** - Insu Jung & Revekka Kostoeva, "Stem Cells: The Controversial Cure" (Sheldon HS)

**Honorable Mention** – Milton Phan & Jennifer Nguyen, "A Growing Future: Regenerative-Medicine Stem Cells" (Sheldon HS)

**Honorable Mention** - Rachele Relador & Erica Wei, "Regenerative Medicine: Stem Cells" (Inderkum HS)

**Honorable Mention** – Satyaprit Das, "Stem Cells: Medicine's Next Frontier" (Mira Loma)

**Honorable Mention** - Ganimat Sanghera, "Synthetic Organs" (Sheldon HS)

**Honorable Mention** - Justine Sun, Eleanor Murguia & Supriya Sanjay, "Induced Pluripotent Stem Cells" (Crystal Springs Uplands HS)



## CIRM Research Scholar Awards

TBC Winners meeting minimum eligibility requirements for the UCDMC 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).

- Alfonso Barraza, Sheldon HS
- Dhruva Biswas, Mira Loma HS
- Hanna Dokter, Sheldon HS
- Ryan Fong, Sheldon HS
- Jacqueline Liu, Davis HS
- Anna McDermott, Menlo-Atherton HS
- Nancy Tran, Sheldon HS
- Maya Varma, Presentation HS
- Yimin Yang, Davis HS
- Siruo Sarah Zhang, Davis 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 to be held on August 12, 2013 in San Francisco.

## Education & Average Salary Ranges for Biotechnology Careers

