

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



ROGER NIELLO

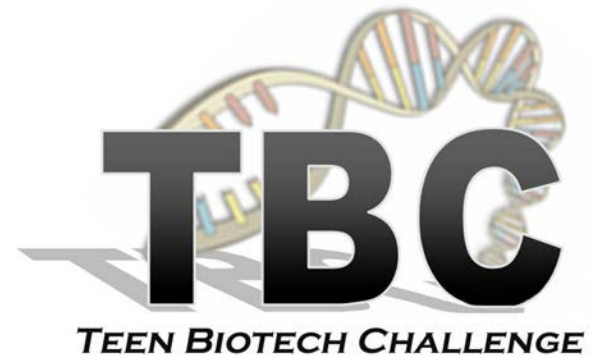
GARY SIMON



Dan Koellen



# 2012 Teen Biotech Challenge Awards Banquet



*University of California, Davis  
Activities & Rec Center (ARC)*

*June 1, 2012*

*5:30 – 9:30 pm*

# 2012 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

Dr. Denneal Jamison-McClung, Director; BioTech SYSTEM

**Keynote Speaker:** James Hildreth, PhD, MD

UC Davis Dean, College of Biological Sciences

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

## **Agricultural Biotechnology Winners**

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

## **Drug Discovery & Biomanufacturing Winners**

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

## **Environmental Biotechnology Winners**

**Presenter:** Dr. Feng Xu; Sr. Research Manager, Novozymes, Inc., Davis, CA

## **Genetic Testing & Forensics Winners**

**Presenter:** Jeffery O’Neal; Statewide Initiative Director, CA Applied Biotechnology Centers Initiative

## **Genomics & Synthetic Biology Winners**

**Presenter:** Christopher Beaven, Chevron Corp., San Ramon, CA

## **Nanobiotechnology Winners**

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

## **Regenerative Medicine Winners**

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

## **CIRM Research Scholar Awards**

**Presenter:** Gerhard Bauer, UCDCM Institute for Regenerative Cures

## **Bio-Rad Biotechnology Explorer Awards for Teachers**

**Presenter:** Dr. Ingrid Hermanson-Miller, Bio-Rad, Hercules, CA

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

**Presenter:** Dr. Denneal Jamison-McClung; Director; BioTech SYSTEM

# STEM CAREERS (Cont.)

The majority of biotechnology jobs require a **Bachelors of Science (BS) college degree**. To find out more about biotech-related BS degrees, please visit booths **H** and **I** this evening.

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 an **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 booth **A** and **D** for more information on biotech AS degrees. At the AS and BS degree levels, more training or experience generally correlates to a higher expected income. 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 2012

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 2012, over 480 Northern California students participated in building a TBC website. Of those forwarded after a preliminary round of school site judging, 61 webpages from 10 high schools were entered into the final judging round. TBC judges reviewed a strong pool of candidate websites in each of seven focus areas and picked the “cream of the crop”.

## Biotech Community Sponsors Make TBC Possible

We would like to offer warm thanks to our event partners, Genentech, SARTA and Chevron, and additional community sponsors for making the Teen Biotech Challenge possible. TBC is financed solely via the generous support of industry and academic organizations (see the back page of the booklet for a complete list).

Sponsors have demonstrated their commitment to educating and training your students in biotechnology—these forward-looking organizations recognize that your students are the future workforce and, without them, we will not achieve new technological milestones and maintain a competitive edge in the global marketplace.

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.*

## ACKNOWLEDGMENTS & THANKS

### Event Sponsors: \$3,000 minimum

Biotechnology Program at UC Davis, Chevron Corp., Genentech, Inc., and SARTA

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

Bio-Rad Laboratories, North Valley Biotechnology Center at American River College, and Novozymes, Inc.

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

Ernst & Young LLP, HDR Architecture, Inc., Roger Niello, Gary Simon, and Powerhouse Science Center

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

DCA Partners, ioSafe, Dan Koellen, Velocity Venture Capital, and WorldBridge Partners

## TEACHERS

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  
Ann Moriarty - Davis Senior High School  
Tim Peevyhouse – Davis Senior High School  
Wayne Raymond – Davis Senior High School  
Louis Dias - El Camino High School  
Sara Turner – El Camino High School  
John Fuller – Folsom High School  
Kristofer Orre – Gilroy High School  
Vlastimil Krbecek - Hiram W. Johnson High School  
Lisa Voss – Horizon Charter School  
Lori Steward – Linden High School  
Matthew Schneider – Partnership for Student Centered Learning  
Jason Brennan - Sheldon High School  
Laura Ziegenhirt – Sheldon High School  
Lilibeth Pinpin - Vallejo High School

## BOOTHS (Continued)

**(Booth J) 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.

**PBGE will be giving away the following cd's at tonight's event!!!**

***DNA Fingerprinting Lab*** – solve a forensic murder mystery using the tools of molecular biology.

***Virtual Plant Biotechnology*** - isolate a gene of interest, transform a virtual plant, and explore the issues surrounding transgenic crops.

PBGE will also have our latest software available for play. In ***STEMware: Zombie Plague***, players are immersed in a virtual world and must discover the microorganism causing a deadly zombie outbreak. Implement a cure, save the town, and learn about important concepts and careers in modern biology.

<http://pbge.ucdavis.edu>

**(Booth K) The UC Davis School of Medicine** is among the nation's leading medical schools, recognized for its research and primary-care programs. The school offers fully accredited master's degree programs in public health and in informatics, and its combined M.D.-Ph.D. program is training the next generation of physician-scientists to conduct high-impact research and translate discoveries into better clinical care. Along with being a recognized leader in medical research, the school is committed to serving underserved communities and advancing rural health. For more information, visit UC Davis School of Medicine at [www.ucdmc.ucdavis.edu/medschool/](http://www.ucdmc.ucdavis.edu/medschool/).

**(Booth L) 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>.



## BOOTHS (Continued)

**(Booth F) SARTA** is accelerating the growth and development of the technology sector in the Sacramento region. We are the nexus that links technology leaders, entrepreneurs, investors, service providers, community organizations, and educational institutions. We are a not-for-profit 501(c)3 corporation founded in 2001, and focused on a nine-county region of Butte, El Dorado, Nevada, Placer, Sacramento, Solano, Sutter, Yolo and Yuba counties. SARTA's mission is to accelerate the growth and development of technology companies and the technology sector in the Sacramento region.

**(Booth G) 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](http://www.swesfs.org)

**Booth H) The UC Davis Biotechnology Major for Undergraduates** is 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 I) 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.

## TBC 2012 WINNERS

### Focus Area 1: Agricultural Biotechnology

- 1<sup>st</sup>** - Manraj Gill and Anna Gong "Genetically Modified (GM) Crops: Drought Resistant and WUE" (Davis HS)  
**2<sup>nd</sup>** - Sam Feineh, Jenner Andersen, and Michael Diefenbach "Crops: Resistance is Key" (El Camino HS)  
**3<sup>rd</sup>** - Stephanie Leyva and Austin Cruz "Herbicide Tolerant (HT) Crops" (California Academy of Mathematics and Science - CAMS)  
**Honorable Mention** – Theresa Loewen, Rachel McKim, and KT Davi "Flood Tolerant Crops" (El Camino HS)  
**Honorable Mention** -Adrian Chao, "Agricultural Biotechnology" (Hiram Johnson HS)  
**Honorable Mention** - Theresa Tran, Ashley Kim, "Genetically Modified or Enhanced Animals, Crops & Bacteria" (Sheldon HS)

### Focus Area 2: Drug Discovery & Biomanufacturing

- 1<sup>st</sup>** - Laura Kay "Monoclonal Antibodies" (Sheldon HS)  
**2<sup>nd</sup>** - Don-Wook Shin and Ted Xiao "Cell Surface Markers" (Davis HS)  
**3<sup>rd</sup> (Tie)** - Namra Tanveer "Industrial Enzymes" (Sheldon HS)  
**3<sup>rd</sup> (Tie)** - Fatuma-Ayaan Rinderknecht and Mikaela Zufelt "Transgenic Animals: Models for Disease" (Davis HS)  
**Honorable Mention** - Carolina Chernyetsky, Samantha Rundle, and Morgan Yanni "Animals Diseased for Human Needs" (El Camino HS)

### Focus Area 3: Environmental Biotechnology

- 1<sup>st</sup>** - Noah Tseng "Biofuels: Energy for Tomorrow" (Sheldon HS)  
**2<sup>nd</sup>** - Jasmeet Singh "Biofuels: Taking A Step Into the New Generation of Energy" (Sheldon HS)  
**3<sup>rd</sup>** - Adam Sumait and Terrissa Jing Shang "Biofuels & Biochemicals" (California Academy of Mathematics and Science -CAMS)  
**Honorable Mention** - Krstine Harbin, Paola Garcia, and Kirstyn Champion "Biodiesel" (Linden HS)



## TBC 2012 WINNERS (Continued)

### Focus Area 4: Genetic Testing & Forensics

**1<sup>st</sup>** - Mariam Bader, "Genetic Mutations & Gene Therapy" (Davis HS)

**2<sup>nd</sup>** - Madeleine Davis, Moniqueka Lee, Pratistha Bajracharya, "Solving Crimes with DNA" (Davis HS)

**3<sup>rd</sup>** - Hope Weseloh, Emily LaMattina, River Nicholas, "Human Paternity & Relationship Testing" (El Camino HS)

**Honorable Mention** - Dominic Domingo, Hillary Phan, "The Investigation" (Sheldon HS)

**Honorable Mention** - Jasmine Piquit, Tammy Nguyen, Jessica Cantora Perriatt, "Human Paternity" (Vallejo HS)

### Focus Area 5: Genomics & Synthetic Biology

**1<sup>st</sup> (Tie)** - Rana Eser "Decoding Life's Manual" (Davis HS)

**1<sup>st</sup> (Tie)** - Kevin Yang "Decoding DNA: Translating the Blueprint of Life" (Folsom HS)

**2<sup>nd</sup> (Tie)**- Zoe Bonfield and Baylee Baugh-Lepper "Personal Genomics 101" (El Camino HS)

**2<sup>nd</sup> (Tie)**- Julia Hills and Alex Little "Designer Babies" (Davis HS)

**3<sup>rd</sup>** - Heather Tucker, Miya Walker and Patty Villalba "Cloning Revealed: Unlocking the Secrets Behind Our DNA" (Antelope HS)

### Focus Area 6: Nanobiotechnology

**1<sup>st</sup>** - Tavneet Gill and Elaine Lee "Capturing the Molecules of Life: Molecular & Medical Imaging" (Antelope HS)

**2<sup>nd</sup>** - Jessica Johnston "Nanotechnology: Future of Medicine & Technology" (Sheldon HS)

**3<sup>rd</sup>** - Diana Huynh "Freezing Through Time: The Science of Cryobiology" (Sheldon HS)

**Honorable Mention** - Thasos Athanasiou Athens and Pavle Jeremic "Biotelemetry and Remote Drug Delivery" (Davis HS)

**Honorable Mention** - Gerome Cadenas, Michael Fulgencio and David Castellanos, "Cryobiology" (Vallejo HS)

## BOOTHS (Continued)

**(Booth C)** The **BayBio Institute** houses the entrepreneurship, science education and career awareness programs of BayBio, Northern California's biotechnology trade association. The Institute's mission is to maintain Northern California's leadership in life science innovation through support of entrepreneurship, science education and life science career development. By maintaining a focus on these three program pillars, we support the foundations of innovation that have made Northern California the most prominent life science cluster in the world. As a non-profit 501(c)(3), our objectives are met through collaborations, partnerships and the generosity of individuals and foundations. Visit us on-line at [www.baybioinstitute.org](http://www.baybioinstitute.org). View Bio-Community and the Bay Area BioGENEius Challenge science education programs at [www.baybioinstitute.org/science-education](http://www.baybioinstitute.org/science-education). For more information contact Sheryl P. Denker, PhD, Sr. Program Advisor ([sheryl@baybio.org](mailto:sheryl@baybio.org)).

**(Booth D)** The **Solano Community College** outreach booth will include an opportunity for students to talk to Professor Jim DeKloe regarding the Industrial Biotechnology Program. Featured elements of the booth include a photo display of the biotechnology lab and students working on projects. Biotechnology brochures outline the unique features of our Biotechnology Program. A comprehensive SCC packet will offer students information about the College as well as the clubs and organizations - such as MESA - which help to enrich our diverse learning community.

**(Booth E)** **Bio-Rad's Biotechnology Explorer Program - Quality you can count on.** At Bio-Rad our mission is to transform science education with engaging and pertinent lab activities that inspire today's students. Biotechnology brings real world relevance to biology, chemistry, physics, and computer science. **From basics to best practices**, Bio-Rad's inquiry-based kits and research-quality equipment connect students to the astounding explorations, applications, and issues percolating in biotechnology research laboratories around the world today. Bio-Rad's objective is to help support and vitalize life science education by providing educators with the resources they need to keep up in the science learning race. We believe this goal is best met by enabling teachers and students to experience scientific discovery first-hand. For more information go to [explorer.bio-rad.com](http://explorer.bio-rad.com)

## 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 Center works with businesses, colleges, K-12 schools, and government agencies to promote biotechnology workforce and economic development. 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. When students complete the course work, they have a solid grounding in theory and hands-on laboratory skills for transfer to upper division programs or entry into the biotechnology workforce.

**(Booth B)** The Bay Area Biotechnology Education Consortium (BABEC) is a regional network of local science education organizations based in the Northern California Bay Area. BABEC is dedicated to increasing student understanding of key concepts in molecular biology and raising student awareness of applications and careers in biotechnology. In the process, BABEC is enabling systemic reform in an important area of science education by helping teachers bring relevant, thought-provoking, hands-on activities into the classroom.

**“BABEC's mission is to work together through biotechnology to inspire, educate, and prepare students and teachers for the future.”**

BABEC was incorporated in 1996 to more fully address the need for biotechnology resources in local schools. To accomplish our mission, BABEC and its partnerships work with teachers, educators, scientists, industry and academia to develop, disseminate, implement, and sustain contemporary laboratory-based biotechnology curricula that increases professional skills of the classroom teacher, capture the interest and challenge the capabilities of our students.



## TBC 2012 WINNERS (Continued)

### Focus Area 7: Regenerative Medicine

**1<sup>st</sup>** - Jaskaran Singh Dhillon “Stem Cells - A Revolution in Medicine” (Sheldon HS)

**2<sup>nd</sup>** - Chloe Rogers, Will Allen, and Katie Yamanishi “Stem Cells: Improving Regenerative Medicine” (El Camino HS)

**3<sup>rd</sup> (TIE)**- Farsheed Fani “Regenerative Medicine: Stem Cell Therapy” (Davis HS)

**3<sup>rd</sup> (TIE)**- Kevin Tang and Brian Tran “Embryonic Stem Cell Research: Changing the Future of Tomorrow” (Sheldon HS)

**Honorable Mention** – Ines Guinard and Aristos Athens “Articular Cartilage’s Struggle with Regeneration” (Davis HS)

**Honorable Mention** – Fey Saechao and Juan Perez “Human Embryonic Stem Cell Research” (Hiram Johnson HS)

## CIRM Research Scholar Awards

Based on TBC Webpage excellence (first or second place) and meeting minimum requirements for UC Davis Medical Center Volunteer Services, 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).

- Mariam Bader, Davis HS
- Rana Eser, Davis HS
- Manraj Gill, Davis HS
- Tavneet Gill, Antelope HS
- Anna Gong, Davis HS
- Jessica Johnston, Sheldon HS
- Laura Kay, Sheldon HS
- Elaine Lee, Antelope HS
- Noah Tseng, Sheldon HS
- Kevin Yang, Folsom 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 to members of CIRM at a research symposium held in August 2012.

## 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

