

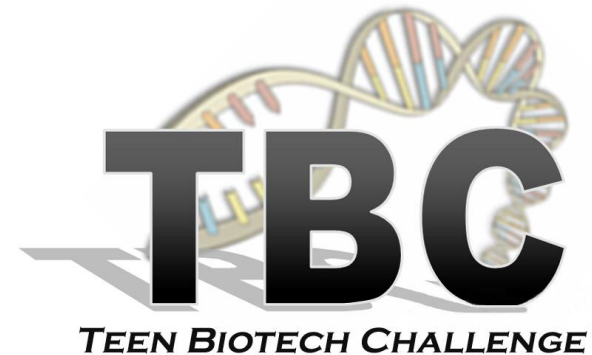
SINCERE APPRECIATION TO THE 2017  
SPONSORS OF THE TEEN BIOTECH CHALLENGE!



Bayer CropScience



# ***2017 Teen Biotech Challenge Awards Reception***



***University of California, Davis  
Conference Center  
May 25, 2017  
5:30 – 8:30 pm***

## 2017 Teen Biotech Challenge Awards Reception Program

Registration, Networking & Pizza Dinner: 5:30 - 6:30pm

Welcome & Keynotes: 6:30 – 7:00pm

TBC Awards & First Place Winner Presentations: 7:00 – 8:25pm

TBC Awards: 7:00 – 8:25pm

### SPARK Research Scholar Awards

**Presenter:** Prof. Gerhard Bauer, UCD Institute for Regenerative Cures

### Regenerative Medicine

**Presenter:** Prof. Gerhard Bauer, UCD Institute for Regenerative Cures

### Personal Genomics & Human Health

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

### Drug Discovery & Biomanufacturing

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

### Agricultural Biotechnology

**Presenter:** Caitlin Rippner, MS, Bayer CropScience, West Sacramento, CA

### Environmental Biotechnology

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

### Computational & Systems Biology

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

### Nanobiotechnology

**Presenter:** Dr. Jamison-McClung, UC Davis Biotechnology Program

### Teacher Appreciation & Grand Prize Winner

**Presenter:** Dr. Jamison-McClung, UC Davis Biotechnology Program

Closing Remarks: 8:25 – 8:30pm

Photos & Congratulations (optional): 8:30-8:45pm

## Which items in the supermarket contain GMOs?

There are only 10 GMO foods currently on the market (or coming soon\* to a grocery store aisle near you). You may see other items labeled “non-GMO”, which is a common marketing ploy:

*Soybeans/Soybean oil (herbicide tolerant)*

*Field corn and Sweet Corn (Bt – insect resistant)*

*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)*

*Arctic Apples\* (PPO gene for browning when sliced “turned off”)*

*Innate Potatoes\* (less browning/bruising and lower acrylamide formation when fried – PPO gene “turned off”)*

*AquAdvantage Salmon\* (have a gene from another type of salmon that helps the fish reach adult size more quickly, using less food/energy = sustainable aquaculture)*

Two additional 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. The first biotech crop, the Flavr’Savr tomato, was invented right here in Davis, CA, at the Monsanto Calgene Campus in the early 1990’s. 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.

**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).



## Myth-Busting Agriculture!

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

**Myth:** *Organic farming is pesticide-free.*

**Facts:** *Like all farmers, those using organic systems must use pesticides to overcome pests. Organic farmers choose both natural and synthetic pesticides from a USDA approved list.*

**Myth:** *GE crops are untested, unregulated and/or pose additional risks to health and the environment, compared to conventional crops.*

**Facts:** *GE crops 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 and are safe for humans and animals.*

**\*\*An independent report on GE crops was released by the US National Academies of Sciences, Engineering and Medicine on May 17, 2016, after a two year study group with a panel of 20 expert reviewers analyzing ~900 research studies. The report reaffirms food and feed safety, as well as environmental safety.\*\* #GECropStudy**  
<http://nas-sites.org/ge-crops/2016/04/27/report-release/>

For additional science-based answers to general questions on genetic engineering for crop and animal improvement, see:

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

For info on humanitarian ag projects for the developing world, see:

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

## WELCOME TO TBC2017!

Thank you for joining us at the Teen Biotech Challenge Symposium and Awards Reception as we honor the academic excellence and dedication of your winning students. In 2017, **254 Northern California students** from 13 high schools registered to build 146 TBC websites. After a preliminary round of school site judging, 56 websites by 86 students at 13 high schools were entered in the final judging round, so your students faced tough competition and all should be proud of their efforts. We appreciate the support that teachers, parents and family members have shown to these exceptional young people and hope that we share a wonderful evening together, learning a little about biotechnology along the way.

### The Biotech Community Makes TBC Possible

We would like to offer warm thanks to our 2017 Industry Sponsors, Bayer CropScience and Novozymes, as well as acknowledging Genentech and Monsanto for on-going support and encouragement. Together with the UC Davis Biotechnology Program's PhD students, staff and faculty, we make the Teen Biotech Challenge possible through fundraising activity and volunteer service. 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  
Program Coordinator, UC Davis ADVANCE

*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.)

**TBC2017 is 100% sponsor supported, including student prizes and the awards event. TBC2017 has been made possible by the following generous sponsors:**

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

- UC Davis Biotechnology Program

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

- Bayer CropScience
- Novozymes, Inc.

We appreciate all TBC Sponsors' steadfast support of science education over the past ten years. Special thanks to Novozymes and Bayer CropScience for funding TBC2017.

We would also like to acknowledge Bio-Rad, Chevron, Genentech (Event Partner 2011-2014), HDR Architecture, Monsanto, Rotary Club of Sacramento and SARTA for significant past support.

For a list of recent contributors, please see our website:  
<http://teenbiotechchallenge.ucdavis.edu/Sponsors.html>

**Thank you TBC Sponsors!!!**

The majority of biotechnology jobs require a **Bachelor of Science (BS) college degree**. In addition to positions requiring a BS degree, there are a significant number of entry-level life science technician jobs in California with a minimum requirement of the **Associate 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 - Biotech Careers & Training** page at:

[http://biotechsystem.ucdavis.edu/biotech\\_training.html](http://biotechsystem.ucdavis.edu/biotech_training.html)



## 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 region's prosperity. **Northern California is the birthplace of biotechnology, also called the life sciences**, 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](http://www.labormarketinfo.edd.ca.gov/Biotechnology_in_California.html#OccData)

## TBC 2017 WINNERS

### Focus Area 1: Agricultural Biotechnology

**1<sup>st</sup>** – Ayushi Mittal & Sanika Walimbe, “Livestock Cloning: The Future of Agriculture” (Vista del Lago HS)

**2<sup>nd</sup>** – Charles Almeida, Saige Miranda, & Abigail Price, “Agronomic Crop Traits” (El Camino HS)

**3<sup>rd</sup> TIE** – Greg Hunt & Charles Hill, “Genetically Enhanced Animals” (El Camino HS)

**3<sup>rd</sup> TIE** – Larisa Deli & Harmeet Ojla, “‘Fast’ Food” (Antelope HS)

**Honorable Mention** – Ayush Malik and Armandeep Singh, “Perfecting the Production of Produce: Changing Crops to Change the World” (Davis Senior HS)



### Focus Area 2: Computational & Systems Biology

**1<sup>st</sup>** – Jenny Chen, “The Human Microbiome: The Trillions of You” (Sheldon HS)

**2<sup>nd</sup>** – Tracy Ly, “De-Extinction: The Resurrection of Species” (Sheldon HS)

**3<sup>rd</sup>** – Jeffrey Keller & Mengxuan Zhang, “Improving Human Health Through Protein Computation” (Davis Senior HS)

## TBC 2017 WINNERS (Continued)

### Focus Area 3: Drug Discovery & Biomanufacturing

**1<sup>st</sup>**– Monserath Mendoza, “HIV in Biotechnology” (Sheldon HS)

**2<sup>nd</sup> TIE** – Giselle Toscano, “Battle Against Cancer: Moderation of Cancer Treatments” (Sheldon HS)

**2<sup>nd</sup> TIE**– Saja Zidan, “Monoclonal Antibodies: An Answer to the Mystery Behind Autoimmune Diseases” (Natomas Pacific Pathways Prep HS)

**3<sup>rd</sup>** – Chathuri Gunasekera & Jenny Petkov, “Vaccines: Taking a Shot at Saving Lives” (Davis Senior HS)

**Honorable Mention** –Devayani Varma, “HIV & AIDS Drug Discovery” (Davis Senior HS)



*Dr. Feng Xu (Novozymes) & Dr. Jamison-McClung with TBC2016 Winners in Environmental Biotechnology.*

## 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. What are the biggest challenges for most global communities today? In 2015, the United Nations set 17 Sustainable Development Goals (SDGs) to improve the everyday lives of millions of people in developing countries, including:

- Zero Hunger (#2)
- Good Health & Well-Being (#3)
- Clean Water & Sanitation (#6)
- Affordable & Clean Energy (#7)
- Industry, Innovation & Infrastructure (#9)
- Sustainable Cities & Communities (#11)
- Responsible Consumption & Production (#12)
- Climate Action (#13)
- Life Below Water (#14)
- Life on Land (#15)

Biotechnology has a key role to play in meeting many of the UN Sustainable 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 SDG'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.

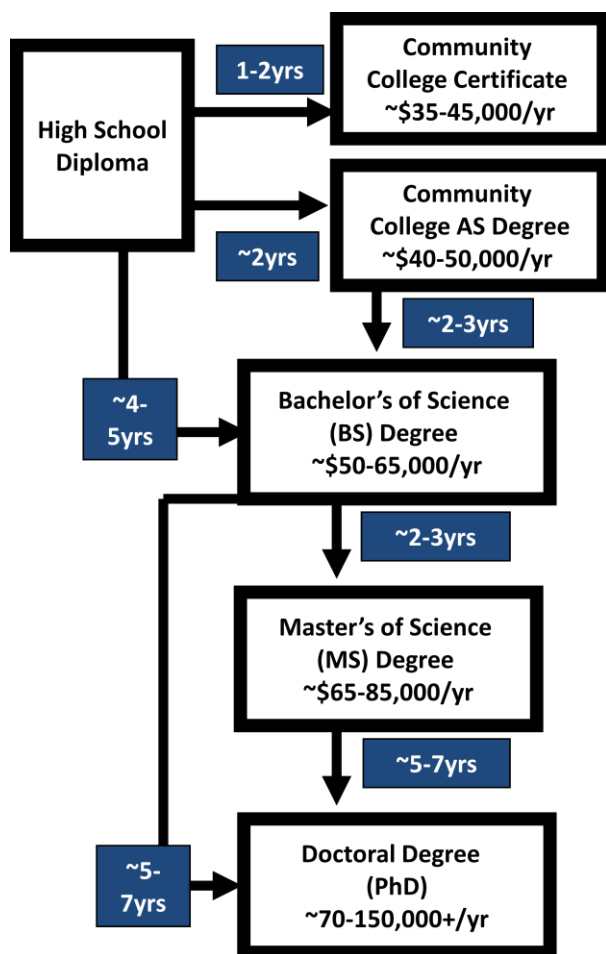
We hope that the Teen Biotech Challenge has opened your eyes to some of the amazing advances we are making through science and engineering!

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



## Academic Paths & Salary Ranges for Biotechnology Careers

STEM career paths in biotechnology are a great option for California students. The diagram below gives a rough outline of STEM educational pathways and approximate earnings at the different levels of expertise. Many of the students we are honoring tonight are fortunate to belong to a high school biotechnology program or multi-year academy, accelerating their knowledge along this career pathway.



## TBC 2017 WINNERS (Continued)

### Focus Area 4: Environmental Biotechnology

- 1<sup>st</sup>** – Reinier Bautista, “Bioplastics” (Sheldon HS)  
**2<sup>nd</sup> TIE**– Diana Pham, “Microbial Fuel Cells: An Organic Way of Energy” (Sheldon HS)  
**2<sup>nd</sup> TIE** – Natalie Mifflin, “Reclaim the Earth” (Buckingham Charter HS)  
**3<sup>rd</sup>** – Amy Tran, “The Power of Bioplastics” (Sheldon HS)  
**Honorable Mention** – Ayjena Calhoun, Fatima Campanero & Fatima Mejia, “Water Desalination” (Vallejo HS)  
**Honorable Mention** – Ismaeel Jaleel, Monalisa Laxa & Priscilla Toe, “Biodiesel – Earth’s Saviour” (Vallejo HS)



### Focus Area 5: Nanobiotechnology

- 1<sup>st</sup>** – Emily Tran, “Nanotechnology: The Small Additions to a Big Future” (Sheldon HS)  
**2<sup>nd</sup> TIE**– Shaniya Singh, “DNA Sequencing: Exploring the Depths of Life” (Sheldon HS)  
**2<sup>nd</sup> TIE** – Priscilla Nguyen, “Biosensors” (Sheldon HS)  
**3<sup>rd</sup>** – Melody Chan, “A Bright Future: Nanomedicine” (Sheldon HS)  
**Honorable Mention** – Lorenzo Galera, Manjot Hansra & James Reyes, “Synthetic DNA” (American Canyon HS)  
**Honorable Mention** – Katie Jordan & Matthew Lillie, “DNA Sequencing” (El Camino HS)

## TBC 2016 WINNERS (Continued)

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

**1<sup>st</sup> TIE** - Jonathan Nguyen, "Impacting Reproduction through Biotechnology" (Sheldon HS)

**1<sup>st</sup> TIE** – Valerie Chu, "Inspecting Inheritance: Genetic Testing and Analysis" (Davis HS)

**2<sup>nd</sup>** – Vivian Nguyen, "Wonders of Gene Editing" (Sheldon HS)

**3<sup>rd</sup> TIE** – Nicole Hoang, "The Human Genome" (Sheldon HS)

**3<sup>rd</sup> TIE** – Rosa Delgadillo & Maryyum Riaz, "Breast Cancer: Tough Times don't last but Tough People do" (Sheldon HS)

**Honorable Mention** – Shevali Kadakia, "Genomics and Chronic Pain Gene Editing: CRISPR-Cas9 (Archbishop Mitty HS)



*Dr. Judy Kjelstrom & Research Scholar Fatima Fierros (2016)*

## 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, taking care to "follow" only reputable sources of scientific information. Some of our winning TBC websites have incorporated a Twitter feed and it is quite a handy tool. 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 governmental bodies (@CIRMnews, @NSF, @CDCgov, @theNASEM), science-based philanthropists (@gatesfoundation, @RockefellerFdn), well known scientific journals (@PLOS, @PNASnews, @NatureNews, @sciencemagazine), popular science magazines and communicators (@neiltyson, @BillNye, @SciAm @NatGeo, @PopSci), and many other recognized experts in science and engineering.

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



-Dr. Jamison-McClung  
@yggdrasil13751



## 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
- Antelope High School – Kristen Williams
- Archbishop Mitty High School – Heidi Negendank
- Buckingham Charter High School- Carrie Rausch
- Davis Sr. High School - Ann Moriarty
- Davis Sr. High School - Scott Richardson
- Davis Sr. High School – Jean-Paul Whittall
- El Camino High School - Louie Dias
- Middle College High School – Aleathea Langone
- Natomas Pacific Pathways Prep H.S. – Daisy Vallesfino
- Sheldon High School - Jason Brennan
- Sheldon High School - Justin Cecil
- Sheldon High School - Bob Fendall
- Sheldon High School - Kelli Kosney
- Sheldon High School - Laura Ziegenhirt
- St. Francis High School – Peter Strawn
- Vallejo High School – Diosa Bande
- Vista Del Lago High School – Suekyung Baker
- Woodland High School – Windy Pappas

## TBC 2017 WINNERS (Continued)

### Focus Area 7: Regenerative Medicine

**1<sup>st</sup>** – Yasmine Mahmoudieh, “Stem Cell Therapy: The Future of Modern Medicine” (St. Francis HS)

**2<sup>nd</sup>** – Alexandra Rogers, “Synthetic Organs” (Buckingham Charter HS)

**3<sup>rd</sup> TIE** – Hayeon Kim, “Artificial Organs – Solving the Organ Transplant Crises” (Sheldon HS)

**3<sup>rd</sup> TIE** – Anh Vo, “Stem Cells: Revolutionizing Medicine” (Woodland HS)

**Honorable Mention** – Rosa Banda & Edna Gomez, “Artificial Limbs” (Vallejo HS)

**Honorable Mention** – Hyo Joon Ahn, Jun Kim & Yifan Wei, “Brain Computer Interface: Controlling Today with the Technology of Tomorrow” (Davis Senior HS)

**Honorable Mention** – Paul Ngo, Yurim Seo & Jana Sun, “Artificial Organs: Transforming Transplants” (Davis Senior HS)

**Honorable Mention** – Lovpreet Hansra, Sierra Smith & Sydney Vanderpool, “Artificial Limbs” (American Canyon HS)

**Honorable Mention** – Aneka Chakraborty, “Biotechnology's Role in the Cure for Neurodegenerative Disease” (Sheldon HS)

**Honorable Mention** – Jule Dao, “Bioprinting: Developing Organs on Demand” (Sheldon HS)

**Honorable Mention** – QuocViet Dam, “Induced Pluripotent Stem Cells” (Sheldon HS)

**Honorable Mention** – Hari Khalsa, Maya Tureez & Joel Varughese, “Stem Cells: The Building Blocks of Life” (Middle College HS)

## SPARK 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 SPARK 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).

- Tracy Ly, Sheldon High School
- Yasmine Mahmoudieh, St. Francis High School
- Monserath Mendoza, Sheldon High School
- Jonathan Nguyen, Sheldon High School
- Shaniya Singh, Sheldon High School
- Giselle Toscano, Sheldon High School
- Maya Tureez, Middle College High School
- Anh Vo, Woodland High School
- Sanika Walimbe, Vista Del Lago High School
- Saja Zidan, Natomas Pacific Pathways Prep High School

This summer research experience has been made possible by a SPARK Award (PI-Gerhard Bauer) from the California Institute for Regenerative Cures (CIRM). SPARK Research Scholars will present their research posters to members of CIRM at the SPARK Conference to be held August 6-7, 2017 in Pasadena, CA.



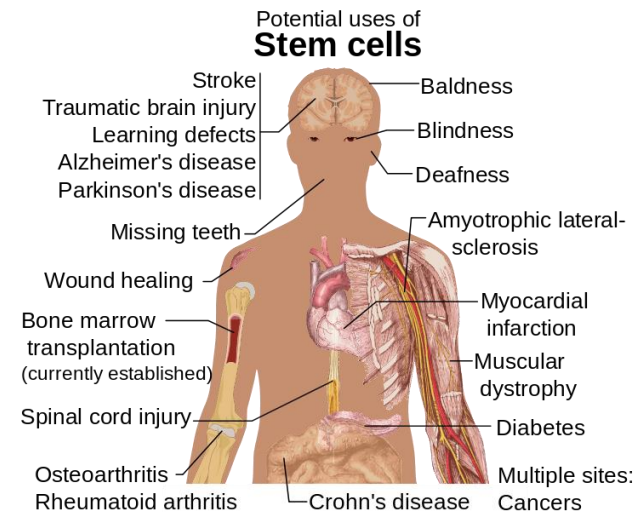
*Dr. Judy Kjelstrom, Dr. Jan Nolte and SPARK PI – Prof. Gerhard Bauer (TBC2012)*

## California Institute for Regenerative Medicine (CIRM)

“California's Stem Cell Agency was created in 2004 when 59% of California voters approved Proposition 71: the California Stem Cell Research and Cures Initiative.” <https://www.cirm.ca.gov/>



The **Summer Program to Accelerate Regenerative Medicine Knowledge (SPARK)** requires student trainees to blog about their experiences and post pictures to Instagram using the hashtag #CIRMSparkLab. Follow the group on Instagram and check out the “SPARK Research Scholars at UC Davis” blog to learn more about the students’ research experiences. <https://cirmsparkucdavis.wordpress.com/>



[https://en.wikipedia.org/wiki/File:Stem\\_cell\\_treatments.svg](https://en.wikipedia.org/wiki/File:Stem_cell_treatments.svg)