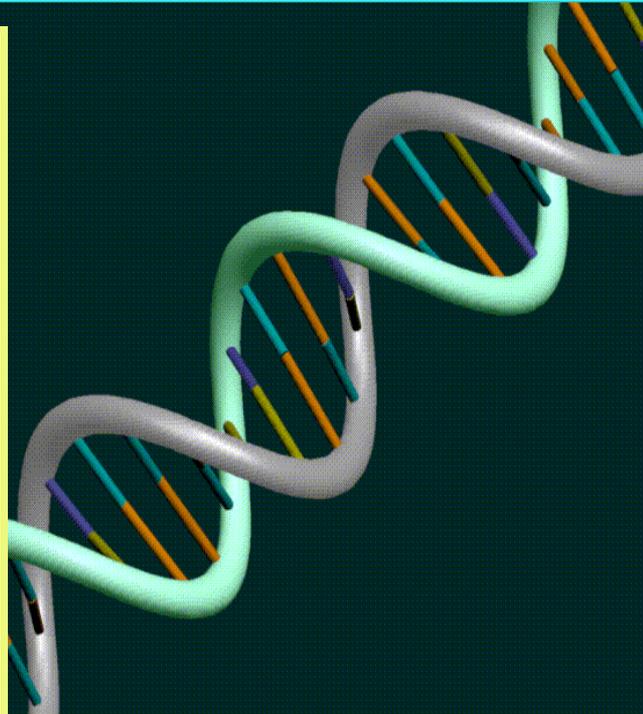


# The 21<sup>st</sup> Century Needs Entrepreneurial Scientists and Engineers



**Dr. Judy Kjelstrom (aka "Dr. Judy")**  
**Director, UC Davis Biotechnology Program**  
**DEB Program Coordinator**  
**April 25, 2013**

# Outline

- What is happening in the field of **Biotechnology**?
- Why do Graduate Education Programs in Science & Engineering need to include **Entrepreneurship, Business** and **Social Science** skills?
- What is **UC Davis** doing to address these needs?
- Why should the public support **STEM education** that includes **invention and innovation**?

# ***“Biotechnology: The Tools to Forge a Better Tomorrow” is our Motto***



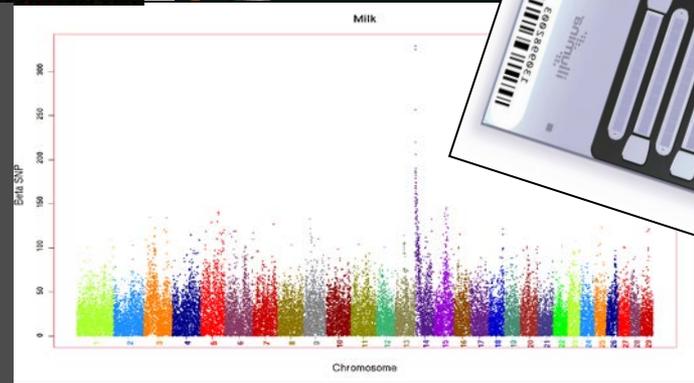
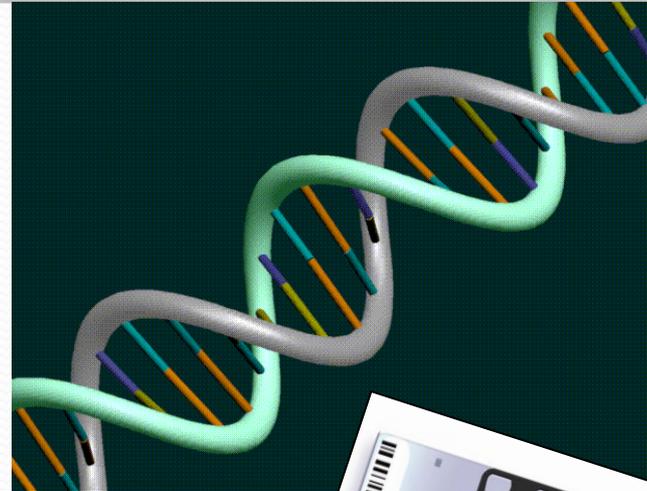
- The **UC Davis Biotechnology Program** is a Special Unit of the Office of Research. **est. 1986**
- Housed within the offices of the **Dean of the College of Biological Sciences**
- Administrative home for the **DEB & ADP** graduate programs, **NSF** and **NIH Biotechnology PhD Training Grants**
- Links Academia to Biotechnology Industries & Government agencies
  - **DEB industry internships**
- Education Source for Students, Teachers, and Community
  - **Summer Technical Short Courses**
  - **“Train the Trainers” workshops for teachers**
  - **BioTECH SYSTEM (K-14 outreach consortium) and (TBC) Teen Biotech Challenge (science competition)**

# Biotechnology is impacting Medicine, Agriculture, Environmental Science and Computer Technology

## The UC Davis Center for Neuroscience



Discovering brain basics



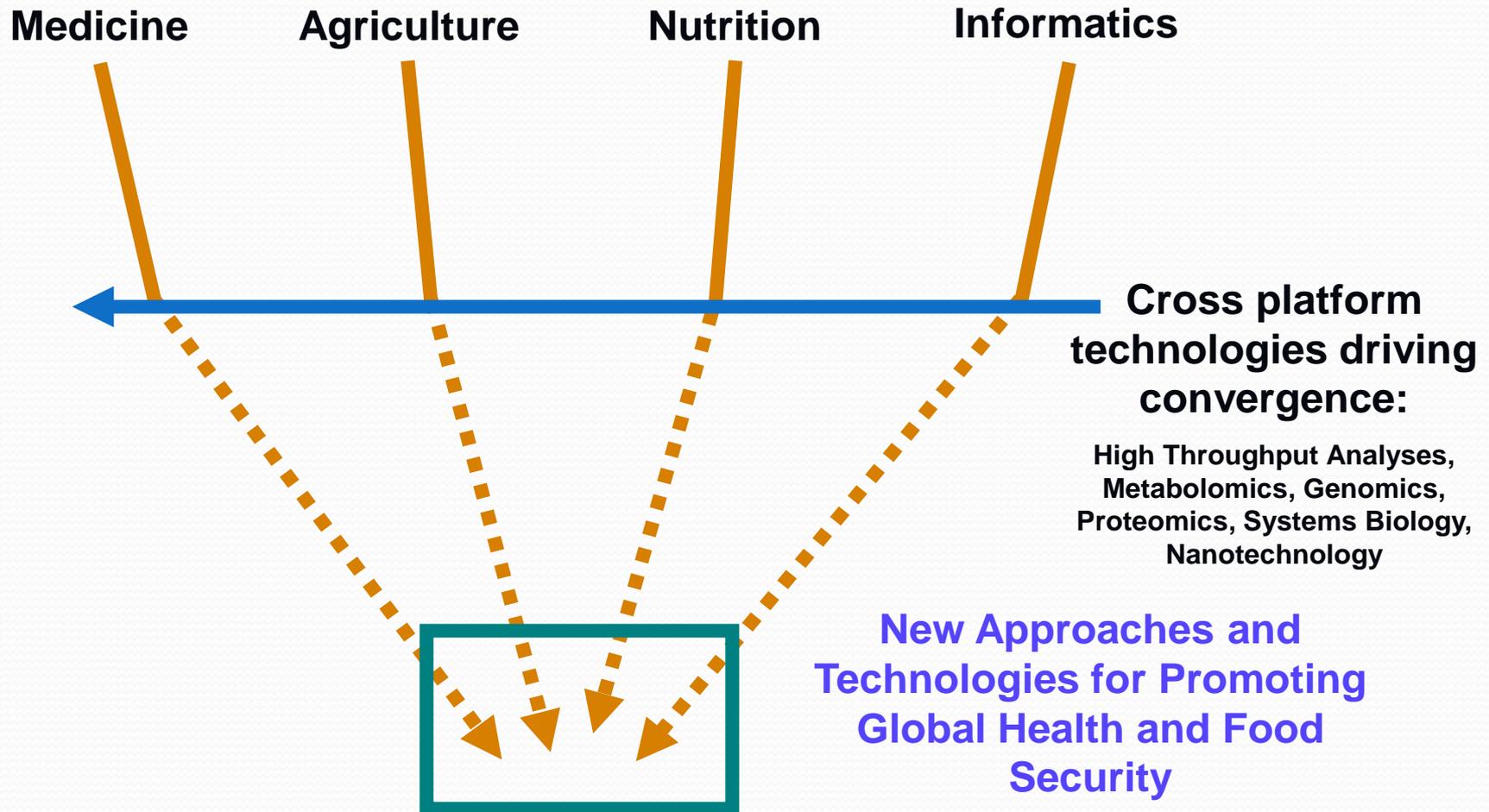
# Biotechnology is Hot



We need Bright Students to Help!

- Genomics - Next Gen Sequencing, Epigenetics and Metagenomics
- Stem Cell Therapies & Tissue Engineering
- Gene Therapy
- Biomarker Detection in Microbial Diagnostics, Cancer therapy, etc.
- Personalized Medicine and Nutrition
- Nanotechnology/Nanotherapeutics
- Immunotherapeutics
- Plant Made Vaccines and Pharmaceuticals
- GM crops – stress tolerant, use for biofuels
- Metabolomics
- Synthetic Biology & Metabolic Engineering in creating new therapeutics and chemicals
- Bioinformatics/Computational Biology

# Convergence in the Life Sciences



# BIOTECH BAY™

(Click on map below to access company's profile.)

<http://www.baybio.org/>

The Bay Area is still the Epicenter for biotech companies.

## Northern California Life Sciences Cluster:

- Birthplace of Biotechnology—Genentech founded in 1976
- 9 Counties, 101 Cities, 7,000 Square Miles of Land
- 1,377 Life Science Companies
- 250,000 Direct and Indirect Employees
- 100,000 Employed in Life Sciences Directly
- \$6B Wages Paid
- 560 Marketed Products
- 463 Products in Phase II and Phase III Clinical Trials
- 95 Publicly Traded Companies
- \$144 Billion Market Cap
- \$2.2 Billion NIH Grants Awarded to Northern California Organizations
- \$860 million invested by Venture Capital firms in Northern California life sciences in 52 Deals



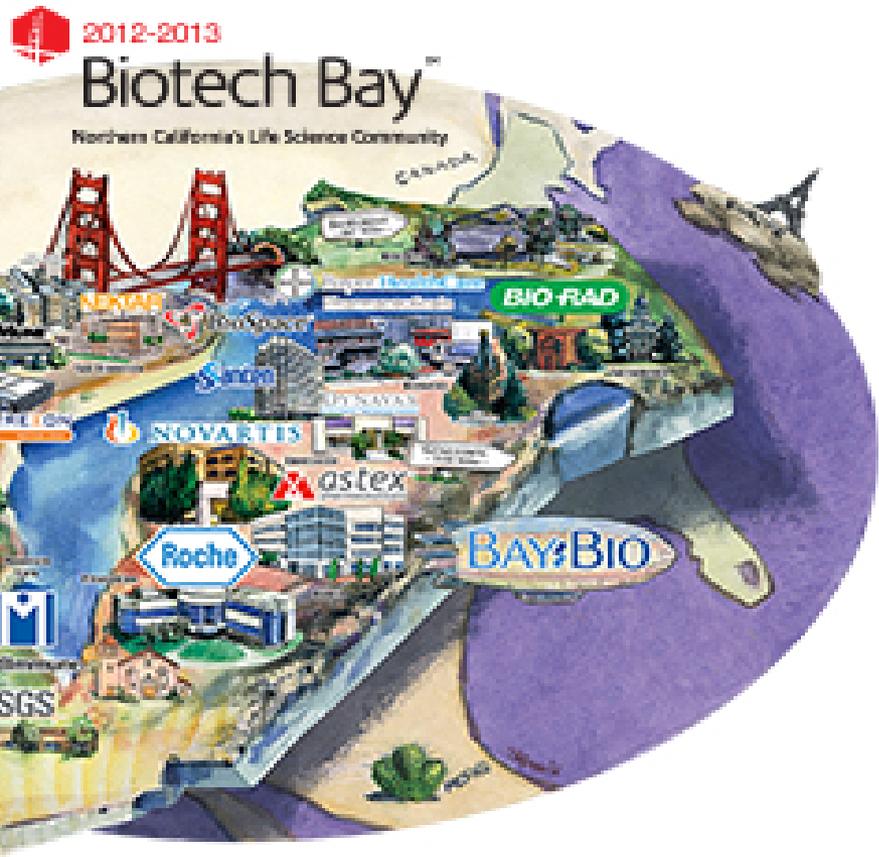
This map is a little outdated...there were some mergers & acquisition as well as some new companies launched

**Biotech and  
Pharmaceutical  
News & Jobs**



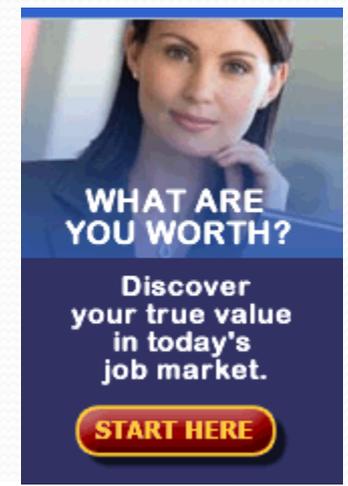
2012-2013 **NORTHERN CALIFORNIA'S**  
**Biotech Bay™ Life Science Community**

on target **BioSpace**



2012-2013 **Biotech Bay™**  
Northern California's Life Science Community

Map labels include: RINAT, GILEAD, NOVARTIS, Roche, BAYBIO, BIO-RAD, and various other biotech facilities.



**WHAT ARE YOU WORTH?**

Discover your true value in today's job market.

**START HERE**



2012-2013 **BioForest™**  
**THE NORTHWEST US AND CANADA'S LIFE SCIENCE COMMUNITY**

on target **BioSpace**

# BioSpace Posting

## 2012 Highest Paying Biotechnology Jobs

11/7/2012

The Bureau of Labor Statistics lists the field of biotechnology as growing at 31 pct, much faster than other fields, with a median salary of \$79,000. There are and will be a wide variety of employment opportunities that range from ongoing research to applications in a number of specific industries. Thanks to the nature of biotechnology, competent individuals can find positions that are vital, personally fulfilling and provide excellent income. Here are ten of the highest paid biotech jobs and their current salary ranges from Salary.com:

1. **Research Fellow**: \$134,000 - 173,000
2. **Biostatistician**: \$149,000 - 161,000
3. **Biotech Business Development Director**: \$123,000 - 154,000
4. **Senior Scientist** - Biotech: \$106,000 - 130,000
5. **Biotech Engineer**: \$97,000 - 123,000
6. **Drug Safety Specialist**: \$ 92,000 - 117,000
7. **Process Engineer**: \$91,000 - 114,000
8. **Clinical Pharmacist**: \$96,000 - 111,000
9. **Regulatory Affairs Specialist**: \$89,000 - 109,000
10. **Biologist** - Specialist and Consultant: \$88,000 - 108,000

[Sign up for the free weekly Career Insider eNewsletter.](#)

## 2012 Highest Paying Biotechnology Jobs

continued

Here's a closer look at three of the most popular positions in the field today.

### **Biotech Research Scientist**

This job focuses mainly on how the introduction of different compounds impact the growth and health of living organisms. The research may focus mainly on chemical products such as cleaning agents, medication or other synthetic materials that are introduced directly or indirectly to the organism. In some cases, the work will focus on the reaction of organisms to certain types of food compounds, including those that have been genetically altered. The ultimate goal is to determine both the benefits and the side effects that are experienced as the result of exposure to the compounds under scrutiny.

The biotechnology job salary for each biotech research scientist will vary, based on level of experience. CNN Money cites the median salary for this type of work as \$90,000 USD, with the potential to make as much as \$136,000 USD.

### **Biotech Medical Research and Development**

As there are various types of biotech and pharma jobs, one should also consider a job in biotech medical research and development. This more specialized field focuses primarily on the research and development of medication for use in treating different types of physical and emotional illnesses. The goal of this work is to develop treatments that help to alleviate human suffering.

Typically, the salary range for this type of work is similar to the earnings of a biotech research scientist. According to the Bureau of Labor Statistics, the 2010 median salary for medical scientists and researchers stood at \$76,700 USD. In addition, the demand for this type of research work is anticipated to increase significantly over the next decade.

### **Industrial Biotech Research and Development**

Biotechnology jobs are also a prominent part of today's manufacturing industry. As industries develop new types of textiles, building materials, plastics and other products, there is the need to assess the impact of those products on consumers and the environment in general. An industrial biotech researcher will focus on what those products do and do not provide in terms of reducing emissions, creating waste products that must be eliminated in some fashion and even how exposure to the finished products could impact the well being of humans and others. The salary range for this type of work will typically follow the same pattern as that of any other type of biological research work, making it possible to earn in the \$100K range each year.

**The actual pay for different [biotech jobs](#) will vary based on the education and experience of the researcher. In addition, some variance in pay will occur between industries and sometimes even within specific companies within those industries. For this reason, job candidates should look closely at all their options before settling for the first biotechnology job they come across.**

# Entrepreneurs Needed

- California, the nation, and the world needs **well trained scientists, engineers, social scientists and business professionals capable of moving ideas to the real world in order to drive the new knowledge-based economy.**
- These individuals **must have technical skills**, but more importantly, they must possess:
  - **Business skills;**
  - **Social and emotional intelligence;**
  - **The ability to work effectively in cross-disciplinary teams;**
  - **A creative entrepreneurial spirit;**
  - **A dense social and investment network to assist in translating new technologies to the marketplace.**
- Training programs that help scientists and engineers hone “**soft skills**” and **appreciate the strengths that entrepreneurs, social scientists, economists, policy and legal experts, communication specialists and other professionals bring to cross-disciplinary training efforts will be key in fostering successful research collaborations.**
- “**Connecting the Dots**” is mandatory for creating new tech businesses

# Burt Wolf's "Connecting the Dots" Part 1 (2011 PBS Special)

- A well known world traveler, Burt Wolf decided to look at a nation's economy. He focused on **Business in the U.S.**
- He spent time with **Steve Chen** (inventor of YouTube), **Daniel Pink** (author of a *Drive* and *A Whole New Mind*), and **Gideon Carter** (founder of a novel Informational Technology company)
- He came to realize that since 1980, **almost every new job created in the U.S. was created by a start-up company that was less than 5 years old.**
- **"The Real Backbone of the U.S. is creative entrepreneurs with great imaginations, smart enthusiastic risk takers, people who started businesses based on their innovative ideas and technology."**

**Good example: CONNECTING THE DOTS: MY LIFE AND INVENTIONS, FROM X-RAYS TO DEATH RAYS** by **ROBERT HOWARD**. WELCOME RAIN PUBLISHERS. ISBN: 1566499577. [WWW.AMAZON.COM](http://WWW.AMAZON.COM)

## Improving Graduate Education to Support a Branching Career Pipeline: Recommendations Based on a Survey of Doctoral Students in the Basic Biomedical Sciences

C. N. Fuhrmann, D. G. Halme,\* P. S. O'Sullivan, and B. Lindstaedt  
University of California, San Francisco, San Francisco, CA 94143-0523  
CBE—Life Sciences Education Vol. 10, 239–249, Fall 2011

- **“Today’s doctoral programs continue to prepare students for a traditional academic career path despite the inadequate supply of research-focused faculty positions.** We advocate for a broader doctoral curriculum that prepares trainees for a wide range of science-related career paths.
- Survey of **doctoral students in the basic biomedical sciences at University of California, San Francisco (UCSF).** Midway through graduate training, UCSF students are already considering a broad range of career options, with **one-third intending to pursue a non-research career path.**
- They recommend that **national standards for training and mentoring include emphasis on career planning and professional skills development to ensure the success of PhD-level scientists as they contribute to a broadly defined global scientific enterprise.”**



# Designated Emphasis in Biotechnology

University of California, Davis

established 1997

ex: "Doctoral Degree in Microbiology with a Designated Emphasis in Biotechnology"

A **unique** inter-graduate program that credits PhD students for training in Biotechnology. Prof. Katie Dehesh is the chair; Dr. Judy Kjelstrom manages the DEB



30 Graduate Programs  
>200 Faculty Trainers  
Over 240 Students

## Mission:

- To coordinate and provide cross-disciplinary training in critical areas of biomolecular research
- Promote interdisciplinary research environments that integrate basic biological science with engineering and computational disciplines
- To provide cross-disciplinary training/trainee experience in a biotechnology company or cross-college laboratory

# The DEB is called the “Jewel of Graduate Programs” at UC Davis

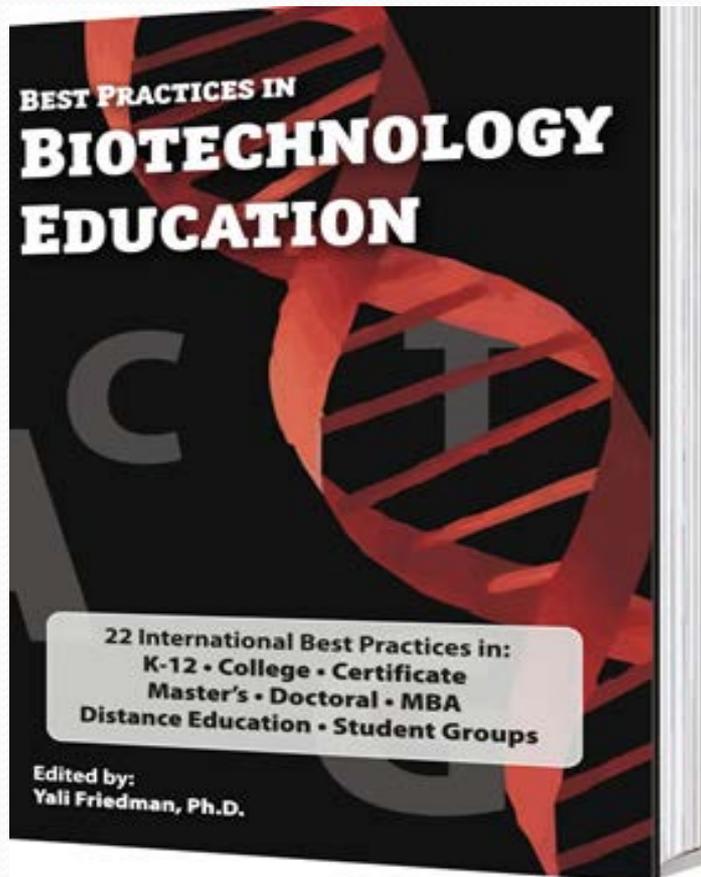
- Our experiences with our DEB graduate program over the last 15 years, show that students also **need guidance in strategic career planning and more experiential learning** through:
  - Industrial internships in both research and non-research departments (regulatory affairs, business development, etc.)
  - Business Plan competitions or Entrepreneurship Academies;
  - Speaking about research to the public and understanding social impact and public policy (example: Portal to the Public Centers at Science Museums, E-mentoring, etc.)

# The DEB Bridges the Skills Gap

- “**Biotech Training Programs Expand Employment Options**” by [Clifford Mintz](#). Science Careers. March 09, 2012. Good article on the need for PhD education reform.....UC Davis’s DEB program was featured in the article. Quotes by Dr. Kjelstrom:  
[http://sciencecareers.sciencemag.org/career\\_magazine/previous\\_issues/articles/2012\\_03\\_09/caredit.a1200029](http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2012_03_09/caredit.a1200029)
- June 12, 2012 – “**Closing The Skills Gap**” (Biotech jobs are going begging because new Ph.D.s lack the industry experience that companies want). Dr. Kjelstrom was interviewed about the DEB by Linda Wang from C&EN (Chemical & Engineering News). Volume 90. Issue 24 . pp. 49-51 <http://cen.acs.org/articles/90/i24/Closing-Skills-Gap.html>
- 2012 – **Judith A. Kjelstrom**, Karen McDonald, Andrew Hargadon, Wilton Agatstein and Meg Arnold. ***The University of California, Davis - Collaborative Model for Biotechnology Education and Training.*** Journal of Commercial Biotechnology. Oct. 2012 <http://commercialbiotechnology.com/index.php/jcb/article/view/521>
  - The University of California, Davis (UC Davis) has created a collaborative model for biotechnology education and training, which enables entrepreneurial researchers to move innovations into the marketplace

# Best Practices in Biotechnology Education

(Dr. Yali Friedman, editor) March 2008



22 International Best Practices in K-12, College, Certificate, Master's, Doctoral, MBA, Distance Education Programs and Student Groups.  
**Contents includes a chapter on:**

**The UCD Biotechnology Program by *Judith A. Kjelstrom and Denneal Jamison-McClung***  
(The DEB graduate program is the only PhD level program described in the book)

*"Best Practices in Biotechnology Education is directed at faculty seeking to start or expand biotechnology education programs; policy-makers and economic developers seeking to help meet workforce needs; and, students, scientists, and business professionals looking to enter the industry or upgrade their existing skills."*

[http://www.logos-press.com/books/biotechnology\\_education.php](http://www.logos-press.com/books/biotechnology_education.php)

# Nature Reviews Showcases.... The UC Davis Biotechnology Program

## Careers and Recruitment

- Nature Reviews Drug Discovery 7, 271 (March 2008)  
|doi:10.1038/nrd2542
- <http://www.nature.com/nrd/journal/v7/n3/full/nrd2542.html>
- **Biotech education**

**Key skills and business knowledge that are important for success in biotechnology are often acquired on the job rather than taught, but programmes that provide formal training in the field are becoming increasingly popular worldwide. This month, we feature two leaders of such programmes.**

- Christopher R. Lowe, Ph.D. Director, Institute of Biotechnology, University of Cambridge, UK.
- **Judith A. Kjelstrom, Ph.D. Director, UC Davis Biotechnology Program, University of California, Davis, California, USA.**

# DEB Program Requirements

- **MCB 263 - Biotechnology Fundamentals and Application** (winter qtr)
  - **Entrepreneurship and Business principles are also stressed**
  - **Team projects with biologists and engineers are required**
- **MCB 294/ECH 294\* - Current Progress in Biotechnology Seminar.** (3 quarters needed). **Speakers come from industry as well as academia.**
  - **\*MIC 292 ( "From Discovery to Product": An Introduction to Industrial Biotechnology – a series of seminars from scientists from Novozymes Biotech in Davis) may be substituted for 1 quarter.**
  - **Opportunity for faculty and students to interact with industry scientist as well as arrange internships and possible fellowships**
- **MCB 282- Internship (usually done after QE)** industrial positions are paid
  - **A minimum of 3 months internship at a biotechnology company, national lab or cross-college: biology ↔ engineering)**
- **GGG 296 (Scientific Professionalism & Integrity) or approved course – bioethics**

Attendance at the annual **Biotechnology Retreat (many industry partners attend) & monthly informal Pizza "Chalk-Talk" Seminars (student and mentor discuss their research)** is also expected.

**Public Service and Participation in Entrepreneurship Activities are encouraged.**

Must complete MCB 263 and Bioethics course before QE

# DEB Program: Internships

Over the last 20 years (even before the formal DEB program was established), we have placed over **250 PhD students** in a variety of biotechnology companies for their 3-6 month industrial research internship experience. They include:

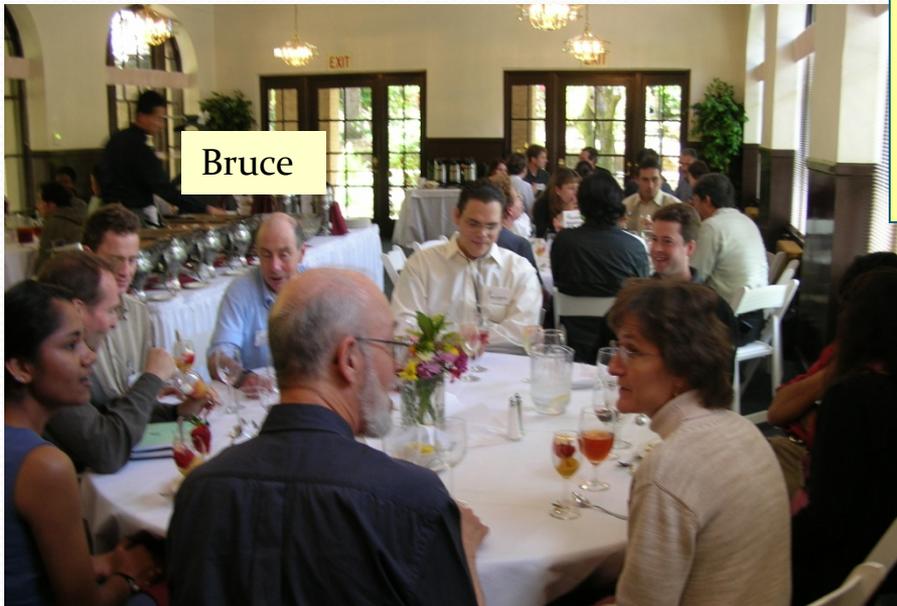
- **AgraQuest**
- **Agilent**
- **Alza**
- **Amgen**
- **Amyris**
- **Bayer**
- **Berlex Biosciences**
- **BioMarin Pharmaceuticals**
- **Celgene**
- **Chiron (now Novartis)**
- **DuPont**
- **Exelixis**
- **Genencor**
- **Genentech**
- **LS9**
- **Marrone Bioinnovations**
- **Maxygen**
- **Monsanto, Calgene Campus**
- **Novartis AG (Vacaville)**
- **Novozymes, Inc**
- **Nunhems**
- **OncoMed**
- **Roche Biosciences**
- **TakedaSF**
- **Ventria Biosciences**
- **and a few others.**

**Most have donated at least \$20,000 per year for a fellowship, have offered an internship site and have presented at the annual Biotechnology Retreat**

# DEB Links to Training Grants

- We have been successful in recruiting outstanding graduate students and faculty trainers by being linked to PhD Graduate Training Grants (**provides financial support**)
- Currently the DEB is the Formal Training Program for:
  - The prestigious NIH Training Program in Biomolecular Technology (started in 1992; **recently renewed for another 5 years: 2012-2017**)
    - Research Project must cross boundaries....biology meets engineering, physical science or computer science....encourage Team Science
  - The NSF CREATE-IGERT Training Program (**renewal in 2012**)
    - Focus on agricultural technologies and engineering
    - Encourage Team Science
- Many of the DEB students are involved in the Howard Hughes Medical Institute-*Med into Grad Initiative: Integrating Medicine into Basic Science* (IMBS) Training Program (**2006-2014**)
  - Focus on bench to bedside
  - Team Science

# Annual Biotechnology Training Retreat at the Christian Brothers Retreat & Conference Center in Napa, California is an Academic-Industry Event



Prof. Bruce Hammock interacting with faculty, industry scientists, UCD staff and students.

Biotech Fellows – must do cross-disciplinary research, linking life science with physical sciences or engineering after their presentations



**Social Interactions are Critical to the Development  
of Interdisciplinary Teams as well as developing  
Professional Networks**

# The DEB Program offers more than Coursework

- Provides **guidance and assistance** in:
  - Locating Internships
  - Career Explorations
    - **A must read:** Career Opportunities in Biotechnology and Drug Development by Dr. Toby Freedman
  - Creation of Oral Presentations
  - Composing a Cover Letter and Curriculum Vitae, **especially for non-academic positions .... We stress CPC: Competence, Passion & Compassion**
- Offers **networking opportunities** for students and faculty with industry & government scientists as well as business leaders
- Acts as a **facilitator** to help resolve other issues that arise during the student's tenure.

# People Skills are Critical to Teams

- To create effective cross-disciplinary teams, students must value the so-called “soft skills”.
- The DEB graduate program stress both academic expertise and “social awareness”
  - Deep, narrow expertise, gained through doctoral research, must be balanced with broad, global perspectives to be an effective leader in the 21<sup>st</sup> century

## Good references:

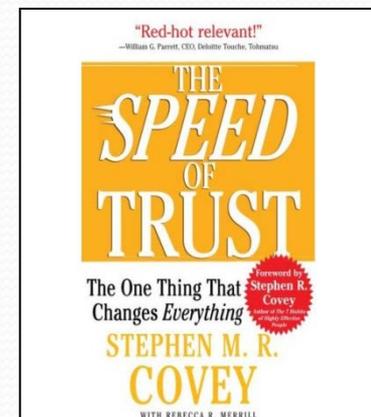
“Working with Emotional Intelligence”(1998) and “Social Intelligence: The New Science of Human Relationships” (2006) by Daniel Goleman

“The Speed of Trust” by Stephen M.R. Covey  
“Trust Trumps Everything”

“ A Whole New Mind” by Daniel Pink

“ Five Dysfunctions of a Team” by Patrick Lencioni

These skills are critical in Translational Research  
and Entrepreneurship



# Team Building at Picnic Day



**Genentech supplied the Colorful Shirts.  
We wear them with UCD Aggie Pride**



**DEB students have FUN WITH SCIENCE  
& CONNECT WITH PEOPLE**



Genentech, Roche, Monsanto, Agilent and Novozymes donate shirts, pens, reagents for experiments, etc. so we have give-aways for our visitors....we get over 1000 visitors per year.

# DEB Public Service Opportunities: BioTech SYSTEM

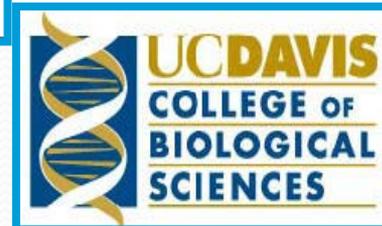
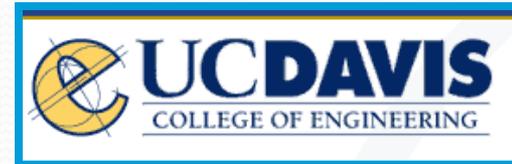
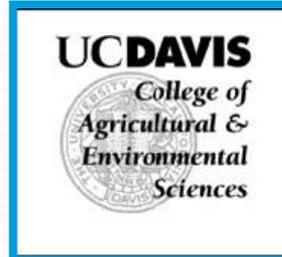
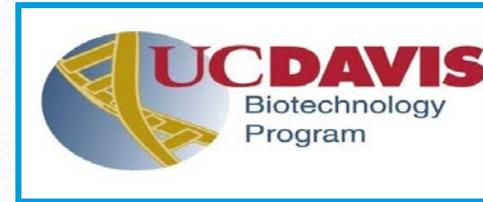
<http://biotechsystem.ucdavis.edu>

- Student Contests
  - **Teen Biotech Challenge** (Grades 9-12)
    - Funded through multiple partners
  - Biotech Expo (Grades 6-8)
- Educational Resources
  - Biotech Careers & Training
  - **E-mentoring**
  - **Biotech Speakers Bureau (BSB)**  
teacher request form
  - Online Educational Resources
  - Podcasts & Videos
- Event Announcements
  - Quarterly Networking Meetings
  - Teacher Professional Development
- UCD Biotech Club for Undergraduates



TBC 2012 winner-Jaskaran Dhillon  
with Dr. Denneal Jamison  
McClung, director of the  
consortium

Sponsors support the TBC & BioTECH SYSTEM to Assist  
Regional High Schools



# New! “Portal to the Public” Project at the PowerHouse Science Center

- **Science Communication Fellows** are scientists, engineers, graduate students, researchers, and other science-based professionals who have been certified by the Powerhouse Science Center as current science ambassadors and excellent communicators.
  - Participate in the Science Communication Short Course
  - Attend our professional development workshop
  - Work individually to develop a hands-on activity related to your current work. Ample concept development and materials support are provided by PSC. (Individual meetings are scheduled as needed.)
  - Prototype your hands-on activity with museum staff before interacting with the public.

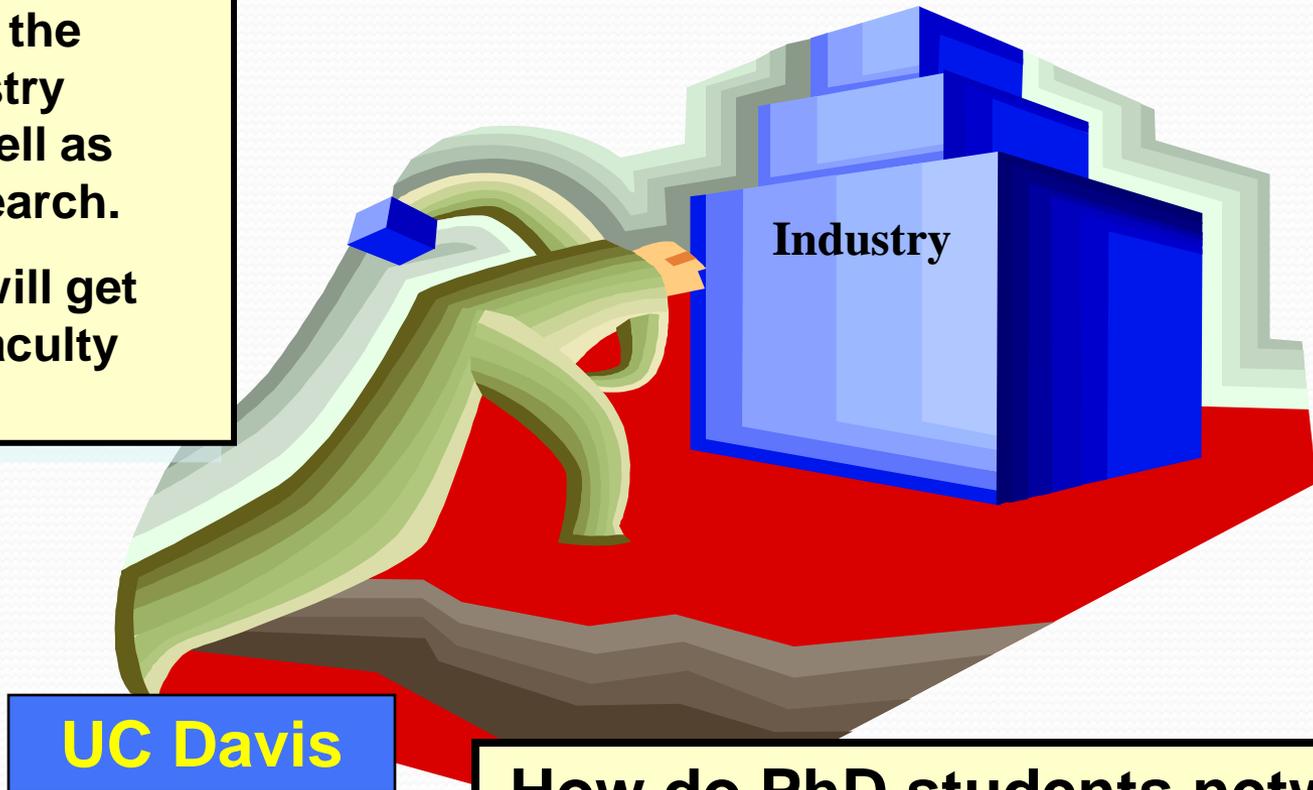


<http://www.powerhousesciencecenter.org>

# Linking UC Davis Research, Education and Training with Industry

A PhD scientist needs to understand the world of industry research as well as academic research.

Only 10-15% will get tenure track faculty positions!



How do PhD students network with industry scientists?

# How do Researchers Communicate with the Business Community?



Every encounter with another human being is an opportunity to Network

- Attend Seminars, Conferences and Mixers. **Take plenty of business cards & CVs, if looking for a job)! Yes, print up business card**
- Enter Business Plan Contests like the **Big Bang to create new companies and showcase your skills**
- Talk about your research to community leaders. **Get the word out! But keep the message simple... “Be user friendly”**
- **Network....make Friends (create Win-Win Partnerships)**

**Good Science is not enough.... You must have great social skills and Be Passionate about Your Work!**

# Networking with Industry is Fun!



**Having Fun at the Biotech Training Retreat in Napa.**

**Many industry scientists were present and interacted with the students**



**UCD Bus Trip to Genentech in South SF in 2007, 2009 and 2012**



**Sitting on the Famous Red Couch with Steve Watkins, President & CEO of Lipomics Technologies**

# Entrepreneurship Opportunities



Many of our DEB students have participated in these entrepreneurial activities and have learned a lot

- The UCD Graduate School of Management (GSM) in collaboration with the Office of Research offers a **one year Certificate Program in Business Development** for graduate students and postdoctoral fellows in science and engineering. **One week bootcamps** are offered.
- This program provides an introduction and **hands-on experience in developing new business ventures designed to commercialize research.**
- The **Program** offered through the Child Family **Institute for Innovation and Entrepreneurship** (directed by Prof. Andrew Hargadon and Wil Agatstein) provides the range of skills necessary to commercialize research, whether in new venture start-ups or in corporate research and development settings.
- The **Big Bang Business Plan Competition** is another way for entrepreneurial faculty and students to obtain hands on skills and **even launch a Company!**

# 2010 Big Bang Winner- Inserogen

- **Plan to use tobacco to grow vaccines wins \$15,000**
- **Inserogen team:** Ying Ng, Agricultural Economics undergraduate; Bob Kays, MBA student; **Lucas Arzola, Ph.D. student in Chemical Engineering with a DEB and CREATE IGERT trainee (group leader);** Gabriel Paulino, Ph. D., Intellectual Property Analyst.
- A new venture that could save thousands of lives and millions of dollars by accelerating development and production of animal and human vaccines.
- The process conceived by a group of UC Davis students **substitutes tobacco plants for conventional manufacturing methods that rely on chicken eggs and cell culture**, to cut development time for new vaccines from six months to as little as six weeks, according to Lucas Arzola, a doctoral candidate in chemical engineering with a DEB, who headed the winning team, Inserogen. The Inserogen plan noted that the U.S. government spent \$1.3 billion to develop an H1N1 vaccine, but could deliver only 30 million of 160 million promised doses by last summer. With limited supplies of the vaccine, 86 million Americans were infected with the flu virus and, of those, 17,000 died.
- **In 2012- company is launched as a new start-up in the new UC Davis Engineering Technology Center.**

Check out **NCIIA (National Collegiate Inventors and Innovators Alliance)** ([nciia.org](http://nciia.org)) **Annual Conference Video** in March 2012 for an interview with Lucas and his professor, Karen McDonald: <https://vimeo.com/47043140>

# 2012 Entrepreneurship Academies

## UC DAVIS CHILD FAMILY INSTITUTE FOR INNOVATION AND ENTREPRENEURSHIP

UC Davis offers **two options this summer** to move your work out of the lab and into the world.

The Entrepreneurship Academy is a **three-day intensive program integrating lecture, exercises, and individual projects**. You'll learn to identify, design and validate new business opportunities for your research. Sessions are taught by venture capitalists, angel investors, entrepreneurs and industry executives.

**Apply now... and help your research make a difference!**  
**got a bright idea?**



## Green Technology Entrepreneurship Academy | June 25–27

<http://entrepreneurship.ucdavis.edu/green>

## Biomedical Engineering Entrepreneurship Academy | July 11–13

<http://entrepreneurship.ucdavis.edu/bmea>

### Why you should attend

- **Explore the market opportunities** surrounding your ideas and your research.
- **Seminars and interactive sessions** taught by leading venture capitalists, angel investors and entrepreneurs.
- **Learn to communicate the broader** potential of your research and develop a presentation pitch about your idea.
- **Evening mentoring sessions with** industry executives and investors.
- **Grow a network of professionals** in your field who can help mentor and connect you as you move forward with your career or new venture

# UC Davis Strives to Have Economic Impact

- UC Davis provided about **56,000 jobs and \$5.5 billion in economic activity during the 2009-10 fiscal year, generating almost \$10 for every dollar invested by the state**
- In 2009-10, the university had a portfolio of 419 patents on inventions, generating licensing income of \$10.4 million from products ranging from optical network switches to strawberry varieties.
- The preliminary figures from the **UC Davis Office of Research**, showed that campus scientists and engineers generated **73 patents** (29 U.S. and 44 foreign) **in fiscal year 2010-11**, while **67 licenses were executed on existing patents. Since 2004, 34 startup companies have spun off from UC Davis, seven of them in 2010-11.**
- 2011- UC Davis Chancellor Linda P.B. Katehi is committed to expanding these efforts through an "Innovation Hub" that will better connect campus research with entrepreneurs and accelerate the transformation of university inventions into commercial products and services. **[2012- 12 RISE (Research Investments in Science and Engineering) Proposals were funded. These interdisciplinary teams have the potential for high impact discoveries and innovation. <http://www.research.ucdavis.edu/pgc/fo/RISE>].**
- The Chancellor promotes a range of university incentives and funding mechanisms, training programs, policies, reward structures and recognition opportunities for faculty, staff, students, alumni and external partners that **foster innovative collaborations, self-sustaining initiatives, team science, "high-risk/high-impact" discovery, next-generation technologies, entrepreneurial activity and other forms of core, interdisciplinary scholarship.**

# UC Davis School Of Medicine is focused on “Bench to Bedside”

- Ref: Meyers FJ, and Pomeroy, C. Creating the future biomedical research workforce. *Sci Transl Med.* 2011 Sep 28;3(102):102fs5.

**"Biomedical research should have the goal of producing sustainable improvements in health and include the full range of early translational research efforts,"** said Claire Pomeroy, UC Davis vice chancellor for human health sciences and dean of the School of Medicine and co-author of the article. She states, "True health gains will occur only if we move beyond the current paradigm and embrace real-life assessment of innovations."

**"Biomedical science trainees require a new set of core knowledge competencies in addition to the traditional scientific disciplines so that they can optimize their potential to make important and relevant discoveries."** One approach is to foster the clinical relevance of biomedical research by promoting partnerships between academia and industry, a relationship that has traditionally been considered suspect in academic institutions.

- Dean Pomeroy is also the principal investigator for a **NSF Partnerships for Innovation (PFI) Grant** to create a prototyping center so that new medical technology start-ups may secure investment capital.
- The **Medical Technology Commercialization Clinic (MTCC)** brings together multidisciplinary teams that include faculty, physicians, STEM students and postdoctoral fellows, MBA and law school students, and Entrepreneurs-in-Readiness (EIRs), to take medical technologies closer to market. **The teams develop commercialization strategies for technologies of interest, under the leadership of EIRs and with mentorship from project partners.**

# The VC of Research at UC Davis is a Leader in Moving Technology to the Market

## Harris Lewin: our 43rd national academy member

- With the May 1 [election of Harris Lewin](#), vice chancellor for research and professor of evolution and ecology, to the National Academy of Sciences, UC Davis now has 43 members in the national academies.
- Election to the national academies — the National Academy of Sciences, Institute of Medicine and National Academy of Engineering — is one of the highest honors given to our nation's scientists, physicians and engineers.
- Throughout his career, Lewin has been **deeply involved in transformative, interdisciplinary research that has the potential to move ideas from the laboratory to the marketplace, where it can help solve real-world problems**. As a graduate student at UC Davis, he discovered genetic factors linked to disease resistance in cattle, leading to a patent on a screening test for cattle resistance to leukemia viruses.
- Lewin, who earned his doctorate in immunology at **UC Davis in 1984**, returned to his alma mater last year as a vice chancellor to oversee the [Office of Research](#).
- **Watch the video [Cattle, Genomes and the National Academy of Sciences](#) to hear Lewin discuss the research that led to his election to the academy.**

*Harris Lewin is the holder of the Robert and Rosabel Osborne Endowed Chair and Professor in the Department of Evolution and Ecology, one of the top NIH ranked departments in that field in the country. He is also a faculty trainer in the DEB and NIH Biotechnology Training Grant*

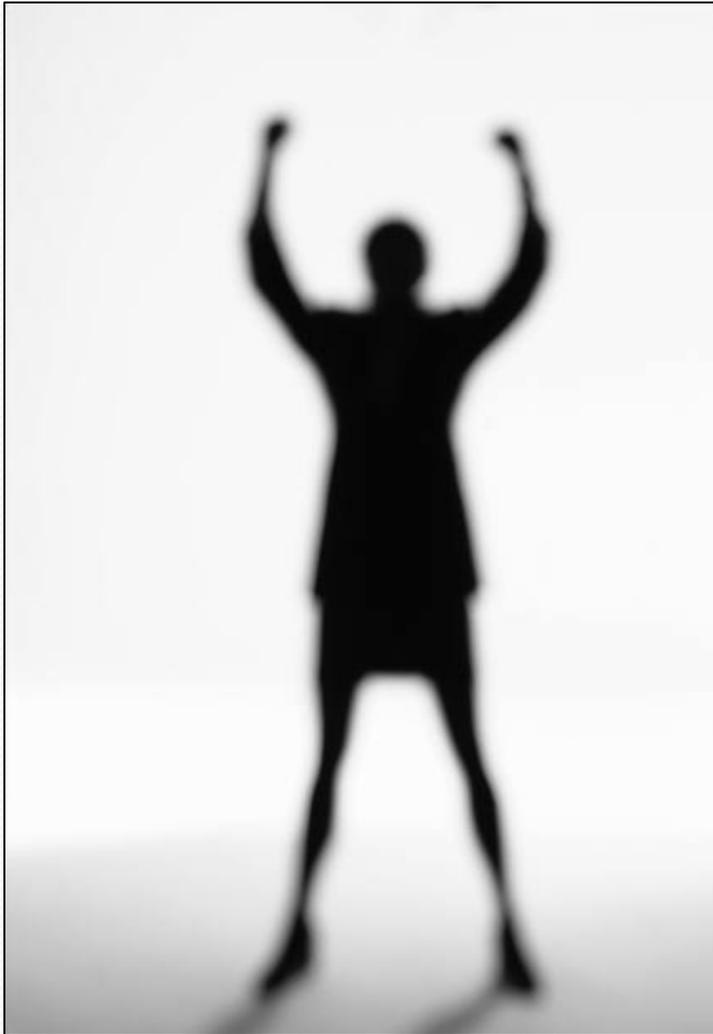
[http://www.ucdavis.edu/ucdavis-today/2012/may/2-national\\_academies.html](http://www.ucdavis.edu/ucdavis-today/2012/may/2-national_academies.html)

# Why Should the Californians Support STEM Research, Education and Training?

- **National Science Board's Call to Action.** The 575-page [\*Science and Engineering Indicators 2012\*](#) report, a biennial report to the President and Congress, is the most comprehensive and up-to-date information and analysis on the nation's position in science and technology
- **States reduced per-student funding for major public research universities by a fifth during the past decade, while foreign competitors invested heavily to challenge our nation's once dominant position in science, innovation and higher education, according to the new NSB report.** The NSB found state funding for the **top 101 public research universities declined by 10 percent between 2002 and 2010.**
- They issued the following statement in response:
  - **"America's public research universities are a critical component to the nation's global economic competitiveness"** .
  - "However, the facts remain, that cuts in state appropriations have resulted in higher tuition and **we urge states to do all they can to sustain their support of students and their public universities.**"

The entire report is available on the [National Science Foundation website](#).

# Scientists need to be Entrepreneurial and Show Visionary Leadership in the 21<sup>st</sup> Century



- The Vision must be shared by the team in order to be achieved
- A visionary leader must use both the left and right sides of the brain.....
- **Left-brain activities** deal well with statistics, analysis that drills into data, information, and language.
- **Right brain thinkers** focus on aesthetics, arts and music, big-picture ideas, patterns, geometry, and creativity.
- Almost everyone does both, but most have a preference.
- Most research universities are highly left-brain places, focused on academic subjects.
  
- **We need to change this and Connect the Dots!**
  
- **The DEB graduate program at UC Davis has been a successful model for over 15 years.**

# Thank You...



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