Our Economic Opportunity in the Greater Sacramento Region: Focus on Biotechnology/Life Sciences

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To the Regional Economic Vitality Briefing:

There is nothing so powerful as an idea whose time has come.

Victor Hugo

- Biotechnology is no longer a fledging technology....
- It is a economic driving force in the region and the state, as well as the world.

Additional background materials are in packet
California is the sixth-largest economy in the world. The state is the arguable biotechnology leader with clusters in the Bay Area and San Diego. The public and private university systems are some of the best in the nation. California universities oversee $3 billion in academic R&D annually. California has more degreed professionals, managers, and engineers than any other state.
The recent UC Impact Study 2003: *California’s Future: It Starts Here* demonstrates the economic impact on California.

- Through 2011, UC’s contribution is estimated to total more than 34,000 undergraduates in science and engineering jobs.
- The impact of UC grads in industry clusters is estimated at $887 million in Gross Regional Product for 2002 and $7.4 billion between 2002-2011.
- The value and economic contribution of UC related start-ups and spin-offs are great. California headquarteried companies founded by UC graduates, had combined revenues exceeding $1.2 billion in 2001.
UC Davis has Strong Intellectual Capital in the Biosciences

- UC Davis Genome Center in the new 6-story Genome and Biomedical Sciences Facility
- Center for Biostabilization – blood products
- Center for Biophotonics Science and Technology
- UC Davis Cancer Center – NCI designated cancer facility
- California National Primate Research Center
- Center for Comparative Medicine & Mouse Biology Program
- Center for Metabolomics
- National Center of Excellence in Nutritional Genomics – focus on minority health
- M.I.N.D Institute – focus on autism
- UC Systemwide Biotechnology Research & Education Program (UCBREP)

Interdisciplinary Collaboration is a Hallmark of UC Davis Teaching and Research
UC Davis Partnerships

- **Education/Training**
  - CSU, Sacramento, local Colleges, and K-12 schools

- **Technology Transfer**
  - Office of Research: Technology-Industry Alliances (TIA) – **UC Davis CONNECT**
  - GSM’s Big Bang Business Plan Competition
  - **SARTA** (Sacramento Area Regional Technology Association) [www.sarta.org](http://www.sarta.org)
  - UC Discovery Grants
  - Collaborations with other academic institutions such as UC Merced, LLNL, UCSF, etc.

- **UCD Research Park & McClellan Park**
  - To promote research collaborations
  - To launch spin-off companies
The Strength of UC Davis is in the Life Sciences

- **Division of Biological Sciences**
  - Numerous outstanding majors: Plant Biology; Biochemistry; Molecular & Cellular Biology; Genetics; Microbiology...

- **College of Agricultural & Environmental Sciences**
  - Undergraduate Biotechnology major is one of the fastest growing majors on campus.

- **School of Medicine**
- **School of Veterinary Medicine**
- **College of Engineering**
  - Biophotonics and Biomedical Engineering are examples of cross-disciplinary areas.

**The Designated Emphasis in Biotechnology** is an innovative program for PhD students (www.deb.ucdavis.edu)
The UC Davis Biotechnology Program is active in Education & Training

• Co-PI on an NSF grant-Tools to Teach Molecular Biology & Bioinformatics “Train the Trainers”
  – Courses for Community College and AP High School Biology teachers
  – Joint project with American River College

• Coordinate the NIH Biotechnology Training Grant & DEB (Designated Emphasis in Biotechnology) www.deb.ucdavis.edu
  – Interdisciplinary training for predoctoral graduate students
  – Industry internships (3-6 months) & corporate fellowships

• The Advanced Degree Program (ADP) for corporate employees
  – A PhD program for the working professional

• Member of Biotech Advisory Committees
  – California State University, Sacramento
  – American River, Solano and Merced Community Colleges
  – Davis Senior High School
Biotech Workforce Needs

- The U.S. is moving toward a knowledge-based economy that requires higher skills.

- According to the Economic Development Department, California’s biotechnology firms currently employ 100,000 workers:
  - 14% are vocational and community college grads, 50% BS, 17% MS and 19% PhD (Steven Dahms, CSU).

- One estimate is that the Bay Area biotechnology companies will need **150,000 more biotechnology workers by 2015** (Sakai and Markland Day, City of Fremont: Life Sciences Industry Scoping Report, Sept. 2004, p 22)
Where will we find Biomanufacturing Technicians?

- Hundreds of biotech jobs in Alameda, Contra Costa and Solano counties go begging due to a lack of qualified talent; **the most-difficult positions to fill involve skilled technicians with two years of community college or the equivalent laboratory training, who can expect earning $35,000 per year.**


Genentech (Vacaville’s Manufacturing Facility) is doubling in size in the next 4 yrs and will hire close to 600 new workers!

  (Barbara Smith, The Reporter, July 16, 2004)
Workforce training in biomanufacturing is a critical need, especially for displaced workers.

- UC Davis (in consultation with Solano Community College and CSU, Sacramento) has developed a pilot plant proposal – CIBER: California Institute for Bioprocess Education and Research.
  - Multi-disciplinary Center for advanced bioprocess training that includes pilot-scale equipment for all unit operations common in the production of purified recombinant proteins and other biological products from microbial fermentation and cell culture.
  - Will be used as a training facility for biochemical engineers and scientists who will be employed in the pharmaceutical and agricultural biotechnology industries, as well as a continuing education resource for the West Coast Biotech industry.
  - Would also allow strategic training collaborations to be established between the University of California and the surrounding community colleges (especially Solano Community College that also has an established program for training the biotechnology workforce) and the California State University system.

- Investment is needed through innovative partnerships: industry, federal, and state to raise $4-5M.
If We Build it; Will the Students Come??

• **Biotech is Hot**, but many students don’t know about it!
• We must reach out to the K-12 teachers to help.
• We must instill the **Ah-Ha experience** early (by 5th grade).... Hands-on learning, discovery-based labs, guest instructors from industry or university, mentoring and job shadowing. **Before- or After-School Science Programs.**
• Community colleges can offer general education courses on **Biotech Issues** to hook undeclared majors. It can also educate the community about Biotech.

See the NSF report on science education: www.nsf.gov/sbe/src/seind02/start.htm
Call to Action for the Biotech Workforce

- Increase the effectiveness of publicly funded training programs;
- Promote alternative education and training opportunities;
- Keep older workers engaged in the labor force;
- Consider changing immigration policies to better meet future workforce needs;
- Need more coordination between academia and industry in creating relevant curriculum

Create Regional Life Science Working Groups
THANK YOU

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