

Overview

Key Issues

- Biotechnology workforce development: It's role in supporting the industry
- How can the State directly impact the biotechnology industry?
- Venture capital: what are the issues?

Utah Bioscience Industry

- Pharmaceutical
 - ZARS, Cephalon, NPS, Watson
- Biomedical device
 - Merit, BD, Hospira, M-Biotech, Techniscan
- Biotechnology
 - Idaho Technology, Myriad Genetics, Echelon
- Nutraceutical
 - Pharmanex, Ashni, Nature's Way, Ridgecrest Herbals
- Military and Homeland Security
 - Dugway
- Clinical and Diagnostic Services
 - ARUP, LabCorp, Nelson Labs

Biotechnology Industry

- “Biotechnology and biomedicine may mean to the first half of the 21st century what electronics and computers meant to the latter half of the 20th century. We are likely to see a fusing of the information and biotechnology/biomedical industries into a powerful technological and global economic force.
- Utah’s pharmaceutical and biotechnology companies have, through their discoveries, improved the quality of human life and extended the lifespan of many individuals. Scientific discovery, innovation and commercialization in the medical devices industry have greatly benefited the human race.”

2003 UTAH BIOTECHNOLOGY PROFILE

www.edcutah.org/datacenter/publications/indprofiles.htm#biotech



Biotechnology in Utah

- Strong, 50 year history in biotechnology
- In 2004, Utah was home to more than 300 Life Science companies.
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- These companies employ thousands of Utahns and contribute an estimated \$1.8 billion in annual revenues and \$1.4 billion to Utah's economy.
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- Utah received 9th place overall ranking by the Milken Institute in their 2002 State Technology and Science index.

Biotechnology in Utah

- In 1956, Deseret Pharmaceutical Co. created a disposable plastic catheter and became Utah's first manufacturer of disposable medical devices.
 - Later acquired by Becton, Dickinson and Company
 - BD Medical Systems now has more than 1,000 employees in Sandy
- Other early companies included Ballard Medical Products (now a subsidiary of Kimberly-Clark), and what is now called Sorenson BioSciences.
- The University of Utah formed their Department of Biomedical Engineering in 1967 and over the next 15 years developed the artificial arm and heart.
 - Willem J. Kolff, pioneer of artificial kidney (dialysis) & artificial heart
 - Ted Stanley, surgeon/anesthesiologist, founder of Anesta & ZARS

Biotechnology in Utah

- **Myriad Genetics** was one of three U.S. firms chosen to analyze DNA samples to identify the victims of the September 11, 2001 World Trade Center disaster.
- In Fall 2002, **Watson Pharmaceuticals** broke ground on a new R&D facility next to its existing manufacturing facility in the University of Utah's Research Park. The expansion doubles the size of Watson Pharmaceutical's presence in Utah.
- In February 2003, **Cephalon** announced that it would add 365 new jobs in Utah. Their current 200-employee Salt Lake facility manufactures a pain treatment for cancer patients.
- **GenData** was founded in 2003 as a non-profit scientific research organization that will provide commercial access for research projects that use the Utah Population Database (UPDB) with more than seven million records comprising genealogical, demographic, and clinical information.

Biotechnology in Utah

- **Merit Medical Systems Inc.** is expanding its operations in Utah with the construction of two buildings totaling 180,000 square feet at the company's South Jordan campus.
- The **Huntsman Cancer Institute**, in conjunction with the University of Utah, has discovered more gene-related diseases than any other institution in the world.
- The **Neutraceutical industry** is booming in Utah with 130 dietary supplement companies & total sales between \$2.5-4 billion a year. Increased FDA oversight and GMP regulations require attention.
- **NPS Pharmaceuticals** recently completed its new 100,000 square foot headquarters in Research Park housing more than 150 employees who earn an average of \$86,000 annually.

Biotechnology in Utah

“It is my dream and hope that this area of Utah can become a centralized biotechnology center of the world, and that we will be known first and foremost for our biotechnology, our medical technology and research, and maybe secondarily for skiing.”

Jon M. Huntsman

“Huntsman Cancer Institute:
Leading Utah’s Biotech Growth”

Wasatch Digital IQ

June 2001

Biotechnology Industry Needs

- Need a larger & better-trained workforce in order to:
 - Sustain growth of local companies
 - Keep existing companies here
 - Attract additional companies
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- Need more focused training for Biotech industries
 - Awareness of FDA regulations & GMPs (Good Manufacturing Practices)
 - Analytical skills for Pharmaceutical & Life Science companies
 - Manufacturing skills for Medical Device companies
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Biotechnology Industry Needs

- Input and coordination with Local Industry
 - Curriculum development & teaching (industry)
 - Internship opportunities full time jobs (students)
- Benefits to local companies
 - Hands on training higher retention rates & decreased learning curve
 - Resource base to help sustain start-ups with limited funds
- Need education programs to match a range of job needs
 - Lab & Mnf. Technician  
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Challenges

- **Bioscience industry**
 - Trained workforce
 - Support of start-ups
 - Retention of existing companies
 - Support growth
- **Students and Education**
 - Greater recruitment
 - Emphasis on hands-on, problem solving
 - Challenging internships
 - Relevant bachelor degree options

Salt Lake Community College Biotechnology Program

- Initiated in August 2001
- Seed money provided by a 3-year NSF grant
- 2-year A.A.S. created
- 1-year high school program



Mission

- Generate interest in science
- Train students in basic research lab skills
 - Hands-on, problem solving, inquiry
- Provide challenging internship opportunities
- Support state economic development
- Support bioscience industry

Program Highlights

- 1 FT faculty; 1 FT staff; adjunct faculty
- 60 college students
 - 21 employed, 11 interns
- State-of-the art facilities
- Foreign exchange programs
- Industry partnerships
- Educational partnerships
- InnovaBio
 - Student contract research organization (CRO)

Industry Partners

- Industry-driven curriculum
- Instruction
- Interns
- Employees
- Equipment and supplies
- Grant collaborations
- Scholarships



Educational Partners

- 526 high school student
 - 12 high schools, 8 districts
- Jordan school district
 - Jordan Applied Technical Center
 - Itineris
 - Early college high school program
 - 68 currently; 75 2005-2006
- Granite school district
 - Granite Technical Institute
 - Biomedical manufacturing program



Action Items

- Challenging, relevant internships
 - InnovaBio
- 4-year Biotechnology degree
- Biomedical manufacturing program
 - Granite school district partnership

InnovaBio

“Innovations in Contract Research and Training”

- Student-operated CRO
- Contract research projects
- Interns work as teams
- Research and Analysis, Document Control, QA/QC, Business Development/Marketing
- Located at SLCC Jordan campus and Miller Business Innovation Center



What do the students gain?

- Access to challenging work-based experience
- Connection with industry
- Cross-disciplinary training
- Flexible internship opportunities
- Workplace skills
- College credit

What do the companies gain?

- Access to research personnel
- Access to well-equipped labs
- Minimal risk environment
- Grant opportunities
- Contribution to student education

Progress Report

- National Science Foundation grant
- ZARS, Pharmanex, Sorenson Genomics, Spendlove Research Foundation, Lifespan Technologies, ACME Biomedical
- 32 interns: high school, SLCC, UVSC
 - 15 for summer
 - 19 for 2005-2006
- Experienced staff
- Additional lab space Aug 2005
- Replication at other institutions

Sustainability

- Salaries, consumables, new equipment, intern scholarships
 - 3-year National Science Foundation grant
 - Y1: 100% salaries, consumables
 - Y2: 50% salaries, consumables
 - New contracts
 - 100% consumables, minimal users fee
 - Service contracts
 - Fee per task
 - Endowments/donations
 - Entrepreneurial spirit
 - Investment in future workforce

Needs

InnovaBio

- Accommodate more students
 - Scholarships
 - More projects
- Serve more companies
 - Equip growth lab space
 - Additional staff:
 - 1 project manager
 - Increase PT business manager to FT
 - 1 FT lab technician

Investment

InnovaBio

" Item	" Year 1	" Year 2	" Total
" FT project mgr	" 63,000	" 64,890	" 127,890
" PT business mgr	" 15,360	" 15,821	" 31,181
" FT lab tech	" 35,000	" 31,050	" 66,050
" Equipment, 1 lab	" 300,000	" 0	" 300,000
" Tuition Scholarships	" 20,000	" 20,000	" 40,000
" <i>Grand total</i>	433,360	131,761	" 565,121

“a true meshing of student and industry needs; regional biotech centers around the nation should take a page from [Utah’s] book”

“this is truly a model to emulate”

“This project is immensely innovative and the answer to many problems faced by both biotech training programs and companies. It deserves to be funded and used as a model for the rest of us.”

Action Items

- Challenging, relevant internships
 - InnovaBio
- 4-year Biotechnology degree
- Biomedical manufacturing program
 - Granite school district partnership

4-year Biotechnology Degree

■ Why?

- Student demand
 - Sustain momentum
 - Expand and diversify options
- Industry demand
 - Entry level and advanced
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■ Who?

- SLCC and 4-year state university

How?

- Transfer with SLCC 2-year Biotechnology program
- Hands-on, project based
- Industry-driven curriculum
- Biotechnology degree
 - Biotechnology and Innovation
- Located in SLCC Health Science building
 - Shared operational expenses

Timeline

- Proposal to Board of Regents
 - August 2005
 - 5-year plan: budget, curriculum, student and industry demand
- Implementation
 - Fall of 2006
 - Biotechnology and Innovation

Investment

4-year Biotechnology and Innovation Degree

" Items	" Year 1 " (2006-07)	" Year 2 " (2007-08)	" Total
" 2 FT biotech faculty	" 1) 105,000	" 1) 108,150 " 2) 105,000	" 318,150
" 1 FT business faculty	" 105,000	" 108,150	" 213,150
" 1 FT admin asst	" 35,000	" 31,050	" 66,050
" Equipment, 1 lab	" 0	" 0	" 0
" Grand total	245,000	352,350	" 597,350

Action Items

- Challenging, relevant internships
 - InnovaBio
- 4-year Biotechnology degree
- Biomedical manufacturing program
 - Granite school district partnership

Biomedical Manufacturing: Why?

- **Student demand**
 - Need for immediate employment
 - More options
- **Industry demand**
 - Represents 60-65% of industry
 - Tremendous workforce needs
 - Projected growth
 - No program currently

COMPANY	Industry sector	Estimated demand (3-5 years)
BD	Device	20
Cephalon, Inc	Pharma	50-60
Idaho Tech	Biotech	10-20
Hospira, Inc	Pharma	80-100
Merit Medical	Device	200-300
Pharmanex	Nutraceutical	30-50
ZARS, Inc	Pharma	10-15

Progress Report

- Industry input
- Courses being developed
 - 2-year high school
 - One-year advanced SLCC
- Students enrolled for 2005-2006
- Implementation
 - Submitted NSF grant; not funded
 - Year 1: three introductory courses
 - Year 2: specific biomanufacturing courses

Investment

Biomedical Manufacturing

" Items	" Year 1 " (2005-06)	" Year 2 (2006-07)	" Total
" 1FT high school faculty	" 56,000	" 57,680	" 113,680
" 1 FT college faculty	" 0	" 72,100	" 72,100
" Equipment	" 100,000	" 0	" 100,000
" Professional development	" 15,000	" 15,000	" 30,000
" <i>Grand total</i>	<i>171,000</i>	<i>144,780</i>	" <i>315,780</i>

Deliverables

- Increase student recruitment AND retention
 - InnovaBio
 - 4-year completion available
 - Diverse options
- Better support industry needs
 - Employees prepared for industry
 - Access to labs and interns
 - Support entrepreneurial interests of students
 - Increase collaborative grant activities
 - High wage, high tech jobs in a stable, growing industry
 - Incentive to come to Utah and STAY in Utah

Deliverables

- Commitment to accountability
 - Students
 - Companies
 - State
- Commitment to self-sustainability
 - Proven track record
 - Build on strong foundation
 - New college president
 - Shared vision with state