Arizona and PSMs

Collaboration Across Arizona Universities for a Better Arizona
Figure 7: Framework for Arizona Public University Technology/Product Pipeline to Industry

<table>
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<th>Core Competencies</th>
<th>Technology Platforms</th>
<th>Product</th>
<th>Markets</th>
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<td>Electronics &amp; Optics</td>
<td>Communications</td>
<td>Nano/Micro Satellites</td>
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<td>Computer Modeling &amp; Simulation</td>
<td>Information Technology</td>
<td>Photonic/Electro Optic Devices</td>
<td>TELECOMMUNICATIONS</td>
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<td>Materials &amp; Chemistry</td>
<td>Sustainable Systems</td>
<td>Wireless Networks/Systems</td>
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<td>Embedded Systems</td>
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<td>Applied</td>
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<td>Molecular Electronics</td>
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<td>“Green” Chip Fabrication</td>
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<td>Optics in Computers/Storage</td>
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<td>SUSTAINABILITY INDUSTRIES</td>
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<td>- agricultural bioproducts</td>
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<td>- environmental engineering</td>
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<td>- integrated resource management</td>
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“Fusion or Convergence”
Based on Battelle’s assessment, the 6 STEM core competencies => 4 tech platforms => JOBS for AZ

- Communications
- Information technology
- Bioengineering
- Sustainable Systems
“...the key to success for Arizona’s economic plan is the Technology Platforms, because these are translational research engines, taking raw science and technology and integrating it into systems that industry can use.”
AZ Universities prepare STEM students for industry in multiple ways

- **Graduate Certificates:**
  - Typically one year
  - Many online & part time
- **Accelerated Master’s**
  - Top BS students can add the MS in one year
- **PSMs & other applied programs**
  - Typically two years
- **Dual degrees**
  - MBA+MS: Typically three years
Some of the Many STEM Programs Preparing for a Bright AZ Future

- Geographical Information Systems
- Entrepreneurship
- Water, Society, & Policy
- Enterprise Information Security
- Medical Physics
- Human Language Technology
- Drug Discovery & Development
- Economic Geology

- Optical Science
- Pharmaceutical Economics
- Applied Biosciences
- Aquaculture
- Biomedical Engineering
- Hydrology
- Rangeland Science
- Rock Mechanics
- Mine Safety
- Photonics Communications
In collaboration with the Board of Regents, Office of the Governor, and P-20 Coordinating Council, Arizona’s three public universities offer innovative, complementary degrees to prepare graduate students interested in science and technology with enhanced training in business and management skills.

http://arizonapsm.wordpress.com/
Some of our PSM Industry Partners

- High Throughput Genomics
- Molecular Diagnostics Lab VA Hospital
- AmpliMed Corp
- Integrated Biomolecules
- Protein Therapeutics
- Ventana Medical Systems
- Niadyne Inc.
- Oncotheryon (ProlX)
- Critical Path Institute
- Boeing
- Honeywell
- AZ Cancer Center
- APS
- Microchip
- First Solar
- Genetech (CA)
- Los Alamos Laboratories
- GE Healthcare
- Medtronics
- ImaRX
- Cord Blood Registry
- BioVigilant Systems
- Rowpar Pharmaceuticals
- Alliance Medical Corp.
- Barrow Neurological Institute
- Mayo Clinic
- Motorola
- Intel
- SRP
- Translational Genomics (TGEN)
- General Dynamics

AND MORE as we grow!
PSMs=Cooperation

- Cooperation with industry, ensuring highly trained graduates and programs that fit changing industry needs
- Cooperation among university departments for increased interdisciplinarity
- Cooperation among AZ universities
  - More online courses/programs
  - More outreach & communication
  - Moving more applied MS degrees to PSMs by adding internships and/or PLUS courses
  - Tri-University PSMs
- Cooperation with Governor’s Office, Governor’s P-20 Council, AZ Dept of Commerce, Flinn Foundation, Southern Arizona Science Foundation, Research Corporation, Alfred P. Sloan Foundation.
Communications

Website

Brochure

Conferences

Career Fairs

Arizona PSM Initiative

Welcome

The Professional Science Master’s (PSM) is a degree program designed to meet growing industry needs for applied scientists, engineers, and mathematicians and to provide rewarding careers for undergraduate science and math majors. Created in 1997 with the support of the Alfred P. Sloan Foundation, the PSM degree is designed to be a faster, less-expensive, and more employer-centered alternative to traditional graduate degrees in science and math. Today, over 2,500 students are enrolled in over 170 programs at over 71 U.S. institutions.

Arizona’s public universities — Arizona State University, Northern Arizona University, and the University of Arizona — offer numerous innovative PSM degrees to prepare graduate students interested in science and technology with enhanced training in business and management skills.

To learn more about the specific PSM programs at Arizona’s public universities, click the links under “Arizona Programs” or download our brochure. For more information about other statewide science, technology, engineering, and math initiatives, contact the Science Foundation Arizona STEM Initiative at info@sfaz.org or 602-682-2400.

Written by dranwitzke2008
September 23, 2005 at 9:13 pm
Northern Arizona University

- NAU’s specialized science degrees are closely aligned with PSM national criteria, but are yet to be affiliated with the national PSM initiative:
  - Environmental Sciences
  - Forestry

Website: http://psm.nau.edu/
Arizona State University

• Programs:
  – Computational Biosciences
  – Nanoscience
  – Technology Management
  – Science & Technology Policy
  – MS in Engineering
  – Nutrition

Website: http://psm.asu.edu/
Nanoscience is an interdisciplinary subject spanning physics, chemistry and biochemistry, materials and electrical engineering. It concerns the properties of atomic and molecular assemblies (composed of tens, hundreds or thousands of atoms) under an extraordinarily wide range of conditions and geometries, and areas of application.
Computational Biosciences

• The disciplines of the life sciences are rapidly requiring more mathematical and computational analyses than have typically been employed. While some mathematical approaches have been applied to biological questions for many years, the advance in computational capability has increased the pace of bioscience research to unprecedented levels of speed, precision, and detail. This has dramatically transformed the kinds of problems tackled. To meet the increased industry demand, a new type of graduate degree program has been developed.
What students say

• “ASU’s PSM program provided me with a bridge to an exciting new career. After many years in IT, I decided that I wanted to work in biotech. Since I didn’t take college biology or chemistry, I wasn’t sure how to make the transition. I read about ASU’s Computational Bioscience program and realized I could leverage my computer and math background to enter the program. After taking night classes to satisfy prerequisites, I quit my job and pursued the PSM degree full time. It was very flexible and allowed me to pick from several electives that I found interesting and felt would be attractive to employers.” Greg Golden, Project Manager, Biodesign Institute at ASU
PSM in Solar Energy Engineering and Commercialization

- Application to NSF
- Arizona has growing Solar Industry programs
- This masters education program integrates both technical and non-technical (social, political, environmental, business) course work to train solar energy professionals with a balanced and informed perspective that can enable the growth of renewable energy technology.
UA PSMs

http://psm.arizona.edu

• Applied Biosciences
• Medical Physics
• Economic Geology
Medical Physics

• Prepares students for Radiation Oncology
• Program started in 2000, 4 grads
• Average salary nationally = $175,000. Starting salaries $85-120,000
Medical Physics: Seeing into the body and into the future
What the students are saying:

“The PSM program at UofA has allowed me to grow as a student and as a person. The program has given me multiple opportunities to move into different roles and industries, and has adapted to fulfill both my academic as well as my non-academic needs. The program has exposed me to start-ups and entrepreneurs, large business and industry leading companies, business marketing and strategy as well as scientific IP law. The University has allowed me to do all this while harboring a strength in my fundamental science background. I am excited to see where this degree will take me.”
PSM in **Applied Biosciences**
Expanding AZ’s biosciences infrastructure

- Bio 5
- Translational Genomics
- Biodesign Institute
- Mayo Collaborative research building
- Phoenix Biomedical Campus
- UA’s dozen bio’l science departments
- AZ Health Sciences Center
Careers

- Tech Transfer
- Regulatory Affairs/Quality Assurance/ Biosafety
- Clinical Trials Management
- Bioinformatics
- Controlled Environment Agriculture
- Program started in 2000
- 49 Graduates
What the students say:

“I am applying to medical school for next fall and I have been able to focus a lot of my studies in this program towards graduate science courses in cancer and medicine. . . . I have been able to develop leadership roles in both medicine and business. . . . The program combines two areas of study that are at the forefront of our society, getting business and science to understand and cooperate with each other is critical to the future. . . .”
PSM: Lowell Program in Economic Geology

- Privately funded by J. David Lowell
- Exploration & Development
  - Orogenic Systems
  - Regional Structural Geology
  - Volcanology
  - Advanced ore deposits
  - Field mapping of mineral deposits
- Mining and processing
  - Mining methods
  - Ore Reserve Estimation
  - Geomechanics
  - Mine design
• Economics, Business, & People
  – Mine investment valuation
  – Project management
  – Management of Information systems
  – Mining and public land law

• Health, Environment, & Safety
  - Field Hydrology Methods
  - Spatial analysis
  - Environmental hydrology
  - Environmental Risk Analysis
  - Health & safety in mining
Economic Geology

- Program started in spring 2007
- Flexible scheduling so that students can maintain jobs in industry
- Strong links to Latin America
New PSM in Computer Science

- Application to NSF
- Online for working professionals
- IBM and Raytheon want their computer scientists to gain competencies without leaving their jobs
- Complements their dual MBA/MS program
MORE PSMs COMING SOON

• Growing interest in new programs
• Transforming current applied master’s to PSMs
• Building cooperative programs across the universities
• More online, flexible options
Next Steps

According to AZ’s Bioscience Roadmap (Flinn Foundation), we need to

1. Build Research Infrastructure
2. Build Critical Mass of Firms
3. Enhance Business Environment
4. Prepare Workers, Educate Citizens

Universities can’t do it alone!