UNIVERSITY-INDUSTRY PARTNERSHIPS

Challenges and Opportunities

Feb. 24, 2011
LINC Conference

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UNIVERSITY/INDUSTRY RESEARCH SNAPSHOT

	1953	Today
Industry Research	71%*	71%
University Research	6%	14%
Other	23%	15%

http://www.ncura.edu/content/news/rmr/docs/v16n1_Arshadi_George.pdf

*Research expenditures as a percentage of total expenditures in the economy

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Sources of Funding for University Research

	1953	Today
Federal Agencies	55%	64%
Industry	8%	5%
Other	37%	31%

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University Technology Transfer - Status

- Positive, statistically significant relationship between the number of university licenses executed and university research expenditure
- No statistically significant relationship between the number of licenses executed and licensing income (many licenses executed generate little in royalty income)
- A major rethinking of university technology transfer practices and university-industry relationships is needed

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CHALLENGES

- Academic researchers' links with industry are decreasing (*Health Affairs* 28, 1814–1825, 2009)
- Cultural Barriers
  - Conflict of Interest
  - IP Ownership, Publication Rights, Student Involvement
- Structural Barriers
  - Up-front Costs of Transferring Innovations from Labs to Marketplace *(i.e., high cost of fabrication, logistics)*

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Structural Shift in Technology Development

3D Printing

- Lower Cost of Entry
  - Cheaper, less risky route to market
  - Depends less on scale, more on quality of ideas
- Challenge: More Complicated IP Issues *(easier to copy, distribute and pirate when described in a digital file)*

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3D PRINTING

3D printing is a form of “additive” manufacturing where a product is produced by stacking successive layers of material.

A 3D design file is sent from a computer to the printer, which makes a series of cross-sectional slices that are placed on top of each other to create the 3D object.

•Faster, cheaper, easier to use than other additive manufacturing technologies

•Less material required than subtractive manufacturing

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3D PRINTER APPLICATIONS

Near Term: Industrial design, prototyping, metal casting, architecture, engineering, construction, automotive, aerospace, dental and medical devices.

Sequin, C.H. (2005)

Under Development: Bioprinting, which involves printing devices that deposit biological material. The long-term goal is to “print” replacement organs.

The company Organovo, formed around bioprinting technology developed at the University of Missouri, reported in Dec 2010 having producing the first fully bioprinted blood vessels.

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3D PRINTER ECONOMICS

The development of this technology will reduce the need for large scale factory production and impact logistics, and concentration of population in cities, among others.

The Economist, Feb. 10, 2011

- Production of single items as cheap as mass production, undermining the economies of scale that have justified large-scale production for more than a century
- Disruptive technology similar in significance to the printing press (1450), steam engine (1750) and transistor (1950)

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3D PRINTERS

Implications for University Technology Transfer

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- Reduced cost of prototyping, ease of use
  - Enables inventors to go through an iterative process in designing, testing and improving their novel products.
- No large startup cost for production
  - Small quantities of products can be produced, market-tested before a large-scale campaign.
- Discoveries can be brought much closer to a final product by inventors
  - Helps mitigate difficulties associated with licensing early stage technologies

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- Improved commercialization efficiency
  - 3D printing will help move inventions from the lab to the marketplace quicker and cheaper, reducing the volume of undeveloped technology portfolios.
- Increased number of technologies commercialized
  - As the marginal cost of product development is significantly reduced with 3D printing, more technologies will be commercialized improving the standard of living.

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Recalibrating for Better Results

Universities and the Federal Government

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- Materially consider faculty inventions as important accomplishments (similar to research) in tenure/promotion considerations
- Encourage, support, and collaborate with faculty inventors to establish startup companies to commercialize their technologies
  - *UM Enterprise Investment Program, $5 Million over 3 years for startups*
- Be proactive and aggressive in establishing university sponsored startup incubators and research parks to support company formation and leverage university intellectual capital
  - *UMSL's IT Enterprises, Express Scripts headquarters in campus research park, support of regional initiatives like CORTEX*

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FEDERAL GOVERNMENT

- Improve USPTO efficacy through reduction of backlog, less expensive application and examination process, faster examination process, and overall increased flexibility
- Provide funding/incentives for proof-of-concept centers associated with universities across the country
- Increase indirect cost limitations with which universities can pay for patent fees

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SAMPLE PARTNERSHIPS

- i6 Project
  - Regional approach to identify early discoveries that can be advanced toward commercial viability.
  - Funded through the Department of Commerce
  - Led by BioGenerator; UMSL 1 of 7 regional co-applicants

- Student Support Program (Center for Nanoscience at UMSL)
  - Student work on company specific projects funded by large industry partner
  - Company provides instrumentation to CNS as part of collaboration
  - Student gains valuable industry experience

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PROGRAMS IN DEVELOPMENT

UMSL continues to explore new ways to support and encourage commercial research and partnerships with industry, including preliminary discussions on:

•Optometry Innovation Fellowship Program *(similar to MU Biodesign & Innovation Program)*

- Collaboration with other departments
- Commercialization experience for Fellows
- Increased technology transfer activities, startup companies

•Alumni-based pre-seed fund to allow for a competitive commercialization grant program on campus

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THANK YOU

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