Technology Transfer Strategies: Approaches and Options

Submitted by: Association of University Technology Managers (AUTM)
APEC-IP Experts Groups Seminar

Janna Tom, AUTM VP-Public Policy
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AUTM Professional Development

• AUTM Annual Meeting - March 18-20, 2010 New Orleans, Louisiana
• Basic and TOOLS Courses - October 7-9, 2009 Atlanta, Georgia
• Monthly online courses

AUTM Region Meetings

• Central Region - July 27-29, 2009 Madison, Wisconsin
• Eastern Region - June 15-17, 2009 San Juan, Puerto Rico
• Western Region - September 13-15, 2009 Vancouver, BC
AUTM Scholarships

• Developing Economies Scholarship
• Howard Bremer Scholarship
• Bayh-Dole Fellowship in Public Policy

AUTM Communications/Publications

• Website, Email
• Journal
• Technology Transfer Practice Manual
• Better World Report/ Reports from the Field

Session 3 – Technology Transfer Strategies: Approaches and Options

• Innovation Ecosystem
• Research Relationships
• Bridging the Gap
• Fostering the Environment
• Key Points
The University is Only Part of the Innovation Ecosystem

University-Industry Relations
Various Interactions

- Knowledge exchange
- Exchange of personnel
- Sharing research materials
- R&D collaborations
- Sponsored research or clinical trials
- Research consortia
- Gifts/Donations from industry
- Trained students entering the workforce
- Faculty consulting
- Cooperative Extension
- Licensing pre-existing technology
- Networking Forums
Inherent Cultural Differences

- **Industry culture:**
  - profit-oriented; requires secrecy; focus on select products
- **University culture:**
  - non-profit; focus on the public benefit and advancing science; dedicated to free dissemination of ideas; studies multiple perspectives and maximizes utilization of ideas

- Even within industry, different business models are used, e.g. IT vs. biotech, large vs. small companies

Research Relationships

Knowledge Transfer
And
Technology Transfer
General Support of Research

• Gifts
  – No strings attached, university controls research
  – University publication of research results
  – University control over licensing of inventions

• Grants
  – Investigator-driven research
  – Direction of research may waver
  – University publication of research results
  – Fellowship or training

Sponsored Research Agreements

• Research Agreements
  – Federal funding
  – Non-profit charitable foundation funding
  – Industry funded
    • Different business models based on field
    • Large vs. Small vs. Start-up
    • Various strategies based on technology type

• R&D Collaboration Agreement
• Material Transfer Agreement
• Clinical Trials
State Co-Funded Research Projects

• State-funded Special Research Programs (admin’d by UC):
  – Tobacco-Related Disease Research Program
  – Systemwide AIDS Research Program
  – Breast Cancer Research Program

• State Co-funded Research Programs
  – UC Discovery Grants co-funded by industry partner: biotech, communications and networking, digital media, electronics manufacturing and new materials, information technology for life sciences, pilot project for multidisciplinary research

AUTM Data

• FY 2007 AUTM U.S. Licensing Activity Survey
• $48.8B in R&D expenditures at U.S. academic centers
• $3.4B in industry-sponsored research at U.S. academic centers (15% ↑ over FY06)
Affiliation Agreements
Dual Appointees

• Howard Hughes Medical Institute
  – Research
• U.S. Department of Veterans Affairs
  – Research
  – Teaching of medical students, residents
• Regional Hospitals
  – Teaching of medical students, residents

Consortium Arrangements

• Multiple research partners: universities with or without industry participants
• Often multiple funding sources, such as government-university-industry centers
• Results shared for research under consortium
• Coordination on licensing strategy
  – Possible license to industry participants or
  – Consolidate rights in university lead for licensing to industry
Multi-Institutional Research Centers

- Micro/Nano Fluidics Fundamentals Focus (MF3) Center
  - Academic strength: team of 17 professors – 10 universities
  - Industry sponsors – 13 company members
  - Federal matching dollars 1.5:1 (DARPA)
  - Small seed grants and larger challenge grants
  - Joint Center Agreement addresses tech transfer and IP rights

- Energy Biosciences Institute (EBI) – research collaboration between UCB, UIUC, LBNL and BP funded by BP over a ten year period with infrastructure investment by the State of California and U.S. Department of Energy

Multi-Disciplinary Research Centers: California Institutes for Science and Innovation

Innovation occurs at interfaces

Making the whole > the sum of the parts... and the QB3 Garage
Industry Affiliate Programs
Engineering and Comp Sci Centers

- Typically multiple companies supporting applied research in a field of interest, particularly across multiple engineering and comp sci projects
- Unlike single company sponsored research, center programs pool members’ money to support multiple parallel initiatives
  - Afford members low cost leveraged view of much more research than possible with one-on-one PI sponsorship
- Freedom-to-practice sufficient for many high-tech IP
  - Shared research results/IP amongst company members not problematic
- May not work for all fields, e.g. biotech

Spanning the “Valley of Death”
University-Industry Relationship

From Basic Research to Products on Shelves

Early Stage Technologies and the “Valley of Death”

- University technologies often are early stage discoveries that need:
  - Years of further development in order to interest an industry partner for commercialization
  - Significant investment to develop a commercial product

➢ Gap Funding Issue: Spanning the “Valley of Death”
Industry-Funded Research: AmberWave – Bridging the Gap

Gap

AmberWave/University collaborations w/licensing
Compelling Demonstration

University Research
MIT
UCSB
Purdue
CM
RIT
UNH
ND

Industry Manufacturing & RD Organizations

Courtesy of B. Lord, Amberwave
Proof of Concept Centers

• Centers provide
  – Competitive proposal process reviewed by commercial experts
  – Seed funding
  – Expert assistance, feasibility studies
  – Educational programs and conferences

• Examples:
  – Deshpande Center, MIT, 2002
  – von Liebig Center, UC San Diego, 2001
  – The two centers provided grant funding of $10 million that led to 26 spinout companies and raised an additional $159 million in private investment by early 2008

State-Supported Gap Funding Programs

• Florida State University REsearch Commercialization Assistance Grant (SURECAG) Program: The Valley of Death/GAP funding program promotes the commercialization of start-up companies based on university research products

• Kentucky Cabinet for Economic Development offers dollar-for-dollar SBIR-STTR matching funds program to match both Phase 1 (up to $100,000) and Phase 2 (up to $500,000 for up to two years) to KY-based companies

• Michigan Emerging Technologies Fund would match 25% of Phase 1 SBIR/STTR (up to $25,000) and 25% of Phase 2 SBIR/STTR (up to $125,000); needs third party match to MI-based companies
Identifying Partners Upfront to Expedite Translational Research and Clinical/Regulatory Approvals

- Instead of a “relay race” a single donor (Gates Foundation) makes one grant to fund basic research, translational research, clinical & regulatory activities
- No uncertainty in finding the next partner or in future contract terms and no gaps (time, expertise, additional transactions) between stages
- Berkeley’s start up company, Amyris Biotech, can refine and scale up the technology
- The Institute for One World Health (iOWH) is the world’s first nonprofit pharmaceutical company and has expertise in clinical trials, FDA regulatory approvals. Mission: cure infectious diseases in developing world

Incubators
- Laboratory facilities for entrepreneurs and start up companies
- Limited term lease
- Reduction of start up costs
- Ability to test technology before seeking significant investment for scale up manufacturing
- Access to various resources and services
Fostering the Environment

Networking Forums

• Ensure that correct players are partnering
• CONNECT (originated at UCSD)
• CleanTech Systemwide UC Forum (4/08)
  – Panel discussions: regional initiatives, research emphases, impacts and drivers
  – Breakout sessions: fuel cells, biofuels/mass, sustainable energy, solar
  – Networking breaks: university researchers and administrators, government economic development and regulatory officials, companies, law firms, venture capital firms and investors
• Next: UC Forum on Stem Cells and Regenerative Medicine in coordination with British Consulate in San Francisco and Canadian Consulate in CA (4/09)
Basic Research Funding

Absolutely CRITICAL to continue basic research funding

- Results of basic research fuel the next generation of ideas and products
- Encourage curiosity and initiative to explore outside-of-the-box ideas

Developing Expertise From the Ground Up

- Technology Development Analyst Program at Boston University
  - Candidates: grad and undergrads in business, science, and engineering
  - Commitment: 10 hrs/week, at least 1 semester, preferably more
  - Compensation: $12/hour
  - Title: Technology Development Analyst
  - Role: Triage and assessment of new technologies, create reports and present select technologies to OTT
  - Training: 1 day intensive and/or Dr. Stevens’ Technology Commercialization Course
Student Competitions Provide Access to Expertise

• Annual business concept/plan competition by Kentucky Cabinet for Economic Development
  – Undergrad or grad students from the state’s eight public university business schools
  – Top team in 2008 earned over $44,000, has since incorporated and received IRB approval to test its prototype medical device in hospital delivery rooms. Half of the universities have implemented courses and programs to develop entries specifically for the state event and to qualify for national competitions, such as Moot Corp.

Successes of Academic Technology Transfer
Communicating the Value of Academic Technology Transfer

- FY 2007 AUTM U.S. Licensing Survey
- 686 new products introduced in FY07
- 5,036 new products introduced from FY98-FY07
- 555 new start-up companies launched in FY07
- 19,827 disclosures received in FY07
- 30,351 licenses/options were managed in FY07
- 6,279 new spinouts from FY80-FY07
- But metrics do not convey the real life value

AUTM Better World Project

- Telling the story of the outcomes of technology transfer in *human terms*
- A database of stories
- A publication (and e-version) with 100 Stories
- A publication (and e-version) with 25 case studies highlighting social and economic impact
- Creation of ‘additional AUTM metrics’
- AUTM is moving beyond its metrics and stories to document the outcomes and impact of academic technology transfer

www.autm.net  *  www.betterworldproject.net
UC Start-Up Companies (1986-2006) by Founding Year

UC Links to Biotech Companies

- 581 life science companies have links to UC
- 1 in 4 public biotechs is within 35 miles of a UC campus
- 1 in 6 public biotechs founded by a UC scientist
- 1 in 3 California biotechs founded by UC scientists

Source: Industry-University Cooperative Research Program
739 high tech companies have links to UC
1 in 6 CA R&D-intensive communication companies founded by UC scientists and engineers
57% has UC scientists and engineers as Execs
65% <7 years old
55% <200 employees

Key Points

✓ Industry-university partnerships are essential for development of products for the public benefit
✓ Think big for multi-disciplinary and multi-institutional research centers
✓ Nurture a broad array of technology development phases, including basic research
✓ University-industry relationships are varied and should be structured to address the circumstances
✓ “One Size Does Not Fit All”
Questions? Thank you.

Janna C. Tom
Janna.Tom@ucop.edu
510-587-6059