THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

From Concept to Application: Managing the Transfer of Academic Research Results

November 20-21, 2008
The National Academy of Sciences Lecture Room
2101 Constitution Avenue
Washington, DC 20418

A Workshop Organized by the
Committee on Management of University Intellectual Property
Board on Science, Technology, and Economic Policy and Committee on Science, Technology, and Law
Policy and Global Affairs Division

Thursday, November 20, 2008

7:30 AM to 8:00 AM
Continental Breakfast

8:00 AM to 8: 15 AM
Welcome
Mark Wrighton, Chancellor, Washington University in St. Louis and Chair, Committee on Management of University Intellectual Property
Mark Fishman, President, Novartis Institutes for BioMedical Research and Vice-Chair, Committee on Management of University Intellectual Property

8:15 AM to 9:45 AM
Session 1: ***Organization and evaluation of the technology transfer function within institutions***
Moderated by: **Wesley Cohen**, Professor of Economics and Management, Duke University
Panelists:
1. **Martin Kenney,** Professor of Human and Community Development, University of California at Davis
2. **Richard Helfrich**, Partner, Alameda Advisors, Inc
3. **Dana Bostrom**, Director of Innovation & Industry Alliances, Portland State University
4. **Kristina Johnson**, Provost and Senior Vice-President for Academic Affairs, The Johns Hopkins University
5. **Tony Hey**, Corporate Vice-President, Microsoft Research

Discussion Questions:
- How well is the university system setup to deal (1) with technology commercialization and licensing in general; (2) across different technologies, for example, software versus biotech; (3) with different firms, large corporations versus start-ups? What differences do you see in approaches undertaken by state and private universities?
- What are the incentives for administrations, faculty, firms, and TT officers to participate in the TT process? Is the current IP administrative structure on most campuses aligned with these incentives? Are these incentives serving the public interest, assuming that interest to be reflected in effective generation and diffusion of welfare-enhancing innovation?
- Do internal lines of reporting (e.g., via chief research/academic officer vs. via chief business/financial officer vs. via chief legal officer) affect the conduct of TTO functions?
- What is the optimal professional skill set of the TTO (e.g., legal, business development, technical specialization, etc)? To what extent does the real world mix of skills in most TTOs differ from the optimal?

— To what extent do you think a principal TTO mission is and should be the earning of revenue for the institution? Have pressures to earn revenue intensified or been moderated in recent years? How can TTOs resist or reduce such pressure if that should be the case?
— How does AUTM survey reporting affect expectations about TTO performance, especially with respect to revenue raising? What changes could or should be made to support diffusion of welfare-enhancing innovation?
— It is well known that the cost of technology transfer administration on most campuses exceeds the revenue they earn through licensing royalties, equity, or lawsuit settlements. In these circumstances should every institution that conducts some research have a TTO?
— Some studies suggest that faculty evasion of the technology transfer office is significant and growing? If you agree, to what do you attribute this? Is it problematic?
— What are the pros and cons of alternative arrangements:
    - Professor's privilege?
    - Outsourcing?
    - Regional (or another basis) coalition of institutions?
— What is the nature of interest, across different nations, in alternative models for tech transfer, commercialization and licensing?
— How well is the monitoring of the TLO's set up over time?

9:45 AM to 10:15 AM
Session 1 Open Discussion

10:15 AM to 10:30 AM
Break

10:30 AM to 12:00PM
Session 2: ***Effects of technology transfer and intellectual property management on the norms of the university***
Moderated by: **Margo Bagley,** Professor of Law, University of Virginia
Panelists:
1. **Jerome Kassirer**, Distinguished Professor of Medicine, Tufts University School of Medicine
2. **John Walsh**, Professor of Public Policy, Georgia Institute of Technology
3. **Melvin Bernstein**, Vice-President for Research, University of Maryland
4. **Rochelle Dreyfuss**, Pauline Newman Professor of Law, New York University
5. **Sheldon Krimsky,** Professor of Urban and Environmental Policy & Planning, Tufts University

Discussion Questions:
— Is there more than anecdotal evidence that the prospect of patenting and commercializing research discoveries has
    - changed behavior regarding the disclosure of findings, presentation of papers, or informal conversation around research?
    - changed the kinds of research projects undertaken (e.g., more applied, less basic)?
    - led faculty to devote less time to teaching and research?
    - changed the criteria for faculty promotion and tenure decisions?
— To the extent such changes have occurred, has the quality of research suffered or benefited? Has there been a more rapid or frequent application of research results in the marketplace?
— Has university patenting in particular fields, e.g., biomedical research, inhibited access to foundational discoveries or research tools and thus caused investigators to abandon certain lines of research?
— How does the share of royalty revenue accruing to faculty inventors (vs. research labs, departments, general funds) affect university norms? Would reducing the share help reverse norm deterioration? What unintended effects might it have?
— To the extent that norms of sharing results, data, materials, etc. have deteriorated, is that a function of commercial motives or a function of other pressures, such as greater academic competition, not necessarily associated with formal intellectual property (not only patents but also copyright and trade secrecy)?

— Are national policies needed beyond the current ones (e.g., the informal NIH guidelines on data sharing, research tools, patenting and licensing of genomic conventions, etc.)? Should other federal research agencies adopt the NIH approach?
— With further evidence that IP protection of knowledge that is typically part of public domain ("Anticommons") can strain knowledge-flow in academia, effectively taxing progress, are TTO's rethinking their IP strategy?

12:00 PM to 12:30 PM
Session 2 Open Discussion

12:30 PM to 1:30 PM
Lunch

1:30 PM to 3:00 PM
Session 3: ***Relationships with private research sponsors and best licensing practices***
Moderated by: **Craig Alexander**, Vice-President and General Counsel, Howard Hughes Medical Institute
Panelists:
1. **Diana Wetmore**, Vice-President of Alliance Management, Cystic Fibrosis Foundation Therapeutics, Inc.
2. **Arvids Ziedonis**, Assistant Professor of Corporate Strategy, University of Michigan
3. **Allen Poirson**, Director of Scientific Programs and Licensing, Glaucoma Research Foundation
4. **Louise Perkins**, Chief Scientific Officer, Multiple Myeloma Research Foundation

Discussion Questions:

— Could the up-front process of negotiating research sponsorship or patent licenses be made simpler and more transparent by standard terms, subject to "blockbuster insurance" terms ensuring appropriate payments to the university and inventor(s) in the event of a highly successful commercial product?
— Many sources have expressed a preference for non-exclusive licensing of patented university inventions on the assumption that access is less restricted. But aren't exclusive licenses frequently limited (by field of use, geography, development requirements, term limits, and conditions for non-profit research use, etc.)? And doesn't the availability of non-exclusive licenses depend on the price, i.e., possibly excluding would-be users?
— One company reported on the basis of more than 100 sponsored research agreements with universities that the incidence of commercializable results is very low compared to other benefits to corporate sponsors. One possible inference is that the transaction costs (actual costs, delays, etc) frequently associated with negotiating special terms including for IP are not justified. Is this experience generalizable? Across different fields?
— US-based firms have increasingly concluded sponsored research agreements with researchers at foreign higher education institutions. How much of this is attributable to delays and difficulties in concluding agreements with domestic institutions vs. other factors (e.g., research capability, cost, etc.)?
— The university needs to preserve its ability to publish, teach, and otherwise disseminate the results of research conducted on campus. But aren't there standard terms that protect these values?
— Have not-for-profit foundation sponsors of research encountered resistance from universities to means of assuring all investigators access to research results, data, and materials? If so, does the resistance appear to come chiefly from investigators or university administrations?
— What new types of agreements for handling IP have been put in place by foundations and corporations to reduce transaction costs, delays in coming to terms, and barriers to sharing research results and to accelerate application and commercialization?

3:00 PM to 3:30 PM
Session 3 Open Discussion

3:30 PM to 6:00 PM
Committee Closed Session at **NAS 250**

6:30 PM to 8:30 PM
Committee Dinner

Friday, November 21, 2008

7:30 to 8:00 AM
Continental Breakfast

8:00 AM to 8:15 AM
Opening Remarks

8:15 AM to 9:45 AM
Session 4: ***Spawning new companies out of university research: Start-ups and spinoffs***
Moderated by: **Darius Sankey**, Managing Director, Zone Ventures

Panelists:
1. **Thomas Fogarty**, Founder and Chairman of Fogarty Engineering and Institute for Innovation
2. **Donald Siegel**, Dean of the School of Business, State University of New York at Albany
3. **Case Grogan**, Licensing Associate, California Institute of Technology
4. **Steven Lazarus**, Managing Director Emeritus, ARCH Venture Partners
5. **Krisztina Holly**, Vice-Provost for Innovation, University of Southern California

Discussion Questions:
- One source familiar with the research portfolio of a major university (with large engineering and medical faculties) estimated that it generates at most six inventions a year that can be the basis of new enterprises. Is that a reasonable estimate of the rate at which such ideas emerge?
- Under what circumstances is the creation of a start-up or spin-off likely to be the most appropriate way of exploiting a university invention vs. licensing an established firm? Are there any criteria for making this determination? Under what circumstances would a spin-off or start-up *not* be appropriate? Does field of technology (IT v. life sciences) make a start-up or spin-off more or less appropriate? Is there any rigorous analysis or rule of thumb that other things being equal that promoting spin-offs and start-ups has a higher return on investment of effort than other means of commercializing university technology? Who does or should decide?
- Beyond commercially promising technology, successful technology-based start-ups require at a minimum a sound business plan, management skill, and finance. How and from what sources are these acquired by university spin-offs? To what extent can these be supplied within the university community? From outside? What assets does the university require other than a functioning TT operation? What parts of the university can or must contribute? Is there a threshold university capacity to engage in start-up development? Can institutions with modest resources be successful?
- How important are the following:
    - Technology management/commercialization/entrepreneurship education at the institution?
    - Business school involvement?
    - Incubation on or near campus?
    - University equity participation in lieu of licensing royalties?
    - University generated seed capital (e.g., through alumni)?
- What should be the terms of university equity participation, extent of management involvement, disposition of equity shares?
- Is there any agreement on how issues of individual and institutional conflict of interest should be handled?
- Are there essential local business conditions that strongly influence success?
- What counts as success? What is the rate of success? What is the attrition rate of university based start ups over, e.g. five years or ten years? Does it differ from startups generally? How long does it take for university start-ups to establish themselves?
- Have recent court decisions (e.g., Medimmune v. Genentech, eBay v. Merck Exchange) had any impact on licensing terms for university-generated patents?

9:45 AM to 10:15 AM
Session 4 Open Discussion

10:15 AM to 10:30 AM
Break

10:30 AM to 12:00 PM
Session 5: ***Alternatives to intellectual property-based, revenue- generating licenses in promoting technology transfer***
Moderated by: **Edward Lazowska**, Bill and Melinda Gates Chair in Computer Science and Engineering, University of Washington
Panelists:
1. **Arti Rai,** Elvin R. Latty Professor of Law, Duke University School of Law
2. **John Maraganore**, Chief Executive Officer, Alnylam Pharmaceuticals
3. **Forest Baskett**, General Partner, New Enterprise Associates
4. **Dana Bostrom**, Director of Innovation & Industry Alliances, Portland State University

Discussion Questions:
This panel explores the fact that while revenue-generating licenses receive a great deal of attention, they are, in fact, only one of a great number of ways to advance the public good through the transfer of university innovations into practice. We seek here to place revenue-generating licenses in their proper perspective.
- Looking back over the past 20 years, what would you suggest are the most important metrics for assessing the impact of university technology transfer, in rank order?
- How would you compare your rank-ordering to your perception of the motives and goals of the various "actors" in the process: university administrators, university technology transfer officers, faculty inventors, student inventors, regional economic development officials, established companies, venture investors, etc.?
- Again looking back over the past 20 years, how would you rank the effectiveness of various means of university technology transfer: revenue-generating licenses, publication in the open literature, mobility of students and faculty, consulting, industry-sponsored research, industrial affiliate programs, consortia through which participants receive access to technology via NERFs, open-source software, etc.?
- Assess the compatibility of each of these means with the traditional learning, discovery, and engagement missions of research-intensive universities.
- How much of university spin-off and start-up activity is independent of formally licensed technology?
- What are the patterns of university faculty and TTO practice with respect to computer software?
- Recently there have been notable examples of contributions of research results to the public domain, such as Science Commons. In what circumstances are these appropriate and effective substitutes for technology transfer based upon revenue-generating licenses?

12:00 PM to 12:30 PM
Session 5 Open Discussion

12:30 PM to 1:30 PM
Lunch

1:30 PM to 3:00 PM
Session 6: ***Using research results to advance the greater social good***
Moderated by: **Alan Bennett**, Executive Director, Public Intellectual Property Resource for Agriculture, Davis, California
Panelists:
1. **Bhaven Sampat**, Assistant Professor of Health Policy and Management, Columbia University
2. **Maria Freire**, President, The Albert and Mary Lasker Foundation
3. **Ashley Stevens**, Director of Office of the Technology Transfer, Boston University
4. **Labeeb Abboud**, Senior Vice-President and General Counsel, International AIDS Vaccine Initiative

Discussion Questions:

- What do we know about the adoption of policies within universities to specifically address humanitarian applications of university research results? Does the data indicate that universities could be doing more?
- What is/should be the process within institutions to assess the potential humanitarian application of research results/invention disclosures? Who is involved? Is there an established process or is it case by case? Does it tend to be instigated by investigators or from outside the institution – student groups? NGOs? Research sponsors?
- Are there different licensing terms for discoveries with potential to relieve poverty, hunger, disease, and environmental degradation in poor countries? How do they differ from discoveries with first world applications that do not promise to become commercial markets (e.g., orphan disease treatments)? From discoveries with applications that promise significant commercial markets?
- In what circumstances have pools of IP owned by universities overcome barriers to humanitarian applications of research advances?
- Has the experience been successful? What would you do differently or advise other institutions to do differently?
- There seems to have been progress in addressing the IP needs for certain area of health and agricultural development. Are there emerging technology sectors needed for global development that represent the next big challenges? How can universities position themselves to now to address emerging challenges?
- Our discussion has largely focused on patented technologies – what about access to information and materials? To what extent should universities focus their attention in these areas and with what relative priority?

3:00 PM to 3:30 PM
Session 6 Open Discussion

3:30 PM to 5:30 PM
Committee Closed Session at **NAS 250**