

PROJECT SUMMARY

Overview:

Research universities make major economic contributions at the global, national and regional level. Since the early 1980s, research universities have come under increasing pressure to justify research investment by showing their "economic contribution" to society through technology transfer. The preponderance of evidence of transfer has been based upon measuring patents and spinoffs. However, the qualitative research demonstrates that this seriously mismeasures and therefore underestimates the contributions, both economically and socially. This conference gathers scholars from a wide variety of disciplines to discuss the development of more comprehensive measures of the totality of the benefits provided by the U.S. research university to society.

The measurement difficulties may, in part, stem from the fact that in U.S. society there is no institution beyond the government itself that undertakes such an enormous variety of tasks yielding social benefits – all of which are related, in some way, to the dual goals of research and teaching. In a world within which organizations increasingly are offshoring various activities, universities are fundamentally rooted in place, and are very unlikely to relocate to lower-cost locations. As a result, the public investment in universities remains local, though the results in terms of knowledge and trained personnel contribute to the global good, also.

Remarkably, despite these widely accepted truisms, many of these public goods emanating from the university have been examined only fitfully.

Intellectual Merit :

The Workshop will include top quantitative and qualitative researchers on topics related technology transfer and university engagement with society and, in particular, how to better measure this role. We anticipate that the edited book from the conference papers will be highly visible and help set the agenda for future research on the role of the research university in society.

Broader Impacts :

The US research university is a fundamental constituent to the innovative and entrepreneurial parts of our economy. While we now know far more about university patenting and licensing than we did two decades ago, we know remarkably little about the many other ways technology is transferred and their myriad other contributions. To effectively maximize, the enormous investments the US is making, science policy studies needs to expand its research focus to better identify and measure these other university outputs. This Workshop aims to catalyze a discourse on how these other outputs can be measured.

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Justification

Since the early 1980s, research universities have come under increasing pressure to justify research investment by showing their “economic contribution” to society through technology transfer (Berman 2011; Breznitz, 2014; Goldstein and Drucker 2006; Mowery et al. 2004; Stephan, 2012). Despite more than three decades of research, with the exception of a few qualitative studies, current research continues to focus almost exclusively upon patents and university-licensed startups (Harrison and Leitch 2010; Kenney and Mowery, 2014). These are important indicators, but interviews and historical studies suggest that many of the most important economic and social contributions of university engagement with society cannot be captured by such narrow indicators (Agarwal and Henderson 2002; Feldman and Desrochers, 2003; Kenney and Mowery, 2014; Levin, 1993; Litan et al., 2007; O'Mara, 2005a; Rodin, 2007). To provide a more comprehensive measurement of the totality of the benefits provided by the U.S. research university, it is necessary to develop a research agenda that can more completely measure both the public good components and the true economic value of the training and knowledge diffusion functions.

The operational diversity among U.S. research universities means that the university system should be conceptualized as a semi-autonomous group of independent actors that both compete and cooperate in the academic marketplace and through various organizations that may lobby for the research university as an institution. This diversity and independence means that the system conducts multiple “experiments” that, when successful, can rapidly diffuse, but, of course, are implemented in different ecosystems. These conditions suggest that those attempting to assess the contributions of the research university require multiple and more flexible measurement methodologies to evaluate the university’s contributions (Lester 2005; Litan and Mitchell, 2010; Litan et al., 2007). Further, while most research university do not generate significant licensing income (see, for example, Siegel et al. 2003) nor are they located in entrepreneurial ecosystems, all of them generate long-term regional benefits (Feldman and Breznitz, 2009). These benefits are extremely varied and range from their professors consulting with local firms (Agrawal and Henderson, 2002) to attracting potential young leaders as students to increasing income of graduates, creating public goods that can attract firms to the region, providing educated employees to local firms (Florida, 2002), and, more rarely, through establishing new firms (Lockett and Wright, 2005; O'Shea et al., 2005; Shane, 2004); some of which can form the basis or one of the key contributors to the creation of entirely new industries (Walshok and West, 2014; Lapsley 2014).

Case studies have demonstrated the wide variety of regional contributions (Lester 2005). These can include community involvement, being the focus of real estate development, summer training for disadvantaged youth, post-graduate training, and many others (O'Mara, 2005b; Breznitz, 2007; Maurrasse, 2001; Moreau and Farrant, 2008; Wiewel and Perry, 2008). In many respects, in U.S. society there is no institution beyond the government itself that undertakes such an enormous variety of tasks yielding social benefits – all of which are related, in some way, to the dual goals of research and teaching.

In a world within which organizations increasingly are offshoring and outsourcing various activities, universities are fundamentally rooted in place, and are very unlikely to relocate to lower-cost locations.¹ As a result, the public investment in universities remains local,² though the results in terms of knowledge and trained personnel contribute to the global good, also. Remarkably, despite these widely accepted truisms, many of these public goods emanating from the university have been explored only fitfully or not at all especially in conventional measurements of the total value of the research university to society.

Description of Workshop and Need

In response to the “Dear Colleague” letter, NSF 15-047, we propose organizing an agenda-setting workshop to explore alternative conceptualizations of the value of investments in academic research, how to measure this value and evaluate what program/incentives/efforts can increase the social and economic value of academic research. The workshop will have two streams: The first stream will focus on measurements. i.e., how do we measure the return of publicly-funded research both in terms of commercialization, but also on the wider range of universities’ contributions? The second stream focuses on evaluation strategies for initiatives to increase these contributions.

The meeting will convene leading scholars from the following fields: university-technology commercialization, the economics of higher education, and science, technology, and innovation studies. By gathering representatives from these different communities, we hope to catalyze a broader community that will examine the value created by universities from different perspectives and with different scientific methodologies. The current plan envisions integrating key university leaders (such as, presidents or key subordinates) and policy-makers into the workshop. Their “real-world” perspectives and concerns can contribute to the formulation of research projects that can address these problems and knowledge gaps. We aim to attract university representation from both Association of Public and Land-grant Universities and Association of American Universities member universities.

Workshop Participants

The Workshop will pay for the airfare, food and lodging for each participant. The participants are chosen

Researchers to be invited:

1. Sheryl Winston Smith, Temple University
2. Julia Lane, American Institutes for Research
3. Ajay Agrawal, University of Toronto
4. Cyrus Mody, Rice University
5. Diana Hicks, Georgia Institute of Technology

¹ It is well-known that many universities are establishing branch campuses; both in the U.S. and abroad. And yet, there are no cases in which a major research university has shuttered the home campus and relocated to one in another region or nation.

² It is also notable that the vast preponderance of spinoffs from university technology and personnel also remain local (Steffensen et al. 2000).

6. Mary Frank Fox, Georgia Institute of Technology
7. Fiona Murray, MIT
8. Pierre Azoulay, MIT
9. Andrew Nelson, University of Oregon
10. Elizabeth Popp Berman, SUNY Buffalo
11. Anthony G. Picciano, CUNY
12. Sheila Slaughter (or Larry Leslie) University of Georgia
13. Al Link, University of North Carolina, Greensboro
14. Paula Stephan, Georgia State University
15. Jerry or Marie Thursby, Georgia Institute of Technology
16. David Mowery, UC Berkeley
17. Donald Siegel, SUNY, Buffalo
18. Walter Powell, Stanford or Jason Owen-Smith, University of Michigan
19. Walshok, Mary, UCSD
20. David Audretsch, Indiana University
21. Chris Kelty, UCLA
22. David A. Wolfe, University of Toronto
23. Joshua Drucker, University of Illinois, Chicago
24. Creso Sa, University of Toronto
25. Caroline Hoxby, Stanford University
26. Barry Bozeman, University of Arizona
27. John Aubrey Douglass, UC Berkeley
28. Richard Arum, NYU
29. Robert Litan or Lesa Mitchell

Prospective University Presidents or their representatives to be invited:

Michael Crow, President, Arizona State University
 Linda Katehi, Chancellor, or Ralph Hexter, Provost, UC Davis
 Richard Levin, President Emeritus, Yale University
 Meric Gertler, President, University of Toronto
 Wim Wiewel, President, Portland State University
 Judith Rodin, President, Rockefeller Foundation
 University of California Office of the President

Prospective Local Participants:

Andrew Hargadon, Professor, UCD
 Mario Biagioli, Professor, UCD

Interested Parties

1. Representative of the Kauffman Foundation
2. AUTM
3. APLU
4. AAU

5. NSF SciSIP

Workshop Venue and Childcare

The Workshop would be the University of California, Davis. UC Davis is conveniently served by the Sacramento or San Francisco airports. Because the Workshop will be scheduled in May or June 2016 in California travel logistics should be acceptable. All participants will be asked as to whether they need childcare, and it will be provided on an as requested basis.

Dissemination and Anticipated Deliverables

- 1) The workshop
- 2) A conference report with the proceedings and presentations.
- 3) The papers will assembled to either be published as a special issue of a journal such as the *Journal of Technology Transfer* or an edited book published by a university press.

Planning Committee

Martin Kenney, University of California, Davis, Co-Chairperson

Shiri Breznitz, University of Toronto, Co-Chairperson

Maryann Feldman, SciSip Program Director and Professor, University of North Carolina

David Audretsch, Distinguished Professor and Ameritech Chair of Economic Development, Indiana University

Sheila Slaughter, Professor, Institute of Higher Education, University of Georgia

Mary Walshok, Associate Vice Chancellor for Public Programs and Dean of Extension, University of California, San Diego.

Goals

- (a) To develop a new research agenda for evaluating more comprehensively the ways in which research universities and their outputs are evaluated to include the wide variety of social benefits, rather than limiting evaluation to patents and publications.
- (b) To create a new research community uniting scholars that may not be aware of each other's work
- (c) To engage social scientific researchers with the cutting edge issues that university presidents and policy-makers experience in daily life

Workshop Agenda

Day 1 –

6:30 Dinner – Workshop speaker – Maryann Feldman (why it is important at this time)

Day 2 -

8:00--9:00 AM Breakfast

9:00--9:20 AM – Plans for Workshop and goals – Martin Kenney

10:00--12:00 Breakout sessions (2-3 sessions) widening up the meaning of measurements: Measuring the return of publicly funded research while focusing on the range of universities' contributions from commercialization to community service and volunteer work.

12:00--1:30 Lunch

1:30--3:30 Breakout sessions (2-3 sessions) Increasing Universities' contributions: how can we drive a wider range of university contribution as well as making sure that the university's contribution is innovative and provides top quality services to the public, while protecting the research university's fundamental goal of teaching and research excellence. While these two goals need not clash, maintaining the balance between engagement and scholarly excellence is a work in progress.

3:30--4:00 PM Coffee Break

4:00--5:30 PM open discussion (session chairs raise issues from sessions)

6:30-- Dinner

Day 3 -

8:00-9:00 AM Breakfast

9:00—9:20 AM – Opening remarks – Shiri Breznitz

10:00--12:00 AM Breakout sessions (2-3 sessions) Both streams

12:00--1:30 Lunch

1:30--3:30 Open discussion – where do we go from here? Discussion on publications, grants, edited book, etc.

Trip to UC Davis Napa Valley Experiment Station to discuss UC Davis technology transfer to the region with guest lecture by Professor Emeritus James Lapsley, former director of University Extension Wine Program.

TimeLine

Phase 1: Invitation and workshop organization October 2015 – December 2015

Phase 2: Workshop May/June 2016

Phase 3: Timeframe for edited book

June 2016 – August 2017

- Agrawal, A. & Henderson, R. 2002. Putting Patents in Context: Exploring Knowledge Transfer from MIT. *Management Science*, 48, 44-60.
- Appleseed. 2003. Engines of Economic Growth: The Economic Impact of Boston's Eight Research Universities on the Metropolitan Boston Area.
- Berman, E. P. 2011. *Creating the market university: How academic science became an economic engine*. Princeton University Press.
- Breznitz, S. M. 2007. From Ivory Tower to Industrial Promotion: The development of the Biotechnology Cluster in New haven, Connecticut. *Revue d'Economie Industrielle*, n°120 115-134.
- Breznitz, S. M. 2014. *The Fountain of Knowledge: The Role of Universities in Economic Development*. Stanford: Stanford University Press.
- Feldman, M. P. & Breznitz, S. M. 2009. The American Experience in University Technology Transfer. In: McKelvey, M. & Holmen, M. (eds.) *European Universities Learning to Compete: From Social Institutions to Knowledge Business*. Edward Elgar.
- Feldman, M. P. & Desrochers, P. 2003. Research universities and local economic development: Lessons from the history of Johns Hopkins University. *Industry and Innovation.*, 10, 5-24.
- Florida, R. 2002. *The Rise of the Creative Class*, New York, NY, Basic Books.
- Goldstein, H., & Drucker, J. 2006. The economic development impacts of universities on regions: do size and distance matter? *Economic Development Quarterly*, 20(1), 22-43.
- Harrison, R. T., & Leitch, C. 2010. Voodoo institution or entrepreneurial university? Spin-off companies, the entrepreneurial system and regional development in the UK. *Regional Studies*, 44(9), 1241-1262.
- Kenney, M. & Mowery, D., C. 2014. *Public Universities and Regional Growth: Insights from the University of California*, Stanford, Stanford University Press.
- Kenney, M. & Patton, D. 2009. Reconsidering the Bayh-Dole Act and the Current University Invention Ownership Model. *Research Policy*, 38, 1407-1422.
- Lester, R. (2005). Universities, innovation, and the competitiveness of local economies. A summary Report from the Local Innovation Systems Project: Phase I. Massachusetts Institute of Technology, Industrial Performance Center, Working Paper Series.
- Levin, R. C. 1993. Beyond the Ivy Walls: Our University in the Wider World [Online]. Yale Office of the President. Available:
http://www.yale.edu/opa/president/speeches/levin_inaugural.html.

- Litan, R. E. & Mitchell, L. 2010. A Faster Path from lab to Market. *Harvard Business Review*, 88, 52-53.
- Litan, R. E., Mitchell, L. & Reedy, E. J. 2007. The University as Innovator: Bumps in the Road. *Issues in Science and Technology*, XXIII, 57-66.
- Lockett, A. & Wright, M. 2005. Resources, capabilities, risk capital and the creation of university spin-out companies. *Research Policy*, 34, 1043-1057.
- Maurresse, D. J. 2001. *Beyond the campus : how colleges and universities form partnerships with their communities*, New York, Routledge.
- Moreau, R. & Farrant, R. 2008. The university effect: UMass Lowell could help revitalize city housing. *The Lowell Sun*, 5/18/2008.
- Mowery, D. C., R. R. Nelson, B. N. Sampat and A. A. Ziedonis. 2004. *Ivory Tower and Industrial Innovation. University-Industry Technology Transfer Before and After the Bayh-Dole Act*. Stanford University Press: Palo Alto, CA.
- O'Mara, M. P. 2005a. *Cities of Knowledge, Princeton and Woodstock*, Princeton University Press.
- O'Mara, M. P. 2005b. *Selling the New South. Cities of Knowledge: Cold War Science and the Search for the Next Silicon Valley*. Princeton: Princeton University Press.
- O'Shea, R. P., Allen, T. J., Chevalier, A. & Roche, F. 2005. Entrepreneurial orientation, technology transfer and spinoff performance of U.S. universities. *Research Policy*, 34, 994-1009.
- Rodin, J. 2007. *The University and Urban Revival*, Philadelphia, University of Pennsylvania Press.
- Shane, S. 2004. *Academic Entrepreneurship: University Spinoffs and Wealth Creation*, Cheltenham, Edward Elgar.
- Siegel, D. S., Waldman, D., & Link, A. (2003). Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study. *Research Policy*, 32(1), 27-48.
- Stephan, P. E. 2012. *How Economics Shapes Science*, Harvard University Press.
- Steffensen, M., Rogers, E. M., & Speakman, K. (2000). Spin-offs from research centers at a research university. *Journal of Business Venturing*, 15(1), 93-111.
- Walshok, M. & West, J. 2014. Serendipity and Symbiosis: UCSD and the Local Wireless Industry. In: Kenney, M. & Mowery, D. (eds.) *Public Universities and Regional Growth: Insights from the University of California*. Stanford: Stanford University Press.

Wiewel, W. & Perry, D. (eds.) 2008. *Global Universities and Urban Development: Case Studies and Analysis*, Cambridge, Massachusetts: M. E. Sharpe.

