



UNIVERSITY OF AKRON

Congressional Testimony
Subcommittee on Research and Science Education
Committee on Science and Technology
U.S. House of Representatives

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Written testimony:

Chairman Lipinski, Ranking Member Ehlers, Members of the Subcommittee, I am Wayne Watkins, Associate Vice President for Research at The University of Akron, and Treasurer of the University of Akron Research Foundation. Thank you for allowing me to testify and to share a perspective on technology commercialization, university industry collaboration, and the University of Akron Research Foundation (UARF) model for improved knowledge and technology transfer from academic researchers to the private sector. Universities, across the spectrum, have the capacity to be powerful contributors to innovation and economic development through knowledge (intellectual asset) creation, transfer, and implementation. In support of the innovation mission of universities, the following testimony is provided in response to the questions of the House Subcommittee on Research and Science Education of the House Committee on Science and Technology.

University-based technology transfer, commercialization, and university-industry collaborations are generating growing interest in academia, corporations, and government. These powerful innovation processes and relationships are ways for academic institutions to disseminate knowledge and share assets, for corporations to accelerate the commercialization of innovations, and for the nation to leverage its valuable resources to reinvigorate the economy and create jobs. The escalating interest, in part, also stems from the recognition that academic institutions play a growing central role in regional and national economic development. The scientific and technological assets, and know-how emanating from universities, federal laboratories, medical and other research institutions, form a powerful base that can

usher in a new, globally competitive era in U.S. knowledge based manufacturing and transformational technology.

As the innovation ecosystem evolves and new technologies emerge, it is prudent to consider the policies, incentives, and structures that best accelerate innovation by enhancing university-industry collaborations and by optimizing commercialization of university innovations.

Challenge #1 As innovation outcomes are dependent on a continuing stream of world leading researchers, innovators, and scholars, the United States must continue to **improve the quality, accessibility, and performance of its higher education systems and institutions to achieve a sustainable status as the leading source and nurturer** . **Educating, developing, identifying, recruiting, and supporting the leading innovators is the primary challenge** to increasing the knowledge and technology flowing from the universities to the private sector and *vice versa*. Thus universities and governments need to address education performance improvement as well as access and costs. Visa and immigration issues need resolution to insure the United States benefits from the top innovators globally.

Challenge #2 **Sufficient and sustained basic and applied research funding to qualified innovators to support leading edge research and development remains a continuing challenge** to driving the downstream commercialization. The majority of research funding at U.S. universities comes from federal agencies. Such funding is the primary source for innovations that result in technology and entrepreneurial

celebratory of innovation related activity by recognizing and rewarding innovation, commercialization, and industry collaboration as well as by encouraging entrepreneurial activity. Institutional support may be decisions that reward work with industries and technology transfer. Some academic institutions now give credit toward tenure for entrepreneurial and commercialization activities. These incentives along with recognition and royalty sharing to the inventors, and their research programs, are effective ways to encourage faculty to engage in commercialization. **Federal policy should recognize and support these strategies.**

Challenge #5 Creating porous boundaries and effective boundary spanning strategies

C. Identifying and connecting with industry partners that have: 1) an appreciation for universities and their nature, 2) flexibility in contracting to accommodate university limitations or core characteristics; and 3) sufficient expertise, culture, capital, and commitment to support innovation and technology commercialization originating from academic institutions.

- i. Corporate culture influences the extent to which corporate researchers engage with university researchers.** Corporations differ considerably regarding their interaction with external research organizations. Just as some universities view corporations as adversarial in forming research alliances, some corporations also view universities as adversarial in negotiating licensing agreements. It is essential that corporations have leaders, who understand and practice the innovation imperative. Corporate and university representatives participating in University Industry Demonstration Partnership (UIDP) workshops voiced an emerging trend among industry to work with fewer universities, primarily to reduce transaction costs and relationship development efforts. By doing so, corporations could miss commercialization opportunities from potentially valuable research being conducted at smaller institutions or from those outside of selected geographical areas.
- ii. Corporate identification of university intellectual property** involves a wide range of activities from internal or contracted ferreting to personal relationships between researchers. Many universities also have established web-accessible databases populated with available technologies and there are emerging national databases that now combine individual university web databases. Marketing outreach by university technology transfer offices to match their intellectual property with known industry needs in an open innovation mode is growing in effectiveness.
- iii. Personal relationships between researchers may still be the best source for technology transfer and commercialization.** While there are many ways for companies to identify relevant university research, many believe that no method substitutes for personal interaction. Faculty research professionals, who meet at conferences and through less formal channels, provide a natural conduit for technology transfer and commercialization.
- iv. University and corporate expectations frequently differ as to speed of research and development as well as the university -to-publish.** Corporations seek accelerated commercialization and intellectual property protection, while universities focus on teaching and knowledge dissemination. Effective partnerships respect the differences and balance the inherent conflicts.

- v. **Small businesses often encounter additional barriers in accessing university and federal laboratory research.** Except for entrepreneurs, who are recent

activities.

H. Appropriate roles for inventors in commercialization need to be established on each specific situation. University inventors often want to play a significant role in the commercialization of their innovations. When the innovation is used to form a start-up company, the inventor may want to become the business leader or CEO, and when the inventions are licensed, the inventor often wants to play a consulting role in adapting their inventions for commercial use. But few inventors have the skills to be strong entrepreneurs and business leaders and, from a business commercialization standpoint, the inventor's consulting presence may not always be preferable. Further, from the standpoint of the inventor's role as CEO often is generally not advisable. Universities need to be sensitive to corporate expectations in setting up commercialization strategies relative to the roles for inventors in start-ups and licensing arrangements.

I. A typical university receives less than 15% of its research funding from industry. Yet the innovation rewards of university-industry research are often significant. Federal financial support for industry sponsored research would pay significant economic development and innovation dividends. We also find that industries are increasingly entering into research agreements with universities outside of the United States. **A National Academies report cited ease of collaboration and access to faculty expertise as two reasons for increasing partnerships with international institutions over domestic institutions.** The cost and transfer of intellectual property rights are other reasons that U.S. companies frequently sponsor research at international institutions. **U.S. universities need to become the preferred providers based on their specific value proposition.** Domestic institutions, with government facilitation, need to have research and innovation services of sufficient quality to earn preferred provider status. Recently five international technology transfer groups including the Association of University Technology Managers (AUTM) and the Association of University Technology Managers (AUTM) were formed.

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Fields that were once distinct are rapidly becoming integrated. Yet federal funding has been slow to address the ever evolving face-of-research. Federal funding should effectively address and promote multi-disciplinary approaches to innovation and commercialization. At The University of Akron, a new Integrated BioSciences Program at the graduate level has proved particularly effective at driving cross disciplinary collaboration.

R. Forming start-ups, based on university innovations, requires a different set of tools than licensing innovations. Forming startups requires entrepreneurial and business development expertise in addition to traditional patenting and licensing knowledge. Many technology transfer offices (TTOs) at academic institutions are not prepared to handle the formation of startups. For those academic institutions that have centers of entrepreneurship, TTOs may refer innovators to the centers, but too

- V. Systemic appreciation for the societal value of university-industry collaboration includes improved education of all students regarding the roles of innovation, entrepreneurship, and intellectual capital. **Universities should consider required courses** at both the graduate and undergraduate levels **with selected innovation-**

accelerate university research to market, mainly through seed funding and extensive mentoring. Linkages with institutional and external resources (such as high-functioning incubators) that take emerging technologies to the next levels of commercialization provide an even greater chance of success.

Challenge #7 The need for government to establish and maintain business friendly policies and to sponsor programs that enable private sector commercialization of intellectual assets.

The United States government plays a significant role in the nurturing of academic innovation. The priorities for the U.S. government related to university innovation should be:

- A. To promote innovation and competitiveness as a critical national priority and to promote the essential and recognized roles of universities and industry in the same.**
- B. To provide strong and sustained federal basic and applied research funding.**

Research that is not market driven does produce unanticipated beneficial discoveries. Nevertheless, merely increasing basic research funding will not necessarily result in greater economic development unless there is follow-on funding for translational research.
- C. To have a strong patent system** that rewards novel inventions and protects against patents that lack novelty or otherwise stifle innovation. Also, encourage discussion on a potentially improved patent system that rewards early disclosure as a means of accelerating and reducing the cost of innovation.
 - i. The current patent reform efforts are appreciated and needed. However, to further accelerate innovation, the **Government** should with economists, inventors, innovators and industrialists, **consider an improved intellectual property system appropriate for the 21st century** that fosters the public good **with more immediate disclosure of inventions.****
 - (a) As an example, consider a patent system that rewards immediate disclosure of inventions on-line, which publication also serves as the equivalent of patent filing for determination of patent priority -to-file. Such efforts would reduce initial research and development costs by reducing duplication of efforts as well as increase and accelerate innovation. It would cause some pause in the inventor community which seeks to maintain developments confidential as long as possible for competitive purposes. The balance should be reconsidered in light of current technology that makes information instantaneously available worldwide and the need to accelerate innovation.

- ii. A related option is to **transform the patent system** so that it functions not only as a means to obtain proprietary protection but also serves **as an on-line idea management system**. Increasingly, organizations and countries will compete based on the speed at which they can discover, develop and implement ideas for new products and services. To compete at this level, organizations must

and resources, its unique regional economy, and its unique expectations for results by state and local investors and sponsors. Best practices are dependent on these local considerations.

G. There are effective federal programs that support university-industry collaborative research, and technology transfer and commercialization.

Programs such as the Technology Innovation Program (TIP) at the National Institute of Standards and Technology (NIST) promote not only university-industry collaboration but also multi-institutional, inter-disciplinary R&D and commercialization. The Industry/University Cooperative Research Center (I/UCRC) program at NSF is a successful, long-standing program that focuses on the development and commercialization of university-industry R&D with the provision that the industry must provide major support to the center at all times. However, these programs are limited and under-funded. Some new programs, such as Advanced Research Projects Agency-Energy, (ARPA-E) at the Department of Energy (DoE), also have the potential of promoting successful multi-institutional, university-industry collaboration. **Continuation and expansion of effective programs, particularly for technology as it progresses through the valley-of-death including SBIR, STTR, and TIP, are appropriate.**

H. Tax incentives, such as the corporate research and development (R&D) tax credit, may encourage corporations to invest in R&D and also may encourage them to invest in adaptive research to commercialize innovations from research institutions. Since R&D expenditures in many corporations have been declining, and since the cost of adapting innovations stemming from research institutions can be high, the use of tax incentives to promote the full range of research may be increasingly significant. In addition tax credits could be considered for intellectual property investment, capital formation, and industry funding of university research. Also, the Tax Reform Act of 1986 limits industry-sponsored research in university facilities financed by tax-exempt bonds, thus hindering university-industry partnerships. As the tax provision does not generate revenue, reform would not reduce tax revenues.

I. Develop sustainable programs to assess nascent university and federal laboratory technology and make it presentable and easily understood by investors and entrepreneurs.

J. International Traffic in Arms Regulations (ITAR) and visa reform could ensure that inappropriate items are not on the ITAR list and would ensure that innovators are allowed entry into the United States.

K. The federal government should establish conflict of interest policies and support state and university conflict of interest policies that permit, rather than prohibit,

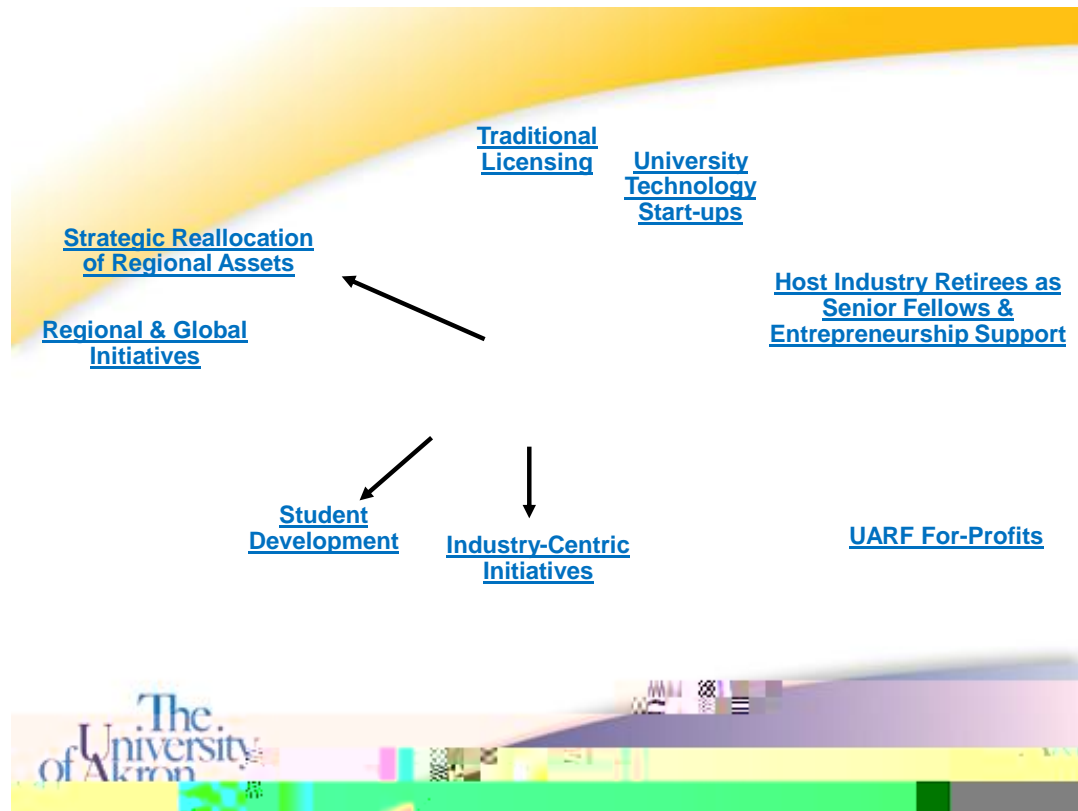
encourage new models that otherwise may not be pursued and would improve the return on the investments, as well as link local communities. There are many possible mid-sized state universities capable of being a true economic hub for populated urban regions

Challenge #2 A related challenge is that of being ineligible for selected federal programs because an institution is not a prior award winner. As an example, the NSF Partnership for Innovation program required any new applying universities to co-apply with prior award winners, which effectively precluded many universities from proposing although otherwise meritorious. This seems contrary to the principle of rewarding innovation based on merit.

4) *University of Akron Specific Questions:*

- a. *Are there best practices or policies implemented by the University of Akron that could serve as a model for other universities interested in increasing the commercialization of federally funded research?*
- b. *Specifically what is the role of the University of Akron Research Foundation?*
- c. *How is The University of Akron engaged in local, state and regional innovation initiatives?*

Most universities focus their innovation efforts on technology transfer and industry sponsored research. The University of Akron has developed strong programs in both technology transfer and industry sponsored research, however The University of Akron has adopted a more robust model that provides significantly more innovation related services and programs



The University of Akron adopted several **practices and policies that could serve as a model for other universities** seeking to increase their commercialization effectiveness and in building regional innovation capacity. As best practices and policies are usually situation specific, each institution needs to consider and respond to its own regional circumstances, since as the communities grow, so does the wealth creation to that community. Nevertheless, many of the University of Akron practices are transferable. The coordinated University of Akron and University of Akron Research Foundation (UARF) model has been particularly successful for supporting innovation in the northeastern Ohio region of ca. four million residents and 80,000 companies with employees. UARF was formed as a boundary spanning structure for industry and the university.

characteristics and strategies, which could be considered *best practices include:*

Best Practice #1 Carefully assess university and community resources and periodically consider how such resources could be used, reconfigured and reallocated for mutual benefit.

- A. **Libraries** - Several regional companies donated their library holdings to The University of Akron, thus increasing university holdings a positive for academic metrics. In most cases, the books remained at the corporate facilities. The University assumed management of the libraries and provided library services to the companies

E. Patents and other intellectual property pooling - In our discussions with industry, we also look for non-core intellectual property that UARF can either bundle with its intellectual property or otherwise assist in the exploitation.

Best Practice #2 Create an Appropriate Organization Structure. The State of Ohio

equity. They have become drivers of entrepreneurship within UARF and with industry collaborators in the Akron community.

We were fortunate to initially find two *kindred spirits* in Barry Rosenbaum and Gordon

Open innovation. Our senior fellows conceptualized and implemented with UARF support, open innovation seminars for regional companies to assist manufacturing companies in the development of business opportunities. We now see a major trend to finding ideas and inventions from any source possible. As universities, we need to determine how we fit in and facilitate increased interactive and collaborative innovation. We have approximately 100 business leaders, policy makers and innovators, who meet to discuss and practice open innovation annually.

Best Practice #4

Thus, as we like to say, 50% is of direct benefit to the inventors. The remaining 50% is shared with the department, college, and UARF for long-term fiscal viability.

We experienced substantial growth in disclosures and patent applications as well as significant royalty revenue growth. We spent considerable time with faculty inventors in order to fully understand the technology opportunity and then developing an appropriate commercialization strategy. As a result, we have 61 technologies now either licensed or optioned to license.

Best Practice #7 Increase research funding and specifically industry-driven research.

We approached companies to seek a comprehensive understanding of their specific challenges and opportunities. UARF representatives would declare:

assignment for you. Give us a challenge! What can we do to help make you more

One company was interested in having experts help them source and exploit emerging technology. We formed a team of UARF experts, primarily from retired industry personnel, to provide such innovation services. The R&D managers of the company now have their annual meeting at The University of Akron and we report to them on our innovation service efforts and we learn about their unique

For Akron Polymer Systems Inc., we formed a university/faculty spin-off company to manufacture a compound already licensed to an end-user, who needed product. We had the scientific expertise in the faculty inventor and his graduate students. They are now a company of about 15 employees, many of whom are graduates of The University of Akron polymer program and importantly, are staying in the Akron area.

As another example of our outreach activity, we pursued licensing discussions with an out-of-state company, which led to the formation of an Ohio affiliate company to develop and exploit ceramic filtration technology. The move was not a requirement of the license, but the company saw value in the linkages and infrastructure that we had created at The University of Akron and moved to Akron.

Best Practice #10 Encouraging student development UARF has made connections resulting in over 120 assistantships with local business. UARF has also provided scholarships to selected programs and is currently pursuing a student run seed capital fund as well as a

Best Practice #11 Regional alliances Recently, we entered into agreements wherein UARF personnel are made available to provide technology transfer and innovation services to other regional institutions, which for a variety of reasons do not have the critical mass to have a full technology transfer and innovation services group. Thus, we provide technology transfer services as needed to Cleveland State University, Youngstown State University and Lorain County Community College. We are also in discussion with local hospitals and companies to assist them with technology transfer and intellectual property management services. We formed the **Ohio Research Foundation**, as a non-University of Akron focused entity, to provide innovation services to regional partners.

Best Practice #12 We have been successful in developing and **teaching intellectual property management courses** primarily to law students. We plan to expand it to the science, engineering, and business disciplines. We are now working with the National Council on Entrepreneurial Tech Transfer to teach webinars on technology commercialization.

Best Practice #13 We formed an innovation fund with our regional higher education partner, Lorain County Community College. The Innovation Fund provides capital to University of Akron spin[)JTJETBT1 0 0a8uB71-4(y)11(, Y)5(oun)o8 11.13(undL 0 0 1 436.T1 0 0a8uB71-4

from corporations, foundations,

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activities provided resources are in addition to, and

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programs more effective, **an increased portion of funding should be available to awardees to purchase commercialization and business development services including, but not limited to, marketing, export development, and other critical elements needed to reach the market place.**

- E. The Partnership for Innovation (PFI) program has been a success, particularly in breaking down barriers.** PFI promotes innovation by bringing together colleges and universities, state and local governments, private sector firms, and nonprofit organizations. These organizations form partnerships that support innovation in their communities by developing the people, tools, and infrastructure needed to connect new scientific discoveries to practical uses.

The goals of the PFI program are to stimulate the transformation of knowledge created by the national research and education enterprise into innovations that create new wealth, build strong local, regional, and national economies, as well as improve ~~the national well-being, broaden the participation of all types of academic institutions~~ and all citizens in NSF activities to more fully meet the broad workforce needs o

Biographical Sketch
Wayne H. Watkins

June 2010

Wayne H. Watkins serves as Associate Vice President for Research at The University of Akron and as Adjunct Professor and Intellectual Property Fellow at The University of Akron School of Law. He serves as Treasurer and directs the operations of the University of Akron Research Foundation, a regional innovation and wealth creation services organization. Mr. Watkins directs The University of Akron programs in intellectual property management, emerging enterprise creation and support, technology based economic development, and university-industry collaborations. Mr. Watkins is Immediate Past President of the University Economic Development Association, a national organization supporting universities in economic development and innovation. Prior to his roles at the University of Akron in Ohio, Mr. Watkins served as Director of the Research and Technology Park and the Office of Technology Commercialization at Utah State University in Logan, Utah. He has served as vice president and corporate counsel of a diversified business holding company and was the administrator of the Utah Innovation Center. He currently serves on several boards of directors of technology and foods related companies and served ten years as a member of the North Logan City Council. Mr. Watkins has taught courses in *Intellectual Property Management, Technology and Innovation, Business Policy, and Global Business*. Mr. Watkins has been a frequent presenter at symposia on intellectual property and innovation including seminars hosted by the World Intellectual Property Organization. Mr. Watkins has degrees in mechanical engineering (B.S.M.E), business (M.B.A), and law (J.D.).