



Broadening University and Industry Engagement

A Summary of the
OSTP-UIDP Symposium
Stanford, CA • Dec. 2019



Strengthening
University-Industry
Partnerships

About UIDP

UIDP is a solutions-oriented forum where academic and industry representatives find better ways to work together. Our membership, comprising top-tier innovation companies and world-class research universities, identifies issues affecting university-industry relations and seeks new approaches to partnership and collaboration. Together, we produce tools and resources to help members make a greater impact. We don't just talk about problems. We solve them. Learn more at uidp.org.

About this Document

This document provides a summary and key takeaways of the December 2019 White House OSTP-University Industry Demonstration Partnership (UIDP) Broadening University and Industry Engagement Symposium held at Stanford University. This document was developed with input from staff at UIDP, OSTP, and IDA's Science and Technology Policy Institute (STPI).

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Background

On December 3, 2019, the Office of Science and Technology Policy (OSTP) and the University Industry Demonstration Partnership (UIDP) hosted the Broadening University and Industry Engagement symposium at Stanford University. The symposium brought together more than 90 leaders and experts from the private sector, academia, and federal, state, and local governments to identify opportunities to broaden and strengthen cross-sector engagement across the science and technology (S&T) enterprise. In addition to senior staff from OSTP, federal government participants included leadership from the National Science Foundation (NSF), the Department of Energy (DOE), and the National Institute for Standards and Technology (NIST).

The U.S. multi-sector research enterprise invested an estimated \$580 billion in S&T research and development (R&D) in 2018, including over \$400 billion in industry investments. Although academic institutions can provide expertise, human capital, infrastructure and other resources to advance industry R&D, industry funding for academic R&D remains at 6% of total academic investments. America can achieve a force multiplier effect by greatly increasing its partnering across sectors. This day-long symposium highlighted federal, state and local efforts to catalyze these partnerships and key elements of novel and successful engagement across sectors.

STATE AND FEDERAL AGENCIES ARE SEEKING SUBSTANTIVE WAYS TO SUPPORT MULTI-SECTOR PARTNERSHIPS.

Key Takeaways from the Symposium

- **There is a pressing need to unify policies across federal agencies**—and to provide clarity on current policies—around common issues like foreign engagement and data sharing.
- **There is urgency to address the opportunities and challenges posed by industries of the future**, including quantum computing and artificial intelligence.
- **Partnerships can be strengthened by improving awareness of cross-sector engagement opportunities and engaging industry early in the process.** Participants expressed strong support for more facile and impactful ways for companies and universities to engage with federal agencies and laboratories in R&D priority areas. There was also recognition that small businesses have unique needs and can disproportionately benefit when provided the opportunity to partner. federal agencies can build awareness of opportunities to engage early with cross-sector S&T communities in planning and prioritization of their R&D programs. Participants emphasized the value of new initiatives to develop joint solicitations with industry, which provide opportunities to co-fund and leverage scarce resources across the S&T enterprise.
- **Cross-sector engagement can stimulate critical partnerships to build our nation's S&T workforce of the future.** Participants discussed the importance of partnerships supporting

“ONE THING THAT MAKES ADMINISTRATIVE BURDEN VERY BURDENSOME IS WHEN IT'S UNCLEAR ... JUST TELL US WHAT TO DO, AND WE'LL DO IT.”

Kathryn Ann Moler, Vice Provost and Dean of Research, Stanford University

training opportunities and filling education pipelines to build the S&T workforce of the future and enhance “multilingual” skills across sectors—the ability to understand multi-disciplinary and multi-sector perspectives. In particular, participants discussed specific actions such as the value of talent exchange, expanding diversity in the S&T workforce, tour-of-duty arrangements, and instituting enabling policies that would support these opportunities and address workforce needs. Also discussed were on-ramps for those in industry to enter academia or government, including exploring broadening the pathways to government service, such as those offered by the Intergovernmental Personnel Act.

- **Federal government, academia, and industry are considering and exploring innovative partnership models.** Participants discussed some recent efforts to develop new and bold approaches to catalyze university-industry partnerships as well as the value of developing innovative partnership models that provide “safe spaces” for partners to experiment with the policy frameworks governing the sharing of R&D resources, in particular data and intellectual property (IP). These models could be developed as short-term pilots to address business and commercialization demands increasingly occurring on shorter timescales.
- **Cross-sector partnerships bring about vital state, local, and regional economic returns and successful models that could be scaled across the nation.** Participants identified valuable techniques to measure the return on investment (ROI) from partnerships. They discussed the importance of continuously demonstrating the value proposition to partners in order to facilitate agreements and continued commitments to shared resources. Assessing the ROI of partnerships, how they align with economic development goals, and how they enable state, local, and regional innovation ecosystems to flourish could help scale up successful models across the nation. As is the case with most relationships, many begin with small interactions and as trust grows, deeper more meaningful relationships are possible.

“AN ONGOING AND OPEN COMMUNICATION CHANNEL BETWEEN GOVERNMENT FUNDING AGENCIES AND INDUSTRY IS KEY. WE CAN ALIGN RESEARCH PRIORITIES AND MAKE THE PARTNERSHIP WITH UNIVERSITIES MUCH MORE EFFECTIVE.”

Gilroy Vandentop, Director, Corporate University Research, Intel Corporation

“BY PARTNERING WITH GOVERNMENT AGENCIES AND ACADEMIA, WE’RE ABLE TO WORK WITH A BROADER RESEARCH COMMUNITY. TOGETHER WE CAN BETTER ENVISION WHAT THE FUTURE NEEDS TO LOOK LIKE, AND WE CAN MAKE FASTER PROGRESS.”

Chris Ramming, UIDP Incoming Chair and Senior Director, Research & Innovation, VMware

Event Summary

The symposium began with opening remarks from Stanford University's Vice Provost and Dean of Research Kathryn Moler and UIDP President Anthony Boccanfuso. OSTP Director Kelvin Droegemeier provided [keynote remarks](#), espousing the unprecedented capabilities of the entire U.S. S&T enterprise underpinned by American values of freedom, openness and reciprocity, sharing of results, and a free market system. Droegemeier discussed how leveraging partnerships effectively and efficiently can achieve a force-multiplier effect and help our nation achieve S&T advances among private industry, academia, non-profits, and government.

“WE’RE READY TO MAKE THE BIG PARTNERSHIP JUMP, TO CONTINUE LEADING THE WORLD IN SCIENCE AND TECHNOLOGY.”

Kelvin Droegemeier, Director, OSTP

Droegemeier described how partnerships across sectors achieve mutual benefit, are built on trust, and require active management and relationship building.¹ He identified **11 partnership benefits industry seeks in multi-sector collaboration:**

- Capital incentives
- Land
- Corporate-friendly policies/laws
- Facilities/infrastructure
- Quality of life/culture/community
- Raw materials/suppliers
- Tax and other incentives
- Technology
- Transportation
- To be good corporate citizens
- Workforce

Universities, in turn, seek to benefit in multiple ways through multi-sector partnerships:

- Ability to show practical value to stakeholders, e.g., community engagement
- Clear return on investment for state funding
- Funding and practical uses for research
- Input about future directions/needs
- Internships for students
- Jobs for graduates
- Philanthropic support
- Capstone projects/service learning

Droegemeier noted that historically black colleges and universities (HBCUs) have an important role to play in supporting the innovation ecosystem and outlined plans for an HBCU engagement initiative.

PANEL DISCUSSIONS: Following the keynote, two panels convened to explore how universities, industry, and the federal government can best collaborate in R&D partnerships from both non-federal and federal perspectives. The panels were:

1. [21st Century Approaches to University-Industry Collaborations](#)²—Tony Boccanfuso; Kelvin Droegemeier; Gilroy Vandentop, Director, Corporate University Research, Intel; Daron Green, Director of Research, Facebook; and Kathryn Ann Moler.
 - A key takeaway from this session was the need for universities to structure policies to allow faculty and students to more holistically engage with industry through internships and startups, or in the case of faculty, industry consulting or employment relationships while retaining their faculty positions. Stanford University, for example, allows faculty to take up


¹ See Droegemeier's brief interview conducted Dec. 3 with UIDP on this topic at bit.ly/UIDP-Droegemeier

² See a video recording of this panel discussion at bit.ly/OSTP-21st-Century

to a 2-year leave of absence to start a company. There are other modalities being used by universities and industry to meet contemporary needs such as joint hiring structures for faculty. For example, at Facebook, agreements are brokered such that university interests are recognized and roles and responsibilities as faculty are maintained.

- While the federal government seeks greater industry participation in its funding programs targeted to universities, the industry representatives expressed concern over the current process and the timelines used to garner support. Contemporary approaches to develop programs and identify priorities are not favorable if the goal is to maximize industry engagement. Efforts to garner industry input early in the program development process will greatly bolster their participation.
- Developing a resource where federal and non-federal organizations can share data in a safe space utilizing pre-negotiated terms with flexibilities for interested parties to join at any time would be valuable.

2. **[New and Evolving Mechanisms for Academic-Government-Industry Engagement](#)**³—Andrea Belz, Director, Division of Industrial Innovation and Partnerships (IIP), NSF; Walt Copan, Director, NIST; Chris Fall, Director, Office of Science, DOE; and Erwin Gianchandani, Deputy Assistant Director, Division of Computer and Information Science and Engineering (CISE), NSF



“WE CAN GET TO YES...THERE’S A TON OF OPPORTUNITY HERE, AND THAT NEEDS TO START WITH YOUR IDEAS.”
Chris Fall, Director, DOE Office of Science

- Many federal agencies are seeking ways to increase their support of academic-corporate partnerships and leverage their programs. This session provided information on several specific initiatives and allowed for dialogue on challenges.
- For example, NIST leads the [Manufacturing USA Institutes](#), a network of sites that share state-of-the-art facilities and equipment for workforce training. The program’s inspiration was the German [Fraunhofer](#) model.
- NSF support for public-private partnerships is expanding across the directorates, through a number of long-standing efforts— the [Small Business Innovation Research](#) (SBIR) program and [Industry–University Cooperative Research Centers](#) (IUCRCs)—as well as new programs (e.g., [Convergence Accelerator](#), [INTERN](#), and the [Principles and Practice of Scalable Systems](#) joint NSF-CISE initiative launched in January 2020). The agency is also partnering directly with industry (e.g., Amazon and Boeing) on jointly issued solicitations and wants to provide students with exposure that can lead to job opportunities. In partnering with NSF, businesses have access to the breadth of university expertise and a rigorous merit review process. Companies may engage with teams of researchers with the qualifications and motivation to address their needs that they might not have previously identified. Projects also train undergraduate and graduate students, the next generation of researchers.
- DOE stewards 17 [National Laboratories](#) with a shared mission to partner across sectors. DOE also has rebooted the [Office of Technology Transitions](#) to expand the commercial impact of DOE’s research and development portfolio. Participants stated that conflicts of interest are

³ See a video recording of this panel discussion at bit.ly/OSTP-New-Models

an issue, but can be managed. DOE has also instituted entrepreneurial training across labs, adopting the model of NSF’s ICorps.

- Participants also noted that NASA is a good model for legislative authorities, culture, and flexibilities. The Space Act provides authorities that have bolstered the commercial space industry.⁴

BREAKOUT DISCUSSIONS: The symposium included four breakout sessions, allowing for greater attendee participation and feedback. Each session is described below.

1. Retaining and sharing talent between academia in industry—Jilda Garton, Vice President for

Research and General Manager, Georgia Institute of Technology; Sandra Brown, Vice Chancellor for Research, University of California, San Diego; Daron Green, Director, Facebook Research; and Charles Isbell, professor and Dean, Georgia Institute of Technology

- Companies and universities recognize the critical role that talent development, acquisition, and retention play in achieving their organizational objectives. Cities, states, and the federal government (as well as non-profits) are also making investments and developing new programs to support this important aspect of engagement. This session covered strategies, such as joint hires and appointments, workforce training/upskilling, and other efforts underway to advance workforce issues.
- Key takeaways:
 - There is a lack of qualified faculty to meet employer demand for, and expected supply of, students trained in certain fields, such as data science. Traditional approaches to university education could be complemented with innovative approaches that are responsive to industry workforce needs. For example, UC San Diego has incorporated data science into all disciplines.
 - Creativity is needed to expand opportunities. An example is the 6-year partnership between Georgia Institute of Technology, Udacity, and AT&T that enables an online master’s degree in computer science; its 9,600 students double the representation from diverse populations (twice as many minority students and women and a higher proportion of domestic students) compared to the on-campus population at significantly lower costs. As a result of this program, 1 in 6 Master’s degrees in computer science is from Georgia Institute of Technology. Facebook’s Align program similarly partners with universities to increase diversity at the master’s degree level. Participants agreed on the need to increase diversity.
 - There’s an opportunity to modernize the tenure and promotion systems and better align the metrics with current issues by recognizing success with commercialization and industry engagement and not just publications. NSF recently awarded Oregon State University funds to host a summit in September 2020 for which the



“IF WE THINK OF DATA SCIENCE AS BEING OWNED BY COMPUTER SCIENCE AND ENGINEERING, WE’RE GOING TO LOSE, BECAUSE COMPUTER SCIENCE IS A BASIC REQUIREMENT OF ALL DISCIPLINES.”

Sandra Brown, Vice Chancellor for Research, UC San Diego

⁴ National Aeronautics and Space Act (Space Act) of 1958 (Pub. L. 85–568), as amended.

outcome will be a report containing specific recommendations to be used by institutions across the nation for conversations on their campus about additions and/or changes to promotion and tenure (P&T) guidelines and processes to support 21st century faculty members and students while better aligning faculty reward structures with institutional priorities.

- Joint hiring is an option; Facebook co-employs about 20 university faculty. This requires a high level of trust among all parties. For both parties, there is a need to work out the nature of IP, conflict of interest, and conflict of commitment issues to allow for continuity in an academic system context. Policy changes could support an environment that will allow greater exchange of personnel across academia and industry.
- The top innovation companies are only closely aligned with computer science faculty from a handful of universities. There is an opportunity to expand this outreach to many other strong programs.

2. **Leveraging Public Funding Opportunities to Bolster Partnerships**—Tony Boccanfuso and Chris Hewitt, Science Relations Manager, BASF Corporation

- Many companies are seeking to leverage their funding by co-investing with federal and state government awards to universities. This session explored issues to consider when companies and universities seek to partner, some contemporary approaches and programs, and where opportunities exist for greater impact.
- Key takeaways included:
 - Industry-university collaborations that exist *prior to* opportunities for federal funding perform better than those that form *in response to* the multi-sector federal funding opportunity. Alignment on fundamental issues, such as research governance, culminated with a memorandum of understanding between VMWare and NSF that set the stage for repeated subsequent interactions around topics of importance to the company.
 - What makes public funding worthwhile is the opportunity to accomplish what one partner could not do on its own. Many university-industry collaborations do not involve or pursue public funding. However, in many instances government can play a positive role in initiating and advancing these relationships. Participants recognized that in some instances there are barriers to government participation. Efforts to address these issues should be pursued.

"EXPANDING OPPORTUNITIES AT THE INTERSECTION OF FEDERAL AGENCY, UNIVERSITY, AND INDUSTRY PARTNERSHIP ALLOWS US TO DEVELOP MORE EFFECTIVE COLLABORATIONS AND CO-INVESTMENTS THAT WILL BENEFIT SOCIETY. UIDP, AS A CONVENER, IS POISED TO SUPPORT THESE PARTNERSHIPS; TOGETHER, WE CAN ADVANCE INVESTMENTS IN TRANSFORMATIVE BASIC AND USE-INSPIRED RESEARCH THAT WILL DEFINE TECHNOLOGIES AND INDUSTRIES OF THE FUTURE." Theresa Mayer, Executive Vice President for Research & Partnerships, Purdue University

- Partnerships can benefit from federal agency engagement to bring attention to a topic and to enable future partnerships—even if immediate funding is not achieved.

3. **State Efforts to Broaden Public-Private Partnerships**—Lisa Nichols, Assistant Director for Academic Engagement, OSTP; Edward Seidel, Vice President for Economic Development and Innovation, University of Illinois; David Winwood, Executive Director, Louisiana Business and Technology Center; and Janna Tom, Director, Research Policy Analysis and Coordination, University of California Office of the President

- States and regions recognize the societal impact from robust public-private partnerships and have invested and supported programs to bolster these relationships.
- Key takeaways included:
 - At the state level, it’s important to bring together all assets across the state and consider what can be leveraged, to include both rural and urban communities. Thinking big and comprehensively and tying to economic impact pulls the state government levers. An example is the Illinois Innovation Network, which has received substantial public and private funding to build research hubs across the state including universities, industry, school districts, and other local organizations.
 - Creative approaches such as pre-negotiated master collaboration agreements, access to specialized equipment, and co-location can strengthen relationships between companies and universities. Facility use agreements/facilities use can support startups that do not yet have the ability to fund or access these capabilities. Agreements may not anticipate every future situation and need across different sectors and partners, particularly regarding IP. Clear goals, a common understanding, and active engagement are helpful in addressing issues that arise and may not be covered in the agreement.



INDUSTRY-UNIVERSITY COLLABORATIONS THAT EXIST *PRIOR TO* OPPORTUNITIES FOR FEDERAL FUNDING PERFORM BETTER THAN THOSE THAT FORM *IN RESPONSE TO* THE MULTI-SECTOR FEDERAL FUNDING OPPORTUNITY.

4. **Partnerships Outside Major Metro Areas**—Cynthia Sides, Director, Innovation and Industry Partnerships, University of Arkansas; Peter Dorhout, Vice President for Research, Kansas State University; and Theresa Mayer, Executive Vice President, Purdue University

- Colleges and universities outside major technology hubs and cities possess unique assets, as well as challenges, in developing effective industry engagement programs that support their missions and local communities. In May 2019, the University of Arkansas and UIDP co-hosted an NSF-supported workshop exploring approaches and strategies for advancing collaborative efforts taking place beyond major cities. Panelists discussed the findings and challenges uncovered during that workshop.
- Key takeaways included:
 - An initial touch point with industry is often workforce development (student internships, etc.), but the relationship can broaden from there.

- Companies – either their corporate headquarters or local facilities - may overlook research institutions in their own state. A successful approach for Wichita State University was having the university president sit down with local industry to discuss challenges and issues—workforce trainability and continuing education among them.
- Universities from non-metro areas are underrepresented in fellowship programs with large corporations. Both sides—universities and industry—have work to do to improve awareness, including campus visits at underrepresented institutions, counseling students on making connections, and building partnerships.

TABLETOP DISCUSSIONS: Over lunch, participants joined one of 12 tabletop discussions in which they had the opportunity to engage directly on topics of interest. Key takeaways from the tabletop discussions were then reported to the full group. Identified needs and observations included the following:

- **Administrative burden.** Although policymakers want to increase research capacity across universities, they may underestimate secondary or tertiary effects that can increase administrative burden and/or misalign incentives (e.g., requiring co-funding/cost-share where universities may find it challenging to engage industry partners).
- **Foreign entity research collaborations – agency regulations.** It would be helpful if guidance about how to handle research collaboration with foreign entities was harmonized between different agencies, e.g., NIH, NSF, and DOE.
- **Foreign entity research collaborations – audit and compliance.** It would also be helpful to have unified direction on how to audit and enforce compliance with government requirements on foreign collaborations (other than an internet search).
- **Industry participation in federal R&D programs.** Federal agencies need to better communicate, with more lead time, the value proposition of federal programs if they seek meaningful industry engagement in programs such as NSF-ENG IIP's IUCRC program.
- **Joint hires/appointments.** New models to facilitate joint appointment exchanges between academia and industry are needed. These should include updating conflict of interest policies, protecting the student experience, and managing issues around IP.
- **Metrics for academic-corporate partnerships.** Data should be leveraged to track deliverables and awards that derive from partnerships. However, being able to leverage it accurately and efficiently remains a major challenge.
- **Promotion and tenure.** To better illuminate issues around tenure, promotion, and industry engagement, there would be value in a series of stories/case studies on how universities have modernized their tenure and promotion criteria.
- **Quantum R&D.** NIST, DOE, and NSF are all key players in the post-quantum world, which requires rethinking the security paradigm. This is a national priority that requires engaging the community of practice across the globe.
- **Research contract models.** As competitive forces push universities to take more risks and move out of their comfort zones, there's recognition that no single

contracting model works across all situations. Each partnership must work to understand the model that is most effective.

- **Rural areas and talent management.** Regional innovation ecosystems in rural areas connect resources to help attract top-level talent and to retain talented individuals who come from those communities.
- **Tax exempt bonds and industry funded university R&D.** Participants felt that the current IRS regulations create uncertainty and hinder certain types of industry sponsored research projects; there is a need to move away from IP rights as the determinant for whether certain projects can be performed in buildings funded by tax exempt bonds.

PARTNERSHIP CASE STUDY: The final session of the symposium was a case study from Matthew Fields, Professor, Montana State University and Director, [Center for Biofilm Engineering](#) (CFE, established nearly 30 years ago). Fields discussed best practices for sustaining research consortia and building momentum for university-industry partnerships.

- Initially funded through the NSF Engineering Research Center (ERC) program, it became self-sustaining via an industry membership program and a mix of federal and state-level grant funding.
- Key takeaways include:
 - Industry-university partnerships can be self-sustaining through mutually beneficial revenue sharing agreements.
 - CFE has identified and established industry collaborations across different applications where biofilms are important (e.g., biofilm control strategies) by helping companies solve new problems. CFE has interacted with 124 companies since 1990.
 - CFE also supports regulatory science (e.g., projects with the Environmental Protection Agency) as part of its portfolio.
 - IP is not an explicit goal; rather, companies come with materials or chemicals for testing.
 - Member benefits include access to:
 - Largest biofilm center in world
 - Consulting services
 - Reduced cost of testing projects
 - State-of-the-art tech apps
 - Webinars
 - CFE is a university space where interdisciplinary faculty and students work with industry. This has fostered direct involvement of industry with undergraduates and created a hiring pipeline for industry members. Companies time and time again enjoy interacting with students. About 25% of students participating in CFE are recruited by companies that they work with.
 - Faculty partnerships with industry at CFE are recognized by the university in promotion and tenure.

Conclusion

The urgency for cross-sector partnerships remains stronger now than ever. These partnerships provide opportunities for shared access to increasingly scarce resources, including state-of-the-art facilities and equipment, data, expertise and education, among others and to address state and federal challenges

with respect to innovation, workforce and areas of state and national need. Addressing the myriad challenges, in particular with shared data and IP, can be achieved with ingenuity and innovative solutions that are jointly championed by federal, state, and local governments, universities, industry, and other organizations.

Developing strong partnerships among the academic, corporate, government and non-profit sectors ultimately enables and nurtures the high impact research collaborations our nation needs to translate research into new therapeutics, products and services that create wealth and improve the lives of the country's citizenry.

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