**RESPONSE TO REQUEST FOR INFORMATION;**

**FEDERAL TECHNOLOGY TRANSFER**

**AUTHORITIES AND PROCESSES**

**Docket Number: 180220199-819-01**

**SUBMITTED BY CARNEGIE MELLON UNIVERSITY**

**JULY 30, 2018**

***Comments Related to Fostering Better Metrics and Methods to Evaluate the ROI Outcomes and Impacts Arising from Federal R&D investment***

Carnegie Mellon believes that there exists today real, uncounted impact of federal research expenditures at both government and university labs. Bayh Dole is a patent act. When the act was passed in 1980 software was not considered patentable. Over time, it became patentable, either in many or some instances. Currently, some university tech transfer offices submit software disclosures as a “Subject Invention”, per 37CFR401.1-.14, via iEdison then get error messages when a patent application isn't filed because, for example, it doesn't make economic sense(ex. the cost to file is greater than the value or the expected time to issue is greater than the technology life). Carnegie Mellon utilizes this approach. Based upon engagement and leadership of the Association of University Technology Managers’ Software Committee it clear that other university tech transfer offices do not submit software disclosures, treating it as a subset of technical data under, for example, FAR 52.227-14(a).

Government agencies, at times in the past, also offered different views when asked specifically if software is a subject invention, which is therefore reported and counted. In part experiences NIH has indicated that software should be reported as a research tool while the NSF has stated that “sometimes software is a subject invention”. Correspondence received from NASA centers seem to indicate that all intellectual property created is considered patentable while a recent letter from the Army suggests it is the university’s choice between patent and copyright.

CMU has generated several high impact outcomes with “just software/no patent” innovations. For example, Carnegie Learning (https://www.carnegielearning.com/ ), a 1998 spin-off which was subsequently acquired, has sold/is selling cognitive tutors in math and algebra to hundreds of U.S. high schools (software developed from research with NSF funding, reported but not patented) and Sphinx, an open source speech recognition system (https://en.wikipedia.org/wiki/CMU\_Sphinx ), has been downloaded over 1.5 million times (developed with NSF, DARPA, others’ funding, open sourced and published therefore not patentable and reported). There are additional examples at CMU and therefore likely numerous technologies at other universities and federal labs which are not currently either reported or reportable.

Carnegie Mellon recommends that the federal government establish clarity via a uniform guidance and require disclosure of both inventions and software (copyrights) separately, including open source when known, either via iEdison or directly if required by the respective agency. The effect of such an action would be to increase in ROI both immediately by capturing the greater technology production of federally-funded R&D performed at university and government facilities. This improved measurement would also facilitate a more robust engagement on strategies to enhance collaboration across federal agencies, labs, universities and industry in software intensive technology areas.

***Comments Related to New Partnering Models and Technology Transfer Mechanisms with the Private Sector, Academia, other Federal Agencies, State and Other Public-Sector Entities to Support Technology Development and Maturation***

Carnegie Mellon believes that recent initiatives by federal agencies to create stronger linkages between federal and university researchers and enhance the focus on commercialization in fundamental research missions is contributing to strengthening the overall innovation ecosystem. These recent measures include the Open Campus initiative launched by the Army Research Lab that encourages and supports stronger visit and collaboration activities between Lab and academic researchers as well as the National Science Foundation’s Innovation Corps (I-Corps). The Department of Energy and DoE national labs have launched similar initiatives to support both regional innovation and stronger collaborative research. As these models continue to evolve they are likely to spark even more dynamic engagements with industry and with state and regional technology development organizations.

Carnegie Mellon strongly supports the replication of the open campus model to other services and agencies and the expansion of the I-Corps program to DoD. CMU recommends that these programs also include support for establishing regional Lab hubs and I-Core nodes focused on specific emerging technologies—such as autonomy, AI, quantum computing and critical areas of advanced manufacturing. These targeted initiatives would increase the ability of these efforts to engage state and local technology development programs, industry and the venture capital community, complement translational initaitives such as the manufacturing innovation institutes and accelerate innovation in critical national mission areas while further deepening the rich engagement between federal and academic researchers.

***Comments on Approaches to Improve Efficiency and Reduce Regulatory Burdens of Technology Transfer to Attract Private Sector Investment in Later-Stage Research and Development, Commercialization and Advanced Manufacturing***

National associations of which Carnegie Mellon University is a member are focusing on a wide array of reporting and regulatory issues associated with the current state of implementation of the Bayh Dole Act. CMU wishes to utilize its comments to focus attention on one barrier that creates significant impediments to enhanced collaboration with industry (and potentially more robust federal lab partnerships as well) and support for early stage start-ups.

Revenue Procedure 2007-47 sets restrictions on the “private business use” activities undertaken in university buildings financed with tax-exempt bonds. Under these provisions, particularly sections 6.02 and 6.03, industry sponsored research is considered a private business use unless the university obtains a fair market value for the outcomes of the research. Specifically, these provisions state that fair market value must be determined at the time the license or resulting technology is available for use.

Exceptions to these private use restrictions include licenses awarded to consortia of companies and non-exclusive licenses that provide similar use rights to all users. Should total private uses exceed the IRS specified space limits (10% for public universities and 5% for private universities, though when bond transaction costs are included the real limits are 8% and 3%) the tax-free status of bonds may be revoked. Private use activities also covered under the total space cap would include bookstores and other retail activities such as coffee shops and restaurants. It also includes space allocated by universities to early stage spin out companies to undertake the research activities often associated with the transition to pilot scale development in labs of buildings with tax exempt bond financing and space allocated for visiting industrial (and governmental) researchers.

These tax provisions and restrictions are unique to the United States—creating a competitive disadvantage as research is increasingly a global enterprise and at a time when a reinvigoration of industry/university interaction could contribute to securing leadership and domestic production in advanced manufacturing technologies and contribute to the robust insourcing of advanced manufacturing. The Treasury Department recommendation in the FY 2014 to address this competitive disadvantage:

*Research and technological innovation provide benefits to educational institutions and to society at large. Research involves significant investment and considerable uncertainty regarding the total costs, necessary lead time, and ultimate outcome of advancing scientific knowledge. More flexible standards for public-private research arrangements for purposes of the private business limits on tax-exempt bonds than those allowed under existing safe harbors potentially would foster greater investment in research, greater technological innovation, and broader benefits to society at large.*

*Proposal*

*The proposal would provide an exception to the private business limits on tax-exempt bonds for requirements:*

*(1) A qualified user (a State and local government or section 501(c)(3) nonprofit entity) would be required to own the research facilities.*

*(2) A qualified user would be permitted to enter into any bona fide, arm’s-length contractual arrangement with a private business sponsor of basic research regarding the terms for sharing the economic benefits of any products resulting from the research, including arrangements in which those economic terms (such as exclusive or non-exclusive licenses of intellectual property, and licensing fees or royalty rates) are determined in advance at the time the parties enter into the contractual arrangement.*

Carnegie Mellon strongly encourages that consideration be given support legislation to address this macro-policy burden on technology transfer.

***Comments on New Approaches to Motivate Significantly Increased Technology Transfer Outcomes from the Federal Sector, Universities and Research Organizations***

The introductory section of this response highlighted the critical impacts the Bayh Dole Act and Carnegie Mellon’s partnership with federal agencies in advancing the spirit and objectives of the Act have had on the university, the Pittsburgh region and CMU’s ability to provide a return on investment in federal research funding. A critical element in this success is the vitality of the state, local and non-profit funded innovation ecosystem in our region. These partners have provided early stage seed funding, incubation and accelerator support, mentoring and executive recruitment and access to first customers—all elements of a vibrant environment needed to support the emergence of start-up and technology transfer breakthroughs.

This state, local and non-profit supported infrastructure remains robust but also faces challenges created by state budget dynamics and always evolving regional needs. As a result, an ongoing resource gap in the innovation pipeline is the pre-seed, occasionally pre-company support that is need for early stage prototyping activities. While initiatives such as I-Corps have increased federal support for mentoring and training and provide some limited pre-seed support, the need for funds to fill this prototype stage gap remains.

Carnegie Mellon recommends that consideration be given to the creation of prototype support funding. Such funds could be incorporated into existing programs such as the I-Corps initiatives. Agencies could also establish separate competitively awarded funding sources that could be open to faculty meeting specific metrics indicating a high potential for commercialization. Federal investment to address this prototyping stage gap would also likely leverage greater state, private and local support and could enhance collaboration among all partners to enhanced technology transfer.

***Conclusion***

Carnegie Mellon appreciates the leadership by NIST and the Administration for collaboration to date and for engaging the university community on how to improve and enhance federal technology transfer and innovation. Federal research investments and policies have played a critical role in Carnegie Mellon’s ability to contribute to national competitiveness and regional revitalization. The accelerating pace of technology development, fundamental social and economic challenges and increased international competition create an imperative for examining opportunities and strategies to improve collaboration and increase the return on federal research investments.

“An opportunity to quantify greater impact of software innovation by clarifying reporting”

*1. What are the core Federal technology transfer principles and practices that should be protected, and those which should be adapted or changed*?

2. *What are the issues that pose systemic challenges to the effective transfer of technology, knowledge, and capabilities resulting from Federal R&D? Please consider those identified in the RFI as well as others that may have inhibited collaborations with Federal laboratories, access to other federally funded R&D, or commercialization of technologies resulting from Federal R&D?*

There exists today real, uncounted impact of federal research expenditures at both government and university labs. Bayh Dole is a patent act. When the act was passed in 1980 software was not considered patentable. Over time, it became patentable, either in many (ex. dotcom era) or some instances (ex. Post Alice decision). Having served on or chaired the Association of University Technology Managers’ Software Committee for over ten years, I know that some tech transfer offices submit software disclosures as a “Subject Invention”, per 37CFR401.1-.14, via iEdison then get error messages when a patent application isn't filed because, for example, it doesn't make economic sense (ex. the cost to file is greater than the value or the expected time to issue is greater than the technology life). Carnegie Mellon is one of them. Other tech transfer offices take a different position and do not submit software disclosures, treating it as a subset of technical data under, for example, FAR 52.227-14(a). Government agencies, at times in the past, also offered different views when asked specifically if software is a subject invention which is therefore reported and counted. I raised the issue to NIH and NSF representatives, for example, at various points – NIH wants software reported as a research tool (even though that isn’t the case for CMU’s commercially viable technology) while the NSF person effectively stated that “sometimes software is a subject invention”. Also, correspondence received from NASA centers seem to indicate that all intellectual property created is considered patentable while a recent letter from the Army suggests it is the university’s choice between patent and copyright.

CMU has had some wonderful success with “just software/no patent”. For example, Carnegie Learning (<https://www.carnegielearning.com/> ), a 1998 spin-off which was subsequently acquired, has sold/is selling cognitive tutors in math and algebra to hundreds of schools (software developed from research with NSF funding, reported but not patented) and Sphinx, an open source speech recognition system (<https://en.wikipedia.org/wiki/CMU_Sphinx> ), has been downloaded over 1.5 million times (developed with NSF, DARPA, others’ funding, open sourced and published therefore not patentable and reported). I think all of that is a success for the researchers, CMU, the US gov’t and public. There are more examples at CMU and therefore must be hundreds (if not more) of technologies at other universities and federal labs which are not currently either reported or reportable.

*3. What is the proposed solution for each issue that poses a systemic challenge to the effective transfer of technology, knowledge, and capabilities resulting from Federal R&D? Please consider the approaches identified in the RFI.*

The simple solution would be to provide clarity via a uniform guidance and require disclosure of both inventions and software (copyrights) separately, including open source when known, either via iEdison or directly if required by the respective agency. There will be increased ROI, both immediately and going forward, by capturing the greater technology production of federally-funded R&D performed at university and government facilities.