

Government-funded research increasingly fuels innovation

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For the third year in a row, the Trump administration has proposed large cuts in science funding across a variety of agencies. Although Congress restored these cuts in the past two years, increased budgetary pressures



may discourage them from doing so this year.

Now, new research from the University of California, Berkeley, the University of Connecticut, Boston University, and Harvard University shows that these cuts in <u>federal funding</u> for science might endanger the <u>innovation</u> that increasingly fuels the modern economy. The study was published recently in *Science*.

By computing new linkages between government grants and tens of millions of U.S. patents and <u>scientific papers</u> from 1926 to 2017, the multi-disciplinary research team demonstrated that almost a third of patents in the U.S. rely on federal research. Although this may be a conservative estimate, this number has increased steadily over the past 90 years.

"Technological progress is seen as a process through which inventions build on one another. In this study we examine the importance of government-supported research as contributing to subsequent inventions," says Hillary Greene, Zephaniah Swift Professor of Law at the UConn School of Law.

Greene, who is an expert in <u>patent</u> law, came to UConn Law in 2007 after having previously served as project director for <u>intellectual</u> <u>property</u> at the Federal Trade Commission's Office of the General Counsel. In addition to having served as the inaugural director of UConn Law's Intellectual Property and Entrepreneurship Law Clinic, she has continued to examine innovation issues from many angles, including writing and teaching extensively on the relationship between innovation and competition policy.

"The fact that Professor Greene is the first UConn Law professor to be featured in *Science* speaks to her truly impressive body of research," observes Timothy Fisher, dean of the UConn School of Law. "It is one



that both spans diverse legal regimes and engages with multiple disciplines to provide valuable insights on topics like the impact of government investment on innovation."

The study, the first of its kind, offers a more holistic view of the impact of federal funding on innovation. Where previous studies established impacts within particular fields, the current work provides a historic and quantitative analysis of all U.S. patents—over a long period of time.

The research also establishes that corporations have steadily increased their reliance on federally supported research. The effect occurs across all fields; as the most extreme example, almost 60 percent of the patents in chemistry and metallurgy rely on federally supported research. Additionally, the team notes that patents that rely on federal research "are more important as measured by future citations, renewal rates, and novel terminology" than patents that do not rely on federal research.

According to Lee Fleming, lead author and professor of industrial engineering and operations research at UC Berkeley, this study is significant because it is the first to quantify the historical sweep of federal <u>science</u> patenting in the U.S. and provide data that illustrate how much the country's patenting has relied on federal <u>science funding</u> since 1926.

Federal research funding is at the heart of the current study in more ways than one. In 2015, Greene and her collaborators were awarded a federal grant from the National Science Foundation in support of this research. The grant was titled "The Reach of the Visible Hand: Government Acknowledgments in U.S. Patents and Technological Change." Fleming and Greene were co-principal investigators on the grant.

"This research is an effort to detect, in a more nuanced way, the myriad



fingerprints that U.S. federal research leaves, directly and indirectly, on innovation by others," says Greene. "We hope that it provides insights for the government, corporations, and citizens about where this funding goes and the downstream impact it has on innovation. And let's not forget, that does not include the social and economic impact of federally supported research—but that's for another day."

More information: L. Fleming et al, Government-funded research increasingly fuels innovation, *Science* (2019). <u>DOI:</u> <u>10.1126/science.aaw2373</u>

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