

Questions Submitted for the Record from Subcommittee Ranking Member Roby
Lost Einsteins: Lack of Diversity in Patent Inventorship and the Impact on America's Innovation
Economy

Responses Submitted by Dr. Lisa D. Cook
April 15, 2019

Question for All Witnesses

1. What recommendations have you for the United States Patent & Trademark Office and the Small Business Administration to help promote the participation of women and minorities in entrepreneurship activities and the patent system?

Response

In addition to the USPTO collecting demographic data on patent applicants to measure participation in the patent system, I would suggest the following measures for the SBA:

- Strengthen the SBIR and STTR program such that introductory, networking, recruiting, road-show and other recruiting activities and target women and underrepresented minorities and women, including holding regular events in geographic areas where such populations are present;
- Introduce mentoring efforts in the SBIR and STTR programs with augmented attention to women and underrepresented minorities, including by engaging successful innovators from these groups as formal mentors to all aspiring or current participants in these programs; and
- Enhance the SBIR and STTR program such that reviewers of proposals are from diverse backgrounds, e.g., good representation of women and underrepresented minorities.

I would recommend the following measures for USPTO based on their current programs.

- The USPTO offers education and outreach programs for students, educators, inventors and innovators. Its Patent & Trademark Resource Centers are part of a network of public, state, and academic libraries that support inventors and small businesses with trademark and patent assistance. Staff in its four regional offices collaborate with start-ups, job-growth accelerators, and technology organizations in their regions, assisting with intellectual property services. I would recommend that the USPTO intensify its outreach and recruiting efforts to include places where (potential) inventors, entrepreneurs, and STEM students who are women and underrepresented minorities are concentrated, e.g., HBCUs, women's colleges, large engineering programs, National Society of Black Engineers conferences, etc.
- The USPTO's education programs include its National Summer Teacher Institute, a professional development training program for teachers. The program's goal is to inspire and support STEM learning in the teachers' classrooms. The USPTO could

intensify its outreach and recruiting efforts to include places where teachers in training who are women and underrepresented minorities are concentrated, e.g., HBCUs, women's colleges, and large urban university campuses, to participate in the USPTO's University Outreach Program and bring in a USPTO to speak about important aspects of intellectual property.

Question for Lisa D. Cook, Associate Professor of Economics and International Relations, Michigan State University

1. I find it surprising that in its recent report on women and patenting, the U.S.P.T.O. found that gains in female participation in science and engineering occupations and entrepreneurship are not leading to broad increases in female patent inventors. Is promoting greater participation by girls and minorities in STEM education and by women and minorities in STEM careers at some point going to increase the number of women and minorities filing patent applications, or is awareness of the patent system by these underrepresented groups the answer?

Response

Promoting greater participation is one component of the solution. For example, the literature has shown that women and girls benefit from having role models in STEM fields and in the innovation economy. The only way to get these is to produce more of them. However, increasing participation is not a panacea.

Further efforts are needed to make the innovation economy inclusive. Such issues include mentoring, exposure to invention, blind patent review, and workplace climate.

Mentoring

Mentoring has been broadly suggested as one tool to address the gender and race gap in STEM careers. As aforementioned, Chetty et al. (2018) show that the income, race, and gender gap in invention is primarily due to environment barriers in acquiring human capital – a lack of mentoring and exposure to careers in science and innovation in childhood – and not due to differences in ability. The American Economic Association launched a summer boot camp program in the 1970's to increase racial and ethnic diversity in the economics profession. Mentoring is a key component of this program. Becker et al. (2014) estimated the effectiveness of the AEA's summer program, finding that program participants were over 40 percentage points more likely to apply to and attend a PhD program in economics, 26 percentage points more likely to complete a PhD, and about 15 percentage points more likely to ever work in an economics-related academic job. According to these estimates, the summer program may directly account for 17 to 21 percent of the PhDs awarded to minorities in economics over the past 20 years.

The effectiveness of mentoring is recognized beyond academic papers and university programs, with programs designed to make a difference. US2020, an organization focused on

programming that supports underserved and underrepresented students, has a mission of changing the trajectory of STEM education in America by dramatically scaling the number of STEM professionals engaged in high-quality STEM mentoring with youth. US2020 is building a community of companies, organizations, schools, government agencies, and cities to participate in mentoring, encouraging us to imagine one million science, technology, engineering and math (STEM) professionals mentoring students in kindergarten through graduate school.¹

In the course of interviewing people for my research on racial and gender disparities in patenting and innovation, I asked a number of interviewees about a particular finding in my research. The finding was that AT&T and NASA were two of the entities with which women and African American patentees most frequently had some affiliation, including as interns, post-docs, etc. Among the interviewees who had had an affiliation with these organizations, they typically said that it was mentoring in the practice of invention, including in the process of filing a patent, that had more impact relative to simply the environment or other factors. The SBA could encourage such mentoring through the SBIR and STTR programs, as well as expanding its current initiatives, including its Women's Business Centers, Small Business Development Centers, SCORE, and Veterans' Business Outreach Centers.

Encouraging Invention at an Early Age

Exposing children to invention and innovation is becoming more recognized method of increasing participation. For example, Spark Lab at the Lemelson Center for Invention and Innovation at the Smithsonian Institution is an activity space that allows children to create an invention and to help them think about making the invention useful. Targeting low-income, underrepresented-minority, and female children for such activities is being recommended by the authors and Chetty and coauthors, among others.

Blind Patent Review

A recent paper in *Nature* finds that, all else equal, patent applications with women as lead inventors are rejected more often than those with men as lead inventors. An easy fix would be for the USPTO to engage in the blind review of patent applications by patent examiners.

Workplace Climate

Workplace issues for women and minorities go beyond the opportunity to participate in invention and innovation. Other issues have been brought into stark relief by recent events related to workplace climate, such as recent protests and discussions at Google and Microsoft. Among the issues identified are ones that have been reported about the climate in similar workplaces, such as lack of transparency (including forced arbitration for sexual harassment claims), workplace culture, and pay and opportunity inequality. Most patented invention occurs at firms. Therefore, at public companies shareholders need to hold CEOs more accountable for workplace climate, and, for private companies, boards and CEOs should do the same. Congress

¹ See <https://us2020.org/>.

may also have a role in bolstering the EEOC to investigate such complaints and help to minimize the frequency and intensity of hostile work places for women and underrepresented minorities.