

## THE SUCCESS ACT: WHERE WE STAND & THE PATH FORWARD

by Brittany Amadi & Gary M. Fox<sup>1</sup>

In October 2020, two women—Emanuelle Charpentier and Jennifer Doudna—shared the Nobel Prize in chemistry for the first time.<sup>2</sup> Previous years looked much different. In 2019, for example, nine individuals won Nobel Prizes in the three scientific fields: physics, chemistry, and physiology or medicine.<sup>3</sup> All nine were men. Most of them were white. This 2019 slate of prize winners is but one example of how women and people of color are still severely underrepresented in the fields of science, technology, engineering, and mathematics (STEM). Innovation in these fields does not and should not come exclusively from scientists, engineers, and mathematicians who all have similar backgrounds. It is against this backdrop that the federal government set out to understand the demographics of inventors who have been formally recognized and what can be done to make that group more reflective of our diverse society.

### The SUCCESS Act

In October 2018, Congress passed the Study of Underrepresented Classes Chasing Engineering and Sciences Success Act, or the SUCCESS Act.<sup>4</sup> The Act received broad bipartisan support. The House of Representative passed it by a voice vote, and the Senate passed it by unanimous consent. It was quickly signed into law.

The SUCCESS Act was brief and contained two primary sections. The first listed Congress's findings. Congress recognized that intellectual property in general, and patents in particular, are important for stimulating innovation and economic growth. Yet Congress found that "[r]ecent studies have shown that there is a significant gap in the number of patents applied for and obtained by women and minorities."<sup>5</sup> Congress believed that the government has a responsibility to work with the private sector to close that gap.

The other primary section of the Act provided instructions for a government study on the topic. More specifically, it instructed the Director of the U.S. Patent and Trademark Office (PTO) to identify publicly available data on patent applications submitted by and patents issued to women, minorities, and veterans. It also asked the Director to make legislative recommendations for promoting patents among women, minorities, and veterans. The Act instructed the Director to work together with the head of the Small Business Administration, as appropriate. It set the deadline for the Director's report to Congress one year later, in October 2019.

In the SUCCESS Act, Congress identified an important problem and explained why that problem should be fixed. But given the PTO's expertise, Congress left the details to the agency.

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<sup>2</sup> See <https://www.nytimes.com/2020/10/07/science/nobel-prize-chemistry-crispr.html>.

<sup>3</sup> See <https://www.nobelprize.org/all-2019-nobel-prizes/>.

<sup>4</sup> Pub. L. No. 115-273, 132 Stat. 4158 (2018), *available at* <https://www.congress.gov/bill/115th-congress/house-bill/6758>.

<sup>5</sup> *Id.* § 2(a)(4).

## Reactions to the Act

After Congress passed the SUCCESS Act, the PTO began working on its study. In April 2019, the PTO sought public comments on a variety of topics, including whether there is public data on inventor demographics and the benefits of patents, whether the PTO should collect demographic data, and whether there are other policies that the PTO should implement. The PTO received 69 written comments from a wide range of entities and individuals. Those submitting comments ranged from corporations like Facebook to academic institutions like Washington University in St. Louis, and from nonprofits like the Henry Ford museum to professional organizations like the American Intellectual Property Law Association. Individuals included Senator Diane Feinstein and the founder and director of the Institute for Intellectual Property & Social Justice, Professor Lateef Mtima. The PTO also conducted three public hearings across the country, in San Jose, Detroit, and Alexandria, during which the agency heard comments from 36 people.

The comments evidenced a broad consensus that there is a need for more data on who is applying for and obtaining patents. But not everyone agrees on the best approach. Some believe that the PTO should collect the data as part of the examination process, though views differ on whether responses should be mandatory or voluntary. Others oppose any data collection by the PTO, with some advocating for data collection by a third-party organization.

## The PTO's Findings

As required by the SUCCESS Act, the PTO released its report in the fall of 2019. While the numbers were not surprising given the existing literature, they were disappointing. Until the 1970s, the percentage of women inventors remained fairly constant at around 5% of all inventors.<sup>6</sup> Although that rate has increased steadily during the past few decades, it has not gone up much. Today, only about 20% of patents include at least one woman as an inventor, and the overall percentage of women inventors has risen to only about 12%.<sup>7</sup> Crucially, the PTO found that women are more likely to become inventors when they are exposed to other women inventors early in life.

The data was no better for people of color. For example, one study from 2016 found that Black and Latinx inventors were severely underrepresented when compared with their shares of the overall population.<sup>8</sup> That underrepresentation is troubling because, on average, inventors earn significantly more than non-inventors. And that differential lasts throughout an inventor's lifetime, not just immediately after the time of invention.

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<sup>6</sup> To read the PTO's report in full, see <https://www.uspto.gov/sites/default/files/documents/USPTOSuccessAct.pdf>.

<sup>7</sup> The PTO recently released an updated report focused on women inventors. The key findings show that, during the past year, the rates for women inventors have increased by only a percentage point or two. *See* <https://www.uspto.gov/sites/default/files/documents/OCE-DH-Progress-Potential-2020.pdf>.

<sup>8</sup> *See* PTO's Report on the SUCCESS Act at 12-13.

## The PTO's Recommendations

In light of those findings, the PTO's report made five recommendations: (1) enhance the PTO's authority to gather information, (2) facilitate data sharing and cooperation between federal agencies, (3) expand the purposes and scopes of federal grant programs, (4) create special coins or stamps to commemorate diverse inventors, and (5) curate exhibits in museums that promote diverse inventors. The details accompanying the recommendations are sparse, and hopefully the PTO will release more specific proposals soon.

On the first recommendation, some have expressed concern that enhancing the PTO's authority to gather demographic information would actually undermine the goal of diversity by discouraging members of certain groups from applying for patents. The PTO's report notes that "care must be exercised to avoid the perception that demographic or other personal information might be used in the examination of patent applications," but it provides no details or specific guidelines for addressing these concerns.

Regarding the second recommendation about interagency cooperation, while the report does not specify which agencies would be involved in sharing data, it is possible that such data might come from the U.S. Census Bureau. Like the PTO, the Census Bureau is housed within the Department of Commerce. The Census Bureau is in the process of completing its decennial survey, which involves collecting limited demographic data on everyone living in the United States. While such information, when merged with PTO data, could provide additional insights into the demographic information of inventors, the same care must be taken to ensure that access to that data will not compromise the examination process or individuals' sensitive personal information.

The PTO's third recommendation (expanding federal grant programs) could potentially result in the devotion of federal financial resources to patent-related diversity, equity, and inclusion initiatives, which is a step in the right direction. But again, the details are not entirely clear, and the specific implementation of these programs will make all the difference. Only time will tell whether expanded grant programs translate into more applications and patents by women and people of color.

Lastly, it may be easy to write off the fourth and fifth recommendations for coins, stamps, and museum exhibits as merely symbolic. But there may be some real value in girls and children of color being able to look up to publicly recognized inventors who come from backgrounds similar to their own. As the PTO found in its report, more diversity among inventors today likely translates to more diversity among inventors in the future.

## Understanding the Pipeline Problem

While the SUCCESS Act and resulting PTO report are a first step in recognizing the disparities that exist between women inventors or inventors of color and their peers, these problems will not be solved by tracking data alone. Rather, attention must be paid to one of the root causes of the diversity problem: increasing the numbers of women and people of color who enter STEM fields in the first place. Of course, the underrepresentation of women and people of color in STEM fields starts at the earliest stages of intellectual development. For instance, societal suggestions

that microscopes, Lego® sets, or coding programs are meant for boys may discourage girls from developing an early interest in STEM.

By the time that students reach college, disparities are readily apparent. One recent study found that women earned only 21% of bachelor's degrees in engineering.<sup>9</sup> Although the percentage of bachelor's degrees in physical sciences earned by women is higher, it's still only 39%, although women make up about half of the U.S. population. Another recent study that focused on race reveals similar statistics for people of color. In 2017-2018, only 38% of bachelor's degrees in all STEM fields were earned by students of color, with only 7% of those degrees earned by students identifying as Black and only 12% of those degrees earned by students identifying as Hispanic.<sup>10</sup>

Unfortunately, the disparities at the college level only widen over time. One recent study calculated that only 22% of C-suite jobs in the life sciences industry are held by women, even though men and women are equally represented in entry-level positions.<sup>11</sup> In the biotech world, people of color make up only 25% of those C-suite jobs.<sup>12</sup> The technology sector is even worse. Women hold only about a quarter of professional computing jobs.<sup>13</sup> And people of color account for only 17% of tech executives.<sup>14</sup>

Given the underrepresentation that exists at both the undergraduate and professional levels, the PTO's findings of significant gaps in the numbers of women inventors and inventors of color are far from surprising. The solution to this problem is not easy, but there are some steps that we can take to promote diversity, equity, and inclusion within STEM. We should all support educational outreach programs that show young girls and children of color that they belong in these fields. The earlier that children develop an interest in these fields and envision themselves entering them, the better. That support should extend throughout secondary education with funded programs specifically geared toward engaging children and fostering an early interest in entering these fields. While support is necessary at each stage, including within colleges, universities, and industry, devoting human capital and financial resources at the earliest stages of development is critical to reducing the persistent gaps documented by the PTO and others in STEM fields.

In response to the SUCCESS Act report, the PTO has started down the right path by establishing the National Council for Expanding American Innovation.<sup>15</sup> The Council brings together leaders from the government, academia, industry, intellectual property associations, nonprofits, small businesses, and venture capital firms to develop a strategy for promoting diversity among future innovators. The Council's inaugural meeting took place in September 2020, and there is plenty of work for the Council to do in 2021 and beyond.

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<sup>9</sup> See <https://nscresearchcenter.org/snapshotreport-science-and-engineering-degree-completion-by-gender/>.

<sup>10</sup> See [https://nces.ed.gov/programs/digest/d19/tables/dt19\\_318.45.asp?referer=raceindica.asp](https://nces.ed.gov/programs/digest/d19/tables/dt19_318.45.asp?referer=raceindica.asp).

<sup>11</sup> See <https://www.lifescienceleader.com/doc/why-and-how-to-close-the-gender-gap-in-the-life-sciences-0001>.

<sup>12</sup> See <https://www.nature.com/articles/nbt.4046>.

<sup>13</sup> See <https://www.ncwit.org/resources/numbers>.

<sup>14</sup> See <https://www.techrepublic.com/article/5-eye-opening-statistics-about-minorities-in-tech/>.

<sup>15</sup> See <https://www.uspto.gov/initiatives/expanding-innovation/national-council-expanding-american-innovation>.

## Conclusion

The findings in the PTO's SUCCESS Act report may not be surprising, but they are not acceptable. While the Act and resulting report represent an initial step at diagnosing a problem that has persisted for generations, the ultimate goal of diversifying the inventors represented in filed patent applications and issued patents in a way that better reflects all Americans will require additional resources at the earliest stages.