

Engine

ENGINE'S RESPONSE
to the Call for Comments *on*
EXPANDING AMERICAN
INNOVATION





Before the
U.S. Patent and Trademark Office

In the Matter of
**Request for Comments on the National Strategy
for Expanding American Innovation**

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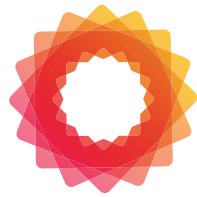
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INTRODUCTION

Engine is a non-profit technology policy, research, and advocacy organization that bridges the gap between policymakers and startups. Engine works with government and a community of thousands of high-technology, growth-oriented startups across the nation to support the development of technology entrepreneurship through economic research, policy analysis, and advocacy on local and national issues. Engine appreciates the opportunity to submit this response to the U.S. Patent and Trademark Office's (USPTO) request for comment on expanding the country's innovation ecosystems to be more diverse and inclusive.¹

The National Council for Expanding American Innovation's (NCEAI) work will touch on critical challenges and opportunities facing the nation's innovation ecosystems. Engine encourages NCEAI to seek a complete picture of the barriers underrepresented innovators and entrepreneurs routinely yet unfairly face, and Engine urges the entire federal government to mobilize toward increasing diversity and inclusion in innovation.

It would be difficult to overstate the value of diversity to innovation and entrepreneurship. Diverse teams generate better economic results, and more—often better—innovation emerges from their unique perspectives. In addition, as the nation continues the essential work of seeking to rectify systemic inequality and structural racism, increasing diversity in innovation should be a core component. Startups make outsized contributions to economic and job growth, and those benefits cannot continue to be withheld from historically underserved communities.

Looking first to the patent system, NCEAI and USPTO must recognize that the agency's stakeholders extend far beyond patent applicants and owners. And in seeking to promote diversity in innovation, the USPTO should not only keep

startups in mind—the USPTO should also look to customers and users who never intend to interact with the patent system because they still have a stake when the government grants exclusive rights in certain technologies. To promote diversity, Engine encourages the USPTO to build or expand initiatives that equip underrepresented founders who want patents with the tools or resources they need to obtain high-quality ones. It should also find ways to eliminate bias in the application process and collect better data to monitor progress.

Outside the patent system, there is much more the government should do to foster diverse and inclusive innovation. The most significant challenge facing many startups is accessing capital. Venture capital (VC) and equity investment is imbalanced along race, gender, ethnic, and geographic lines. Most VC funding goes to companies founded by white men located in a few corners of the U.S. Many underrepresented founders are further excluded because they lack equitable access to more common sources of startup capital—personal or family wealth and lines of credit or business loans. Systemic racism and sexism have created deep gaps in wages and wealth, leaving many underserved founders at an unwarranted (and sometimes severe) disadvantage.

There are many levers the government can pull, starting with its own funding. Agencies should seek to eliminate current bias and disparities in federal grants and loans. To accomplish this they should, for example, ensure diverse leaders are at the table, setting more inclusive research priorities and making funding decisions. The government should also create or improve existing financial programs to better serve startups—particularly nascent tech companies, which have different needs, and would benefit from specific tax credits or streamlined grant review. In addition, the government should consider how it can encourage private investors to spend in more equitable ways, like by incentivizing angel investors or implementing policies to reduce bias in banking.

¹ Request for Comments on the National Strategy for Expanding American Innovation, 85 Fed. Reg. 83906 (Dec. 23, 2020).



Another core feature of startup success is rooted in networking and mentoring. Startups across the country routinely emphasize the enormous value of community. Yet this is another area where underrepresented founders have been historically excluded—costing them access to potential investors, seasoned industry advisors, and entrepreneurial peers. The government can support and bolster the connective tissue of startup ecosystems by, for example, funding incubators, accelerators, and entrepreneurial support organizations that focus on underrepresented founders. And it should actively meet startups where they are, by attending conventions or working through regional offices to facilitate access to government resources and hear directly from startups about what they need from policymakers.

Finally, the talent pipeline is key. It is critical that training resources are equitably distributed, but all young people—no matter their zipcode—should be encouraged to be innovators. Unfortunately, certain students lack access to STEM education, but even those who pursue it often abandon STEM before they choose a career. The government can—and should—spend more on education, but it should figure out how to get “smarter” about training tomorrow’s innovators. For many innovators, their path will not include a university degree. Part of building the talent pipeline will require new curricula to highlight accomplished innovators from underrepresented backgrounds. The government should also focus on attracting and retaining more diverse STEM educators. And finally, the government should invest in improved, dedicated innovation and entrepreneurship education, to train creative, innovative young people and equip them with the tools they need to succeed in solving problems and developing new ideas into practical solutions through advanced technology.

IMPORTANCE OF DIVERSITY

Engine applauds the USPTO and the NCEAI for seeking to increase diversity throughout American's innovation ecosystems. Promoting diversity and inclusion in innovation is not only the right thing to do, it also makes for the best economic policy.² Studies show that diverse teams produce better financial returns and more innovation: racially and gender diverse teams are 33 percent and 21 percent more likely to be profitable than their less-diverse peer teams, respectively.³ The diversity of a company's leadership correlates to increased innovation, measured by the revenue attributable to new products and services.⁴ And innovative companies whose leaders exhibit inherent and acquired diversity are likelier to capture new market share and report market share growth.⁵

Generations of American inventors from many different backgrounds have created countless products and processes that enrich our lives and power our economy. Percy Julian created fire-retardant foam used throughout World War II,⁶ Sarah Boone was fundamental in developing the modern ironing board,⁷ and Katharine Burr Blodgett made "invisible" glass,⁸ a key component of computer screens today, just to name a few. Julian, Boone, and Blodgett are all examples of women and Black American founders and inventors, merely some of the innovators from underrepresented backgrounds who have driven America's scientific progress.

Similarly, diversity can impact—and improve—the direction of product development and innovation. Diverse teams serve a more diverse customer base, and bring unique perspectives to develop solutions to more problems experienced by more people.⁹ Merely by way of example, engineers who navigate the world in a wheelchair will more-readily see opportunities to improve accessibility in public transit; women are more likely to introduce innovative new services that cater to the

purchasing needs of women;¹⁰ and multilingual teams will better notice the value of testing voice recognition technology on many accents.¹¹ And these varied perspectives are integral to keeping American startups at the forefront of global innovation.

Startup Testimonial:

On running a startup focused on the race and gender accuracy of facial recognition: "Facial recognition technology has far-reaching implications. We saw this [] during the George Floyd protests, when law enforcement relied on inaccurate facial recognition technology. The issue also affects me and the people I care about. I am Black and I am a woman, and we know that facial recognition technology is particularly bad at identifying people of color and women. . . . Part of my social responsibility and holding Infiltron accountable is through working with teams that are diverse. For the company I am building and the solutions we are building, diversity will show in what we build, attending to accuracy and defending against racial or gender bias." ¹²

² See Rocío Lorenzo, Nicole Voigt, Miki Tsusaka, Matt Krentz, & Katie Abouzahr, *How Diverse Leadership Teams Boost Innovation*, Bos. Consulting Grp. (Jan. 23, 2018), <https://www.bcg.com/en-us/publications/2018/how-diverse-leadership-teams-boost-innovation>; Vivian Hunt, Lareina Yee, Sara Prince, & Sundiatu Dixon-Fyle, *Delivering Through Diversity*, McKinsey & Co. (Jan. 18, 2018), <https://www.mckinsey.com/business-functions/organization/our-insights/delivering-through-diversity>.

³ Hunt et al., *supra* note 2.

⁴ Lorenzo et al., *supra* note 2.

⁵ Sylvia Ann Hewlett, Melinda Marshall, & Laura Sherbin, *How Diversity Can Drive Innovation*, Harv. Bus. Rev. (Dec. 2013), <https://hbr.org/2013/12/how-diversity-can-drive-innovation>.

⁶ *Percy Julian - Facts, Inventions & Death*, Biography (Jan. 8, 2021), <https://www.biography.com/scientist/percy-julian>.

⁷ *Sarah Boone - Invention, Ironing Board & Facts*, Biography (Jan. 13, 2021), <https://www.biography.com/inventor/sarah-boone>.

⁸ Jacob Roberts, *The Invisible Woman*, Science History Institute: Distillations (May 3, 2014), <https://www.sciencehistory.org/distillations/the-invisible-woman>.

⁹ See, e.g., Edward Graham, *Styloquin Reimagines Online Shopping*,

Engine (June 14, 2019), <https://www.engine.is/news/category/startupseverywhere-providence-rhode-island> ("There's a huge opportunity in the funding community to create funds for women and minorities [Investors] should also be aware that if you're not in those communities, you don't know what their needs are. Every one of those needs has a solution that is potentially profitable.") (quoting Sarah Fletcher, co-founder of Styloquin in Rhode Island) [hereinafter "Styloquin"]

¹⁰ Modupe Akinnawonu, *Why Having a Diverse Team Will Make Your Products Better*, N.Y. Times Open (May 23, 2017), <https://open.nytimes.com/why-having-a-diverse-team-will-make-your-products-better-c73e7518f677>.

¹¹ Laura Evans, *I'm a Latina Veteran Who Works at Amazon. Diversity Isn't About Checking a Box*, Fast Company (July 30, 2020), <https://www.fastcompany.com/90532486/im-a-latina-veteran-who-works-at-amazon-diversity-isnt-about-checking-a-box>.

¹² Edward Graham, *Securing Data and Devices from Hackers*, Engine (Nov. 11, 2020), <https://www.engine.is/news/startupseverywhere-warner-robins-ga-infiltron> (quoting Chasity Wright, founder and CTO of Infiltron in Georgia) [hereinafter "Infiltron"].

IMPORTANCE OF DIVERSITY

Moreover, increasing diversity in the nation's innovation ecosystems is one path toward creating wealth and building the jobs of the future in communities across the country that have been historically marginalized and excluded from these benefits without justification.¹³ And the COVID-19 pandemic has escalated the need for concerted focus on advancing diversity in innovation sectors, as women—especially Black and Latina women—are being driven from the workforce in significant numbers.¹⁴ Rapidly increasing unemployment rates now put a finer point on the inequity that existed in innovation sectors before the pandemic, and ratchets up the urgency for effective government intervention now.

With all of this in view, it is apparent that the value of and need for greater diversity and inclusion in U.S. innovation is paramount. Likewise, as USPTO and members of the NCEAI no-doubt know, the barriers facing underrepresented founders are complex and reaching. And they extend far beyond the patent system. Of course, the solutions to expand U.S. innovation cannot be one-size-fits-all. The NCEAI and USPTO should instead carefully consider the unique needs of different underrepresented founders and propose a variety of strategies to support innovators across, e.g., race, gender, and geography. Otherwise, the country risks implementing policies that only help a few and continue to unfairly leave many innovators behind.

Engine urges the USPTO and NCEAI to thoroughly examine the complex barriers underrepresented founders face, and consider a broad range of bold, creative solutions. Were NCEAI merely to take a narrow focus on barriers to patenting, it would be missing an opportunity to contribute real value toward advancing diversity in innovation. To be sure, patenting is a valuable part of some innovators' startup models, but innovation is not always about a patentable invention—valuable innovation can include new business models,¹⁵ or customer outreach services. All underrepresented innovators and entrepreneurs, regardless of whether they want or need

patents, also deserve the attention and support of the USPTO, NCEAI, and the federal government more broadly.

Indeed, agencies and officials across the federal government have a critical role to play in dismantling the unjust barriers facing underrepresented founders. Advancing diversity in innovation and entrepreneurship will require dedicated efforts from all branches and levels of government, not just the USPTO. For example, the Small Business Administration, National Science Foundation, and Department of Education each have expertise and authority that can be brought to bear and should take a prominent role in the government's efforts to expand American innovation. And some steps will require Congressional action. Engine encourages USPTO and NCEAI to share findings with other agencies and tap into parallel efforts underway elsewhere.

¹³ See, e.g., *Why 1863?*, 1863 Ventures, <https://www.1863ventures.net/why-1863> (last visited Feb. 2, 2021) (“Our thesis is that entrepreneurship is becoming an increasingly viable pathway for the New Majority to build wealth. Our goal is to facilitate this trend by reducing barriers and risk for these founders across the nation.”).

¹⁴ LuLu Garcia-Navarro, Interview with Elise Gould, *The Economic Fallout of the Pandemic Has Had a Profound Effect on Women*, NPR (Jan. 31, 2021), <https://www.npr.org/2021/01/31/962528953/the-economic-fallout-of-the-pandemic-has-had-a-profound-effect-on-women>.

¹⁵ But the value of a patent is often not the incentive to invent, especially for startups. See Stuart J.H. Graham, Robert P. Merges, Pam Samuelson, & Ted Sichelman, *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 Berkeley Tech. L.J. 1255, 1296–97 (2009).

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Technology startups create promising innovations and develop them for the benefit of their customers and the public. Many startups continue in the footsteps of Percy Julian, Sarah Boone, and Katharine Burr Blodgett by seeking patents. Some inventors hope to license to fund further research and development,¹⁶ and others want strategic advantages associated with being the first to patent.¹⁷ For others, patents are not a part of their innovation strategy.¹⁸ Moreover, when the USPTO issues a patent, that has far reaching economic consequences. And many startups' only interaction with the patent system is when they are accused of infringement. But there are few avenues for the public to engage with the Office, as it interacts almost exclusively with patent applicants (or owners), and has very few ways to hear "from those who stand to suffer immensely" from, e.g., improvidently granted patents.¹⁹ In thinking about the importance of diversity within the patent system, the USPTO and NCEAI should not take a myopic view and misunderstand patent applicants or owners as the only relevant stakeholders. As detailed further below, Engine encourages the USPTO and NCEAI to focus on the whole innovation sector, but here presents issues and some possible solutions underrepresented innovators face in patenting.

STARK DISPARITIES IN PATENT OWNERSHIP EXIST.

Examples of excellence do not mitigate legacies of discrimination.

Our history is full of stories of inventors from communities who have been underrepresented in innovation and prevented from fully exploiting the fruits of their labor. Enslaved Black artisans literally built the Capitol building and the White House.²⁰ Across generations, Black inventors' talents have

been stolen and undervalued by American racism, and this is reflected in our patent system. Despite this inglorious history, many Black inventors were able to unleash their talent during America's Golden Age of Invention. Black inventors were awarded 50,000 patents between 1870 and 1940, making Black people among the most patent-productive groups of Americans at the time.²¹ This was in spite of Jim Crow-era anti-Black violence that, according to pathbreaking research by Professor Lisa Cook, robbed the U.S. of an estimated 1,100 patented inventions.²² In fact, Black Americans' patent rates have never recovered from their high at the turn of the 20th century.²³ The consequences of our history reverberate into patent disparities today. Black American innovations from the past to the present, despite significant obstacles, should not be interpreted as a sign of historic inclusion.

American women also have patented inventions for centuries, despite significant barriers. Hannah Wilkinson Slater is considered by many to be the first (white) woman to receive a patent in the U.S., in 1793,²⁴ and Sarah Goode was the first Black woman granted a patent, in 1885.²⁵ Coverture doctrine in early America meant that legal title to a patent went to a married woman's husband. Some scholars suggest that this early legal regime stopped many women from commercializing their inventions.²⁶ Similarly, enslaved Black women could not receive patents.²⁷ Best estimates suggest that women inventors overall composed about 4 to 8 percent of patent recipients between 1870 and 1940.²⁸ The rates for Black women are much lower:

²¹ Jonathan Rothwell, Andre M. Perry & Mike Perry, *The Black Innovators Who Elevated the United States: Reassessing the Golden Age of Invention*, Metropolitan Policy Program, Brookings Inst. (Nov. 23, 2020), <https://www.brookings.edu/research/the-black-innovators-who-elevated-the-united-states-reassessing-the-golden-age-of-invention/>.

²² Lisa D. Cook, *Violence and Economic Activity: Evidence from African American Patents, 1870-1940*, 19 J. Econ. Growth 221, 239 (2014).

²³ Rothwell et al., *supra* note 21.

²⁴ *Progress and Potential: A Profile of Women Inventors on U.S. Patents*, Office of the Chief Economist, U.S. Patent and Trademark Office, 2019 IP Data Highlights 2, 3 <https://www.uspto.gov/sites/default/files/documents/Progress-and-Potential.pdf>.

²⁵ Sarah Boone, *supra* note 7.

²⁶ Daniel H. Shulman & Angela Upchurch, *Spousal Rights to Inventions: A Latent Threat to Corporate Patent Portfolios*, 50 Seton Hall L. Rev. 1, 4 (2019); B. Zorina Khan, *Married Women's Property Laws and Female Commercial Activity: Evidence from United States Patent Records, 1790-1895*, 56 J. Econ. Hist. 356, 385 (1996).

²⁷ Shontavia Jackson Johnson, *The Colorblind Patent System and Black Inventors*, 11 *Landslide* 4 (2019), https://www.americanbar.org/groups/intellectual_property_law/publications/landslide/2018-19/march-april/colorblind-patent-system-black-inventors/.

²⁸ *Report to Congress Pursuant to P.L. 115-273, the SUCCESS Act*, U.S. Patent and Trademark Office 8 (Oct. 2019), <https://www.uspto.gov/sites/default/files/documents/USPTOSuccessAct.pdf>; see Sarada et al., *Historical Changes in the Demographics of Inventors in the United States* (Jan. 30, 2017), <https://ssrn.com/abstract=2908160>.

¹⁶ See, e.g., *id.* at 1300 (recounting anonymous inventor's story).

¹⁷ Bhaven N. Sampat, *A Survey of Empirical Evidence on Patents and Innovation* 5, 9 (Nat'l Bureau of Econ. Rsch., Working Paper No. 25383, 2018), https://www.nber.org/system/files/working_papers/w25383/w25383.pdf.

¹⁸ *Id.* at 20 ("A considerable amount of innovation occurs outside the patent system.")

¹⁹ Priti Krishtel, Opinion, *The Path to Racial Justice Runs Through This Agency*, N.Y. Times (Feb. 9, 2021), <https://www.nytimes.com/2021/02/09/opinion/biden-patent-office.html?action=click&module=Opinion&pgtype=Homepage>.

²⁰ Felicia Bell, *Enslaved Labor and the Capitol*, U.S. Capitol Hist. Soc'y (2003), <https://uschs.org/explore/historical-articles/enslaved-labor-united-states-capitol/>; *Slavery and the White House*, White House Hist. Ass'n (last visited Feb. 15, 2021), <https://www.whitehousehistory.org/press-room/press-backgrounders/slavery-and-the-white-house>.

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“historians can identify only four African-American women who were granted patents for their inventions” between 1865 and 1900.²⁹ To understand and rectify today’s patent disparities, we must relearn our past.

Historic disparities persist today.

The latest data suggest that, while underrepresented inventors make up a larger share of the tech community than ever, reaching equity will require much more work. Despite being more than half the U.S. population, and holding about a quarter of science and engineering jobs, women made up only 13 percent of all inventor-patentees.³⁰ The USPTO has not released official data on inventor-patentees by race, but multiple studies suggest that Black people and Latinos, as well as Native Americans, are dramatically underrepresented.³¹ Separately, some studies suggest that women inventors emerge from the patent prosecution process with fewer claims approved and more alterations of their claims (therefore potentially lowering the claims’ value) than men.³² Evidence also suggests that patent examiners may be inclined to treat applications from inventors of the same gender more favorably.³³ These data suggest the legal and cultural barriers to diverse and inclusive patenting may have abated over time but remain substantial.

MAKING THE PATENT SYSTEM MORE INCLUSIVE.

Embodying diversity and minimizing bias.

The Biden-Harris Administration has an early opportunity to nominate a USPTO Director who embodies diversity and

values inclusion,³⁴ alongside Commerce Secretary-designate Gina Raimondo and Small Business Administrator-designate Isabel Guzman. The Administration should also seek to grow diversity within the rest of USPTO leadership and among USPTO’s employees—by attracting and retaining a diverse slate of examiners and administrative patent judges.³⁵

The next USPTO Director should also move quickly to minimize bias in patent examination. To start, she should launch a pilot program to de-identify patent applicants—removing inventor and attorney names.³⁶ The Director should also launch an independent investigation to understand the role of systemic racism and bias within the patent system.

Creating better demographic data sets.

Part of understanding these problems of underrepresentation is being able to quantify them, and the USPTO needs metrics to monitor progress. To that end, it should collect demographic data from patent applicants, and “more systematically collect and distribute data about assignees that support the tracking of startups, small businesses, independent inventors, minority- and veteran-owned businesses.”³⁷ And this data should support investigations into possible implicit, structural, or other bias in the patent system. The USPTO should also examine how it can act under its current authority to implement proposals within the IDEA Act to better collect and disseminate demographic data throughout the patent application process.³⁸ A strong early focus on equity, backed by data from an authoritative source, would help the country understand and address gaps in invention and innovation.

²⁹ Leila McNeill, *These Four Black Women Inventors Reimagined the Technology of the Home*, Smithsonianmag.com (Feb. 7, 2017), <https://www.smithsonianmag.com/science-nature/these-four-black-women-inventors-reimagined-technology-home-180962060/>.

³⁰ *SUCCESS Act Report*, *supra* note 28, at 8-10; *Progress and Potential*, *supra* note 24, at 2, 4 <https://www.uspto.gov/sites/default/files/documents/OCE-DH-Progress-Potential-2020.pdf>.

³¹ *SUCCESS Act Report*, *supra* note 28, at 11-14

³² Kyle Jensen et al., *Gender Differences in Obtaining and Maintaining Patent Rights*, 36 *Nature Biotechnology* 307, 308 (2018).

³³ Pranav Desai, *Biased Regulators: Evidence from Patent Examiners* (Nov. 10, 2019) (unpublished manuscript), https://www.hhs.se/contentassets/8dc2ad16aae347b68404bdf57e02dbc3/200117-jpm-pranav-desai_ssrn-id3485965.pdf; see also Michael Risch, *Race and Gender in the USPTO: Schuster’s Hard Data for Hard Issues*, Written Description (Aug. 18, 2020), <https://writtendescription.blogspot.com/2020/08/race-and-gender-in-uspto-schusters-hard.html>.

³⁴ Letter from Engine to President Joe Biden and Vice President Kamala Harris (Jan. 19, 2021), <https://www.engine.is/news/engine-asks-biden-harris-team-to-consider-startups-when-naming-next-uspto-director>.

³⁵ The USPTO should also consider adding diversity to its public advisory committees. See Priti Krishtel, *The Path to Racial Justice Runs Through This Agency*, N.Y. Times (Feb. 9, 2021), <https://www.nytimes.com/2021/02/09/opinion/biden-patent-office.html>.

³⁶ U.S. Patent and Trademark Office (USPTO) *Transition Document*, Day One Project 5 (last accessed Feb. 15, 2021), available at https://9381c384-0c59-41d7-bbdf-62bbf54449a6.filesusr.com/ugd/14d834_fa6b0d730acb491fa81b0fce54cfbef8.pdf.

³⁷ Colleen V. Chien, *Increasing Diversity in Innovation by Tracking Women, Minority, and Startups Innovators that Patent and Supporting Experimentation in Inclusive Innovation* (June 30, 2019), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3413805.

³⁸ Press Release, U.S. Representative Nydia M. Velázquez, Velázquez, Stivers, Hirono, Tillis, Introduce Bipartisan, Bicameral Bill to Help Close Patent Gap Faced by Women, Minorities (July 25, 2019), <https://velazquez.house.gov/media-center/press-releases/velazquez-stivers-hirono-tillis-introduce-bipartisan-bicameral-bill-help>.

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Helping underrepresented inventors seek high-quality patents.

Patent quality is essential to startups. High-quality patents can be a valuable asset for underrepresented founders growing emerging tech companies. But when the USPTO issues low-quality patents—which sometimes happens—those patents operate as a drain on innovation. Moreover, low-quality patents create problems for patent owners—innovators and entrepreneurs who spent time and money on a patent application that has little (if any) value.³⁹

But to obtain a high-quality patent, an inventor needs financial resources to cover, e.g., prior art searches, specification and claim drafting, and prosecution counsel. It is critical that underrepresented inventors seeking patent protection can access the resources they need to support issuance of a high-quality patent.

The USPTO should take (and Congress should support) more direct steps to help underrepresented inventors who choose to file for a patent obtain a high-quality patent. And that focus on quality should remain paramount. Professor Colleen Chien and her students have documented that smaller firms, such as startups, are over 40 percent less likely to have an application end in a patent, signaling that many startups that do file patents may need assistance during the application process.⁴⁰ On top of that, underrepresented innovators often have less access to capital and social networks of other innovators, which can leave them with fewer resources to tap for guidance or assistance in navigating the examination process.

Congress and the USPTO have both acted in recent years to support underrepresented innovators. The America Invents Act (AIA) was an important step. It allowed the USPTO to adjust its fees and establish a lower fee rate for smaller applicants.⁴¹ It created a pro bono program to assist under-resourced inventors and small businesses.⁴² And it established regional USPTO offices, making it easier for inventors across the country to access the Office's resources.⁴³

³⁹ Comment by Engine to the Subcommittee on Intellectual Property of the Senate Judiciary Committee (Nov. 6, 2019), available at <https://www.engine.is/news/engine-submits-comments-to-senate-judiciary-subcommittee-on-patent-quality>.

⁴⁰ Colleen V. Chien et al., *Guest Post: Advancing Inclusive Innovation and Entrepreneurship through the Patent System*, Patently-O (Nov. 4, 2020), <https://patentlyo.com/patent/2020/11/advancing-innovation-entrepreneurship.html>.

⁴¹ John R. Thomas, *The Leahy-Smith America Invents Act: Innovation Issues*, Cong. Rsch. Serv. 17 (Jan. 15, 2014), <https://fas.org/sgp/crs/misc/R42014.pdf>.

⁴² E.g., *Inventors*, U.S. Patent and Trademark Office (June 1, 2020), <https://www.uspto.gov/patents/basics/using-legal-services/pro-bono/inventors>.

⁴³ Michelle K. Lee, *Report on Satellite Offices*, U.S. Patent and Trademark Office, https://www.uspto.gov/sites/default/files/aia_implementation/

But more can be done. For example, as USPTO staff previously noted, applicants may benefit from accessible online tools for the pre-submission process.⁴⁴ Better low- and no-cost tools to research prior art would help both applicants and examiners. The pro bono program should be more accessible and prioritized to include more lawyers from underrepresented backgrounds. And USPTO should also move to diversify the patent bar by relaxing the technical requirements for the patent bar,⁴⁵ because the lack of representation among patent prosecutors, in part, reflects the lack of representation in the relevant degree programs.⁴⁶ The government should also ensure startups wrongly-accused of infringement can afford to challenge low-quality patents or avoid the steep costs of frivolous litigation.⁴⁷

Finally, given the successes of its newer regional office structure, the USPTO should consider adding another regional office and expanding resources for existing ones. Creating a regional office in the southeastern U.S., for example near Atlanta, could add a lot of value. The region is home to several historically Black colleges and universities (HBCUs) and has burgeoning startup industries, but currently lacks a dedicated USPTO office.

Startup Testimonial:

On applying for a patent as a woman entrepreneur: "I would like to see the U.S. government do something [], like create a program for women and minorities, because it's just such a heavy lift. . . . So I think the government should consider setting up programs [for women and minorities] to help reduce some of the financial burdens of the patent process." 48

USPTO_AIASatelliteOfficesReport_2014Sept30_Online.pdf.

⁴⁴ E.g., *Patent Quality Chat, Application readiness: Assessing incoming applications*, U.S. Patent and Trademark Office 20 (Feb. 19, 2020), https://www.uspto.gov/sites/default/files/documents/Patent%20Qual%20Chat%20Application%20Readiness%202_19_2020%20for%20posting.pdf.

⁴⁵ See General Requirements Bulletin, U.S. Patent and Trademark Office, available at https://www.uspto.gov/sites/default/files/documents/OED_GRB.pdf.

⁴⁶ See Eric L. Goldman et al., *Boosting Patentee Diversity by Relaxing the Technical Barriers to Patent Bar Membership*, Docket No. PTO-C-2019-0010 (June 30, 2019), available at <https://www.uspto.gov/sites/default/files/documents/SUCCESSAct-Goldman-et-al.pdf>.

⁴⁷ See, e.g., Comments of Engine Advocacy in Response to Setting and Adjusting Patent Fees During Fiscal Year 2020, Proposed Rule, Docket No. PTO-P-2018-0031 (Sept. 30, 2019), available at https://static1.squarespace.com/static/571681753e44d835a440c8b5/t/5d92500377d2fc7dc66349f1/1569869827579/2019.09.30_Comments+to+Docket+PTO+P+2018+0031.pdf (discussing disproportionate costs to challenge low-quality patents).

⁴⁸ Graham, *Stylaquin*, *supra* note 9.

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The most significant challenge facing almost every startup innovator is access to capital—but this is especially true for underrepresented founders. These groups of entrepreneurs face unique and complex barriers to raising the money they need to launch and grow their businesses and introduce new technologies. But the government can, and should, help dismantle those barriers and create new funding channels for historically underrepresented innovators.

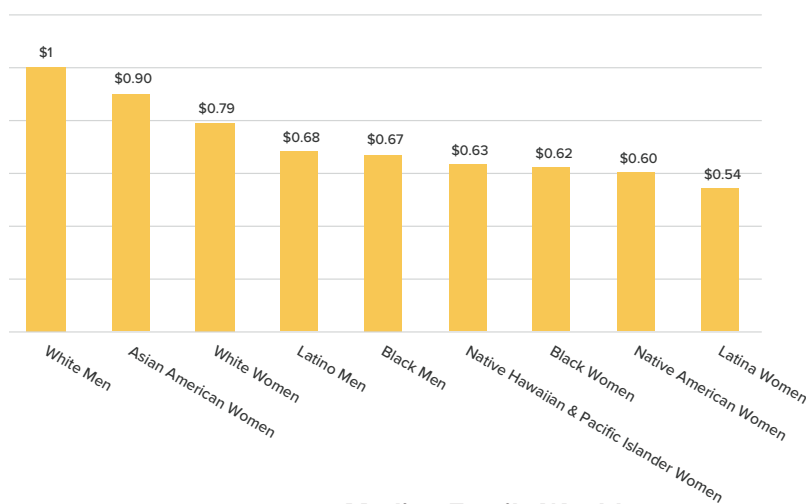
Underrepresented founders face serious barriers across every traditional startup funding stream.

The most common forms of startup funding are routinely and unfairly unavailable to underrepresented founders.

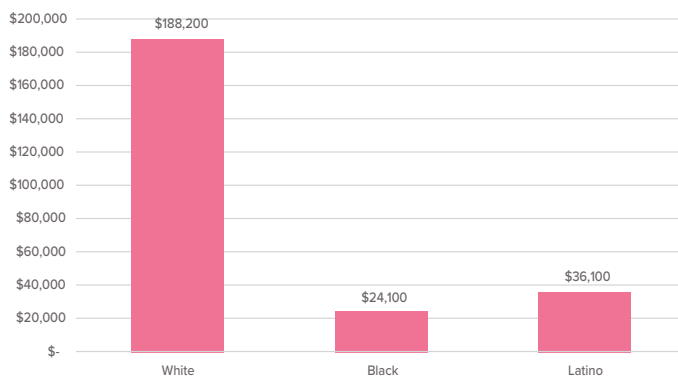
Cash and credit can propel a groundbreaking idea into a successful business, but that capital is often not accessible to underrepresented founders. An entrepreneur with access to enough capital to hire, research, and expand has a head start on others who must choose between, e.g., new hires or a new product line. Most startups begin their financial journeys by raising money from the founders and their family.⁴⁹ The head start begins there: systemic racism and sexism mean that many entrepreneurs cannot equitably access those traditional sources of capital. The gender and racial pay gaps are well-known illustrations of this problem. For every dollar a white man earns in America: white women earn approximately 79 cents; Black men, 67 cents; Black women, 62 cents; Latino men, 68 cents; Latina women, 54 cents.⁵⁰ These disparities remain when analyzing the family wealth gap. In the U.S., for every dollar the average Black family owns, the average white family owns about eight dollars; for every one dollar of assets the average Latino family owns, the average white family owns

about six dollars.⁵¹ And while the average single white woman's wealth is about half as much as the average white man (the “singles wealth gap”), comparable figures for Black people and Latinos are insulting: single Black men's wealth is equivalent to 1% of single white men; 0.69% for Black women; 3.3% for Latino men; 0.35% for Latina women.⁵² The inequities in access to capital start with underrepresented innovators' relative lack of income and wealth and balloon from there.

Gender & Racial Wage Gaps



Median Family Wealth



have-faced-some-of-the-most-damaging-economic-and-health-effects-of-the-coronavirus/; *Quick Facts About the Gender Wage Gap* (Center for American Progress, Washington, D.C.), Mar. 24, 2020, at 1–2, https://cdn.americanprogress.org/content/uploads/2020/03/23133916/Gender-Wage-Gap-.pdf?_ga=2.77896212.1092372900.1612138845-1354523628.1612138845; Courtney Conley, *New Census Data Reveals No Progress Has Been Made on Closing the Overall Gender Pay Gap*, CNBC: Make It (Sept. 18, 2020), <https://www.cnbc.com/2020/09/18/new-census-data-reveals-no-progress-has-been-made-closing-the-gender-pay-gap.html>.

⁵¹ Neil Bhutta, et al., *Disparities in Wealth by Race and Ethnicity in the 2019 Survey of Consumer Finances*, Board of Governors of the Federal Reserve System: FEDS Notes (Sept. 28, 2020), <https://www.federalreserve.gov/econres/notes/feds-notes/disparities-in-wealth-by-race-and-ethnicity-in-the-2019-survey-of-consumer-finances-20200928.htm>.

⁵² *Women and Wealth: Insights for Grantmakers* (Asset Funders Network, Evanston, Ill.), 2005, at 5, https://assetfunders.org/wp-content/uploads/Women_Wealth_-_Insights_Grantmakers_brief_15.pdf.

⁴⁹ *Startup Financing Trends by Race: How Access to Capital Impacts Profitability*, Annual Survey of Entrepreneurs Data Briefing Series, (Kauffman Foundation, Kansas City, M.O.), Oct. 2016, https://www.kauffman.org/wp-content/uploads/2019/12/ase_brief_startup_financing_by_race.pdf.

⁵⁰ It is worth noting that while the data trends are consistent across sources, exact figures differ by source. See, e.g., David Leonhardt, *The Black-White Wage Gap Is as Big as It Was in 1950*, N.Y. Times (June 25, 2020), <https://www.nytimes.com/2020/06/25/opinion/sunday/race-wage-gap.html>; Press Release, Economic Policy Institute, *Latinx workers—Particularly Women—Have Faced Some of the Most Damaging Economic and Health Effects of the Coronavirus* (Aug. 20, 2020), <https://www.epi.org/press/latinx-workers-particularly-women->

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Underrepresented founders also have less access to outside financing. Relative to white men, Black and Latino small business owners rely more on capital from personal and family sources, utilize business loans less, and their loans have higher interest rates.⁵³ Women-owned small businesses also receive less in business loans than small businesses owned by men.⁵⁴ And all of these underrepresented groups report higher reticence to seek out business loans out of a fear of rejection.⁵⁵

Startup Testimonial:

“Until the whole of government addresses the generation wealth gap, the food insecurities a lot of our families suffer, and the educational challenges we continue to have, then everything else is just lip service. You can’t grow prosperous communities when people are hungry, poorly educated, and the Black-white wealth gap is what it is right now. The net worth of a typical white family is nearly 10 times greater than that of a Black family.” ⁵⁶

These gaps in capital are the result of several factors. For example, about 1 in 20 American families lack any relationship with banks, and even more families utilize credit outside the banking system, such as payday or auto title loans.⁵⁷ The FDIC found that Black and Latino households were more likely to use

⁵³ *Startup Financing Trends by Race*, *supra* note 49; see also Robert Fairlie et al., *Black and White: Access to Capital among Minority-Owned Startups* 9-10, 25 (Stan. Inst. for Econ. Pol’y Rsch., Discussion Paper No. 17-03, 2016), <https://siepr.stanford.edu/sites/default/files/publications/17-003.pdf>; see also *Small Business Credit Survey*, Rpt. on Minority-Owned Firms (Federal Reserve Bank of Atlanta, Atlanta, Ga.), Dec. 2019, at 16 (reporting higher interest rates), <https://www.fedsmallbusiness.org/medialibrary/fedsmallbusiness/files/2019/20191211-ced-minority-owned-firms-report.pdf>.

⁵⁴ *Women Business Owners’ Access to Capital Literature Review*, (National Women’s Business Council, Washington, D.C.), Mar. 1, 2018, at 14-15, https://cdn.www.nwbc.gov/wp-content/uploads/2018/03/28215658/NWBC-Report_Understanding-the-Landscape-Access-to-Capital-for-Women-Entrepreneurs.pdf.

⁵⁵ *Id.* at 15 (women); *Minority Small Business Credit*, *supra* note 53, at 9 (people of color).

⁵⁶ Edward Graham, *Supporting Innovation and Entrepreneurship in Southeast Arkansas*, *Engine* (July 31, 2020), <https://www.engine.is/news/startupseverywhere-pinebluff-ark-generator> (quoting Mildred Franco, Executive Director of The Generator at Go Forward Pine Bluff).

⁵⁷ *How America Banks: Household Use of Banking and Financial Services*, 2019 FDIC Survey, (FDIC, Washington, D.C.), Oct. 2020, at 1 (unbanked), 6-9 (finding higher rates of nonbank financial transactions), <https://www.fdic.gov/analysis/household-survey/2019execsum.pdf>.

nonbank credit, even after controlling for income.⁵⁸ It seems likely that recent trends of bank branch closures in Black and rural neighborhoods (the latter particularly impacting Latino and Native American communities) will only worsen these issues.⁵⁹ Similarly, over the past two decades, half of Black-owned banks have closed.⁶⁰ Disparities in credit scores are also an important factor here: studies suggest that women, Black people, and Latinos all have relatively lower credit scores.⁶¹ Income and wealth inequality result in systemic differences in credit scores, which are then used by banks to determine who does and does not get a loan. In addition, Black people and Latinos receive unequal and worse treatment by financial institutions, even after controlling for disparities in income, wealth, and credit scores.⁶²

At the same time, Black- and Latino-owned small businesses are often pushed to use riskier credit options to capitalize their businesses—including personal credit cards and cash advances—at higher rates than white-owned small businesses.⁶³ These closed doors to traditional financing push underrepresented founders towards riskier alternatives to make their visions a reality, and unfortunately may push many out of innovation altogether.

⁵⁸ *Id.* at 8-9.

⁵⁹ See, e.g., Zach Fox et al., *Bank branch closures take greatest toll on majority-black areas*, S&P Global: Market Intelligence (July 25, 2019), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/bank-branch-closures-take-greatest-toll-on-majority-black-areas-52872925>; *Bank Branch Closures from 2008-2016: Unequal Impact in America’s Heartland*, Rsch. Memo (Nat’l Cmty. Reinvestment Coal., Washington, D.C.), May 2017, https://ncrc.org/wp-content/uploads/2017/05/NCRC_Branch_Deserts_Research_Memo_050517_2.pdf.

⁶⁰ Cameron Costa, *Minority Entrepreneurs at a Tipping Point as Black-Owned Banks Dwindle in the U.S.*, CNBC (Aug. 25, 2020), <https://www.cnn.com/2020/08/25/minority-entrepreneurs-at-tipping-point-as-black-owned-banks-dwindle.html>.

⁶¹ See, e.g., *Women Business Owners*, *supra* note 54, at 16; *Minority Small Business Credit*, *supra* note 53, at 6.

⁶² See, e.g., *Disinvestment, Discouragement and Inequity in Small Business Lending* (Nat’l Cmty. Reinvestment Coal., Washington, DC), Sept. 2019, at 5-6 (“[W]hile the customer service experience of all applicants for small business credit is poor, it’s even worse for [B]lack and Hispanic applicants.”), 29-30 (“The profiles of all testers was sufficiently strong that on paper, either profile would qualify them for a loan. Furthermore, the [B]lack and Hispanic testers’ profiles were slightly better than their white counterparts in terms of income, assets and credit scores. ... In almost every measure evaluated, white testers received superior customer service by being asked fewer questions about eligibility and receiving more information about the loan product than were their [B]lack and Hispanic counterparts.”), <https://ncrc.org/wp-content/uploads/2019/09/NCRC-Small-Business-Research-FINAL.pdf>; Press Release, Credit Sesame, *Black and Hispanic Americans on the U.S. Financial System: “The Odds Were Always Against Me,” New Credit Sesame Survey Finds* (Jan. 26, 2021), <https://apnews.com/press-release/pr-newswire/business-race-and-ethnicity-north-america-public-opinion-african-americans-044f597aa001de38936a9f64c8997bfc>.

⁶³ See *Startup Financing Trends by Race*, *supra* note 49 (Black Americans’ lower credit card scores); *Minority Small Business Credit*, *supra* note 53, at 12.

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Startup Testimonial:

*“But it’s not just venture capital that is more challenging for underrepresented founders to access. Black and Brown founders often don’t have a friends and family round—or they have one that’s substantially smaller than their counterparts—due to the lack of generational wealth. In addition, when we consider securing loans, we often encounter additional barriers and difficulties.”*⁶⁴

Equity investment from VC and angel investors is very unevenly distributed.

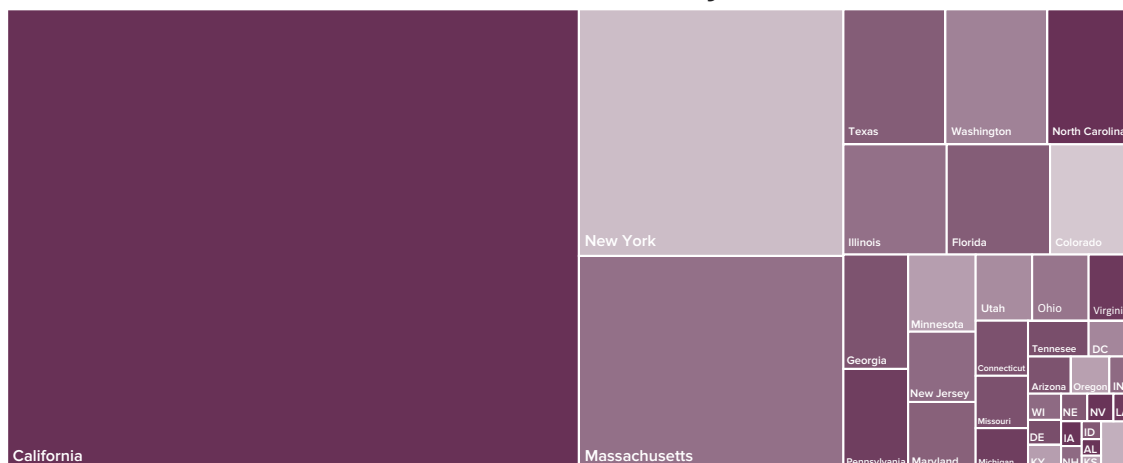
While VC is rightly acknowledged for successfully fueling much innovation, it has fallen enormously short in supporting diversity and inclusion. VC’s modern origins chart from the post-WWII boom in the U.S., when several firms were founded in Boston and New York City in the 1940s.⁶⁵ VC emerged in California alongside the rise of the semiconductor industry in Silicon Valley in the 1950s and 1960s.⁶⁶ While less than 1 percent of all startups utilize VC funding,⁶⁷ that early mover advantage remains critical—over 70 percent of the \$130 billion in VC investment today goes to founders in three states: California, Massachusetts, and New York.⁶⁸ This

concentration speaks to many inequities—for example, less than 1 percent of VC investment goes to rural communities.⁶⁹ VC’s demographic composition is similarly concentrated: only about 20 percent of VC professionals are women, 5 percent are Latino, and 3 percent are Black.⁷⁰ While VC was crucial to the successes of certain well-known companies like Facebook, Zynga, or Spotify, there are systemic failures in VC that must be addressed. And if addressed, could contribute to more startups led by diverse teams growing into household names.

Startup Testimonial:

*“As a Black-owned business, funding has and continues to be a challenge. I reached out to hundreds of venture capitalists to raise funding . . . and I was unsuccessful. If it were not for the fact that I have a technology consulting company where I was able to see some revenue to bootstrap Postagraph, then the app wouldn’t have been created.”*⁷¹

VC Deal Volume By State



⁶⁴ Edward Graham, *Helping the Production Community Locate and Hire Talent*, Engine (Feb. 19, 2021), <https://www.engine.is/news/startupseverywhere-atlanta-ga-filmconnx> (quoting Carolyn Pitt, CEO and Founder of Film Connx) [hereinafter “Film Connx”].

⁶⁵ Martin Kenney, *How Venture Capital Became a Component of the US National System of Innovation*, 20 *Industrial and Corporate Change* 1677, 1687-89 (2011).

⁶⁶ *Id.* at 1689-90.

⁶⁷ Meredith Wood, *Raising Capital for Startups: 8 Statistics That Will Surprise You*, Fundera (Feb. 3, 2020), <https://www.fundera.com/resources/startup-funding-statistics>.

⁶⁸ *Venture Capital Funding Report Q4 2020* (PwC/CB Insights), 2nd ed. 2021, at 57, <https://www.pwc.com/us/en/moneytree-report/assets/pwc-moneytree-2020-q4.pdf>.

⁶⁹ Matt McKenna, *Access to Capital Is Critical to Ensuring Success of Rural Entrepreneurs*, VC-List (June 6, 2018), <https://vc-list.com/startup-capital-rural-entrepreneurs/>.

⁷⁰ *NVCA-Deloitte Human Capital Survey* (NVCA/Deloitte), June 2019, at 7-9, available at <https://www2.deloitte.com/us/en/pages/audit/articles/diversity-venture-capital-human-capital-survey.html>.

⁷¹ Edward Graham, *The Digital Home: A Social Messaging Platform for Authentic and Private Connections*, Engine (Sept. 25, 2020), <https://www.engine.is/news/startupseverywhere-gaithersburg-md-postagraph> (quoting Pelumi Olatinpo, CEO of Postagraph in Maryland) [hereinafter “Postagraph”].

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VC has not been a source of equitable financing for many underrepresented founders. Crunchbase estimates that women founders receive about 3 percent of venture capital, while Black and Latino founders receive a similar fraction of overall venture funds.⁷² And consistent with other trends, Black and Latina women receive a fraction of these fractions from the venture capital sector—less than 1 percent each.⁷³ While there have been recent efforts to increase racial and gender equity, VCs still have a long way to go.

Startup Testimonial:

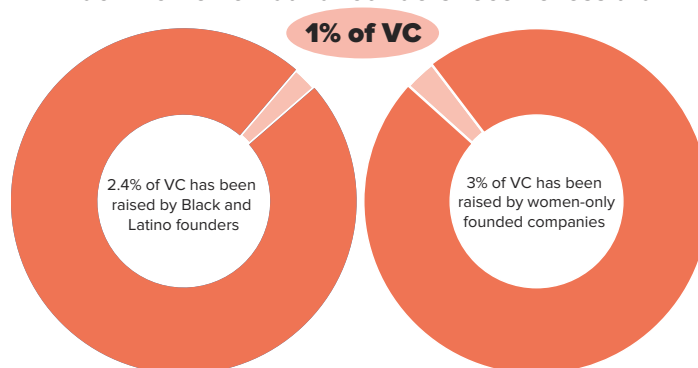
“A lot of times, VC firms aren’t looking for early-stage entrepreneurs or businesses, which is another big barrier. And a lot of Black and Brown entrepreneurs cater their services towards Black or Brown people, and investors can’t see the vision or the mission of their companies. So they don’t understand their focus, and then they skip over those entrepreneurs. If they look hard enough though, and if they really want to, they will find startups led by entrepreneurs of color.”⁷⁴

⁷² *Funding to the Female Founders* (Crunchbase, S.F., Cal.), Mar. 2020, at 5 (“In 2019, female-only founded companies raised 3 percent of venture dollars.” (emphasis added)), https://about.crunchbase.com/wp-content/uploads/2020/03/Funding-To-Female-Founders_Report.pdf; *Funding to Black & Latinx Founders*, Crunchbase Diversity Spotlight 2020 (Crunchbase, S.F., Cal.), Oct. 2020, at 4 (“So far in 2020, Black and Latinx founders have raised \$2.3 billion, representing 2.6 percent of funding through Aug. 31, 2020.” (emphasis added)), http://about.crunchbase.com/wp-content/uploads/2020/10/crunchbase_diversity_report_2020.pdf.

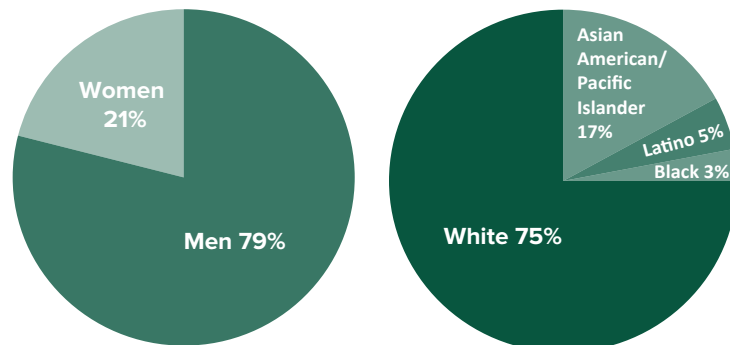
⁷³ Sources differ on exact figures, but there is consensus that the total figure is less than 1 percent. See, e.g., *id.*; Jessica Guynn, *Racial inequity persists after George Floyd: Black women and Latina entrepreneurs get less than 1% of venture capital*, USA Today (Dec. 3, 2020) (“Black women-founded companies raised about \$700 million in funding from 2018-2019, a significant increase from the previous two-year period yet still account for 0.27% of the \$276.7 billion in venture capital investment.”), <https://www.usatoday.com/story/tech/2020/12/02/black-women-latinas-venture-capital-systemic-racism-george-floyd/3795961001/>.

⁷⁴ Edward Graham, *A Platform to Help Professionals of Color Make Informed Career Choices*, Engine (June 12, 2020), <https://www.engine.is/news/startupeverywhere-nyc-dipper> (quoting Netta Jenkins, Co-Founder of Dipper).

Gender and Racial Disparity in VC Funding Black women & Latina founders receive less than



Disparities in VC Workforce: By Percentage of Investment Professionals



Newer sources of startup funding may have some potential but present similar challenges for underrepresented founders. Angel investors—wealthier individual investors who back startups—are substantially smaller than VCs as a whole but can have high profiles.⁷⁵ While demographic investment data for angels is sparse, the demographic profile of angel investors is consistent with the VC industry as a whole—few women and fewer Black people and Latinos.⁷⁶

Many advocates suggest that equity crowdfunding may be a potential tool to combat discriminatory trends, and there are several crowdfunding platforms designed specifically for underrepresented founders.⁷⁷ But data on efficacy is hard to find. Some studies have

⁷⁵ *Angels: Foundational Investors to VC* (Pitchbook, Seattle, Wash.), Sept. 1, 2020, at 1-2, 6 (“While a relatively small slice of overall investment, angels still play an important role within the market.”), available at <https://pitchbook.com/news/reports/q3-2020-pitchbook-analyst-note-angels-foundational-investors-to-vc>.

⁷⁶ *The American Angel* (Angel Capital Association/John Huston Fund for Angel Professionalism), Nov. 2017, 7 (reporting survey findings that 22.1 percent of angel investors were women, 2.3 percent were Latino and 1.3 percent were Black), <https://www.angelcapitalassociation.org/data/Documents/TAARep11-30-17.pdf?rev=DB68>.

⁷⁷ See, e.g., *Crowdfunding, Cryptocurrency, and Capital: Alternative Sources of Business Capital for Black Entrepreneurs* (Congressional Black Caucus Foundation, Inc./Center for Policy Analysis and Research, Washington,

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found that crowdfunding is a more welcoming environment for women founders. A PwC report found that women-led crowdfunding campaigns were 32 percent more successful than those led by men.⁷⁸

Fintech, firms focused on updating the banking model for the digital world, may hold similar promise in decreasing discrimination. While the fintech industry's demographics are no better than the broader technology industry,⁷⁹ studies suggest that, while finance algorithms discriminate against Black and Latino loan applicants, they may discriminate less in certain industries (e.g., mortgages) than traditional face-to-face lending.⁸⁰ Both the financial and technology sectors have lagged historically in tackling discrimination, but advances in fintech algorithm design could cut down on biased lending and promote greater equity. While some of these developments are encouraging, no matter the vector, the challenges to true equity in accessing capital remain deep.

Leveraging the government in expanding capital access across the board.

Making federal financing fairer and more equitable.

The federal government should take a leading role in creating a financial system that builds bridges to innovation instead of walls. That starts with addressing systemic problems within the government itself. As this pandemic demonstrated, federal programs can play an important role in exacerbating inequities,

D.C.), Mar. 2019, 12-13, 15, <https://www.cbfcinc.org/wp-content/uploads/2019/03/CPAR-Report-Crowdfunding-Cryptocurrency-FINAL.pdf>; Steven Overly, *Crowdfunding Expands Access to Capital for Women, Minority Entrepreneurs*, Wash. Post (Apr. 7, 2013), https://www.washingtonpost.com/business/capitalbusiness/crowdfunding-expands-access-to-capital-for-women-minority-entrepreneurs/2013/04/07/f37f2cda-9d59-11e2-a2db-efc5298a95e1_story.html.

⁷⁸ *Women Unbound: Unleashing Female Entrepreneurial Potential* (PwC/The Crowdfunding Center), July 2017, at 4, <https://www.pwc.com/gx/en/diversity-inclusion/assets/women-unbound.pdf>.

⁷⁹ *Achieving Gender Equity in the Fintech Community: Enlisting Key Stakeholders to Drive Change*, Within Reach Series (Deloitte Center for Financial Services/100 Women in Finance), Oct. 2020, at 2 (“[W]omen-founded fintechs [fintech startups] accounted for 3.1% of the total pool [of startups] in 2019.”), 3 (“In the world of startups, the global fintech founder community is still dominated by men, with women making up just 7% of the total pool), available at <https://www2.deloitte.com/us/en/insights/industry/financial-services/women-in-fintech.html?id=us:2em:3na:4di6918:5awa:6di:MMDDYY:&pkid=1007338>; see also Lauryn Nwankpa, *I'm a Black Woman in Fintech. My Industry Has to Overcome Its Racism to Survive*, Fast Company (Oct. 19, 2020), <https://www.fastcompany.com/90565223/im-a-black-woman-in-fintech-my-industry-has-to-overcome-its-racism-to-win-talent>.

⁸⁰ Robert Bartlett et al., *Consumer-Lending Discrimination in the Fintech Era*

as well as mitigating them. On the one hand, researchers suggest that COVID-19 relief efforts like enhanced unemployment insurance and stimulus checks kept millions of Americans out of poverty.⁸¹ But on the other, measures like the Paycheck Protection Program (PPP) failed to provide adequate support for Black and Latino-owned businesses, particularly those that were unbanked or underbanked.⁸² Data show, for example, that predominantly Black congressional districts got fewer PPP loans,⁸³ where applicants faced longer delays receiving funds;⁸⁴ minority-owned PPP applicants had to wait longer and try harder to have applications processed;⁸⁵ and Black applicants received worse treatment from banks.⁸⁶ The federal government must understand its failures and shortcomings in order to surmount them.

Expanding Existing Programs for Small Business Financing and Prioritizing Underrepresented Founders.

Startups can tap into many existing federal funding programs and Engine encourages the NCEAI to holistically review how best to improve and expand them. Some ideas include:

(Nat'l Bureau of Econ. Rsch., Working Paper No. 25943, 2019), https://www.nber.org/system/files/working_papers/w25943/w25943.pdf; Thomas Philippon, *On Fintech and Financial Inclusion* (Nat'l Bureau of Econ. Rsch., Working Paper No. 26330, 2019), https://www.nber.org/system/files/working_papers/w26330/w26330.pdf.

⁸¹ Meghan Roos, *First Stimulus Check Prevented Around 12.5 Million Americans from Poverty, Study Finds*, Newsweek (July 6, 2020), <https://www.newsweek.com/first-stimulus-check-prevented-around-125-million-americans-poverty-study-finds-1515694>; Ben Zipperer, *Over 13 Million More People Would Be in Poverty Without Unemployment Insurance and Stimulus Payments*, Economic Policy Institute: Working Economics Blog (Sept. 17, 2020), <https://www.epi.org/blog/over-13-million-more-people-would-be-in-poverty-without-unemployment-insurance-and-stimulus-payments-senate-republicans-are-blocking-legislation-proven-to-reduce-poverty/>.

⁸² Megan Cerullo, *Up to 90% of Minority and Women Owners Shut Out of Paycheck Protection Program, Experts Fear*, CBS News (Apr. 22, 2020), <https://www.cbsnews.com/news/women-minority-business-owners-paycheck-protection-program-loans/>.

⁸³ Imani Moise, *Predominately Black Congressional Districts Got Fewer PPP Loans: Study*, Reuters (July 30, 2020), <https://www.reuters.com/article/us-health-coronavirus-ppp/predominately-black-congressional-districts-got-fewer-ppp-loans-study-idUSKCN24V24B?edition-redirect=uk>.

⁸⁴ Sifan Liu & Joseph Parilla, *New Data Shows Small Businesses in Communities of Color Had Unequal Access to Federal COVID-19 Relief*, Brookings (Sept. 17, 2020), <https://www.brookings.edu/research/new-data-shows-small-businesses-in-communities-of-color-had-unequal-access-to-federal-covid-19-relief/>.

⁸⁵ Joyce M. Rosenberg & Justin Myers, *Minority-Owned Companies Waited Months for Loans, Data Shows*, Assoc. Press (Dec. 31, 2020), <https://apnews.com/article/technology-small-business-new-york-coronavirus-pandemic-7613e946275f085367b5fc8c9a496aea>.

⁸⁶ Emily Flitter, *Black Business Owners Had a Harder Time Getting Federal Aid, a Study Finds*, N.Y. Times (July 15, 2020), <https://www.nytimes.com/2020/07/15/business/paycheck-protection-program-bias.html>.

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- Streamline and expand small business forgivable loan programs,⁸⁷ like PPP or SBA's 7(a) loans more broadly, so that Black- and Latino-owned businesses are not unfairly denied and have better access to (emergency) relief;⁸⁸
- Widen and simplify the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs to include more U.S. startups;
- Accelerate reforms and address acknowledged shortcomings in startup access to National Science Foundation (NSF) grants,⁸⁹ and expand funding; and
- Make direct equity investments,⁸⁶ such as in (1) startups struggling to meet operating demands during the global pandemic, or (2) industries critical to maintaining and enhancing U.S. global competitiveness.

Elevating, Establishing, and Strengthening Dedicated Organizations to Implement Priorities for Underrepresented Founders.

The federal government should start by adopting a holistic government approach centered on promoting innovation and entrepreneurship. Elevating the profile of underrepresented entrepreneurs would be a good step forward. Part of this should include attracting and retaining diverse leaders and employees across every government agency that funds or regulates research and development sectors. But dedicated organizations can provide necessary focus and momentum, as well as make the federal government's programs more accessible. One way to move forward would be enhancing the role and status of the Minority Business Development Agency (MBDA) within the Commerce Department. Under a proposal from the Center for American Progress, for example, the MBDA could be a one-stop shop for many underrepresented entrepreneurs: providing technical assistance, loans, and grants as well as a hub for internal advocacy across the executive branch.⁹¹

⁸⁷ *Startup-Oriented COVID-19 Relief Proposals* (Engine, Washington, D.C.), 2020, at 2-3, <https://static1.squarespace.com/static/571681753c44d835a440c8b5/t/5f15c9ebd0fec75789cbe677/1595263468537/Engine+Proposals+for+Future+%28Phase+4%29+COVID-Relief+Packages.pdf>.

⁸⁸ See Cerullo, *Minority Business Shut out of PPP*, *supra* note 82.

⁸⁹ See Jane Edwards, *NSF Seeks to Reach More Startups Through 'Project Pitch' Platform*, *ExecutiveGov* (June 23, 2020), <https://www.executivegov.com/2020/06/nsf-seeks-to-reach-more-startups-through-project-pitch-platform/>.

⁹⁰ *Startup-Oriented COVID-19 Relief Proposals*, *supra* note 87, at 2.

⁹¹ *A Blueprint for Revamping the Minority Business Development Agency* (Center

Startup Testimonial:

*"The government has programs that we can apply to in order to get money or support, which is great. However, they often forget that startups have very few resources or limited administrative capacity. In order to get the government funding, startup founders have to allocate hours and hours to get through the application process to secure any funding. When startups go through these lengthy and expensive processes, by the time they end up qualifying for funding, they could have gone out of business. If the government could establish some kind of entrepreneur-residency program to help startups with this process, then I think that would really help."*⁹²

Addressing Sexism, Racism, and Bias in Federal Funding.

Part of resolving existing disparity in federal funding will require ensuring that the government's decisions are being made by more diverse leaders and employees. But the government should also ensure it has the data it needs to drive better, more inclusive decisions in the future and that it takes steps to eliminate current bias.

Engine welcomes President Biden's fresh thinking about innovation policy by encouraging investment through targeting specific sectors, which could bring greater geographic diversity into the nation's innovation hubs.⁹³ While a good start, the Biden-Harris Administration must also take care that their research strategy is inclusive; one way to do this is to ensure that research priorities are set by diverse teams and that funding decisions are inclusive.⁹⁴ For example Vice President Harris and Representative

for American Product/CAP's National Advisory Council on Eliminating the Black-White Wealth Gap, Washington, D.C.), July 31, 2020, <https://www.americanprogress.org/issues/race/reports/2020/07/31/488423/blueprint-revamping-minority-business-development-agency/>.

⁹² *Using Satellites and Technology to Detect Methane Leaks from Space*, Engine (Jan. 22, 2021), <https://www.engine.is/news/startupseverywhere-new-york-city-ny-bluefield> (quoting Yotam Ariel, Founder and CEO of Bluefield Technologies).

⁹³ *The Biden Plan to Ensure the Future Is "Made in All of America"* by *All of America's Workers* (Biden-Harris campaign, Phila., Penn.), 2020, <https://joebiden.com/made-in-america/>.

⁹⁴ See, e.g., Jeffrey Mervis, *Study Identifies a Key Reason Black Scientists are Less Likely to Receive NIH Funding*, *Science* (Oct. 9, 2019), <https://www.sciencemag.org/news/2019/10/study-identifies-key-reason-black>

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Yvette Clarke elevated the need to research uterine fibroids, which disproportionately harm Black women.⁹⁵ And as the Biden-Harris Administration has brought on a diverse group of leaders within the White House and Cabinet, lower-level leadership and staff in the federal government must also reflect the diversity of America. Federal promotion of innovation and entrepreneurship should start with strengthening the government's capacity to engage with underrepresented founders.

In addition, the federal government should also improve its data collection and targeting capacity. For example, the IRS was more successful in distributing the second round of stimulus checks than the first time around—confirming that capacity exists for change.⁹⁶ But the lack of data collection and proper targeting seen within the USPTO and through the PPP are seen throughout the federal government. And even when data is collected, insufficient action follows. In the procurement process, for example, recent data show that only 10 percent of federal contracting went to disadvantaged small businesses, while only 5 percent went to women-owned small businesses.⁹⁷ Grant programs demonstrate similar disparities.⁹⁸ The White House should use its authority to encourage other departments and agencies to make similar strides in data collection and targeting, to better understand and assist underrepresented innovators. And once that data is collected, the federal government needs to move more quickly to rectify inequity.

scientists-are-less-likely-receive-nih-funding.

⁹⁵ Renee G, *Kamala Harris Introduces Bill to Tackle Uterine Fibroids*, The Grio (Aug. 1, 2020), <https://thegrio.com/2020/08/01/kamala-harris-bill-uterine-fibroids/>; Uterine Fibroid Research and Education Act of 2020, H.R. 6383, 116th Cong. (2020).

⁹⁶ Shahar Ziv, *IRS to Send Out Stimulus Checks Faster This Time*, Forbes (Dec. 21, 2020), <https://www.forbes.com/sites/shaharziv/2020/12/21/irs-to-send-out-stimulus-checks-faster-this-time-600-per-person-could-go-out-to-bank-accounts-next-week/?sh=598a64ba4e8b>.

⁹⁷ Press Release, U.S. Small Business Administration, *Federal Government Exceeds Small Business Contracting Goals by Awarding Record-Breaking \$132.9 Billion to Small Businesses* (Aug. 12, 2020), <https://www.prnewswire.com/news-releases/federal-government-exceeds-small-business-contracting-goals-by-awarding-record-breaking-132-9-billion-to-small-businesses-301111199.html>.

⁹⁸ Michael A. Taffe & Nicholas W. Gilpin, *Equity, Diversity and Inclusion: Racial inequity in grant funding from the US National Institutes of Health*, eLife (2021), available at <https://elifesciences.org/articles/65697>; *Is There Gender Bias in Federal Grant Programs?*, Research Brief (RAND, Santa Monica, Cal.), 2005 (“[W]e found a gender gap in the amount of funding on average that females receive relative to their male counterparts at NIH, although important caveats are associated with that finding. Second, we found a gender gap in subsequent application rates.”); Donna K. Ginther et al., *Gender, Race/Ethnicity, and National Institutes of Health R01 Research Awards: Is There Evidence of a Double Bind for Women of Color?*, 91 Acad. Med. 1098 (2016), <https://journals.lww.com/academicmedicine/>

Creating New Indirect Financial Benefits to Support Underrepresented Founders.

The government currently offers numerous indirect financial benefits, in significant part through tax incentives, to support and encourage business. However, many extant tax incentives are a poor fit for startups and new tax incentives could be targeted to unique needs of underrepresented founders. For example, the government should:

- Grow and tailor research and development (R&D) tax credits to better support startups,⁹⁹ such as by offsetting income and payroll tax liability for small businesses that spend on R&D, or by expanding what counts as R&D to include common software development activities like user experience (UX) research and design;
- Prioritize employee retention and support the most nascent companies, such as through the First Employee credit in the PROGRESS Act.¹⁰⁰ Women-owned businesses tend to have less annual income, so they may not benefit from existing tax incentives. The PROGRESS Act would create a first employee credit that more women-owned companies and companies owned by underrepresented entrepreneurs of color could take advantage of sooner.¹⁰¹

The federal government should also do more to recognize the full extent of the work that startups do as well as to support founders' roles outside of the workplace. For example, women are disproportionately responsible for taking care of children, older adults, and sick family members in the U.S., which limits their opportunities to launch new tech or companies.¹⁰² Likewise many women—mothers and women of color in particular—have been pushed out of the workforce during the pandemic.¹⁰³ To support underrepresented founders, the government should expand family

Fulltext/2016/08000/Gender_Race_Ethnicity_and_National_Institutes_of.23.aspx#ej-article-sam-container.

⁹⁹ *Startup-Oriented COVID-19 Relief Proposals*, *supra* note 87, at 3-4.

¹⁰⁰ Press Release, Office of Senator Ron Wyden, *Wyden Introduces Bill to Boost Capital Access for Women-Owned Businesses* (Oct. 30, 2019), <https://www.finance.senate.gov/ranking-members-news/wyden-introduces-bill-to-boost-capital-access-for-women-owned-business>.

¹⁰¹ This bill would also create an investor tax credit—a promising proposal discussed in a subsequent section.

¹⁰² E.g., Eduardo Porter, *Why Aren't More Women Working? They're Caring for Parents*, N.Y. Times (Aug. 29, 2019), <https://www.nytimes.com/2019/08/29/business/economy/labor-family-care.html>.

¹⁰³ Alexandra Kelley, *Women's Labor Force Participation Hits 33-Year Low*, The Hill: Changing America (Feb. 8, 2021), <https://thehill.com/changing-america/respect/equality/537884-womens-labor-force-participation-hits-33-year-low>.

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leave and other caregiver support programs—such as the child tax credit. And it should consider other creative ways to bring women with caregiving responsibilities (back) into the innovation sector.

Making Existing Funding Programs Work Better for Startups.

While federal grants and loans can be essential for many startups, the approval processes need to be quicker and more streamlined to better suit the startup lifecycle. The government should also leverage existing incubators and accelerators to improve government programs to fund diverse startups directly. Applying for grants is a lengthy and time-consuming process, with applicants competing for set amounts of money. This is often not suited to the startup lifecycle, where companies tend to need more flexibility and (a potentially smaller amount of) capital quickly. The government could funnel some traditional SBIR and STTR funding through incubators, accelerators, and innovation intermediaries who can disburse it directly into the startup ecosystems in their communities.¹⁰⁴ This would make government grants more nimble and allow more focus on underrepresented founders.

Incentivizing private investment.

The government can also encourage more inclusive innovation by incentivizing private investors to fund more diverse teams. Innovators have many great ideas but a serious need for flexible capital.

Creating Public-Private Partnerships.

Bringing public and private dollars together can help diversify innovation ecosystems through (1) increasing available funding, (2) increasing private lenders' (perceived) risk tolerance, and (3) prioritizing underrepresented founders in investment portfolios. One legislative proposal to partner the private and public sectors—the New Business Preservation Act—would help incentivize investments in startups by creating an equity investment program at the Treasury Department to give states the necessary funding to support the growth of new startups.¹⁰⁵ And that funding would be directed to underrepresented founders in less traditionally tech-heavy regions of the country. Businesses would be able to invest in these programs as well, and the combined funding would seed new growth in the startup space. This type of legislation would increase startup diversity and development, while also creating a self-sustaining program that would allow the federal government's financial returns to be reinvested in future startups.

¹⁰⁴ Engine and others have made similar suggestions in the past. *E.g., Startup-Oriented COVID-19 Relief Proposals*, *supra* note 87, at 4.

¹⁰⁵ *Id.* at 1-2.

Startup Testimonial:

“Not only do Black and Brown founders and women founders face these challenges, but founders allocated outside of Silicon Valley face similar investment issues as well. So there’s an opportunity to have the government partner with venture capital to ensure that those dollars are available, and also ensure that entrepreneurs who come from underrepresented communities or outside of Silicon Valley have the ability to build and grow their companies.” ¹⁰⁶

Establishing Tax Credits for Investors Who Make Qualified Investments.

Startups, and underrepresented founders in particular, have unique expenses and challenges. Encouraging investors to make productive investments to diversify innovation should be a priority. For example, some states have angel investor tax credits through which the government offers tax breaks to individuals that make qualifying investments. To subsidize private investment in underrepresented founders, Congress should enact a federal tax program which would allow angel investors a credit of the amount they invested in a startup launched by an underrepresented founder (e.g., new investments in recently established businesses with a tech-focus and with underrepresented founders of color or women founders).¹⁰⁷ To take another example, the PROGRESS Act would create an angel investor tax credit that would offer greater incentive to invest, including in women-owned small businesses.¹⁰⁸ Similarly, Opportunity Zones could be reformed to include more areas and attract more funding to a more diverse array of communities.¹⁰⁹

¹⁰⁶ Graham, *Film Connx*, *supra* note 64.

¹⁰⁷ *Id.* at 3.

¹⁰⁸ Wyden, *Capital Access Bill*, *supra* note 100.

¹⁰⁹ *Startup-Oriented COVID-19 Relief Proposals*, *supra* note 87, at 3; *see also* Joe Gose, *Despite Challenges, Opportunity Zones Provide Much-Needed Capital*, N.Y. Times (Nov. 24, 2020), <https://www.nytimes.com/2020/11/24/business/opportunity-zones-funding-development.html>.

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Opening Up More Alternatives.

The federal government should also engage with traditional and newer forms of startup financing to get more innovations into the market. Crowdfunding and fintech solutions offer some promise as viable alternatives for startup financing. Engine encourages the Biden-Harris Administration to ensure that a recent rule change that would allow startups to raise more crowdfunding in a given year goes into effect.¹¹⁰

Exploring alternatives to credit scores.

The current credit score system is a serious barrier to an underserved founder's ability to access capital, and is in serious need of reform. As noted above, in general, underrepresented founders have lower credit scores than white male founders. However, credit scores present a chicken-or-the-egg problem: you need a higher credit score to get more capital, but you need a longer credit history to get a higher credit score. And it is often not a good measure of whether a borrower can and will repay a loan. In addition, the banking system has played an important part in preventing Black Americans from building wealth, such as through historical redlining and ongoing discrepancies in mortgage lending. Because rental payments are not counted in many credit histories, inequitable access to housing also contributes to lower credit scores.¹¹¹

Alternative credit scoring could use a borrower's ability to pay by measuring other inputs, including rental payments, occupations, cell phone payments, checking account information and shopping history. Such scoring, according to community leader, entrepreneur, investor, and professor Melissa Bradley, could play a meaningful role in ameliorating systemic inequities in the financial system.¹¹² Engine encourages the Biden-Harris Administration to continue its early efforts to develop alternatives to the current credit scoring system, such as pushing the Consumer Financial

Protection Bureau to work with existing credit agencies to create and disseminate an alternative.¹¹³

And alongside proposals like the New Business Preservation Act, the federal government should promote the development of more community development financial institutions—with enhanced funding—as well as women-, Black-, and Latino-owned banks. Rectifying inequities in the financial system requires diversifying the financial sector, and the Biden-Harris Administration should join newer efforts from major financial institutions and venture capital firms to achieve that goal.¹¹⁴ Underrepresented innovators need a whole of government approach to realize their financial dreams and grow.

¹¹⁰ See JD Alois, *Presidential Action Taken by Biden Administration May Delay Investment Crowdfunding Improvements*, Crowdfund Insider (Jan. 22, 2021), <https://www.crowdfundinsider.com/2021/01/171487-presidential-action-taken-by-biden-administration-may-delay-investment-crowdfunding-improvements/>.

¹¹¹ Michelle Singletary, *Credit Scores Are Supposed to Be Race-Neutral. That's Impossible.*, Wash. Post: Personal Fin. (Oct. 16, 2020), <https://www.washingtonpost.com/business/2020/10/16/how-race-affects-your-credit-score/>.

¹¹² Melissa L. Bradley, *Expanding Credit through Alternative Credit Scores*, Medium (Oct. 21, 2020), https://medium.com/@melissa_6316/expanding-credit-through-alternative-credit-scores-f015c4eada29.

¹¹³ See Andrew Ackerman & Orla McCaffrey, *Banks Brace for Tougher Rules Under Biden on Consumer Protection, Fair Lending*, Wall St. J. (Jan. 30, 2021), <https://www.wsj.com/articles/banks-brace-for-tougher-rules-under-biden-on-consumer-protection-fair-lending-11612022400>.

¹¹⁴ See Ryan Williams, *Opinion: Investing in Black-Owned Banks Key to Ending Racial Disparities*, CNBC (Oct. 14, 2020), <https://www.cnbc.com/2020/10/14/opinion-investing-in-black-owned-banks-key-to-ending-racial-disparities.html>; Jeffrey McKinney, *Citi Hires Four Black Investment Banks to Disburse \$2.5 Billion Bond Issuance*, Black Enter. (Jan. 29, 2021), <https://www.blackenterprise.com/citi-hires-four-black-investment-banks-to-disburse-2-5-billion-bond-issuance/>; Emily Birnbaum, *Inside Tech's Efforts to Invest in Black Banks*, Protocol (Dec. 21, 2020), <https://www.protocol.com/tech-investing-black-owned-banks>.

NETWORKING & MENTORING

Networking and mentoring are crucial to every startup—and underrepresented innovators are no exception. But underrepresented innovators and entrepreneurs have been historically excluded from many of these opportunities. The government can and should do more to establish and foster links between entrepreneurs and investors, between entrepreneurs and industry advisors, and between similarly situated entrepreneurs.¹¹⁵

Startup Testimonial:

“This is not just about underrepresented entrepreneurs, but also about broadening the entire ecosystem by being more inclusive when it comes to leadership, mentors, advisors, investors, and talent. Underrepresented founders and women are not in the same networks as traditional white male entrepreneurs, so they were not getting that same access. How do you learn from startup failures and successes if you’re not even talking to the people who have done it? So we wanted to almost force our way into the existing startup ecosystem and say, ‘We are here, and we’re going to be here.’ Great ideas are not limited to a certain race or gender. Nor are they determined by zip codes.”¹¹⁶

¹¹⁵ Cindy Foy-Uhler, founder and CEO of Fierce Female Founders in North Carolina, summarizes it well: “When I work with [underrepresented] entrepreneurs, there are three consistent issues that they all face. They’re not sure about the right next steps if they want to scale, they lack a network of other [underrepresented] entrepreneurs that understand what they’re going through, and they lack access to capital.” Eric Sampsel, *Creating New Opportunities for Women*, Engine (Aug. 14, 2020), <https://www.engine.is/news/startupseverywhere-raleigh-nc-fierce-female-founders> [hereinafter “Fierce Female Founders”].

¹¹⁶ Edward Graham, *Driving Entrepreneurial Innovation Through Diversity, Equity, and Inclusion*, Engine (June 19, 2020), <https://www.engine.is/news/startupseverywhere-austin-divinc> (quoting Preston L. James, II, co-founder and CEO of DivInc in Texas).

Community is critical for startup success, and underrepresented innovators often lack access.

Investors

Access to networks is often a critical component of access to capital, as investors traditionally source investment opportunities from their own networks or rely on introductions from people they already know.¹¹⁷ And both VCs and founders have historically backed or hired people from within networks that tend to consist of people with similar views and life experiences.¹¹⁸ Geography is also key, with over 40 percent of VC investment concentrated in Silicon Valley.¹¹⁹

This means, for example, people of color, women, and geographically diverse entrepreneurs often lack the connections needed to get in the room with angel investors and VC firms. Several underrepresented founders in Engine’s network have faced these barriers; their stories highlight the importance of networks as critical to raising capital. For example, Bernard Worthy, co-founder and CEO of LoanWell in North Carolina, describes how “[c]ommunity and connections are so important” to connecting “business[es] to big companies and [venture capitalists].”¹²⁰ When underrepresented entrepreneurs lack connections to funding networks, they struggle to gain needed investments. It is not that funding is unavailable generally, as noted by Thkisha Sanogo, founder and CEO of MyTaask in Alabama; it is that underrepresented innovators do not have access to the “paths and avenues to capture that [funding].”¹²¹

¹¹⁷ See *Beyond the VC Funding Gap*, Morgan Stanley (Oct. 23, 2019), <https://www.morganstanley.com/ideas/venture-capital-funding-gap>.

¹¹⁸ *Diversity in U.S. Startups*, RateMyInvestor (2020), available at https://ratemyinvestor.com/pdfs/full?file=%2FDiversityVCReport_Final.pdf.

¹¹⁹ *Id.*
¹²⁰ Abby Rives, *Platform Helps Streamline Loan Origination and Servicing Processes for Community Lenders*, Engine (Dec. 18, 2020), <https://www.engine.is/news/startupseverywhere-durham-nc-loanwell> [hereinafter “Loanwell”].

¹²¹ Edward Graham, *A New Tool to Help People Plan*, Engine (Jan. 17, 2020), <https://www.engine.is/news/startupseverywhere-daphne-ala> (quoting Thkisha Sanogo, Founder and CEO of MyTaask in Alabama) [hereinafter “MyTaask”].

NETWORKING & MENTORING

Startup Testimonial:

*On the connection between networks and access to capital: “[A] lot of funding that happens in this area is based on relationships. A lot of white entrepreneurs that are building startups already have those networks and connections. . . . Programs to implement tax incentives for angel investors could work in a way that bypasses some of the problems associated with other private funding programs. I think a program that adds a lot of incentives for angels to make investments in underserved communities could actually work.”*¹²²

The lack of diversity in existing startup networks and communities can easily become a cyclical problem, with the same types of people from the same universities and regions of the country invited into the same rooms. Part of solving the problem must come from the networks themselves, with investors thinking differently and diversifying their own ranks. But the government can incentivize the expansion of these networks.

Advisors

Beyond networks for funding, all entrepreneurs need experienced industry advisors to mentor them as they grow their companies.¹²³ Industry advisors provide inside know-how on transforming an idea into a flourishing startup,¹²⁴ offer outside perspective to inform business decisions, and help founders work through thorny issues, develop industry connections, and meet potential customers. This mentorship not only empowers underrepresented innovators to grow their businesses, but it also facilitates connections between

¹²² Graham, *Postagraph*, *supra* note 65.

¹²³ Rhett Morris, *Mentors Are the Secret Weapons of Successful Startups*, TechCrunch (Mar. 22, 2015), <https://techcrunch.com/2015/03/22/mentors-are-the-secret-weapons-of-successful-startups/>.

¹²⁴ See Edward Graham, *A Platform to Help Professionals of Color Make Informed Career Choices*, Engine (June 12, 2020), <https://www.engine.is/news/startupseverywhere-nyc-dipper> (“Having advis[o]rs who can talk about how to scale and have a network of founders is really key, because some professionals of color might not have that network and might be starting from scratch.” (quoting Netta Jenkins, co-founder of Dipper in New York)).

entrepreneurs and other industry actors, synergistically expanding networks beyond advisors to investors and similar entrepreneurs.¹²⁵

Similarly Situated Entrepreneurs

Networks between similarly situated entrepreneurial peers are also critically important, not only as a source of information but also as a source of community. Bernard Worthy of LoanWell highlights that founders at a common stage learn from one another about “the menu of options for next steps.”¹²⁶ And, as Jake Soberal—co-founder and co-CEO of Bitwise in California—indicates, connecting innovators with “similar backgrounds . . . make[s] them feel safe and welcome.”¹²⁷ This sense of community allows underrepresented founders the space to be free of pressure “to prove that they deserve” to exist and expand their businesses.¹²⁸ These communities then become “sacred space[s] to offer organic and authentic connection[s]” to others who “understand what they’re going through.”¹²⁹ The ability to learn from and grow alongside of similarly situated entrepreneurs in turn can help foster networks for new generations of startup founders.

Startup Testimonial:

*On the importance of connecting underrepresented founders to one another: “A diverse, online community can give you more feedback to help you make your decisions. And the beauty of the online community is that it can transcend geography, so that a founder in a small county in North Carolina can connect to larger networks in Raleigh or Charlotte. Similarly, if I can find someone in an online community who looks like me and landed a big sales deal, then it is easy to ask them about how they landed the deal and what the experience of being the only Black person in the room was like for them.”*¹³⁰

¹²⁵ See, e.g., Graham, *Infiltron*, *supra* note 12 (“Google for Startups . . . empowered us with so much information and I have been able to connect with so many other people. Google opened their rolodex up to us . . . I’ve already been able to take what I’ve learned from the program to help out other entrepreneurs in our network.” (quoting Chastity Wright, founder and CTO of Infiltron in Georgia)).

¹²⁶ Rives, *LoanWell*, *supra* note 120.

¹²⁷ *Activating Tech Workers in Underserved and Overlooked Communities*, Engine (Jan. 8, 2021), <https://www.engine.is/news/startupseverywhere-fresno-calif-bitwise> [hereinafter “Bitwise”].

¹²⁸ Edward Graham, *A Search Engine for Colors*, Engine (Feb. 28, 2020), <https://www.engine.is/news/startupseverywhere-charlotte-north-carolina> (quoting Samantha Smith, founder and CEO of Vishion in North Carolina) [hereinafter “Vishion”].

¹²⁹ Sampsel, *Fierce Female Founders*, *supra* note 115.

¹³⁰ Rives, *LoanWell*, *supra* note 120.

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Startup Testimonial:

"I wanted to ensure that there was equal representation on the panels and within the actual audience, and what that really takes is just reaching out and inviting people. Women want to see other women in the room, because they assume if other women are there that it's a safe environment where they have the ability to act like themselves and don't have to prove that they deserve to be there."¹³¹

Facilitating and funding networking and mentoring programs for underrepresented founders.

To help address inequities in innovation ecosystems and ensure underrepresented founders are connected to robust networking and mentorship opportunities, the federal government should take an active role in promoting and financing local and national initiatives that foster diverse businesses. While many of these connections traditionally occur face-to-face, enabling networking through online platforms can also expand access, particularly for those in remote or rural communities, and would encourage connections without limitations inherent in geography-based networking events.

Funding

The federal government should increase and direct funding to develop networks between and among underrepresented innovators. Specifically, incubators and accelerators in underserved communities, whose stated goal is to create connections for entrepreneurs within their own communities, are uniquely situated to address the entrepreneurial needs of the startups they serve and could benefit from increased access to federal resources, including grants. For example, Arrowhead Center in New Mexico features an accelerator program for underserved entrepreneurs in the state. The Center connects these entrepreneurs with networks of experts so that the entrepreneurs can access the resources they need to establish and grow their businesses.¹³²

¹³¹ Graham, *Vision*, *supra* note 128 (quoting Samantha Smith, founder and CEO of Vision in North Carolina).

¹³² Edward Graham, *Helping Entrepreneurs Thrive Across New Mexico*, Engine (Apr. 12, 2019), <https://www.engine.is/news/category/startupseverywhere-las-cruces-nm> [hereinafter "Arrowhead Center"].

Startup Testimonial:

On the importance of looking to local incubators and accelerators: "We [] have a business incubator that is focused on developing a peer community. A lot of business owners or entrepreneurs feel very isolated. There are no words in Navajo for the concept of entrepreneur or business, and people who are engaged in business activity feel like it's another world and separate from our Native American identity. But Native people have been artisans and traders and sellers as long as we have existed. Unfortunately, there is a lot of negative connotation associated with the concepts of business and entrepreneurship, so people who run businesses are always straddling a fine line where they have to almost ask for permission to start a business. Our incubator is trying to create new narratives and help people connect with their peers."¹³³

Startup Testimonial:

"It is important to invest in entrepreneurs of color and women though without the programming or infrastructure to support them, the impact will not be measurable. For a successful outcome, in addition to providing financial support to entrepreneurs, the funding for economic development should include programming and support to fund the ecosystem builders, like In3."¹³⁴

¹³³ Edward Graham, *Supporting the Growth and Development of Native Entrepreneurs*, Engine (Oct. 19, 2020), <https://www.engine.is/news/startupseverywhere-tuba-city-ariz-change-labs> (quoting Heather Fleming, co-founder and executive director of Change Labs in Arizona).

¹³⁴ Edward Graham, *Supporting Black and Underrepresented Entrepreneurs in the District*, Engine (July 2, 2020), <https://www.engine.is/news/startupseverywhere-dc-in3> (quoting Aaron Saunders, CEO of the Inclusive Innovation Incubator).

NETWORKING & MENTORING

Building on Pre-Existing Initiatives

Federal entities can also bolster pre-existing initiatives targeted at supporting underrepresented innovators so that the programs are situated to provide networking and mentorship opportunities. For its part, the Small Business Administration should work to hire and retain more diverse staff, especially in its regional offices, ensure regional offices receive and distribute resources equitably to their geographic regions, and focus on programs targeted at underrepresented entrepreneurs like the 8(a) Business Development Program.¹³⁵

Startup Testimonial:

On the importance of building initiatives in local innovation ecosystems: “Policy leaders and government institutions have a unique ability to convene and coordinate. For us, it would be incredibly impactful if policy leaders would use this power to develop a strategic vision for the future of innovation to improve economic development and job creation in Baltimore, as well as the rest of the state. Specifically in Baltimore, officials could use their strength as conveners to establish a coordinating position or entity solely focused on bolstering the ecosystem.”¹³⁶

Taking a More Active Approach to Outreach

Federal actors cannot expect that underrepresented innovators will easily find them. The government needs to both actively seek out diverse entrepreneurs and also improve the accessibility of government resources. To be sure, this requires intentionality and thus considerable time and effort, but it is necessary to ensure that government resources and programs are more likely to be discovered and used by those for whom they are intended.

There are at least two specific ways the government can facilitate direct outreach: first, government entities should make it easier for

¹³⁵ See *Minority Owned*, U.S. Small Bus. Admin., <https://www.sba.gov/category/business-groups/minority-owned> (last visited Jan. 28, 2021).

¹³⁶ Emma Peck, *#StartupsEverywhere: Darius Graham* (Baltimore, MD), *Engine* (Mar. 2, 2017), <https://www.engine.is/news/category/startupeverywhere-darius-graham-baltimore-md> (quoting Darius Graham, director of the Social Innovation Lab at Johns Hopkins University).

¹³⁷ Sampsel, *Fierce Female Founders*, *supra* note 115.

underrepresented businesses to register as, for example, person-of-color- or woman-owned. As described by Cindy of Fierce Female Founders, bureaucratic hoops and complicated paperwork can make it difficult to register as an underrepresented entrepreneur, which in turn makes it difficult to access dedicated resources.¹³⁷ Reducing barriers to the registration process would also provide local government and private startup services with better information about where to direct resources.¹³⁸ Additionally, it can encourage advising and peer networks by more easily identifying similarly situated startups.¹³⁹

Second, the government should show up—literally. Underrepresented entrepreneurs organize and attend conferences, where government representatives are often able to participate;¹⁴⁰ and they should seek to do so and bring resources in hand. Whether it be giving out pamphlets at an information booth, delivering remarks, or just listening to what founders need (but ideally all of the above), federal agencies should be present where the founders are, proactively highlight government programs, and hear directly about what startups need to advance their businesses.

Startup Testimonial:

“I just finished with a women’s entrepreneurship conference last week. We had about 130 female entrepreneurs come in . . . It was our third annual conference, and it was a really fantastic opportunity for female entrepreneurs to network, get inspired and empowered, and actually walk away with the tools and resources they need to start a venture.”¹⁴¹

¹³⁸ See Graham, *Arrowhead Center*, *supra* note 132 (“I’m also launching . . . an open list of female entrepreneurs in New Mexico, and I’m going to share this with economic development organizations, entrepreneurship development organizations, and others who are in charge of running entrepreneurship or startup-based programs or services. . . . [S]o there are essentially no excuses for not having equal representation.” (quoting Zetdi Runyan Sloan of Arrowhead Center)).

¹³⁹ See Rives, *LoanWell*, *supra* note 120 (“[I]here are efficiencies that can come from companies at a similar stage who would benefit from common advising, professional services, and counsel.” (quoting Bernard Worthy of LoanWell)).

¹⁴⁰ See, e.g., Graham, *Vishion*, *supra* note 128 (“I initially created Collective Hustle[, a Charlotte-based investor and startup coalition,] to be a monthly meet-up, with the goal of having panels of investors and founders tackling a specific topic. I wanted to ensure that there was equal representation on the panels and within the actual audience, and what that really takes is just reaching out and inviting people.” (quoting Samantha Smith of Vishion)).

¹⁴¹ Graham, *Arrowhead Center*, *supra* note 132 (quoting Zetdi Runyan Sloan of Arrowhead Center).

NETWORKING & MENTORING

Startup Testimonial:

On the importance of the government showing up: “Your network is your net worth. It doesn’t help if you’re not exposed to officials. I’ve written many of them and invited them to many things, but they’re just not coming, and I don’t know how else to get their attention.”¹⁴²

Including Online Resources and Ways to Connect

But resources, like funding and networking opportunities, should not be confined to the physical world—they should be expanded to online formats. Online resources offer meaningful benefits in that they are not bounded by geography, and they can provide breadth and depth of advising opportunities. Organizations serving underrepresented founders describe these benefits after moving their own initiatives online in light of the COVID-19 pandemic. Online platforms reach everywhere, from urban to rural entrepreneurs.¹⁴³ And online resources connect underrepresented innovators with perspectives beyond a single mentor: “If a company only has one mentor, that’s only one person’s advice. A diverse, online community can give you more feedback to help you make your decisions.”¹⁴⁴

Startup Testimonial:

“We are also very intentional about bringing people together and organizing conversations, because innovation and businesses often start with just a conversation. We invite a lot of people—now virtually—to share their stories with us and connect with other entrepreneurs. Oftentimes, these conversations help new projects come together and new teams form and new product ideas emerge.”¹⁴⁵

¹⁴² Graham, *MyTaask*, *supra* note 121 (quoting Thkisha Sanogo of MyTaask).

¹⁴³ Sampsel, *Fierce Female Founders*, *supra* note 115 (“We pivoted by taking our programs online. The advantages we have seen is that in going virtual we are no longer bound by geography. It has opened us up to be able to serve women everywhere.” (quoting Cindy Foy-Uhlir of Fierce Female Founders)).

¹⁴⁴ Rives, *LoanWell*, *supra* note 120 (quoting Bernard Worthy of LoanWell).

Startup Testimonial:

On the importance of online resources for rural entrepreneurs: “[Arrowhead Center’s] focus for the last few years has been dedicated to building out a program that is accessible to underserved entrepreneurs. . . . We’re doing that by building a system-wide network of accelerator programs that are offered virtually. And we’re using a shared-economy model—leveraging the resources and expertise of individuals in various rural communities across New Mexico—to provide access to a robust network of experts and technical assistance providers. We have about 40 mentors that are available to anyone who participates in this program. The accelerator programs are called ‘sprints’ and they vary in length and industry focus. They’re unique in that the virtual format really opens the door for entrepreneurs who would’ve otherwise not been able to participate.”¹⁴⁶

Supporting Equity in All Professions

The community surrounding a startup founder is bigger than investors, mentors, and colleagues—entrepreneurs must also turn to experts for other services like legal advice and accounting. Building diversity in those pipelines is also critical so that underrepresented founders can turn to professionals that bring similarly diverse and unique perspectives. The ability to readily hire a Black woman patent lawyer, for example, will help build trust and facilitate successful applications for high-quality patents by Black women inventors. The same is true for services across the innovation sector.

¹⁴⁵ Edward Graham, *Support Entrepreneurial Success in the Borderlands*, Engine (Sept. 18, 2020), <https://www.engine.is/news/startupseverywhere-el-paso-texas-pioneers-21> (quoting Carlos Martínez-Vela, Executive Director of Pioneers 21).

¹⁴⁶ Graham, *Arrowhead Center*, *supra* note 132 (quoting Zetdi Runyan Sloan of Arrowhead Center).

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While improving access to capital and expanding networks for underrepresented entrepreneurs may yield more near-term results, federal entities should also improve education opportunities for underrepresented innovators so that they are equitable and inclusive, affecting long-lasting change. This includes improving access to science, technology, engineering, and mathematics (STEM) education, but it also applies to business and innovation and entrepreneurship (I&E) education and training for underrepresented students. Greater access and retention is critical because the nation needs diverse students in the talent pipeline. In order to achieve that goal, diversity of STEM, business, and I&E educators is also critical but often overlooked.

Diversity gaps among students and educators.

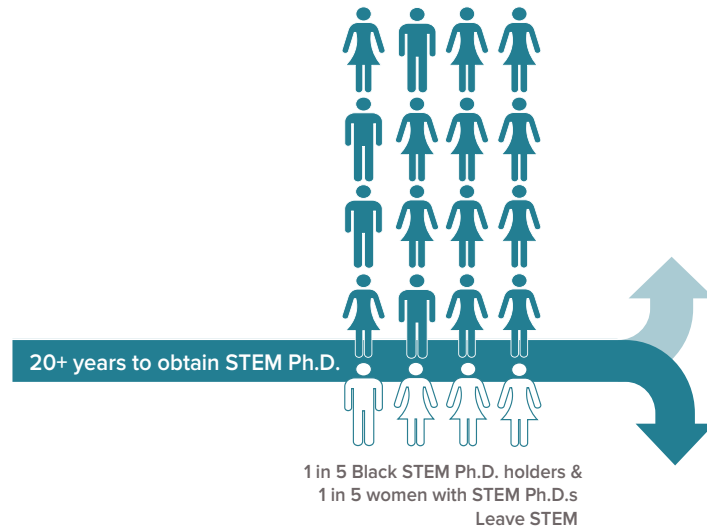
Retention of Students in Innovation Careers

The nation's innovation ecosystems need high-skilled, diverse talent. In order to grow and sustain diversity in innovation, the government should invest in a diverse talent pipeline because, beyond funding, building a team is one of the biggest challenges facing startups. A successful talent pipeline not only starts early to excite young students about innovation, but it also requires encouraging talented students to channel that excitement into innovation careers.

Disparities in education representation are compounded by problems of retention, which cuts off the innovation pipeline too early for students who cannot or do not want to pursue innovation careers. Students of color represent 38.5 percent of STEM postsecondary students,¹⁴⁷ but Black and Latino students switch out of STEM degree programs at higher rates than their white peers.¹⁴⁸ In addition, an estimated 20 percent of Black STEM

Ph.D. holders and 20 percent of women STEM Ph.D. holders leave STEM fields.¹⁴⁹ And the retention problems only continue, creating further underrepresentation in the workplace: of all STEM professionals, only 9 percent are Black and only 7 percent are Latino.¹⁵⁰

Women and Black Ph.D. Holders Leave the STEM Field More Often



Beyond a lack of representation in STEM fields, taking a closer view—and acknowledging that not all STEM jobs are created equal—reveals other relevant disparities across STEM fields. For example, computer jobs feature one of the highest median earnings of any STEM field, but the computer workforce is only 14 percent Black or Latino and only 25 percent women.¹⁵¹ On the other end of the salary median are healthcare practitioners and technicians.¹⁵² And it is these lower paying fields that have the highest representation of Black, Latino, and women workers. By way of example, 37 percent of licensed nurses are Black or Latino as are about a quarter of health support, medical record, and clinical laboratory technicians.¹⁵³ Women, on the other hand, comprise 75 percent of healthcare practitioners and technicians.¹⁵⁴

¹⁴⁷ Nat'l Ctr. For Educ. Stat., *Table 318.45*, Dig. Educ. Stat. (Oct. 2019), https://nces.ed.gov/programs/digest/d19/tables/dt19_318.45.asp (2017-2018 percentages).

¹⁴⁸ Emily Arnim, *A Third of Minority Students Leave STEM Majors. Here's Why*, EAB (Oct. 8, 2019), <https://eab.com/insights/daily-briefing/student-success/a-third-of-minority-students-leave-stem-majors-heres-why/>; see also Univ. of Ill. Coll. of Agric., Consumer & Env't Scis., *Racial Microaggressions Contribute to Disparities in STEM Education*, ScienceDaily (Dec. 8, 2020), <https://www.sciencedaily.com/releases/2020/12/201208111636.htm>.

¹⁴⁹ See Carol O'Donnell & Shelina Ramnarine, *An Integrated Approach to Diversity, Equity, Accessibility and Inclusion (DEAI) in STEM*, Smithsonian Sci. & Educ. Ctr. (2019), available at <https://ssec.si.edu/sites/default/files/other/STEMLeadershipAlliance2020.pdf>.

¹⁵⁰ Cary Funk & Kim Parker, *Women and Men in STEM Often at Odds Over Workplace Equity*, Pew Rsch. Ctr. 8 (Jan. 9, 2018), https://www.pewresearch.org/social-trends/wp-content/uploads/sites/3/2018/01/PS_2018.01.09_STEM_FINAL.pdf.

¹⁵¹ *Id.* at 16, 34, 36.

¹⁵² *Id.*

¹⁵³ *Id.* at 34.

¹⁵⁴ *Id.* at 30.

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Understanding STEM’s “leaky pipeline,” and ensuring that underrepresented innovators are inspired and able to pursue lucrative careers, will require further data collection; and Engine encourages NCEAI to call for that. But anecdotal evidence suggests that disparate access to education, lack of encouragement at an early age, discrimination, difficulty balancing work and family, and lack of representation are barriers to entering STEM jobs for underrepresented innovators of color and women innovators.¹⁵⁵

It is also important to note that fostering STEM jobs should be inclusive of those positions that do not require postsecondary education. Innovation does not require a degree, so inquiry into innovation retention should not focus on only advanced education-related factors. For example, alternative education like immersion programs or “boot camps” can be another successful path to STEM and innovation careers.¹⁵⁶

Finally, in addressing retention, geography is another important factor: innovation industries, talent, and jobs cluster in a few cities.¹⁵⁷ And rural communities that may be successful at turning out students interested in STEM tend to lose talent to other regions upon graduation. Indeed, some entrepreneurs looking to launch companies outside those traditional tech sectors face pressure to relocate so that they can connect with investors and talent.¹⁵⁸

Startup Testimonial:

On Missoula’s startup ecosystem: “Our number one challenge right now is continuing to fuel the talent pipeline. When I first moved here, Montana’s biggest export was its talent, we used to lose a lot of people to big cities and traditional hubs. What we’re going through now is trying to help the students coming through our universities understand that there are great career opportunities here. We are also trying to get the word out to Montanans who have left here and want to come back that the opportunities with successful companies exist.”¹⁵⁹

¹⁵⁵ *Id.* at 21.

¹⁵⁶ For a discussion of some alternative pathways to STEM education and STEM careers, see Joe Alper, *Developing a National STEM Workforce Strategy: A Workshop Summary*, Nat’l Acads. 63-70 (2016), available at <https://www.nap.edu/read/21900/chapter/8>.

¹⁵⁷ Eduardo Porter, *A Few Cities Have Cornered Innovation Jobs. Can That Be Changed?*, N.Y. Times (Dec. 9, 2019), <https://www.nytimes.com/2019/12/09/business/economy/innovation-jobs-cities.html>.

¹⁵⁸ Nathan Lindfors, *Cultivating a Marketplace for Farmers Using Technology*, Engine (Nov. 24, 2020), <https://www.engine.is/news/startupseverywhere-manchattan-kan-hitchpin> (interviewing Trevor McKeeman, CEO of HitchPin in Kansas).

¹⁵⁹ Andrew Jones, *#StartupsEverywhere: Missoula, MT*, Engine (Mar. 26, 2018), <https://www.engine.is/news/category/startupseverywhere->

Startup Testimonial:

On Effingham’s startup ecosystem: “[T]he hardest part about staying in a rural community, especially when you leave high school and go to college, is not understanding or knowing what the local opportunities are. It would be great to have a program funded by the government, at the high school level, that allows local companies to engage with students. For students at Effingham High School, it would be great to educate them about the local job opportunities as part of career development. If students going from high school to college don’t know about their local opportunities or companies, then they won’t come back because they don’t know that there are good jobs for them in rural communities.”¹⁶⁰

Innovation Educators

To better encourage and foster diversity in innovation, the government should invest in underrepresented STEM and business educators as well as students.

The diversity of educators matters because representation matters.¹⁶¹ The opportunity for students to identify themselves in their educators instills the belief in students that they, too,

missoula-mt (interviewing Paul Gladen, director of Blackstone Launchpad at the University of Montana).

¹⁶⁰ Edward Graham, *Streamlining Acreage Reporting Solutions for Farmers*, Engine (Aug. 28, 2020), <https://www.engine.is/news/startupseverywhere-effingham-ill-myagdata> (quoting Deb Casurella, co-founder and CEO of MyAgData in Illinois).

¹⁶¹ The same is true in fields other than education. Lack of representation leads to additional inequalities and exacerbates existing ones. This is well-documented in medicine, where Black patients face more adverse outcomes when treated by white doctors than when treated by Black doctors. See, e.g., Erin Dehon et al., *A Systematic Review of the Impact of Physician Racial Bias on Clinical Decision Making*, 24 Acad. Emergency Med. 895 (2017); Nat’l Acads., *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* 3-12, 19 (Brian D. Smedley, Adrienne Y. Stith, & Alan R. Nelson eds., 2003); see also Talia Milgron-Elcott, *Students of Color Are Missing Out on STEM Opportunities, So the Planet Is Missing Out on Their Brilliance. Here’s How We Finally Achieve Equity in High School STEM*, Forbes (Sept. 24, 2020), <https://www.forbes.com/sites/taliamilgronelcott/2020/09/24/students-of-color-are-missing-out-on-stem-opportunities-so-the-planet-is-missing-out-on-their-brilliance-heres-how-we-finally-achieve-equity-in-high-school-stem/?sh=52eba28e5148> (making the connection between the effects of representation in medicine and in education).

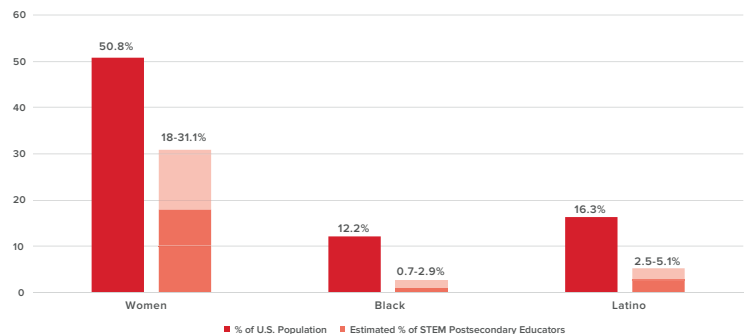
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belong as innovators.¹⁶² This is due, at least in part, to role model effects and cultural understanding. Diverse educators serve as role models and signal to underrepresented students that they have a future in STEM, innovation, and entrepreneurship.¹⁶³ Additionally, cultural understanding between educators and students helps ensure that material is explained in a “culturally relevant and engaging way.”¹⁶⁴ As one expert describes the effects, “[a] diverse staff allows more students to see themselves in their teachers, school leaders, and other school personnel. . . [and] provides more opportunities for students to find someone they can connect with, whether through shared culture or other experiences.”¹⁶⁵

Representation in education is essential because it encourages more underrepresented students to choose a career of innovation and entrepreneurship. Early exposure to inclusive innovation education excites and motivates students to pursue STEM, business, and innovation higher education, and from there, careers. As Irma Olguin Jr., co-founder and co-CEO of Bitwise, explains, joining an innovation ecosystem “shouldn’t be an unfathomable option[] or an accident for anyone.”¹⁶⁶

Unfortunately, the educator workforce is less diverse than the population. STEM and business education begins far earlier than college,¹⁶⁷ so the government should start by looking at educators

Underrepresented Groups in STEM Education, Compared to Representation in U.S. Population



in primary and secondary schools, where a recent report by the Department of Education found that only 18 percent of educators were people of color,¹⁶⁸ while over the same time, 36 percent of the population identified as people of color.¹⁶⁹

The same is true for postsecondary educators. Only 24 percent of university faculty members in the U.S. are people of color.¹⁷⁰ And across STEM fields, the statistics are even bleaker. According to a 2017 study, 12.2 percent of the population is Black, but only 0.7 to 2.9 percent of STEM faculty are Black.¹⁷¹ And while 16.3 percent of the population is Latino, between 2.5 to 5.1 percent of postsecondary STEM faculty identify as such.¹⁷² Gender parity is likewise absent, with only 18 to 31.1 percent STEM postsecondary educators identifying as women despite comprising 50.8 percent of the population.¹⁷³

¹⁶² See Christopher Redding, *A Teacher Like Me: A Review of the Effect of Student-Teacher Racial/Ethnic Matching on Teacher Perceptions of Students and Student Academic and Behavioral Outcomes*, 89 Rev. Educ. Rsch. 499 (2019).

¹⁶³ See Seth Gershenson et al., *The Long-Run Impacts of Same-Race Teachers*, Nat'l Bureau Econ. Rsch. (Nov. 2018), available at <https://www-nber-org.stanford.idm.oclc.org/papers/w25254>.

¹⁶⁴ See Anna J. Egalite & Brian Kisida, *The Effects of Teacher Match on Students' Academic Perceptions and Attitudes*, 40 Educ. Evaluation & Pol'y Analysis 59, 75 (2018); see also *Cultivating Native American Entrepreneurship in Northern Michigan*, Engine (Jan. 29, 2021), <https://www.engine.is/news/startupseverywhere-traverse-city-mich-arrowhead-incubator> (interviewing Shiloh Slomsky, executive director and co-founder of Arrowhead Incubator in Michigan, and describing the power of infusing culture into business training for Native American entrepreneurs, like by lecturing in traditional attire).

¹⁶⁵ Daniel A. Domenech, *Here Is Why Diversity in STEM Education Is So Important*, Educ. & Career News, <https://www.educationandcareernews.com/education-technology/here-is-why-diversity-in-stem-education-is-so-important/> (last visited Feb. 9, 2021) (interviewing and quoting Kendell V. Ali).

¹⁶⁶ *Bitwise*, supra note 127.

¹⁶⁷ See Edward Graham, *Using Technology to Support Child Care Providers*, Engine (Oct. 4, 2019) <https://www.engine.is/news/startupseverywhere-pittsburgh-pa> (interviewing Shimira Williams, co-founder of C.C. Busy in Pennsylvania, who discusses the need to start STEM education as

early as preschool); Andrew Jones, *#StartupsEverywhere: Kansas City, MO*, Engine (May 15, 2018), <https://www.engine.is/news/category/startupseverywhere-kansas-city-mo?rq=Missouri> (interviewing Ryan Weber, president of the KC Tech Council in Missouri, who notes the disparity in computer science education across schools in Missouri).

¹⁶⁸ U.S. Dep't of Educ., *The State of Racial Diversity in the Educator Workforce at 3, 6* (July 2016), available at <https://www2.ed.gov/rschstat/eval/highered/racial-diversity/state-racial-diversity-workforce.pdf>.

¹⁶⁹ Stephanie Ewart, *U.S. Population Trends: 2000 to 2060*, U.S. Census Bureau at 7 (Oct. 15, 2015), available at <https://www.ncsl.org/Portals/1/Documents/nalfo/USDemographics.pdf>.

¹⁷⁰ Leslie Davis & Richard Fry, *College Faculty Have Become More Racially and Ethnically Diverse, But Remain Far Less So Than Students*, Pew Rsch. Ctr. (July 31, 2019), <https://www.pewresearch.org/fact-tank/2019/07/31/us-college-faculty-student-diversity/>.

¹⁷¹ Diyi Li & Cory Koedel, *Representation and Salary Gaps by Race-Ethnicity and Gender at Selective Public Universities*, 46 Educ. Researcher 343, 346, 347 tbl.3 (2017). Note that the Li and Koedel used the 2010 census demographic data in making their comparisons. Demographic data from the 2020 census remains outstanding, but it is expected that the proportion of nonwhite residents has only grown, meaning these data underestimate the disparity in representation.

¹⁷² *Id.*

¹⁷³ *Id.*

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Funding STEM and I&E education initiatives for underrepresented students and educators.

To diversify American innovation ecosystems, the government should invest in local and federal programs aimed at improving access to STEM and I&E teaching and education across primary, secondary, and postsecondary levels.

Improving and Expanding Programs for Students.

Access to STEM and I&E education should improve on two axes. First, the government should ensure innovation education resources and programs are available to underrepresented students regardless of race, gender, or geography. This includes access to STEM and I&E educators as well as to innovation and entrepreneurial co-curricular and extracurricular activities. Second, those resources should be presented in ways that are tailored to and engaging for underrepresented students.

Startup Testimonial:

“I worked on a bill to provide funding to STEM organizations that focus on students of color across Georgia’s education system. That funding has gone to create STEM clubs across the state. We are hosting targeted workshops, and we are seeing more Black and Latino children engaged with science and math throughout the course of their education. I wanted to be part of this effort to give students opportunities that I did not have at their age. If I had a STEM club in elementary school, then I think I would have been an aerospace engineer a lot earlier in my career.”¹⁷⁴

The federal government should invest in programs aimed at expanding and revising STEM and I&E curriculum resources so that innovation education is exciting and inviting to all students. Federal entities can fund and encourage state and local funding of tailored education programs for

students of all ages—from early childhood to postgraduate education—and highlight contributions of diverse innovators. Additionally, the government should invest in local STEM and I&E co-curricular and extracurricular programs for primary and secondary schools in underserved communities.¹⁷⁵ For postsecondary education, the government should invest in innovation-related clubs at HBCUs, land-grant universities, and other postsecondary education institutions that attract more diverse student bodies, including community colleges.

It is also vital that innovation educators establish inclusive environments.¹⁷⁶ Doing so requires that educators reflect on their own identities and privileges, recognize the multidimensional motivations and aspirations of their students, and highlight STEM and I&E contributions by diverse entrepreneurs.¹⁷⁷ Instead of focusing on only Thomas Edison, for example, the works of Percy Julian, Sarah Boone, and Katharine Burr Blodgett also should be center stage.

Increasing Diversity Among Educators.

The government should encourage and invest in efforts to diversify the educator workforce. For example, alternative-route certification programs attract more diverse educators and should be expanded.¹⁷⁸ The government should also increase funding for initiatives like the Smithsonian STEM Education Summit and 100Kin10 that specifically seek to increase diversity in STEM and I&E education.¹⁷⁹ More broadly, the government should build and encourage the narrative that teaching STEM is a viable career path for all, both through explicit programming and through more expansive loan forgiveness.

The government should also take an active role in reaching out to and connecting with potential underrepresented educators.

¹⁷⁵ See, e.g., *Project Invent Fellowship*, Project Invent, <https://projectinvent.org/for-educators> (last visited Jan. 29, 2021); Graham, *Infiltron*, *supra* note 12 (discussing STEM program focusing on students of color across Georgia).

¹⁷⁶ Alison Singer, Georgina Montgomery, & Shannon Schmall, *How to Foster the Formation of STEM Identity: Studying Diversity in an Authentic Learning Environment*, *Int’l J. STEM Educ.* (Nov. 6, 2020), <https://doi.org/10.1186/s40594-020-00254-z>.

¹⁷⁷ See Tess L. Killpack & Laverne C. Melón, *Toward Inclusive STEM Classrooms: What Personal Role Do Faculty Play?*, *CBE Life Sci. Educ.* (Oct. 13, 2017), <https://www.lifescied.org/doi/full/10.1187/cbe.16-01-0020>.

¹⁷⁸ U.S. Dep’t of Educ., *supra* note 168, at 17.

¹⁷⁹ *STEM Education Summit: Building a Coalition for Attracting and Retaining a Diverse STEM Teaching Workforce*, Smithsonian Sci. & Educ. Ctr., <https://ssec.si.edu/event/stem-education-summit-building-coalition-attracting-and-retaining-diverse-stem-teaching> (last visited Jan. 28, 2020); *Our Story*, 100Kin10, <https://100kin10.org/about> (last visited Jan. 28, 2021).

¹⁷⁴ Graham, *Infiltron*, *supra* note 12 (quoting Chastity Wright of Infiltron).

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For example, the Department of Education should actively recruit underrepresented educators to join the STEM and I&E education workforce. Action produces results: as Washington University in St. Louis demonstrated with its practice of solicitation and invitation for its Women in Innovation and Technology program, actively reaching out to underrepresented educators diversifies the innovation educator workforce which in turn provides role models for underrepresented students to see themselves in STEM and I&E.¹⁸⁰

Investing in I&E Education Programs Focused on Underrepresented Innovators.

The government should also look to I&E education as a path to expand American innovation. Innovation and entrepreneurship are often complex and non-linear, and preparing students to succeed requires different educational approaches compared to traditional disciplines.¹⁸¹ Extant I&E programs range from guiding students from an idea to a business or technology launch to focusing further upstream by training students to be more innovative and creative.¹⁸² Indeed, I&E are core skills, and training students to be more innovative should be considered a part of the core curriculum from a young age.¹⁸³

Because I&E programs are often interdisciplinary, attracting

students from across an institution, they can create a natural pull towards diversity. Well-designed I&E programs can encompass students from a broad range of disciplines—engineering, computer science, psychology, sociology, marketing, finance, law, nursing, and more. And in so doing, I&E programs can attract students who may shy away from traditional STEM fields but are interested in learning about innovation.¹⁸⁴

Many I&E programs currently look to private donors¹⁸⁵ and may struggle to compete for traditional government funding because they do not fit tidy STEM definitions. While these private donations add a lot of value, I&E programs reliant on private funds are often targeted to the donor's particular interests and can be difficult to scale. The government should consider establishing dedicated funding pools or issuing specific grant opportunities for I&E education. This would make it easier to expand U.S. innovation and would enable schools that lack a wealthy donor base to launch successful I&E programs. The government could also expand existing programs like NSF's I-CORPS, which is designed to support the commercialization of new technologies and reduce the risk and time required to translate new ideas to the market.¹⁸⁶

Importantly, the government should also identify gaps in diversity for its current I&E investments and develop new, dedicated programs that serve all underrepresented students. Existing I&E education investments provide a start, but they do not fully accomplish this goal. For example, while I-CORPS has made strides broadening participation by women,¹⁸⁷ participation by other underrepresented groups is still lacking.¹⁸⁸ The government should consider establishing additional programs at institutions that attract a more diverse student body, like HBCUs, land-grant universities, and community colleges.

¹⁸⁰ Wash. Univ. in St. Louis, Comment Letter on Request for Comments on the SUCCESS Act of 2018, at 2-3 (June 27, 2019), <https://www.uspto.gov/sites/default/files/documents/SUCCESSAct-Washington-University-in-St-Louis.pdf>.

¹⁸¹ See Gabriel Linton & Markus Klinton, *University Entrepreneurship Education: A Design Thinking Approach to Learning*, J. Innovation & Entrepreneurship (Jan. 14, 2019), <https://innovation-entrepreneurship.springeropen.com/articles/10.1186/s13731-018-0098-z>.

¹⁸² See Martin Lackeus, Entrepreneurship in Education: What, Why, When, How, Entrepreneurship360, at 1 (2015), https://www.oecd.org/cfe/leed/BGP_Entrepreneurship-in-Education.pdf (noting that the definition of entrepreneurship can vary, from training students to start a business to making students more creative). For examples of I&E programs, see Duke Univ., *Education, Duke Innovation & Entrepreneurship*, <https://entrepreneurship.duke.edu/education/> (last visited Feb. 12, 2021); Ga. Inst. of Tech., *TI:GER Program*, Ga. Tech Scheller Coll. Bus., <https://www.scheller.gatech.edu/centers-initiatives/tiger/index.html> (last visited Feb. 12, 2021); and Univ. Colo. Colo. Springs, *UCCS Bachelor of Innovation*, <https://innovation.uccs.edu/what-is-the-bi/>. See also U.S. Dep't of Com., *The Innovative and Entrepreneurial University: Higher Education, Innovation & Entrepreneurship in Focus 10-12* (Oct. 2013), https://www.eda.gov/pdf/The_Innovative_and_Entrepreneurial_University_Report.pdf (listing select programs).

¹⁸³ One model, the Network for Teaching Entrepreneurship (NFTE), is an education non-profit focused on bringing entrepreneurship to middle and high school students, as well as educators, in low-income communities. *NFTE*, NFTE, <https://www.nfte.com/> (last visited Feb. 18, 2021).

¹⁸⁴ Indeed, the student population of certain I&E programs mirrors the diversity of the entire student population. Compare, e.g., Duke Univ., *Scaling, Duke Innovation & Entrepreneurship*, <https://entrepreneurship.duke.edu/ar-2019-2020-scaling/> (last visited Feb. 18, 2021) with Duke Facts, <https://facts.duke.edu/> (last visited Feb. 22, 2021) (I&E students drawn from multiple majors across the university, where the demographic data of the I&E program are highly similar to that of the overall university).

¹⁸⁵ See, e.g., A. James & Alice B. Clark Found., *A. James Clark Scholars Program*, <https://clarkfoundationdc.org/clark-scholars/> (last visited Feb. 11, 2021).

¹⁸⁶ Nat'l Sci. Found., *National Science Foundation Innovation Corps*, https://www.nsf.gov/news/special_reports/i-corps/about.jsp (last visited Feb. 12, 2021).

¹⁸⁷ Nat'l Sci. Found., *Innovation Corps (I-Corps): Biennial Report 13* (Spring 2019), https://www.nsf.gov/news/special_reports/i-corps/pdf/I-CorpsReport--6_4_19FINAL_508.pdf.

¹⁸⁸ See *id.* at 26 (noting that, of 1626 individuals, only 453 were from underrepresented groups but 338 of those were women and reporting that only 208 team leads were from underrepresented groups but 164 of those were women); Nat'l Sci. Found., *A National Initiative to Develop Diversity and Inclusion Infrastructure for STEM Innovation*, https://www.nsf.gov/awardsearch/showAward?AWD_ID=1940055 (last visited Feb. 11, 2021).

CONCLUSION

Diversity in innovation is critical. Yet for too long, underrepresented startup founders have faced unfair and unwarranted barriers—erected both intentionally and unintentionally—across the country. And these injustices have also deprived the nation of economic opportunities and great ideas. Engine is thankful NCEAI will take up these vital questions about how to expand American innovation and encourages NCEAI to conduct a thorough, nuanced assessment of the roadblocks underrepresented founders face, as well as suggest creative solutions to start dismantling them. While the USPTO may be limited in what it can do directly, it has a role to play. Importantly, Engine urges the entire federal government to think broadly about what it can do to right past wrongs; create new opportunities through funding and programs to invite more diversity into existing innovation ecosystems; and incentivize private actors to make change.

Thank you for the opportunity to submit these perspectives. Engine is firmly committed to helping grow and support the nation's startup ecosystems, and a substantial part of that work must include promoting diversity and inclusion. Engine is likewise committed to serving as a resource for and engaging with NCEAI, USPTO, and all levels of government on changes that could advance this goal.