



January 31, 2022

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National Institute of Standards and Technology
U.S. Department of Commerce
100 Bureau Drive
Gaithersburg, MD 20899
301.975.2900

VIA ONLINE SUBMISSION

Re: Comments of Engine Advocacy Regarding *Study To Advance a More Productive Tech Economy*,
Docket No. NIST-2021-0007

Dear Mr. Romine:

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. We appreciate the opportunity to submit this response to the National Institute of Standards and Technology (NIST) request for comment on, *inter alia*, legislative and policy needs and what the government can do to foster the development and adoption of emerging technology in the U.S.

Startups are major drivers of innovation and emerging technology, and they make outsized contributions to economic and job growth and U.S competitiveness.¹ Across technology and market sectors—from advanced manufacturing and robotics, to artificial intelligence and agtech—the number and value of startup financing deals have grown consistently over the past decade.² And while startups already operate in every state, startup ecosystems are increasingly expanding beyond the cities with the most established tech ecosystems.³ And better, publicly-accessible data about technology-focused startups would help fill knowledge gaps and enable federal policymakers to best

¹ See, e.g., *The Economic Impact of High-Growth Startups*, Kauffman Foundation (June 7, 2016) https://www.kauffman.org/wp-content/uploads/2019/12/PD_HighGrowth060716.pdf.

² *The State of the Startup Ecosystem*, Engine 19-22 (2021), <https://www.engine.is/news/engine-releases-report-on-the-health-of-the-startup-ecosystem>.

³ See, e.g., Appendix D at 2.

serve this community—indeed, statistical agencies like the Census Bureau should be encouraged to leverage existing surveys to collect more specific data about the state of tech startups in the U.S.⁴

Startups make such impressive contributions, but they operate on thin margins and need the landscape of law and policy to work for them—not against them. Indeed, the federal government can do a lot to foster opportunities for the early-stage companies that are leading the development and adoption of key emerging technologies. As NIST prepares the present report, we urge you to recommend policymakers focus on the resource needs of startups and on ensuring startups do not face unwarranted roadblocks. Resources, including capital and talent, are essential to every startup, and the government can do more to foster investment and secure a robust talent pipeline. At the same time, the government must do more to promote a more diverse and inclusive innovation ecosystem in the U.S. and should attend to unique resource and talent challenges facing underrepresented innovators. Beyond creating a resource-rich environment, it is critical that policymakers avoid or dismantle policies that make it harder for emerging tech startups to operate. An invalid patent, for example, can stand in a company’s way, and a complex patchwork of privacy laws can make it impossible to reach users in several states. Policymakers should prioritize clear, consistent, and balanced policy so startups can proceed with certainty towards innovation in emerging tech.

While the following comments elaborate on a few key priorities, we are also attaching Engine’s 2022 Startup Agenda as Appendix A.⁵ This provides additional context and high-level recommendations on how policymakers can support domestic startups.

Capital Access. Capital is an absolutely essential part of every startup’s growth—and that includes startups working on emerging technologies. Most startups rely on a combination of personal loans and family savings at launch,⁶ and while venture capital and angel investments are very attractive options, less than two percent of startups successfully compete for those forms of funding.⁷ And many startups face barriers the federal government can help tackle, or resolve entirely. For example, the federal government provides direct funding to innovators through grants and loans, regulates how and when startups can raise money from which investors, and encourages private investment through levers like tax incentives. It can use each of these tools to better support emerging tech startups.⁸

Policymakers must continue to improve the environment for startups seeking capital.⁹ This should include expanding direct investment in emerging tech, for example as proposed by the United States

⁴ E.g., Press Release, Eshoo Leads 10 Colleagues in Urging Better Data Collection on Startup Companies (Nov. 4, 2021), <https://eshoo.house.gov/media/press-releases/eshoo-leads-10-colleagues-urging-better-data-collection-startup-companies>.

⁵ *Startup Agenda 2022*, Engine (Jan. 31, 2022), <https://www.engine.is/news/category/engine-releases-2022-startup-agenda> [hereinafter “Appendix A”].

⁶ E.g., Laura Entis, *Where Startup Funding Really Comes From*, Entrepreneur (Nov. 20, 2013), <https://www.entrepreneur.com/article/230011>.

⁷ E.g., *id.* (reporting approximately 0.91 percent of startups get angel investment and 0.05 percent get VC funding).

⁸ See, e.g., Appendix A at 4.

⁹ See, e.g., *Startup-Oriented COVID-19 Relief Proposals*, Engine <https://static1.squarespace.com/static/571681753c44d835a440c8b5/t/5f15c9ebd0fec75789cbe677/1595263468537/E>

Innovation and Competition Act (USICA).¹⁰ Yet recent legislative efforts to expand R&D spending also highlight an important point of caution—as innovators are rightfully concerned when lawmakers try to include unrelated legislation, especially things that could harm innovation, within broader spending packages.¹¹

The government should also find ways to streamline grant application processes so they are accessible to emerging tech startups. The timelines and rigidity of federal grants can be a poor fit for certain startups. The government could consider directing SBIR/STTR funding to incubators who can more nimbly leverage those funds to startups when and how they need it most.¹²

Relatedly, the government can also play a valuable role as a startup’s customer or partner. Startups are well-positioned to help the government develop or adopt emerging technologies—startups working on artificial intelligence (AI), advanced manufacturing, Internet of Things (IoT), etc. can help the government solve its own problems through innovative new technologies. This can also help startups gain early customers and establish proof of concept in the market. But to achieve this, it would take proactive government effort to connect with startups, putting out targeted requests for proposals, and helping streamline the procurement process to make it more accessible to smaller companies.

- As Leonardo Bonanni, Founder and CEO of Sourcemap, an NY-based and supply chain-focused startup, put it: “There should be more opportunities for the government to engage in pilots with startups. Policymakers should be thinking about and lifting up better, more innovative procurement targeting startups. Because if the choices facing the government are just do nothing (don’t move forward) or wait until Microsoft or Amazon can offer the full solution, that’s not great.”¹³

Finally, the federal government should also do more to encourage private investment in emerging tech startups. It could take lessons from successful state programs that offer tax incentives for angel

[ngine+Proposals+for+Future+%28Phase+4%29+COVID-Relief+Packages.pdf](#) (last visited Jan. 31, 2022). While this document is targeted to pandemic relief, it discusses many policy proposals that address the capital needs of startups more generally.

¹⁰ Letter from TechNet et al. to Senators Maria Cantwell and Roger Wicker (Apr. 29, 2021) <https://static1.squarespace.com/static/571681753c44d835a440c8b5/t/608835e54d5b2179f83f7b6e/1619539429281/FINAL+AS+OF+APRIL+27+Endless+Frontier+Act+Multi+Association+Letter.pdf> (multi-coalition letter voicing support for Endless Frontier Act).

¹¹ E.g., *America COMPETES is a Mixed Bag for Startups*, Engine (Jan. 28, 2022), <https://www.engine.is/news/startup-news-digest-012822-rp8b2-p557e-rgwr5-xft3x-whbzb-dc92a-sbcfx-gf3fn-dskn5-6f455-f3xf3-ppmak-b5xk6> (discussing inclusion of unrelated, controversial e-commerce bill in R&D investment package); Issie Lapowsky, *The Ecommerce Killer Lurking in the Competes Act*, Protocol (Jan. 26, 2022), <https://www.protocol.com/newsletters/policy/competes-shopsafe> (similar).

¹² See, e.g., Engine Letter to Members of the Subcommittee on Innovation and Workforce Development of the House Committee on Small Business (Feb. 27, 2020), <https://static1.squarespace.com/static/571681753c44d835a440c8b5/t/5e582a468fa56521103d6600/1582836294242/House+Small+Business+Committee+Feb+27.pdf> (discussing

¹³ #StartupsEverywhere profile: Leonardo Bonanni, Founder and CEO, Sourcemap, Engine (June 11, 2021), <https://www.engine.is/news/startupseverywhere-newyorkcity-ny-sourcemap>.

investment and look to other options, like the New Business Preservation Act, to encourage and target more private investment in priority areas.¹⁴

- As Jifei Ou, Founder & CEO of additive manufacturing startup OPT Industries, elaborated: “[I]n China, if you’re a manufacturing-related startup company, there are tax policies, real estate, and hiring incentives that are very beneficial for a young company. In the end, there’s a whole package of benefits that encourage people to go into manufacturing and develop those businesses in China. Whereas, in the U.S. I’m still struggling to find similar incentives. . . . You do not really see a large number of people encouraging entrepreneurs or graduate students to go into manufacturing. I hope that will change. You see the Biden administration talking about this idea more and that could definitely help it become part of the broader conversation. But I also think that will require tax and real estate policy innovations to attract more talent into advancing the manufacturing sector through tech.”¹⁵

Talent Pipelines. Along with capital, talent is one of the foundational resources every startup needs. Policymakers interested in ensuring a vibrant tech talent pipeline should invest in STEM education and craft immigration policy that allows startups to attract and retain top talent.¹⁶

On domestic STEM education, the government should consider increasing funding, but also targeting investment and programming to bolster diversity and inclusion in the pipeline.¹⁷ This could include everything from ensuring diversity in federal training grants, to incorporating more diverse and inclusive stories into K-12 STEM education, to initiatives to attract and retain diverse STEM educators. And a critical part of the talent pipeline is retaining talent. For example, an estimated 20 percent of women STEM Ph.D. holders and 20 percent of Black STEM Ph.D. holders leave the STEM field.¹⁸ Interventions that reduce attrition are needed, for example government programs that alleviate child or family care burdens.¹⁹

Turning to immigration, policymakers should defend and expand existing programs that enable foreign-born innovators to come to the U.S. This includes bolstering the H1-B visa program, finding permanent paths for DACA recipients to stay in the country, and creating a startup visa.

- As Rishi Ranjan, Founder & CEO of augmented, virtual, and mixed-reality startup GridRaster, put it: “We have some very good talent, but we have not been able to secure H-

¹⁴ E.g., Engine Proposals, *supra* note 9, at 1-2, 3-4; *State Program Details*, Angel Capital Assoc., <https://www.angelcapitalassociation.org/aca-public-policy-state-program-details/> (last visited Jan. 27, 2022); #StartupsEverywhere profile: Ryan Heafy, Co-Founder and COO, 6AM City, Engine (May 15, 2020), <https://www.engine.is/news/startupseverywhere-greenville-sc> (discussing South Carolina’s angel tax credit); Press Release, Klobuchar, Coons, Kaine, King Introduce Legislation to Protect and Strengthen Young Businesses Across the Country (Mar. 19, 2020), <https://www.klobuchar.senate.gov/public/index.cfm/2020/3/klobuchar-coons-kaine-king-introduce-legislation-to-protect-and-strengthen-young-businesses-across-the-country>.

¹⁵ #StartupsEverywhere profile: Jifei Ou, Founder and CEO, OPT Industries, Engine (May 28, 2021), <https://www.engine.is/news/startupseverywhere-medford-ma-opt>.

¹⁶ Appendix A at 10.

¹⁷ Appendix C at 22-26.

¹⁸ Appendix C at 22.

¹⁹ Appendix B at 9.

1B visas for everyone. One of our employees has an M.S. and is critical to our research and development efforts, but their OPT visa expires early next year. We are extremely worried that we will not be able to keep that person on board. . . . A lot of our customers are in defense or aerospace, so apart from hurting the company, this challenge also hurts the country that we serve. We train these people, who spend five or 10 years earning a Ph.D., and then we lose them.”²⁰

- As Andre Wegner, CEO & Founder of additive manufacturing startup Authentise, explained: “The U.S. visa process stops us from bringing people onto our U.S. payroll and growing our company, full stop. For example, we were trying to hire a prospective employee who is an Indian citizen that graduated from the University of Pennsylvania. He applied for his H-1B visa three times and was repeatedly denied. We had already gone through the few months-long process to get the license to apply for visas in the UK. So instead, we decided to employ him in the UK and were able to get his employment visa in just a week.”²¹

Diversity & Inclusion. We cannot reiterate the importance of diversity in emerging technologies enough. Diverse teams generate better economic results and more—often better—innovation emerges from the unique experiences diverse innovators and entrepreneurs bring to the table. As the nation encourages development and adoption of cutting-edge new technologies, it is essential that we not lose out on the compelling ideas and essential perspective that underrepresented startup founders and innovators can contribute. Bringing diversity into our innovation ecosystems, and prioritizing diverse voices, already is, and will continue to be, essential to creating inclusive technology.²²

- As Sanna Gaspard, CEO & Founder of Rubitection, a Pittsburgh-based startup developing innovative technology for monitoring skin health, put it: “Diversity should always be a focus in developing tech. This is not just inclusive but is good business. The global market is diverse. To really address this problem, first we need more people of color in the development teams and in the focus groups. However, in the absence of having a diverse team, it is the responsibility of the product development team to prioritize including people of color in their focus group testing to ensure they are building to appropriate technical requirements that will result in an inclusive product.”²³

Yet the challenges facing underrepresented startup founders are exacerbated, often multiple times over. For example, only 21 percent of VC funding goes to women founders, and less than 1 percent of VC funding goes to Black women and Latina founders,²⁴ and similar disparities exist in federal

²⁰ #StartupsEverywhere profile: Rishi Ranjan, Founder & CEO, GridRaster, Engine (July 2, 2021), <https://www.engine.is/news/startupseverywhere-mountainview-ca-gridraster>.

²¹ #StartupsEverywhere Profile: Andre Wegner, CEO & Founder, Authentise, Engine (Nov. 5, 2021), <https://www.engine.is/news/startupseverywhere-philadelphia-pa-authentise>.

²² See generally Appendices B, C.

²³ #StartupsEverywhere profile: Dr. Sanna Gaspard, CEO and Founder, Rubitection, Engine (July 30, 2021), <https://www.engine.is/news/startupseverywhere-pittsburgh-pa-rubitection>.

²⁴ Appendix C at 11.

funding.²⁵ Networking and mentoring communities that are vital to startup success are not nearly diverse enough, which impacts the funding opportunities, advising, and partnerships available to underrepresented founders. And, as noted above, the nation needs to do better delivering on an education system that supports diverse pipelines of innovators and entrepreneurs.

Engine's report on *Making the Startup Ecosystem More Equitable* and *Response to the Call for Comments on Expanding American Innovation* (attached as Appendices B and C, respectively),²⁶ provide additional details on what the government can do to help rectify disparities in innovation and startup ecosystems.

Intellectual Property. Balanced intellectual property laws are essential for promoting emerging technology. Sound IP policy must acknowledge that for some startups high-quality IP is a valuable asset while at the same time accounting for the fact that overbroad IP coverage or abusive assertion creates unwarranted roadblocks for innovation. Especially in the areas of emerging technology identified in this Federal Register Notice, balanced IP frameworks will be critical, and policymakers must strive to avoid changing the law in ways that would make it harder for startups to find the space to operate and advance in these areas. For example:

- Curbing abusive litigation: Startups across technology areas are unfortunately familiar with abusive patent assertion—where invalid patents or weak infringement accusations are wielded as weapons against innovation and progress.
 - As Jean Anne Booth, Founder & CEO of UnaliWear, a Texas-based startup that developed a connected smartwatch to support vulnerable populations, has explained: “I had to stop publicizing positive news about UnaliWear because every time I did, we would get hit with a demand or lawsuit from a patent troll. It does not matter that we do not violate their patents—they still threaten to sue. The whole business model feels like legalized extortion. . . . Patents should be there for the people who are doing something meaningful and implementing novel ideas. With NPEs, it is just a waste of time and investors' money. . . . There are good things that [] my company could be doing in the world besides dealing with patent trolls.”²⁷

As detailed in Appendix D, *Startups and the U.S. Patent System*, there are many ways the government can maintain or improve balanced patent policy.²⁸ That could include:

²⁵ E.g., *id.* at 13-14; Christian E. Weller et al., *Redesigning Federal Funding of Research and Development*, CAP (Aug. 18, 2020), <https://www.americanprogress.org/article/redesigning-federal-funding-research-development/>.

²⁶ *Making the Startup Ecosystem More Equitable*, Engine (Nov. 2021), <https://www.engine.is/news/category/engine-releases-making-the-startup-ecosystem-more-equitable> [hereinafter “Appendix B”]; Matt O. Dhaiti, Jamie Dohopolski, & Phillip Malone, *Engine's Response to the Call for Comments on Expanding American Innovation*, Engine (Feb. 23, 2021), <https://bit.ly/2NrnfpD> [hereinafter “Appendix C”].

²⁷ #StartupsEverywhere profile: Jean Anne Booth, Founder and CEO, UnaliWear, Engine (Apr. 30, 2021), <https://www.engine.is/news/startupseverywhere-austin-tx-unaliwear>.

²⁸ *Startups & the U.S. Patent System: Prioritizing Quality and Balance to Promote Innovation*, Engine (July 2021), <https://static1.squarespace.com/static/571681753c44d835a440c8b5/t/60f8579bae6a2d324b7440a2/1626888093336/Engine+Patent+Quality+Booklet+2021+7.21.pdf> [hereinafter “Appendix D”].

improving the quality of issued U.S. patents, so only valid patents issue; restoring affordable, efficient mechanisms to clear out invalid patents (such as inter partes review); preserving prohibitions around patenting abstract ideas; preserving balance in patent damages; and creating some risk for bad actors abusing the system.²⁹

- As Joshua Montgomery, Founder of Mycroft AI, a Kansas City-based startup developing open source AI voice assistant technology, put it: “The inter partes review (IPR) system is really important, but it needs to be reformed. The whole intent of IPR is to give a company targeted by a patent abuser an alternative path to challenge a bad patent. What we are finding now, under the current policy, is that a company that files with the Patent Trial and Appeal Board (PTAB) within 30 days of being sued has their IPR thrown out because of parallel litigation. This is not what Congress intended in passing the law creating IPR, and it creates a series of challenges for startups. When IPR isn’t there to invalidate a bad patent, startups are looking at \$2 million in costs. That creates a big disincentive to fight back against frivolous claims.”³⁰
- Promoting balance in standard essential patent licensing: Especially in the context of IoT, startups that want to create connected devices or build technology to run on them depend on fair and balanced licensing of standard essential patents (SEPs). A recent draft policy statement from the Department of Justice, U.S. Patent and Trademark Office, and NIST marks a critical improvement in bringing balance back to SEP policy.³¹ The government should continue to take positive steps to ensure that certain SEP holders are not able to demand inflated licensing rates or threaten startups with injunctions—because those sorts of imbalances in law and policy will make it harder for startups to innovate, develop IoT products and services, and reach consumers.³²
- Ensuring startups can use software interfaces that enable interoperability without facing copyright liability: It is essential policymakers resist the pull to expand the universe of what software development activities constitute copyright infringement. If established companies were able to use copyright threats to prevent startups from using certain software interfaces—for example application programming interfaces (APIs)—it would deprive startups of important tools necessary for interoperability. That would, in turn, make it harder

²⁹ Appendix D at 11-21.

³⁰ #StartupsEverywhere profile: Joshua Montgomery, Founder, Mycroft AI, Engine (Apr. 23, 2021), <https://www.engine.is/news/startupseverywhere-kansas-city-mo-mycroft>.

³¹ Press Release, Public Comments Welcome on Draft Policy Statement on Licensing Negotiations and Remedies for Standards-Essential Patents Subject to F/RAND Commitments (Dec. 6, 2021), <https://www.justice.gov/opa/pr/public-comments-welcome-draft-policy-statement-licensing-negotiations-and-remedies-standards>.

³² E.g., ACT | The App Association et al., *Standards, Licensing, and Innovation: A Response to DOJ AAG’s Comments on Antitrust Law and Standard-Setting* (May 30, 2018), <https://www.saveourstandards.com/wp-content/uploads/2021/03/Multi-Assn-DOJ-White-Paper-053018.pdf>; Carl Shapiro & Mark A. Lemley, *The Role Of Antitrust In Preventing Patent Holdup*, 168 U. Penn. L. Rev. 2019 (2020).

for them to launch and compete. The Supreme Court recently held that reimplementing APIs is fair use under copyright law, and policymakers must preserve that.³³

- In the months leading up to that Supreme Court decision, Doug Standley, CEO of Colorado-based startup niolabs, explained “the notion that all software will be built from scratch in the command line sets innovation back so far. I am not sure how developers would be able to operate—and how we would be able to do it—if you could get a copyright on an API. . . . In addition, companies would see an onslaught of litigation were the Court to treat APIs as copyrightable.”³⁴
- Attending to non-patent incentives to invent: Finally, when it comes to IP and innovation, policymakers must combat the impulse to prioritize patent quantity above all else. That means focusing on quality and balance in IP policy, but also making sure that the government pays attention to the numerous non-patent incentives to innovate.³⁵

Data Security & Privacy. For many startups, attending to data security and user privacy are business imperatives. Being responsible stewards of user data will look different for every company, depending on its resources as well as the sensitivity and amount of data it has.³⁶ But for a startup, one data breach can drive away users and investors and ruin a company, making security paramount. And user privacy—referring to a user’s ability to have a say in how her data is collected, used, and shared—is critical to ensuring a user’s trust in Internet ecosystems.³⁷ Startups have to constantly balance competing goals while building out a successful product or service and cultivating a satisfied user base—privacy and security are some of the many things they have to consider—and clear, consistent policy frameworks that do not hinder innovation are essential. Indeed, emerging IoT and AI technologies are very data-intensive. Where startups operating in those spaces interact with personal data—collecting it, storing it, using it—they will depend on sound federal policy that allows them to navigate legal compliance and ensure appropriate protections for their users.

Right now, startups face a patchwork of state laws with sometimes-unclear data security and privacy standards, which creates ambiguity and uncertainty for startups that want to protect their users. Across the country, states such as Virginia and Colorado have already followed California’s lead in enacting privacy legislation—and there is variation between those laws, where even small differences

³³ See, e.g., Abby Rives, *Copyright Law & Startup Innovation: Policies That Matter and Where They May be Headed*, Medium (Jan. 19, 2022), <https://engineadvocacyfoundation.medium.com/copyright-law-startup-innovation-policies-that-matter-and-where-they-may-be-headed-dea034904e25>.

³⁴ #StartupsEverywhere: Doug Standley, CEO, niolabs, Engine (Nov. 20, 2020), <https://www.engine.is/news/startupseverywhere-broomfield-colo-niolabs>.

³⁵ #StartupsEverywhere Profile: Nathan Seidle, CEO & Co-Founder, SparkFun, Engine (Nov. 19, 2021), <https://www.engine.is/news/startupseverywhere-boulder-co-sparkfun> (discussing the need for NSF application processes to create space for open source projects, instead of effectively requiring applicants to obtain or hold patents).

³⁶ *Hearing on Enhancing Data Security: Hearing Before the Comm. on Commerce, Sci., and Transportation*, 117th Congress (2021) (testimony of Kate Tummarello) <https://www.commerce.senate.gov/services/files/3B1B0CB5-B41E-4542-B981-9581B2387FE5>.

³⁷ Appendix A at 12.

frustrate a startup's ability to comply.³⁸ Likewise, state data security and breach notification laws vary nationwide, forcing startups that are victims of a data breach to waste precious time hunting down where users are located and what notifications are required, when they could be fixing the problem.³⁹ Due to lean budgets, many startups cannot afford to navigate a costly regulatory and legal landscape, especially compared to larger counterparts.

It is critical that Congress take the lead on creating federal privacy and security frameworks—ones that do not vary across state lines or between jurisdictions—and ones that work for consumers and startups.⁴⁰ This would provide startups clarity on the measures they need to implement to protect consumer data and the steps they need to take if they suffer a data breach.

- As Ben Golub, CEO of Georgia-based decentralized cloud storage startup Storj, recently told us: “Privacy is just one particular area where many startups struggle to understand what is required of them. . . . As policymakers grapple with these issues, it is important that they give startups a role in policy debates. There are things that Amazon, Microsoft, or Google can do that startups cannot, so it helps level the playing field when the voices of startups are included in policy debates.”⁴¹
- As Anne Kim, Co-Founder & CEO of Massachusetts-based Secure AI Labs, explained: “Right now in the U.S. we have the Genetic Information Nondiscrimination Act (GINA) and the Health Insurance Portability and Accountability Act (HIPAA), as well as in California we have the California Consumer Privacy Act. And in Europe, there is the General Data Protection Regulation (GDPR). This results in a pretty complex framework of an array of policies, and there are ongoing discussions as policies continue to grow and change. And I think it is important to recognize that with every single policy, regardless of how it addresses privacy, it adds more rules that companies, no matter their size, have to navigate.”⁴²

Artificial Intelligence-Specific Concerns. Startups innovating in artificial intelligence (AI) are leveraging the technology across all sectors of the economy—from increasing crop yields in agriculture to decreasing vulnerabilities in cybersecurity. Innovation in AI, however, requires vast data, compute, and skilled talent, which can be difficult for resource-strapped startups to obtain.⁴³ Government can help lower barriers to entry in the AI space and has initiated some efforts to that end. For example, as part of the National Defense Authorization Act for fiscal year 2021, the

³⁸ See, e.g., Sean Davis, *Startups Need It, Lawmakers Want It, But Congress Has Yet to Move a Privacy Bill*, Medium (Sept. 17, 2021), <https://engineadvocacyfoundation.medium.com/startups-need-it-lawmakers-want-it-but-congress-has-yet-to-move-a-privacy-bill-77a688eb2a12>; Cathy Lee, *Startups and State Privacy Laws*, Medium (Nov. 19, 2019), <https://engineadvocacyfoundation.medium.com/startups-and-state-privacy-laws-77cd96d84100>.

³⁹ See, e.g., Tummarello, *supra* note 36.

⁴⁰ Davis, *supra* note 38.

⁴¹ #StartupsEverywhere Profile: Ben Golub, CEO, Storj, Engine (Oct. 8, 2021), <https://www.engine.is/news/startupseverywhere-atlanta-ga-storj>.

⁴² #StartupsEverywhere profile: Anne Kim, Co-Founder and CEO, Secure AI Labs (SAIL), Engine (May 21, 2021), <https://www.engine.is/news/startupseverywhere-cambridge-ma-sail>.

⁴³ *Startup Ecosystem*, *supra*, note 2, at 16-17 (discussing average software engineer salaries and the resources of the average seed-stage startup); see also, e.g., Ivy Nguyen, *Could Data Costs Kill Your AI Startup?*, VentureBeat (Nov. 10, 2018), <https://venturebeat.com/2018/11/10/could-data-costs-kill-your-ai-startup>.

National AI Research Resource Task Force was established to move toward the implementation of a National AI Research Resource (NAIRR) composed of shared compute, data, and other resources.⁴⁴ As both startups and Engine shared in comments to the Task Force, the NAIRR can lower barriers by providing those resources and promoting best practices to mitigate biases in data and in AI application.⁴⁵ To successfully do so, though, the NAIRR must be open to startups for commercial use.

To promote innovation in AI, regulation in the space must also be balanced to preclude bias and promote trust while avoiding burdensome compliance costs and creating barriers to entry and AI uptake. While the European Union, for example, attempts to achieve this balance in their Artificial Intelligence Act, the EU proposal may sweep up innocuous applications of AI while imposing compliance costs that can present barriers and reduce the uptake of AI by businesses and consumers.⁴⁶ U.S. policymakers should avoid creating unwarranted barriers to startups looking to innovate in AI.

Mitigating bias is critical to trustworthy, socially beneficial AI, and as the U.S. considers regulation of AI, there are resources and guardrails that the government can and should help innovators to implement. To accomplish this, as the startup Infiltron has noted, “the government can develop best practices or tools small companies can use—when they are just launching or getting started—to assess the trustworthiness of their AI solutions. Companies, including startups, need ways to test their AI, to make sure it is dependable and that it does not open up gaps for, e.g., hackers.”⁴⁷ NIST’s ongoing work on the AI Risk Management Framework is one such important resource. As NIST continues this work and considers additional ways to boost AI innovation, creating practical resources and disseminating them through trusted sources that startups turn to (e.g., ecosystem support organizations) can promote best practices while lowering barriers to startup success.

Building diverse teams and diverse leadership—both at startups and in government—is similarly critical in mitigating biases while promoting cutting-edge innovations. Who is in the room matters and will show in the outcomes: this means diverse teams should decide what government resources will be made available and who will get them, it means that companies need to hire and retain

⁴⁴ William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, Pub. L. 116-283, tit. LI, § 5106, 134 stat. 4531-4, (2021).

⁴⁵ See, e.g., *Request for Information (RFI) on an Implementation Plan for a National Artificial Intelligence Research Resource: Response of Engine Advocacy*, (Sept. 1, 2021), <https://www.ai.gov/rfi/2021/86-FR-39081/Engine-NAIRR-RFI-2021.pdf>; *Request for Information (RFI) on an Implementation Plan for a National Artificial Intelligence Research Resource: Response of BeeHero*, (Sept. 30, 2021), <https://www.ai.gov/rfi/2021/86-FR-39081/BeeHero-NAIRR-RFI-2021.pdf>; *Request for Information (RFI) on an Implementation Plan for a National Artificial Intelligence Research Resource: Response of Infiltron*, (Sept. 21, 2021), <https://www.ai.gov/rfi/2021/86-FR-39081/Infiltron-NAIRR-RFI-2021.pdf>.

⁴⁶ Porter Enstrom, *EU AI Regulation Needs Balance to Protect Startups, Promote Innovation*, Medium (Aug. 6, 2021), <https://engineadvocacyfoundation.medium.com/eu-ai-regulation-needs-balance-to-protect-startups-promote-innovation-97e33bd6a8af>.

⁴⁷ See *Infiltron*, *supra* note 45, at 4.

diverse leadership and engineers, and it means that the data used to train AI systems has to be diverse and as bias free as possible.⁴⁸

Finally, a lot of attention has been paid to the intersection of AI and IP. We attached as Appendix E comments Engine submitted to the World Intellectual Property Organizations and U.S. patent office on that intersection—comments which discuss how current U.S. IP law and policy is aligned to support advances in AI.⁴⁹ Briefly, it is critical that patent law continue to prevent individuals and companies from obtaining patents that generically claim the performance of abstract ideas using conventional AI technology.⁵⁰ Allowing such patents would thwart downstream innovation and allow a few patent holders to hold-up large sectors of productive activity by asserting such overbroad patents. Likewise, patent disclosure requirements must be rigorously applied in the context of AI.⁵¹ And it should be lawful to ingest data and use it to train, tune, and test AI systems. In some cases, that data could implicate copyrighted content, but use of the data in the AI context should either involve content that is ineligible for protection, involve non-infringing uses, or involve fair uses.⁵² If startups faced copyright infringement liability when AI systems ingested content, it would put innovation at substantial risk.

* * *

Thank you again for the opportunity to provide these comments. Engine remains committed to engaging with NIST on these and other important topics that implicate the roles the federal government can and does play to support the domestic innovators and startups across the country as they lead the development of critical emerging technologies.

⁴⁸ See, e.g., *id.*; Appendix E at 5; Rubitection, *supra* note 23; see also, generally, Appendices B & C.

⁴⁹ Comments of Engine Advocacy, *In re* Impact of Artificial Intelligence on Intellectual Property Policy, Docket No. WIPO/IP/AI/2/GE/20/1 (Feb. 14, 2020), https://www.wipo.int/export/sites/www/about-ip/en/artificial_intelligence/call_for_comments/pdf/org_engine_advocacy.pdf [hereinafter “Appendix E”].

⁵⁰ Appendix E at 1-2.

⁵¹ *Id.* at 2-3.

⁵² *Id.* at 3-4.