No. 21-5028

IN THE
United States Court of Appeals for the District of Columbia Circuit

WASHINGTON ALLIANCE OF TECHNOLOGY WORKERS,
Plaintiff-Appellant,

v.

DEPARTMENT OF HOMELAND SECURITY ET AL.,
Defendants-Appellees,

and

NATIONAL ASSOCIATION OF MANUFACTURERS ET AL.,
Intervenors for Defendants-Appellees.

On Appeal from the United States District Court
for the District of Columbia
No. 1:16-cv-01170-RBW
Hon. Reggie B. Walton

BRIEF OF FWD.us, 47 COMPANIES, AND 12 INDUSTRY ASSOCIATIONS AS AMICI CURIAE IN SUPPORT OF DEFENDANTS-APPELLEES AND INTERVENORS

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Amazon†

Apple, Inc.

Argo AI, LLC

Asana, Inc.

Bates White LLC†

Betterment Holdings, LLC

Bloomberg LP

Boundless

Box, Inc. †

BSA | The Software Alliance

Business Roundtable

Carbon Health

Cisco

College and University Professional Association for Human Resources

Compete America

Cummins Inc.

The Dow Chemical Company

Dropbox

Enanta Pharmaceuticals

Engine Advocacy

Ernst & Young LLP

Facebook

Garmin International

GitHub, Inc.

Google†

Hewlett Packard Enterprise

HP Inc.

Illinois Science & Technology Coalition

Intel Corporation

LinkedIn Corporation

Micron

Microsoft

National Immigration Forum

National Venture Capital Association

Netflix

Ooma, Inc.

Partnership for a New American Economy Research Fund

PayPal

RealNetworks, Inc.

RingCentral, Inc.

salesforce.com, inc.

SAP

Semiconductor Industry Association

Schweitzer Engineering Laboratories, Inc.

Society for Human Resource Management

Sourcegraph

Square, Inc.†

State Business Executives

TechNet

TechNexus

Tendo Technologies

Texas Instruments†

The Guestbook

Transformative AI Inc.

Unshackled Ventures

Waymo LLC†

Zillow Group

† Denotes signatories represented by Donahue, Goldberg, Weaver & Littleton.

CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

A. Parties and Amici

To counsel's knowledge, all other parties, intervenors, and amici appearing before this Court are as stated in the Brief for the Appellees. A list of signatories to this brief is provided above.

B. Rulings Under Review

References to the rulings at issue appear in the Brief for the Appellees.

C. Related Cases

Related cases appear in the Brief for the Appellees.

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CERTIFICATE AS TO NECESSITY OF SEPARATE *AMICUS* BRIEF

Pursuant to D.C. Circuit Rule 29(d), counsel certifies that this separate brief is necessary because none of the parties or other amici are affected by this case in the same way as the signatories to this brief. As explained below, the amici filing this brief are a diverse array of companies and organizations that all recognize the importance to the American economy of science, technology, engineering, and mathematics (STEM) in general, and the Optional Practical Training (OPT) and STEM OPT programs in particular. All have a significant interest in the outcome of this case. Companies such as amici consistently struggle to fill STEM jobs and often face significant and persistent vacancies. The OPT and STEM OPT programs are critical to addressing that deficit. As amici have seen firsthand, these essential programs mitigate the immediate shortfall of STEM-skilled individuals, while ameliorating that problem in the long term by educating and training the next generation of STEM workers. Eliminating these programs would cause substantial and unnecessary hardship to amici, their employees, and the U.S. economy.

No other party or amicus is affected in the way that these amici are, and so none makes the arguments that amici develop here: explaining the impact that the OPT and STEM OPT programs have on the U.S. economy and innovation, and the deleterious consequences that ending those programs would have on U.S. companies and their employees. To amici's knowledge, the only other amicus brief to be filed in support of affirmance is by two non-profit immigration organizations; that brief intends to provide a historical background (focused particularly from 1952 to 1986) on the statutory, regulatory, and sub-regulatory provisions addressing non-citizen work authorization. There is practically no overlap between that brief focused on legal history and this one focused on present economic impacts. It would thus be impracticable for these amici—many of whom will be directly impacted by this Court's ruling—to join any other brief in this case.

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CORPORATE DISCLOSURE STATEMENT

Pursuant to Fed. R. App. P. 26.1 and D.C. Cir. Rule 26.1, amici provide the following corporate disclosure statement.

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Unshackled Ventures does not have any parent companies. No publicly traded company has a 10% or greater ownership interest in Unshackled Ventures.

Waymo LLC has as parent companies Alphabet Inc., XXVI Holdings Inc., OB Technology Holdings Inc., and Waymo Holding Inc. The only publicly traded company that has a 10% or greater ownership interest in Waymo LLC is Alphabet Inc.

Zillow Group does not have any parent companies. No publicly traded company has a 10% or greater ownership interest in Zillow Group.

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INTEREST OF AMICI CURIAE[1]

Amici are a diverse array of companies and organizations that all recognize the importance to the American economy of science, technology, engineering, and mathematics (STEM) in general, and the Optional Practical Training (OPT) and STEM OPT programs in particular. Today, companies of every size, in every industry and geography, depend on workers trained in STEM fields to succeed. But American companies are struggling with a sustained scarcity of STEM-trained workers. Companies, including amici, have consistently failed to fill STEM jobs and often face significant and persistent vacancies.

The OPT and STEM OPT programs are critical to addressing that deficit. As amici have witnessed firsthand, these programs mitigate the immediate shortfall of STEM-skilled individuals, while ameliorating that problem in the long term by educating and training the next generation of STEM workers. Eliminating these programs would cause substantial and unnecessary hardship to amici, their employees, and

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[1] No counsel for a party authored this brief in whole or in part. No party, counsel for a party, or any person other than amici and their counsel made a monetary contribution to fund the preparation or submission of the brief.

the U.S. economy. Amici urge this Court to uphold these vital programs.

ARGUMENT

I. The U.S. Economy Relies On Contributions Of Foreign Professionals To Flourish.

A. OPT and STEM OPT benefit the U.S. economy, businesses, and workers.

1. OPT and STEM OPT mitigate a growing labor scarcity.

The STEM workforce is critical to the American economy. Qualified "high-skilled professionals working in the sciences and engineering are fundamental to driving innovation, technological adoption, and productivity."[2] As more companies in more sectors incorporate cutting-edge technology into their products and services, a growing number of positions call for STEM skillsets, including many in industries outside traditional science and technology fields.[3]

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[2] FWD.us & Orrin G. Hatch Foundation, *Barriers to Recruiting and Retaining Global Talent in the U.S.* 3 (2019); *accord* Nat'l Sci. Bd., Nat'l Sci. Found., *Revisiting the STEM Workforce* 3 (2015) ("*Revisiting the STEM Workforce*").

[3] *See, e.g.*, Nat'l Acads. Sci., Eng'g, & Med., *Graduate STEM Education for the 21st Century* 30 (Leshner & Scherer eds., 2018) ("STEM graduate degrees holders are increasingly in demand in traditionally

Increasingly, STEM "knowledge and skills are critical to an extensive portion of the *entire* U.S. workforce,"[4] from national security[5] to critical infrastructure.[6]

Though STEM work is crucial to the country's economic prospects, the United States has been facing a scarcity of STEM workers for years.[7] Large numbers of job openings in critical STEM fields have persisted despite radical shifts in the broader workforce and economy; for example, when looking at job openings in computer-related positions that typically require a university degree, a January 2021 report

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non-STEM fields, such as policy, law, media and communications, nonprofits, and government.").

[4] *Revisiting the STEM Workforce*, at 3.

[5] House Armed Services Committee, Future of Defense Task Force Report 2020, at 5-6 (Sept. 2020), https://tinyurl.com/y6hdmnbm.

[6] Cybersecurity & Infrastructure Security Agency, Guidance on Essential Critical Infrastructure Workers (Aug. 18, 2020), https://tinyurl.com/2v266k3h.

[7] ACT, *STEM Education in the U.S.: Where We Are and What We Can Do* 1 (2017) ("[N]ot enough U.S. students are equipped for STEM opportunities—now or in the future."); Cameron Evans et al., *Closing the Gap: Addressing STEM Workforce Challenges*, EduCause Rev., May/June 2013, at 64, 64 ("[I]n the country today, there are simply not enough people with the high-tech skills needed to fill open positions in tech-dependent fields.").

identified 773,844 active online job postings for such jobs in December 2020.[8] And while the overall unemployment rate is 5.5% as of May 2021, unemployment numbers in STEM fields are markedly lower: Unemployment is 4.1% in life and physical science occupations, 2.8% in architecture and engineering occupations, and just 2.4% in computer and mathematical occupations.[9] These numbers are not simply a result of the pandemic; for years job postings for STEM-related roles have vastly outnumbered the qualified individuals searching for work in STEM fields,[10] leading STEM vacancies to remain unfilled for more than twice as long as non-STEM jobs.[11] This dynamic imposes severe

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[8] Nat'l Found. for Am. Policy, *Updated Analysis: Employment Data for Computer Occupations for January to November 2020* 1 (2021).

[9] *See* Bureau of Labor Statistics, *Labor Force Statistics from the Current Population Survey*, https://tinyurl.com/y37psonn (last modified June 4, 2021).

[10] Press Release, Conference Board, *Online Job Ads Decreased 157,700 in July* (Aug. 2, 2017), https://tinyurl.com/y4smkuvu (reporting that there were nearly five times as many advertisements for computer and mathematical science positions as job seekers in those fields); New Am. Econ. Research Fund, *The Cost of Removing Optional Practical Training for STEM Graduates* (Oct. 21, 2019), https://tinyurl.com/yxdyqbd5 (13 times more STEM jobs posted online than available unemployed STEM workers in the United States).

[11] *Revisiting the STEM Workforce*, *supra* n.2, at 9.

strains on industry,[12] as amici know firsthand. Both the statistics and amici's experiences demonstrate that there are many more open STEM positions in the United States than qualified STEM professionals looking for work: "There simply are not enough people with the necessary skills to meet th[e] burgeoning demand" for STEM workers.[13]

This mismatch between the supply of STEM-trained individuals and demand for their skills is largely attributable to the insufficient numbers of U.S. workers with STEM educations or training.[14] Insufficient numbers of U.S. high school graduates are prepared to

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[12] *See, e.g.*, Society for Human Resources Mgmt., *The Global Skills Shortage: Bridging the Talent Gap with Education, Training and Sourcing* 3-4 (2019) (75% of employers struggling to recruit qualified candidates reported insufficient qualified applicants in areas like data analysis, science, and engineering, and 50% identified recent worsening of the skills gap); *Border Security, Economic Opportunity, and Immigration Modernization Act: Hearing on S.744 Before the S. Comm. on the Judiciary*, 113th Cong. 16 (2013) (written testimony of Brad Smith, General Counsel and Executive Vice President of Legal and Corporate Affairs, Microsoft Corporation) ("Smith Testimony"), at 3.

[13] Smith Testimony, *supra* n.12, at 16.

[14] Evans, et al., *supra* n.7,at 64 ("By the end of the decade, the U.S. economy will annually create 120,000 new jobs requiring a bachelor's degree in computer science, yet the country's higher education system is currently producing only 51,000 such degrees per year." (footnote omitted)).

begin pursuing STEM degrees in college, with only 39% meeting college-level readiness benchmarks in math and 36% in science.[15] Worse yet, the number of students studying crucial STEM subjects like computer science in U.S. high schools is decreasing.[16] Low college-readiness numbers are matched by similarly low college graduation rates across STEM fields.[17] There are thus "too few American students … achieving the levels of education required to secure jobs in innovation-based industries."[18]

Of the relatively small population of U.S.-educated students who receive STEM degrees, particularly advanced degrees, a significant percentage are not U.S. citizens or permanent residents. Among U.S. STEM graduates, about 7% of bachelor's recipients are international students, while 53% of master's recipients and 43% of Ph.D. recipients

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[15] ACT, *The Condition of College and Career Readiness National 2019*, at 6 (2019).

[16] Smith Testimony, *supra* n.12, at 5.

[17] *See* Nat'l Ctr. for Educ. Statistics, U.S. Dep't of Educ., *STEM Attrition: College Students' Paths into and out of STEM Fields*, at iv (2013) (attrition rates of 48% among bachelor's degree students and 69% of associate's degree students initially pursuing STEM education).

[18] Smith Testimony, *supra* n.12, at 16.

are international.[19] Most dramatically, roughly 80% of full-time graduate students in electrical engineering and computer science are international.[20] This means that, without immigration programs that allow international students to remain in the United States to complete their practical education after graduation, a significant share of the total number of graduates of STEM programs in the United States would have to leave the country after graduation, without ever putting their newly enhanced skills to use in American industry.

This shortfall is projected to worsen. The number of jobs requiring STEM literacy is expected to skyrocket over the next decade.[21]

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[19] *See* Nat'l Ctr. For Educ. Statistics, U.S. Dep't of Educ., *Digest of Education Statistics 2018*, at Table 318.45 (2019); *accord*, Madeline Zavodny, Nat'l Found. for Am. Policy, *International Students, STEM OPT and the U.S. STEM Workforce* 11 (2019).

[20] Stuart Anderson, Nat'l Found. for Am. Policy, *International Students and STEM OPT* 6 (2017) ("*International Students and STEM OPT*").

[21] *See, e.g.*, Bureau of Labor Statistics, *Computer and Information Technology Occupations*, https://tinyurl.com/n2jxmwd (last modified May 14, 2021) ("Employment in computer and information technology occupations is projected to grow 11 percent from 2019 to 2029, much faster than the average for all occupations."); Smith Testimony, *supra* n.12, at 4 ("[H]igh skilled jobs in today's modern economy increasingly are requiring an education in STEM fields. These … occupations … are experiencing some of the fastest growth rates in new job openings and

At the same time, the number of STEM students in the United States is stagnating or declining.[22] Notably, because U.S.-educated STEM students are disproportionately foreign-born, growing international competition for such students has increased, diminishing the overall numbers of STEM graduates in the U.S. labor pool. Other nations are liberalizing immigration laws and increasing outreach to foreign-born students and workers, making those countries more attractive to candidates deciding where to pursue their education and initial professional opportunities.[23] For instance, Australia permits international students in certain high-need fields to work for up to four years following their graduation; Canada allows international students

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compensation, particularly in the highest demand STEM fields like computer science.").

[22] *See, e.g.*, *Maintaining U.S. Leadership in Science and Technology: Hearing Before the H. Comm. on Sci., Space & Tech.*, 116th Cong. 4 (2019) (statement of Marcia K. McNutt, President, National Academy of Sciences) (describing "continued decline in temporary visa holder enrollment in 2018 … with some of the sharpest drops in engineering and physical and earth sciences"); Julie Baer, Inst. for Int'l Educ., *Fall 2018 International Student Enrollment Hot Topics Survey* 3 (2018), https://tinyurl.com/y4t86q6m (declines in new foreign student enrollment in U.S. academic institutions of 3.3% in 2016, 6.6% in 2017, and 1.5% in 2018).

[23] *See, e.g.*, FWD.us & Orrin G. Hatch Foundation, *supra* n.2, at 10.

to work after graduation for a period of time equal to the length of their academic study and is launching a new pathway to permanent residence for 90,000 additional essential workers and international graduates in response to the COVID-19 pandemic; China allows international students with a master's degree or higher to apply for work visas within one year of graduating; and India is attempting to attract 200,000 international students through scholarships.[24]

Meanwhile, in a recent survey, 60% of foreign-born graduates of U.S. Ph.D. programs in artificial intelligence who remained in the United States reported "significant difficulties with the U.S. immigration system," and 59% of such graduates who left the country after graduation reported that immigration challenges were at least

[24] *U.S. at Risk of Losing the Benefits of Talented International Students*, NAFSA, http://tinyurl.com/yffw7v4j (last visited June 4, 2021) ("[M]any other countries are proactively establishing national policies and marketing strategies in order to attract these talented individuals."); NAFSA, *Losing Talent 2020: An Economic and Foreign Policy Risk America* Can't *Ignore* 7 (2020); Immigration, Refugees & Citizenship Canada, *New Pathway to Permanent Residency for Over 90,000 Essential Temporary Workers and International Graduates* (Apr. 14, 2021), https://tinyurl.com/yn7zdp7m.

part of the reason they left.[25] As foreign-born STEM students are increasingly drawn to other countries with more accessible educational and professional opportunities for high-skilled foreign students and workers, the number of STEM graduates in the United States will fall further. That will only increase the disparity between the number of jobs requiring STEM literacy and the number of workers qualified to fill the roles.

The OPT and STEM OPT programs help address the STEM labor scarcity by creating a recruiting opportunity and a crucial pipeline of talent to fill companies' needs across industries.[26] They provide an attractive prospect for foreign-born students who wish to gain additional, practical knowledge in their fields of study in the United States following conferral of their degrees, enhancing the United States'

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[25] Catherine Aiken et al., Ctr. for Sec. & Emerging Tech., *Immigration Pathways and Plans of AI Talent* 3, 8 (Sept. 2020).

[26] Jeremy L. Neufeld, *Optional Practical Training (OPT) and International Students After Graduation* 2 (Niskanen Center Research Paper, 2019) ("[T]he OPT program can accurately be described as the largest high-skilled worker *recruitment* program in the country.").

ability to vie for those students with competitor countries.[27] It creates opportunities for highly skilled foreign-born students to work for U.S. companies in the short term, augmenting their scholastic education with a practical one. And it enables companies to play a critical role in that continuing education, recruiting STEM workers in the short- and medium-term, and evaluating them throughout their practical training to assess whether they would make valuable long-term contributors to the company.[28]

2. OPT and STEM OPT bring international talent to American workplaces, which benefits the U.S. economy and U.S. workers.

In addition to filling critical vacancies for American jobs and continuing STEM graduates' education through apprenticeship, introducing international STEM graduates into the labor market provides myriad systemic economic benefits. Notably, participation in

[27] Business Roundtable, *The Economic Impact of Curbing the Optional Practical Training Program* 12 (2018) (describing OPT as a "key component" of the United States' strategy "to encourage international students to come to America to study and work").

[28] Zavodny, *supra* n.19, at 2, 18.

the STEM labor market is not zero sum.[29] As Microsoft's now-president put it, "we are not dealing with a choice between hiring U.S. workers and hiring foreign workers" because the "talent shortage is so acute that we need *both* to address today's workforce needs."[30]

In fact, hiring foreign-born workers actually *expands* job opportunities for U.S. workers. The economic activity spurred when a qualified candidate fills an open high-skill job creates many more jobs across the local economy, in what is known as a "multiplier effect"[31]: Filling a high-skill job in a STEM field with a foreign-born worker creates nearly two additional jobs *in that same field*, by "raising production and productivity in the firm" and "allow[ing] the firm to expand and hire more workers to handle new tasks related to the

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[29] Giovanni Peri, Kevin Shih & Chad Sparber, *Foreign and Native Skilled Workers: What Can We Learn From H-1B Lotteries?* 28 (NBER Working Paper No. 21175, 2015) (during declines in H-1B visas, "the employment [opportunities] and wages of natives in similar occupations was at best unchanged and at worst harmed," because "H-1B workers complement native computer workers and/or increase the productivity of the firm").

[30] Smith Testimony, *supra* n.12, at 14.

[31] *Id.* at 3; *see also, e.g.*, *id.* at 9 ("[F]or every job created in the high tech sector, an additional 4.3 jobs emerge over time in the local economy.").

increased productivity."[32] In other words, "immigrants help native-born workers by increasing the size of the economic pie, rather than simply competing for a slice."[33]

The increase in productivity driven by foreign-born workers, in turn, drives up wages throughout the relevant market, particularly among college-educated U.S. workers: A "1 percentage point increase in the foreign STEM share of a city's total employment increased the wage growth of native college-educated labor by about 7-8 percentage points and the wage growth of non-college-educated natives by 3-4 percentage points."[34] Foreign-born STEM workers "spur economic growth by increasing productivity, especially that of college-educated workers."[35]

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[32] David Bier, Niskanen Center, *H-1Bs Don't Replace U.S. Workers* 1, 4, 8 (2015) ("[T]he entrance of a single foreign-born worker into … engineering and computer-related fields … is associated with an increase of nearly two new jobs overall in those industries."); Giovanni Peri et al., P'ship for a New Am. Econ., *Closing Economic Windows: How H-1B Visa Denials Cost U.S.-Born Tech Workers Jobs and Wages During the Great Economic Recession* 5-6 (2014).

[33] Business Roundtable, *supra* n.27, at 4.

[34] Giovanni Peri, Kevin Shih & Chad Sparber, *STEM Workers, H-1B Visas, and Productivity in U.S. Cities*, 33 J. of Labor Econ. S225, S252 (2015).

[35] *Id.*

Across the economy, "a 1 percent increase in the population of immigrants in the United States is associated with a 1.15 percent gain in GDP."[36]

Moreover, foreign-born STEM workers disproportionately "are essential leaders of and contributors to the innovation and entrepreneurial activity of our nation."[37] Although immigrants constitute only 15% of the workforce,[38] 55% of $1 billion startup companies in America had at least one immigrant cofounder; of those startups, nearly one quarter were founded by immigrants who first came to the United States on an F-1 student visa; and immigrants started 33% of U.S. venture-backed companies that became publicly

[36] Business Roundtable, *supra* n.27, at 3; *see also* Diana Furchtgott-Roth, Manhattan Institute, *Does Immigration Increase Economic Growth*? 10 (2014).

[37] Smith Testimony, *supra* n.12, at 10.

[38] Business Roundtable, *supra* n.27, at 4.

traded between 2006 and 2012.[39] Immigrants are twice as likely as U.S. workers to become entrepreneurs.[40]

Early studies of the STEM OPT extension indicate that it offers the same benefits as high-skilled immigration generally.[41] Unemployment rates are lower in areas with larger numbers of STEM OPT participants as a share of workers in STEM positions.[42] Studies have documented that greater numbers of OPT participants correlate to "large[] positive effects on earnings for college-educated residents."[43] OPT participants have "statistically significant positive effects" on the number of patents filed: Every ten additional OPT participants in an area "leads to about five additional patents" through "direct innovation by OPT participants and indirect spillover effects caused by a larger

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[39] *Id.* at 11; Stuart Anderson, Nat'l Fed. for Am. Policy, *Immigrants and Billion-Dollar Companies* 1-2 (2018).

[40] Robert Fairlie, Sameeksha Desai & A.J. Hermann, Ewing Marion Kauffman Foundation, *2017 National Report on Early-Stage Entrepreneurship* 10 (2019); Business Roundtable, *supra* n.27, at 11.

[41] Neufeld, *supra* n.26, at 2-3; *id.* at 6.

[42] Zavodny, *supra* n.19, at 17.

[43] Neufeld, *supra* n.26, at 5. The effect on average earnings for all native workers is also positive, though not statistically significant (unlike the effect on average earnings for college-educated natives). *Id.*

supply of highly educated workers."[44] And, overall, the vast majority of employers of OPT participants report that those participants "contribute to the overall success of the organization, creating new job opportunities for U.S. and foreign national employees alike" and "work[ing] in conjunction with U.S. workers in a way that promotes career development for everyone involved."[45]

Amici's experiences illustrate the real-world benefits of OPT and STEM OPT. At Intel, for instance, a STEM OPT participant independently developed a sensor for detecting counterfeit microchips—a component with urgent significance for national security. Counterfeit chips—which can suffer from inconsistent performance, material, and characteristics—have been found in mission-critical military equipment, including U.S. Missile Defense Agency mission computers, ship-based aviation antenna equipment, and helicopter night-vision systems. The discovery of these counterfeit chips was so concerning that it led the Senate Armed Services Committee to investigate

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[44] *Id.*; *see* Business Roundtable, *supra* n.27, at 4, 11.

[45] Council for Glob. Immigration & Soc'y for Human Res. Mgmt., Comments Regarding STEM OPT Proposed Rule/DHS Docket No. ICEB-2015-0002, at 2 (Nov. 18, 2015), https://tinyurl.com/3nbuwy6t.

counterfeit parts in the Department of Defense supply chain. The sensor developed by the Intel STEM OPT participant can detect these dangerous counterfeits with significantly higher precision, repeatability, and performance than conventional instruments.

B. Eliminating OPT and STEM OPT would hurt U.S. workers.

WashTech and the other opponents of the Final Rule do not dispute that terminating the OPT and STEM OPT programs would mean removing participants from their current jobs, which in turn would harm both the participants and their employers who would then have to scramble to find replacements for those qualified workers—to say nothing of the hardship to the participants from likely having to leave the country. WashTech and its supporters also do not dispute that OPT and STEM OPT provide all the economic upside discussed above.

Instead, they discount those benefits as supposedly coming at the expense of the U.S. worker. In particular, WashTech and its supporters argue that OPT and STEM OPT create an incentive to hire foreign STEM graduates over U.S. citizens and thus exacerbate an *oversupply* of STEM workers in the American economy. WashTech claims,

therefore, that eliminating these programs will result in more jobs and higher pay for Americans. But the factual assertions underlying that argument rest on shoddy statistics and a misunderstanding of the American labor market. And, as the amici here can attest, they run directly contrary to the on-the-ground reality of American industry.

1. OPT and STEM OPT create jobs for U.S. workers.

As described above (at 12-13), by providing needed employees for critical technical positions that would otherwise go unfilled, OPT and STEM OPT create ancillary jobs for U.S. workers. The converse is true as well: Eliminating OPT and STEM OPT would *cost* jobs now filled by U.S. workers. That is because striking down OPT and STEM OPT would create a sudden labor shortage in the United States for many companies' most important technical jobs. To mitigate that crisis, companies will be forced to shift those entire operations—not just the unfilled STEM jobs, but also the other supporting jobs—to other countries with more robust STEM labor forces (indeed, countries who will now be receiving an influx of would-be OPT and STEM OPT participants).

a. Without OPT and STEM OPT, employers—whose demand for high skilled jobs outstrips the supply of U.S. employees—would suddenly find fewer STEM-educated persons available to fill those roles. For many employers, that deficit would be significant. One amicus, for instance, noted that because so few U.S. workers have graduate degrees in computer science, about 45% of its new software engineers are filled by OPT or STEM OPT participants. A decline in STEM-educated workers in the United States would thus create strong pressure for companies to shift STEM jobs to other countries that either have a large preexisting pool of STEM workers (like India and China) or are making deliberate efforts to attract foreign STEM students (like Canada and Australia). Indeed, another amicus confirmed that if the district court had ordered a halt to OPT and STEM OPT, it would have relocated its operations to Toronto.

That sentiment is consistent with the experiences of not just these amici, but with American companies more broadly. Recent interviews with employers "revealed that ending STEM OPT" would wreak significant harm on American companies, who would suddenly lose highly skilled employees in key technical positions, while also hurting

U.S. workers by potentially "caus[ing] U.S. tech companies to change recruiting practices," by "recruit[ing], hir[ing] and plac[ing] international students *outside* the United States."[46] Companies are already increasing their hiring abroad in response to immigration restrictions on high-skill professionals, with the "strongest" effect among "R&D-intensive firms."[47] Ending OPT and STEM OPT would only accelerate that trend.

Potential impacts would not be limited to STEM positions. If a software development office, for instance, is moved overseas, not only are the engineering positions sent abroad, but the nontechnical support roles (e.g., secretaries, janitors, and kitchen staff) are too, to say nothing of neighboring businesses that support that office and its employees. That effect is, in part, what led a Business Roundtable study to find that a 60% reduction in the OPT program would cost U.S. workers 255,000 jobs (and foreign workers 188,000 jobs) by 2028.[48] The impact

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[46] *International Students and STEM OPT*, *supra* n.20, at 6.

[47] Britta Glennon, *How Do Restrictions on High-Skilled Immigration Affect Offshoring?* 26 (Carnegie Mellon Working Paper, May 2019), https://tinyurl.com/y2brtgfy.

[48] Business Roundtable, *supra* n.27, at 8.

of those job losses would ripple through the entire U.S. economy, causing the unemployment rate to rise 0.15 percentage points and average real hourly wages to fall by 17 cents over the same time period.[49]

b. The only piece of that logic that WashTech disputes is that OPT and STEM OPT fill otherwise unfillable jobs. It claims, to the contrary, that the programs shut U.S. workers out of the labor market. That argument rests on the assertion that there is not a scarcity of STEM workers in the American economy, but a *surplus*—one which OPT and STEM OPT exacerbate to the detriment of U.S. workers. *See* 81 Fed. Reg. 13,040, 13,052-53 (Mar. 11, 2016). As an initial matter, however, the claim of an oversupply of available STEM workers in the United States is contrary to the experience of the amici here, *see also supra* § I.A.1. Moreover, the sole study cited in support of the claimed STEM-worker surplus in fact shows no such thing.

[49] *Id.* at 10; *see also* New Am. Econ. Research Fund, *supra* n.8 (finding that "the direct costs—the immediate loss of wages and the cost to rehire employees"—of eliminating the STEM OPT extension "would total more than $130 million" in "just one year" (emphasis omitted)).

The assertion that the U.S. economy faces an oversupply of STEM workers is based on a Census study purporting to show that a high percentage of U.S. STEM graduates are not employed in a STEM field. But that study employs an idiosyncratic definition of "STEM" that reflects neither the ordinary understanding of that term nor (more to the point here) the definition used by DHS in implementing the STEM OPT program. In particular, the Census study is overbroad in classifying which college majors qualify as STEM, but overly narrow when making that same determination about professions. The study significantly overcounts the true number of STEM graduates by including, for instance, anyone with a degree in "social science"[50] (despite the fact that DHS, understandably, excludes social science from its definition of "STEM"[51])—thus artificially increasing the denominator. The study then makes the error worse by artificially *decreasing* the numerator by undercounting the true number of STEM professionals. It excludes from its definition of STEM professionals the

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[50] *Id.*

[51] *See* Dep't of Homeland Sec., *STEM Designated Degree Program List Effective May 10, 2016* (2016), https://tinyurl.com/jrnbu7u.

millions of STEM graduates employed as doctors, STEM professors, IP lawyers, and C-suite executives—positions that routinely require facility with science, technology, engineering, or mathematics, and more to the point, positions that hardly reflect that U.S. STEM graduates are suffering from unemployment or underemployment because of foreign competition.[52]

Beyond the skewed statistics, WashTech misunderstands why STEM graduates who work outside their field of study do so. WashTech assumes that those STEM graduates must have been forced out of STEM fields by an excess of workers—such that a reduction in the number of OPT and STEM OPT participants would bring those U.S. STEM graduates back into the fold. But that assumption is contradicted by the data and by the experience of amici. A study by the National Science Foundation revealed that the rate of individuals with STEM degrees working out of their field *involuntarily* (i.e., the number forced out) was quite low: only 4% for those whose highest degree was in

[52] Liana Christin Landivar, U.S. Census Bureau, *The Relationship Between Science and Engineering Education and Employment in STEM Occupations* 11 (2013), https://tinyurl.com/r2qz346.

computer and mathematical sciences, and 3.2% for those whose highest degree was in engineering.[53] That makes sense: The "non-STEM" jobs that STEM majors are most commonly pursuing—prestigious (and generally lucrative) careers in medicine, law, business, and academia—are hardly the type one settles for out of desperation because of difficulty in finding gainful STEM employment.

There is thus support for the assertion that there is a glut of STEM workers in the U.S. economy, or that OPT and STEM OPT are making such an oversupply worse. In fact, a recent study that sought to measure the negative impact of OPT on the U.S. employees in the labor market found that of all the effects measured, including labor force participation rate, employment rate, and unemployment rate, none "is statistically different from zero, suggesting that OPT participants do not have adverse effects on aggregate labor market outcomes" for domestic professionals.[54] Another study similarly found that an increase in "the number of international undergraduate students has no

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[53] Nat'l Sci. Bd., Nat'l Sci. Found., *Science & Engineering Indicators 2018: Science & Engineering Labor Market Conditions* tbl.3-12 (2018), https://tinyurl.com/y6ayvfy5.

[54] Neufeld, *supra* n.26, at 6.

impact on the number of U.S. students enrolled at or receiving bachelor's degrees from U.S. schools."[55] WashTech's crusade to extinguish the OPT and STEM OPT programs thus cannot be justified on grounds of protecting the U.S. worker—who stands to gain little, and lose much, from the termination of the OPT and STEM OPT programs.

2. There is no incentive to hire STEM OPT students over American STEM workers.

WashTech's worry that employers will preference STEM OPT participants over U.S. workers is already obviated by federal law. Every employer that participates in STEM OPT must certify under penalty of perjury that the STEM OPT student "will not replace a full- or part-time, temporary or permanent U.S. worker." 8 C.F.R. § 214.2(f)(10)(ii)(C)(10)(ii); *see* U.S. Immigration & Customs Enforcement, Form I-983 (2019), https://tinyurl.com/y6k4x9se.

Nevertheless, WashTech claims that the protection of federal law is insufficient because STEM OPT participants are supposedly "inherently cheaper to employ" than similarly situated U.S. workers.

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[55] Madeline Zavodny, Nat'l Found. for Am. Policy, *The Impact on U.S. Men and Woman in STEM Fields of Increases in International Students* 19 (2021).

Compl. ¶ 221. That too is addressed by the Final Rule, which requires that "[t]he terms and conditions of a STEM practical training opportunity … including duties, hours, and compensation, must be commensurate with terms and conditions applicable to the employer's similarly situated U.S. workers." 8 C.F.R. § 214.2(f)(10)(ii)(C)(8).

Because the wages, hours, and benefits of STEM OPT participants are not cheaper than those of analogous U.S. workers, WashTech must base its argument solely on a purported second-order tax effect of STEM OPT participants' status as F-1 student visa holders. Foreign students cannot collect Social Security or Medicare, so they are exempt from taxes under the Federal Insurance Contributions Act (FICA), 26 U.S.C. § 3101 *et seq.*—the 6.2% Social Security and 1.45% Medicare payroll taxes—for their first five calendar years in the country. 26 U.S.C. § 3121(b)(19); *see* 26 C.F.R. § 31.3121(b)(19)–1; *id.* § 301.7701(b)–3(b)(4), (7)(iii). According to WashTech, this tax savings motivates employers to disregard federal law and hire STEM OPT participants over U.S. workers.

WashTech's argument, however, vastly overstates the financial impact of this minor tax exemption. For one thing, the time-limited

nature of the tax exemption means that for many F-1 students it will result in virtually no tax savings during their OPT and STEM OPT extensions. The FICA exemption applies only during the first five calendar years in which an F-1 visa holder is in the country—which is largely (if not completely) while they are in school and thus before they begin work. The average Ph.D. program, for instance, takes 5.8 years to complete.[56] Even for an F-1 student who completes a standard four-year undergraduate program, the employer would see virtually no tax savings, because the four academic years spent pursuing that degree will span most of the five *calendar* years in which the student is FICA exempt.

Meanwhile, any employer can tell you that hiring OPT and STEM OPT students often results in *more* costs for employers because of regulatory burdens associated with the program, and those costs generally offset any minimal payroll tax savings from the FICA exemption. As DHS noted in promulgating the Final Rule, employers

[56] Nat'l Ctr. for Sci. & Eng'g Statistics, Nat'l Sci. Found., *Science & Engineering Doctorates: Data Tables* tbl.31 (2018), https://tinyurl.com/yxssbcxm.

who wish to hire F-1 visa holders face additional "administrative costs, legal fees, and staff time related to securing the authority under U.S. immigration law to employ the foreign-born worker." 81 Fed. Reg. at 13,058. Moreover, the Final Rule itself imposed additional requirements on employers seeking to participate in the program, including compliance with enhanced integrity procedures, participation in E-Verify, and accession to DHS site visits.

In any event, the notion that employers would make employment decisions based on this (minor) tax benefit presupposes that the employer even knows about the employee's precise immigration status and that this FICA exemption exists—assumptions that experience does not bear out. Many amici report, for example, that their recruiting team and manager typically avoid asking a about a candidate's immigration status during the recruiting process. Likewise, the recruiting team is often unaware of any FICA taxation rules for OPT and STEM OPT workers—indeed, one amicus reported that until this case, *no one* at the company was aware of this exception—so they have no incentive to treat those applicants differently.

WashTech's argument thus boils down to the supposition that, for the possibility of a modest-to-nonexistent financial benefit (which in many cases actually nets negative), employers might be willing to violate the immigration laws, perjure themselves, and risk not only expulsion from the STEM OPT program, but also significant fines. *See* 18 U.S.C. §§ 1621, 3571(c)(3). Unsurprisingly, that is inconsistent with the on-the-ground reality. As one recent survey of employers reported: "In practice, company human resources executives say that the demand for tech and science talent is so great that when they find both a qualified U.S. applicant and another that is a foreign national they would offer jobs to *both* individuals."[57] And if there is any remaining doubt, amici here state clearly now: The possibility that a job candidate might have FICA-exempt status simply does not impact employers' hiring decisions, let alone lead them to prefer foreign workers over U.S. ones.

[57] *International Students and STEM OPT*, *supra* n.20, at 9 (emphasis added).

II. OPT And STEM OPT Serve An Important Role In STEM Education Through Practical Training Opportunities

The OPT and STEM OPT programs play a critical role not just in meeting the United States' current need for STEM workers, but also in ensuring that need will be met in the future. Those programs push forward cutting-edge research for future generations of STEM students and provide crucial opportunities to crystalize classroom learning through hands-on experience.

A recent poll of employers found that "93% view th[e STEM OPT] experience as vital to preparing students for the U.S. workforce."[58] That finding is unsurprising: There is widespread agreement that practical work experience plays an important role across all disciplines in higher education. A broad diversity of fields, from social work to engineering, have recognized that "[i]t is imperative that students in professional programs be able to put into practice what they have learned in the classroom."[59] Exposing students to real-world work

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[58] Council for Glob. Immigration & Soc'y for Human Res. Mgmt., *supra* n.45, at 2.

[59] Jan Wrenn & Bruce Wrenn, *Enhancing Learning by Integrating Theory and Practice*, 21 Int'l J. of Teaching & Learning in Higher Educ. 258, 258 (2009), https://tinyurl.com/y6gtqz6k.

experience can help them "make th[e] transition from theory to practice with confidence and effectiveness" by supplementing their theoretical coursework with practical learning.[60]

The benefits of practical training, however, go far beyond just creating more effective workers for industry. Even from a purely academic perspective, hands-on work has tangible benefits. In addition to "enhanc[ing] … work readiness," the combination of practical experience and classroom theory has been shown to increase students' "self-efficiency" and "reflexive capabilities."[61] For that reason, higher-education "[i]nstitutions are placing increased emphasis on facilitating the integration of theory and practical work experience" through "work placements, internships, and practicum."[62]

The benefits of such practical experience abound and are especially pronounced in the STEM fields. Research from the University of Chicago has demonstrated that "[s]tudents who physically

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[60] *Id.*

[61] Ly Thi Tran & Sri Soejatminah, *Integration of Work Experience and Learning for International Students: From Harmony to Inequality*, 21 J. of Studies in Int'l Educ. 261, 262 (2017), https://tinyurl.com/y2ebk8c2.

[62] *Id.*

experience scientific concepts understand them more deeply and score better on science tests."[63] Additionally, "[d]ata show[] that through hands-on instruction[], students in the STEM study environment achieved and acquired new vocabulary and mathematical concepts and understandings.[64] And a report prepared for the National Academy of Sciences concluded that "[p]ractical work" helps to "develop[] students' scientific knowledge" and is thus "an essential component of science teaching and learning."[65]

Practical work experience also helps ensure that STEM students are learning about the latest developments in their fields. As a study by the National University Continuing Education Association found, "Over half the technical knowledge or skill of engineers becomes obsolete in two to seven years."[66] That means that professors'

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[63] Jann Ingmire, *Learning by Doing Helps Students Perform Better in Science*, UChicago News (Apr. 29, 2015), https://tinyurl.com/y4ka6t5r.

[64] John Kyere, *Effectiveness of Hands-on Pedagogy in STEM Education* 41 (2016), https://tinyurl.com/v8yfbb9.

[65] Robin Millar, *The Role of Practical Work in the Teaching and Learning of Science* 20 (2004), https://tinyurl.com/y38vwgxr.

[66] Ahad S. Nasab & James H. Lorenz, *Merits of Faculty Internship in Industry—A Valuable Experience*, Proceedings of the 2003 Am. Soc. For

knowledge can soon become outdated, and so, without some mechanism for continually updating it, the information they pass on to their students will quickly fail to reflect the cutting edge. "Connections to industry" can address that problem, by keeping faculty members up to date on the latest developments.[67]

Experiential learning for STEM college students, especially at the graduate level, has likewise become a key aspect of higher education in the United States, providing an avenue for completing and updating classroom learning with hands-on industry experiences that serve to achieve the students' educational goals. For F-1 nonimmigrants, the only way to access such experiential learning is through OPT and a STEM OPT extension. For instance, an OPT participant at one amicus improved his technical execution designing and building large-scale software systems by creating a testing platform that processed a large amount of data.

Eng'g Educ. Annual Conference & Exposition 8.849.1, 8.849.1-.2 (2003), https://tinyurl.com/y5mbcr53 (citing Ernest T. Smerdon, *It Takes A Lifetime*, ASEE Prism, Dec. 1996, at 56).

[67] Colin Gasper & John Lipinski, *Industry Experience: Enhancing a Professor's Ability to Effectively Teach in Higher Education*, 5 J. of Educ. & Hum. Development 63, 64 (2016).

Additionally, hands-on STEM experience in general—and the STEM OPT program in particular—can play a significant role in advancing the cutting edge of academic research. Of the top 200 employers of STEM OPT participants, 65 are major research universities, including MIT, Stanford, Harvard, Columbia, Berkeley, and Caltech.[68] That means that every year, thousands of F-1 visa holders take advantage of the STEM OPT program to spend extra time continuing the research that they began during their graduate studies—either their own research or that of a professor for whom they work as a research assistant or post-doc. Other students use their STEM OPT extensions to conduct research at prominent government research laboratories, including Lawrence Berkeley National Laboratory, Argonne National Laboratory, and Los Alamos National Laboratory—all among the top 200 STEM OPT employers as well.[69]

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[68] *See* U.S. Immigration & Customs Enforcement, *2017 Top 200 Employers for Science, Technology, Engineering and Mathematics (STEM) Optional Practical Training (OPT) Students*, https://tinyurl.com/y4dbbmc8 (last updated Sept. 12, 2019).

[69] *Id.*

The STEM OPT program thus provides a critical assist to classroom learning in training the next generations of STEM workers. It leads STEM students to cement the concepts they learned in their academic programs. It helps them make an eventual transition from academia to industry.

CONCLUSION

This Court should affirm.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the D.C. Circuit by using the appellate CM/ECF system on June 18, 2021.

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CERTIFICATE OF COMPLIANCE

The brief complies with the type-volume limitation of Fed. R. App. P. 29(a)(5) and D.C. Cir. R. 32(e)(3) because this brief contains 6,497 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(f).

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