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6 INCLUSION IN TECH: HOW DIVERSITY

7 BENEFITS ALL AMERICANS

8 WEDNESDAY, MARCH 6, 2019

9 House of Representatives,

10 Subcommittee on Consumer Protection and

11 Commerce,

12 Committee on Energy and Commerce,

13 Washington, D.C.

14

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16

17 The subcommittee met, pursuant to call, at 10:30 a.m.,

18 in Room 2123, Rayburn House Office Building, Hon. Janice

19 Schakowsky [chairwoman of the subcommittee] presiding.

20 Members present: Representatives Schakowsky, Castor,

21 Veasey, Kelly, O'Halleran, Lujan, Cardenas, Blunt Rochester,

22 Soto, Rush, Matsui, McNerney, Dingell, Pallone (ex officio),

23 Rodgers, Latta, Guthrie, Bucshon, Hudson, Carter, and

24 Gianforte.

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1           Also present: Representatives Butterfield and Clarke.

2           Staff present: Jeff Carroll, Staff Director; Evan

3           Gilbert, Press Assistant; Lisa Goldman, Counsel; Waverly

4           Gordon, Deputy Chief Counsel; Alex Hoehn-Saric, Chief

5           Counsel, C&T; Meghan Mullon, Staff Assistant; Joe Orlando,

6           Staff Assistant; Tim Robinson, Chief Counsel; Chloe

7           Rodriguez, Policy Analyst; Melissa Froelich, Minority Chief

8           Counsel, CPAC; Peter Kielty, Minority General Counsel; Bijan

9           Koochmaraie, Minority Counsel, CPAC; Brannon Rains, Minority

10          Staff Assistant; and Nate Wilkins, Minority Fellow.

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1 Ms. Schakowsky. [presiding] The Subcommittee on  
2 Consumer Protection and Commerce will now come to order.

3 I am going to say good morning, and thank you all for  
4 joining us today.

5 And I will recognize myself first for 5 minutes with an  
6 opening statement.

7 Once again, good morning to everybody. Thank you to our  
8 witnesses.

9 Today, we are meeting to discuss an important issue, the  
10 lack of diversity in the tech workforce. As the presence of  
11 technology continues to play a larger and larger role in all  
12 of our lives, industry's workforce has remained largely  
13 homogeneous. People of color, women, and older Americans  
14 have all been notably absent from the tech workforce, and the  
15 corresponding problem that that creates has been that the  
16 technology itself reflects that lack of diversity. And I  
17 want to hear about that today.

18 This has real impact on Americans. We have seen  
19 algorithms biased against sentencing guidelines, resulting in  
20 harsher sentences for minorities. We have seen that  
21 automatic soap dispensers sometimes fail to recognize the  
22 hands of African-Americans and Latinos -- imagine that -- who  
23 are seeking to use the product to wash their hands. These  
24 may seem like two opposite sides of the spectrum as far as

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1 harm, but they both clearly demonstrate that something is  
2 amiss.

3 Simply put, diverse voices are lacking in the tech  
4 workforce. Moreover, diverse startups are facing difficulty  
5 competing with the large multinational technology companies.

6 It strikes me that unfair business practices and extreme  
7 market concentration in tech may, in fact, perpetuate the  
8 bias and the old boys' club, or actually the young boys'  
9 club, that we are examining today. This lack of diversity in  
10 the workforce has real-life impact on consumers, and I thank  
11 our panel for coming here to discuss this very important  
12 issue.

13 With that, I want to yield 1 minute to the vice chair of  
14 this committee from California, Mr. Cardenas, for 1 minute.

15 Mr. Cardenas. Thank you very much, Madam Chairwoman.

16 It is no secret that the tech industry has a diversity  
17 problem, and every day we are seeing more and more unintended  
18 consequences when companies lack a diverse body of employees.

19 We are seeing fitness trackers, for example, that have  
20 problems with dark skin. They just don't operate properly.  
21 Virtual assistants like Alexa having a hard time recognizing  
22 accents.

23 Something that is no secret is that we still have  
24 something that is news to some people: diversity is actually

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1 good for business. The Hispanic community in America has a  
2 buying power annually of upwards of \$1.5 trillion. Hispanics  
3 make the fastest-growing number over number of growing  
4 Americans in this country. Also, it is a younger population,  
5 and Hispanics happen to have a high brand loyalty. So, it is  
6 good for business to have diversity, especially when it comes  
7 to Hispanics.

8 Reports show that companies with more diversity amongst  
9 senior executives were 33 percent more likely to see an  
10 increase in their bottom line. When you have diverse  
11 backgrounds and experiences among your employees, you spur  
12 innovation; you avoid creating bias into your products; you  
13 avoid turning your back on a whole group of Americans.

14 So, how do we solve this problem? I will say this: for  
15 example, a sharp Princeton-educated computer engineer  
16 recently told me she heard her coworker say that women and  
17 people of color dilute the talent pool for tech companies. I  
18 take that very personal. I am an electrical engineer myself.

19 We have a problem in our culture in the tech industry  
20 that diversity is not only not prioritized, it seen as a  
21 hindrance, which nothing could be further from the truth.

22 I would like to say much more, but, again, thank you,  
23 Madam Chairwoman, and I yield back the balance of my time.

24 Ms. Schakowsky. And I yield now the balance of my time

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1 to Congresswoman Kelly.

2 Ms. Kelly. Thank you, Madam Chair.

3 Thank you, Chairwoman Schakowsky and Ranking Member  
4 Rodgers, for holding this hearing today.

5 As a founder of the Tech Accountability Caucus and  
6 founder of the Diversifying Tech Caucus with my colleague on  
7 the other side of the aisle, Cathy McMorris Rodgers, I am  
8 glad that this subcommittee is committed to addressing the  
9 issue of diversity in tech.

10 Report after report from technology companies continue  
11 to show a lack of diversity in their workforces. According  
12 to the National Urban League, less than 5 percent of the  
13 digital workforce is African-American today. It is not just  
14 the large tech companies in Silicon Valley. Organizations  
15 like Mentoring Youth Through Technology, or MYTT, in my  
16 district help get minority students interested in STEM  
17 careers, but I continue to hear from startups in Chicago that  
18 they struggle to recruit diverse workforces. This is a  
19 fundamental problem, getting women and minorities into the  
20 technology jobs, and it must be corrected.

21 A lack of diversity creates real-world problems of  
22 producing programs that can harm underserved communities.  
23 Poorly-trained artificial intelligence tools can lead to  
24 implicit racial, gender, or ideological biases and can

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1 perpetuate existing biases. As AI use becomes more common  
2 and decisions are made by machines, we may not understand it  
3 is vital that these considerations are taken into account.

4 I am hopeful that companies are going to see the  
5 benefits of having a diverse workforce that brings new ideas  
6 and perspectives. While there is no one solution to this  
7 problem, I hope that the witnesses today -- and I am happy to  
8 see a former colleague, Dr. Turner-Lee -- will share their  
9 experiences and make recommendations, so we can continue to  
10 make tech a more diverse and inclusive community.

11 Thank you, Madam Chair.

12 Ms. Schakowsky. Thank you. Thank you.

13 And now, it is my pleasure to recognize for 5 minutes  
14 our ranking member, Ms. McMorris Rodgers.

15 Mrs. Rodgers. Thank you. Thank you, Madam Chair, and I  
16 appreciate your organizing this panel today, and appreciate  
17 the additional voices at the table.

18 As my colleague Congresswoman Kelly just said, we  
19 organized the Diversifying Tech Caucus in 2015. It was aimed  
20 at highlighting some of these issues that we are going to  
21 hear more about today, getting more women, people with  
22 disabilities, minorities, veterans, into the tech sector.

23 At a time when we are celebrating a booming economy  
24 because of our work on tax reform and to lift the regulatory

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1       burden, our economy has more jobs today. We have record low  
2       unemployment, record participation with African-Americans,  
3       Hispanics, people with disabilities, people coming off the  
4       sidelines. It means that there is more opportunities for  
5       people to find better-paying jobs and have an opportunity for  
6       a better life.

7               Today's hearing focuses, I believe, on an important  
8       aspect of encouraging those opportunities for all. And it is  
9       the focus on recruitment. We need to be doing more to  
10      recruit into the tech field, but also, once we recruit, to  
11      retain and promote these individuals into positions of  
12      leadership.

13             The creation of one high-tech job is projected to create  
14      4.3 other jobs in the local economy. I often say the job is  
15      the opportunity. It is vital that these opportunities are  
16      available to people from all walks of life. A vibrant and  
17      dynamic workplace with women, people of color, people with  
18      disabilities, reflects the promise of America, where, no  
19      matter who you are, you can achieve your version of the  
20      American dream.

21             Oftentimes, it might look different than your own. I am  
22      excited personally for the opportunities for those with  
23      disabilities to work because more are offering the  
24      accommodations and the job coaches. Employing people with

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1 disabilities fosters innovation and it creates a stronger  
2 workplace culture.

3 Many tech companies are leading in hiring those with  
4 autism. And because of their unique abilities for the  
5 attention to detail and the abilities to detect patterns,  
6 taking a software testing company like ULTRA Testing, the  
7 founder's wife one day told him, quote, ``We spend all this  
8 time focused on things these children may never be good at,  
9 but we spend no time nurturing the skills they already have a  
10 talent for. Isn't that a shame?" And he agreed, and he got  
11 to work hiring people with autism to leverage their  
12 strengths. And now, ULTRA Testing is outperforming bigger  
13 companies in software quality assurance.

14 This month we are also celebrating Women's History  
15 Month, and it is a time to celebrate women who are leading  
16 across the board. Our goal today is to see more women in  
17 tech leading, being those disruptors, inspiring our next  
18 generation of transformational women leaders.

19 Again, it may look different. Women have different  
20 leadership styles. And research is showing that we have  
21 greater understanding for teams and systems. We foster a  
22 healthy workplace culture. When women are not at the table,  
23 our perspectives and voices aren't represented. A study by  
24 McKinsey shows that companies with women in executive

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1 positions outperform the average profitability of their  
2 industries by 21 percent. Tech companies that don't open the  
3 door for women to shine and be decisionmakers risk being left  
4 behind. So, yes, we need to do more to open the door to  
5 allow these women to shine and do more to retain and promote  
6 these women.

7 America has led the world in innovation. We celebrate  
8 that every single day. Entrepreneurs from all walks of life  
9 are taking an idea, making it a reality, creating more  
10 opportunities for hardworking people across the country.  
11 Again, that is the promise of America. It is not the promise  
12 for just some people or the somebodies in Silicon Valley. It  
13 is a promise for everyone. When we celebrate every person's  
14 strengths and abilities and embrace what every person has to  
15 offer, we are living up to that promise.

16 I recognize there has been tremendous efforts, like  
17 recruiting more girls into STEM, and hiring people with  
18 disabilities, like ULTRA Testing that I mentioned. We need  
19 to continue to do more to address the pipeline, whether it is  
20 young people of every background, in girls in elementary and  
21 middle school, and exceptional people with disabilities, but  
22 we also need to focus on how we retain those individuals once  
23 they are recruited, and do more to encourage their promotion  
24 to leadership positions. So, today I look forward to hearing

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1 how the tech industry is leading on this and where you can  
2 also do better.

3 Thank you all for being here.

4 Ms. Schakowsky. The gentlewoman yields back. And now,  
5 the chair recognizes Mr. Pallone, chairman of the full  
6 committee, for 5 minutes for his opening statement.

7 The Chairman. Thank you, Madam Chair.

8 As this subcommittee knows well, the influence of the  
9 internet and technology in our lives has grown exponentially  
10 over the past two decades, and our daily lives as consumers  
11 and workers have become dependent on technology. But while  
12 the U.S. has become more and more diverse, the workforce of  
13 the technology sector has not kept up. And we are seeing the  
14 effects of that in the products and services we use, like the  
15 wearable fitness trackers that don't work for people with  
16 dark skin, online job advertisements targeted at men over  
17 women, and websites with buttons and links too small for  
18 people with motor impairments to use.

19 Without inclusive workforces, too often product design  
20 leaves people out, and the result can be embarrassing for the  
21 company when discovered and harmful for society when a  
22 discriminatory result is not identified and fixed. These are  
23 complicated and often uncomfortable discussions, but they are  
24 necessary to start to make changes.

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1           The Congressional Black Caucus launched its Tech 2020  
2 Initiative in 2015 and has been working to hold companies  
3 accountable since. And several members of this committee  
4 have been working on these issues for years.

5           I would like to yield time to some of them today. So, I  
6 will start beginning with Mr. Lujan. I would yield 1 minute  
7 to him.

8           Mr. Lujan. Thank you very much, Mr. Chairman. And I  
9 thank our chair and our ranking member for this important  
10 hearing.

11           When it comes to diversity in tech, let me be clear,  
12 more is needed. The tech industry is not where it needs to  
13 be on this issue. Representation of women and people of  
14 color in tech companies lags the rest of corporate America,  
15 and this matters.

16           As Dr. Lee notes in her testimony, the absence of  
17 diversity among the people that make the decisions around  
18 products and services for the tech sector and the markets  
19 that these companies serve hurts us all. This lack of  
20 diversity informs the algorithms that determine whether  
21 people get a loan or a job, impacts how much people pay for  
22 everyday products and services. Investigations and studies  
23 have shown that these algorithms often have biased results  
24 and discriminatory outcomes.

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1           It is one reason why I am reintroducing the Accountable  
2           Capitalism Act with the inclusion of diversity language, to  
3           push corporations to make more socially-responsible  
4           decisions. Action and accountability are a must.

5           And I yield back.

6           The Chairman. And, Madam Chair, I would now like to  
7           yield a minute to Mr. Butterfield.

8           Mr. Butterfield. Thank you, Chairman Pallone. Thank  
9           you, Chairwoman Schakowsky.

10           For too long, the promise of the internet age for  
11           communities of color has been left unfulfilled. Technology  
12           is a fast-growing and lucrative industry, employing thousands  
13           every year. However, the rate of racial minorities in tech  
14           industries had not increased at a sufficient rate. This is  
15           unacceptable, Madam Chair, considering the number of capable  
16           racial minority students and workers that are available.

17           The problem is exacerbated by insufficient resources in  
18           K-12 schools to HBCUs and often low expectations for our  
19           minority students. Studies show that African-American  
20           children enter kindergarten at a competitive disadvantage.  
21           To close the gap in tech, we must give our students the  
22           resources they need to compete, not starting in college, but  
23           in the earliest stages of primary education. Public and  
24           private sectors have a responsibility to work together to

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1 create effective diversity and inclusion initiatives.

2 The CBC Tech 2020 has been pounding tech companies now  
3 for years. We are beginning to see modest results.

4 And so, I want to thank you for your effort in this  
5 space, and I yield back.

6 The Chairman. Thank you.

7 Before I yield to Mr. Rush for the last minute, I just  
8 want to say, as you could probably tell, Mr. Rush had a  
9 subcommittee hearing in the Energy Subcommittee on diversity  
10 in the workforce. And now, we are doing this in the Consumer  
11 Protection Subcommittee with Ms. Schakowsky. Because the  
12 Energy and Commerce Committee has jurisdiction over so many  
13 sort of jobs of the future and areas of the future, I think  
14 it is particularly important that we address this issue of  
15 diversity.

16 Mr. Rush, I yield the balance of the time.

17 Mr. Rush. I want to thank you, Chairman Pallone, for  
18 yielding. And I want to thank you, Chairwoman Schakowsky for  
19 holding this important hearing.

20 In the 1990s, Chicago's O'Hare Airport, the world's  
21 busiest airport at the time, became the first to install  
22 touchless faucets. This innovation's promise of making  
23 things more sanitary and wasting less water were anti-  
24 climatic, however, when it was shown that these faucets had

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1 difficulties in recognizing the hands of black and brown  
2 Americans. While seemingly trivial, this is just one example  
3 of the real-world impediments that people of color across the  
4 nation face because of their lack of representation in the  
5 technology industry.

6 This same phenomena has been repeated in facial  
7 recognition technology that mistakenly identified 28 Members  
8 of Congress, myself included, in search engines that provide  
9 ads related to criminal record history when associating,  
10 quote, ``black-sounding names". End of quote.

11 Madam Chairman, it should be clear that, while the issue  
12 and emergency in tech may seem like a relatively  
13 straightforward problem, its ramifications are much bigger  
14 and go much deeper than it would appear. Madam Chairman,  
15 progress and innovation must go beyond being just skin deep.

16 So, I thank you for holding this hearing and I look  
17 forward to hearing from the witnesses.

18 And, Madam Chair, I would like unanimous consent to  
19 submit a New York Times article about mistakes in facial  
20 recognition for the record.

21 And thank you. I yield back the balance of my time.

22 Ms. Schakowsky. Without objection, so ordered.

23 [The information follows:]

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1 Ms. Schakowsky. And I want to thank the ranking member  
2 for her indulgence on going over some time.

3 Next, I will yield 5 minutes to Mr. Hudson, who has been  
4 designated to take the place of our ranking member of the  
5 full committee, Mr. Walden.

6 Mr. Hudson. Thank you, Madam Chair.

7 This is my first opportunity publicly to say  
8 congratulations on your chairmanship. I look forward to  
9 working with you and finding common ground where we can work  
10 together. I know you are going to provide strong leadership.

11 Thank you for recognizing me.

12 I would say that today we have an exceptional panel of  
13 witnesses here to examine inclusion and diversity in tech. I  
14 am proud to represent a district that has many institutions  
15 of higher education that have recognized the value a diverse  
16 workforce brings to the table.

17 As a member of the Historically Black Colleges and  
18 Universities Caucus, I have seen firsthand how these  
19 institutions greatly contribute and prepare our students for  
20 a 21st century workforce. Fayetteville State University is a  
21 prime example of this leadership. Because of their great  
22 track record, they are a recent recipient of a \$2 million  
23 grant from the project Strengthening Student Success in STEM.

24 The project at Fayetteville State University seeks to build

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1 on previous successful efforts to increase the participation  
2 of African-American students in STEM disciplines through  
3 education and research.

4 Additionally, we will examine ways to include other  
5 groups of individuals, including service-disabled veterans  
6 and military spouses. My district is home to the epicenter  
7 of the universe, Fort Bragg, home of the Airborne Special  
8 Operations Forces. Our community is no stranger to  
9 supporting these groups, and we understand the value that  
10 they bring to our community.

11 Many businesses and entrepreneurs in the tech space have  
12 started in our community, including RLM Communications, a  
13 minority-owned and service-disabled, veteran-owned small  
14 business which has repeatedly been recognized for its  
15 outstanding work.

16 The fact is that a variety of experiences and  
17 perspectives yield better results. That is exactly what  
18 diversity brings to the table. That is why I have been proud  
19 to work very closely with Chairman Rush the past two  
20 Congresses on the issue of diversity in our 21st century  
21 energy economy and preparing our students for those jobs,  
22 particularly minority students and disadvantaged groups. And  
23 I look forward to working with my colleagues on this  
24 important issue here in the tech industry as well.

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1           With that, Madam Chair, I would like to yield the  
2 balance of my time to my good friend from Montana, Mr.  
3 Gianforte.

4           Mr. Gianforte. Thank you, Mr. Hudson, for the  
5 recognition.

6           Getting more Americans working in tech businesses  
7 increases opportunities for all of our communities, not just  
8 in Silicon Valley. In Montana, we continually face a  
9 workforce availability challenge across most businesses. It  
10 is particularly pronounced, however, in the high-tech sector.

11          In the software business that I built in Montana, we were  
12 always competing to get the best and the brightest. Rather  
13 than go far and abroad, however, we worked to develop people  
14 from within.

15          Recently, I had the pleasure of spending a day with  
16 fourth graders at Bozeman's Emily Dickinson School during  
17 their hour of code. Allowing the kids time to engage in  
18 coding early increases awareness and drew new faces into the  
19 field. Using pre-written code, these students were able to  
20 blow up their screens and make farm animals talk. They were  
21 having fun and they were learning at the same time.

22          Another successful program for the state has been Code  
23 Montana. This class brings high school students into the  
24 computer lab. Students experiment with JavaScript and other

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1 programs to create their own apps and earn college credit.

2 Over 90 percent of Montana parents want their kids to  
3 study computer science. Unfortunately, only 40 percent of  
4 our public schools offer this curriculum.

5 Our company understood that we needed to grow our  
6 workforce organically, and we recognized the challenges  
7 facing our local schools. We started working with the local  
8 university, Montana State, to develop cutting-edge computer  
9 science programs. Other entrepreneurs developed classes to  
10 develop their employees for the next generation. And through  
11 organizations like the Montana High Tech Business Alliance,  
12 we created space to share ideas and address challenges facing  
13 tech in Montana. We are making progress, but there is still  
14 a lot more to do. I look forward to the testimony and the  
15 discussion as we look for solutions.

16 Thank you, and I yield back.

17 Ms. Schakowsky. Mr. Hudson, do you yield back?

18 Mr. Hudson. I do.

19 Ms. Schakowsky. Okay. Thank you.

20 So, the chair wants to remind members that, pursuant to  
21 committee rules, all members' written opening statements  
22 shall be made part of the record. And now, I would like to  
23 introduce our illustrious panel and our witnesses.

24 First, we have Mr. Mark Luckie, digital media strategist

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1 and former manager at Facebook and Twitter.

2 Dr. Joan Ferrini-Mundy, president of the University of  
3 Maine, welcome.

4 Ms. Jiny Kim, vice president of policy and programs at  
5 Asian Americans Advancing Justice.

6 Dr. Nicol Turner Lee, fellow at the Center for  
7 Technology Innovation, Governance Studies, at the Brookings  
8 Institution.

9 Ms. Natalie Oliverio, CEO of Military Talent Partners.

10 Ms. Jill Houghton, president and CEO of Disability:IN.

11 And Mr. David Lopez, counsel at Outten & Golden, LLP,  
12 and co-dean of the Rutgers Law School.

13 And we are missing somebody, right? Did I get  
14 everybody? Okay, I guess it is Natalie Oliverio who is not  
15 here yet.

16 Okay. So, let's begin, then, with Mr. Luckie, 5  
17 minutes.

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1 STATEMENTS OF MARK LUCKIE, DIGITAL MEDIA STRATEGIST, AND  
2 FORMER MANAGER, FACEBOOK AND TWITTER; JOAN FERRINI-MUNDY,  
3 PRESIDENT, UNIVERSITY OF MAINE; JINY KIM, VICE PRESIDENT,  
4 POLICY AND PROGRAMS, ASIAN AMERICANS ADVANCING JUSTICE; NICOL  
5 TURNER LEE, FELLOW, CENTER FOR TECHNOLOGY INNOVATION,  
6 GOVERNANCE STUDIES, BROOKINGS INSTITUTION; NATALIE OLIVERIO,  
7 CEO, MILITARY TALENT PARTNERS; JILL HOUGHTON, PRESIDENT AND  
8 CEO, DISABILITY:IN, AND DAVID LOPEZ, COUNSEL, OUTTEN &  
9 GOLDEN, LLP, AND CO-DEAN, RUTGERS LAW SCHOOL

10

11 STATEMENT OF MARK LUCKIE

12 Mr. Luckie. Chairwoman Schakowsky and members of the  
13 committee, I thank you for the invitation to participate in  
14 today's hearing on inclusion in tech.

15 From toddlers to seniors, technology has become a vital  
16 part of the lives of many Americans. However, the way we use  
17 these tech products is not singular. Gender, age, race,  
18 ethnicity, sexual orientation, disability, religion,  
19 political beliefs, geographic location, and other factors can  
20 all dramatically change the way people interact with a  
21 product.

22 And yet, the hundreds of thousands of people who are  
23 creating these technologies remain mostly homogeneous. The  
24 tech industry continues to be populated by mostly white and

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1 Asian men. Diversity is an integral part of the fabric of  
2 America, but that is not reflected in the companies that  
3 affect the lives of millions of this country's citizens.

4 In my time as a manager at tech companies, including  
5 Facebook, Twitter, and Reddit, I have seen firsthand the  
6 issues around diversity that continue to plague the industry.

7 The concerns surrounding the lack of diversity at U.S.  
8 technology companies is not just about the fair treatment of  
9 their employees.

10 What is even more alarming is the discrimination built  
11 into the products emerging from Silicon Valley companies,  
12 from the use of artificial intelligence software, more likely  
13 to flag black defendants as future criminals; Asian-Americans  
14 being charged higher prices for online test prep; apps  
15 lightening the skin of users to make them more attractive;  
16 Amazon's recruiting tool penalizing resumes that included the  
17 word ``women's," to Facebook's real-name policy that  
18 discriminates against Native American names and transgender  
19 people.

20 In many of these instances, the transgressions were  
21 unintentional and later corrected, but most of these  
22 oversights can be mitigated by employing and retaining staff  
23 from diverse backgrounds in an environment that welcomes all  
24 voices. Statistically, tech companies are not doing that.

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1 In 2017, at eight of the largest tech companies in the U.S.,  
2 women, on average, made up a little over 30 percent of the  
3 staff; 4.2 percent were black, and 6 percent were Latinx,  
4 according to the company's self-reported numbers. While  
5 there is a disproportionately high number of Asians who work  
6 in tech, industry data shows they are the least likely to  
7 attain a leadership role.

8 One of the common explanations of why there is a lack of  
9 diversity in Silicon Valley is the pipeline. Tech companies  
10 argue that there are not enough women and people of color  
11 graduating with degrees in computer science. However, there  
12 are more women and people of color with tech-related degrees  
13 that are graduating than are actually being hired.

14 The discussions around the pipeline also ignore an  
15 obvious, but overlooked fact. Most jobs at tech companies  
16 are not in engineering. At least one-third of the jobs  
17 listed in the career websites of many of the top tech  
18 companies are on non-engineering teams.

19 There is a common refrain in Silicon Valley: "We can't  
20 lower the bar." This term is widely understood to infer that  
21 black, Latinx, and women candidates are less qualified.  
22 Their hiring would be a token, putting them over more  
23 qualified white or Asian male candidates, who in some cases  
24 are actually equally or sometimes less qualified.

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1           When women and people of color are hired, they often  
2           face unwelcoming environments that upend the great work they  
3           came to do. Half of all diverse employees said they see bias  
4           as part of their day-to-day work experience, according to a  
5           recent study. Women in tech are leaving the industry at  
6           nearly double the rate as men. A person over 40 at a tech  
7           company is a rarity, and even more so if they are not in a  
8           managerial position.

9           Despite all these challenges, we are thriving. We are  
10          leaders impacting our communities and executing the ideas  
11          that are transforming the landscape of technology and beyond.

12          Tech companies need to recognize the greatness or risk  
13          losing some of the industry's most brilliant minds.

14          A study by McKinsey found that ethnically-diverse  
15          companies were more than 35 percent more likely to outperform  
16          their industry counterparts. And companies in the bottom  
17          quartile, both for gender and for ethnicity and race, are  
18          statistically less likely to achieve above-average financial  
19          returns.

20          Superficial proclamations from corporate leaders are not  
21          enough. It is time to stop saying we can do better and to  
22          start being better.

23          For Congress and this committee, more oversight of this  
24          nation's tech companies is absolutely necessary. Continuing

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1 to learn about how the industry functions in hearings like  
2 this will lead to better economic solutions for all  
3 Americans.

4 Tech companies must do their part, step up, and reflect  
5 the ideals of equality, democracy, and justice for all, on  
6 which this country was founded.

7 Thank you for this opportunity to share, and I look  
8 forward to answering questions you may have.

9 [The prepared statement of Mr. Luckie follows:]

10

11 \*\*\*\*\* INSERT 2\*\*\*\*\*

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1 Ms. Schakowsky. Thank you very much.

2 Next, I want to invite Dr. Joan Ferrini-Mundy for 5

3 minutes.

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1 STATEMENT OF JOAN FERRINI-MUNDY

2

3 Ms. Ferrini-Mundy. Thank you. Good morning, Chairman  
4 Schakowsky, Ranking Member Rodgers, and members of the  
5 subcommittee. Thank you for inviting me here today.

6 My name is Joan Ferrini-Mundy, and since July of 2018, I  
7 have been the president of the University of Maine and the  
8 University of Maine at Machias.

9 I plan to comment on the roles of institutions of higher  
10 education in the preparation of a diverse STEM and technology  
11 workforce that is ready to solve problems and innovate  
12 through diversity, and to provide pathways, especially in  
13 STEM, for diversity.

14 The mission of the University of Maine is to advance  
15 learning and discovery through excellence and innovation in  
16 undergraduate and graduate academic programs while addressing  
17 the complex challenges and opportunities of the 21st century  
18 through research-based knowledge.

19 Our population on our campus of about 11,000 students in  
20 Orono, Maine, is 51 percent women. Our geographic diversity  
21 is above the national average, but we are below the national  
22 average in racial and ethnic diversity. White students  
23 comprise about 82 percent of our student body, and 12 percent  
24 of our students are black or African-American, Hispanic, or

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1 Latino, and other races and ethnicities.

2 In addition to diversity of race, gender, and ethnicity,  
3 at U Maine we have diversity on the dimensions of age, sexual  
4 orientation, socioeconomic status, religion, disability,  
5 disciplinary background, veteran service, and experience. In  
6 Maine, 47 percent of pre-college students are economically  
7 disadvantaged. Twenty-six percent of our entering students  
8 are first-generation college students.

9 For some college students, the diverse environments of  
10 higher education are their first experience with people  
11 different from themselves and from their home communities.  
12 Our institutions need to be skilled and effective in  
13 supporting their success and opening up their pathways into  
14 the tech industries and into the STEM fields more generally.  
15 At the University of Maine, we have more than 40 different  
16 organizations and initiatives to support our diverse  
17 students.

18 Scott Page has argued that people from different  
19 backgrounds have varying ways of looking at problems. There  
20 is certainly a lot of evidence that people's identity groups,  
21 ethnic, racial, sexual, age, matter when it comes to  
22 diversity in thinking. And as we have heard, their solutions  
23 to problems will be equitable and more effective.

24 One function of the university is to prepare leaders and

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1 a workforce for tomorrow. And universities across the  
2 country are doing so with inclusive, cross-disciplinary STEM  
3 programs, research to better understand and ensure inclusion,  
4 support services to promote student success, curriculum and  
5 instruction designed to build from the diversity on our  
6 campuses and to engage diverse students, and through  
7 partnerships.

8 Through the University of Maine, for example, students,  
9 faculty, and staff from around the world and from very  
10 diverse backgrounds come together in our Graduate School for  
11 the Biomedical Sciences and Engineering to participate in  
12 convergence research. They work in molecular and cellular  
13 biology, bioinformatics and genomics, toxicology,  
14 neuroscience, and biomedical engineering, to address some of  
15 tomorrow's biggest challenges. And the diversity that they  
16 bring to those challenges is absolutely essential.

17 Our campus Center on Aging promotes and facilitates  
18 activities on aging and aging-related education and training  
19 programs. Our Center for Community Inclusion and Disability  
20 Studies partners with the community to enhance the lives of  
21 individuals with disabilities and their families.

22 In Maine, within one year of high school graduation, 50  
23 percent of economically-disadvantaged youth are enrolled in  
24 higher education compared to 75 percent of non-economically-

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1       disadvantaged youth. Enabling all students to be able to  
2       attain degrees is critical for the diversity that we discuss  
3       here today. The University of Maine is addressing this  
4       through a new First Year Student Initiative.

5               Some of our focus is directly in the curriculum. With  
6       funding from the National Science Foundation INCLUDES  
7       Program, U Maine anthropologist Dr. Darren Ranco and  
8       colleagues are developing the Wabanaki Youth in Science  
9       Program to bridge inclusion in postsecondary education  
10      through the sciences. The team is developing a course that  
11      brings together traditional ecological knowledge and Western  
12      science for undergraduates. The success of this ongoing  
13      effort will depend upon diversity and student engagement with  
14      ideas that are unfamiliar and with experts who bring diverse  
15      experiences.

16             I would like to also mention that the University of  
17      Maine system partners with Educate Maine in a project to  
18      match students with internships and full-time jobs in  
19      computing occupations. And we hope to bring underrepresented  
20      minorities, women, and rural students to pursue a variety of  
21      experiential learning opportunities.

22             In closing, our nation's diversity is a resource for  
23      learning and for solving the most complex problems of our  
24      times. As technologies and advances lead to changes in our

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1 workplace, new generations of STEM professionals will bring  
2 their collective diversity to bear on improvements and  
3 innovations. U.S. higher education has a key role to play in  
4 ensuring the pathways for inclusive learning environments, so  
5 that those professionals are ready to make a difference.

6 Thank you for the opportunity to speak with you today.

7 [The prepared statement of Ms. Ferrini-Mundy follows:]

8

9 \*\*\*\*\* INSERT 3\*\*\*\*\*

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1 Ms. Schakowsky. Right on the dot. Thank you.

2 Ms. Jiny Kim, you are now recognized for 5 minutes.

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1 STATEMENT OF JINY KIM

2

3 Ms. Kim. Good morning, Chairwoman Schakowsky, Ranking  
4 Member Rodgers, and members of the subcommittee. Thank you  
5 for the opportunity to testify on the importance of diversity  
6 in the technology sector.

7 My name is Jiny Kim, and I am vice president for policy  
8 and programs at Asian Americans Advancing Justice, AAJC, a  
9 national civil rights organization dedicated to advancing the  
10 civil and human rights of Asian-Americans and building and  
11 promoting a fair and equitable society for all.

12 The economic rationale for diversity has been well-  
13 documented in numerous studies. Companies in the top  
14 quartile in terms of racial diversity are 35 percent more  
15 likely to have financial returns higher than the national  
16 median in their industry. But, despite this economic  
17 reality, women and people of color have historically been  
18 excluded from both the rank and file and from positions of  
19 leadership within tech companies. According to the EEOC,  
20 African-Americans and Latinos were underrepresented in the  
21 tech sector by 16 to 18 percentage points compared with their  
22 presence in the American labor force overall.

23 While there is a higher representation of Asians in the  
24 tech workforce, they are still underrepresented in non-

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1 technical roles compared to their presence in technical  
2 roles, and they are disproportionately left out of C-suite  
3 positions.

4 While the effort companies are making to provide  
5 transparency in their diversity data should be appreciated,  
6 there remain issues in how that data is reported. Asian-  
7 Americans and Pacific Islanders include over 50 different  
8 ethnic groups and over 100 languages and dialects. Yet,  
9 companies fail to disaggregate the data, resulting in  
10 overlooking the most underrepresented and historically  
11 marginalized AAPI communities with lower levels of  
12 educational attainment, higher rates of poverty, and larger  
13 populations with limited English proficiency. When these  
14 groups are left out, those efforts by industry and other  
15 stakeholders to encourage recruitment and build pipelines  
16 from diverse communities remain incomplete.

17 Not surprisingly, tech companies have developed digital  
18 tools to review the myriad applications for positions in  
19 their companies. The problem with this approach is that the  
20 ideal profile being used as a model reflects a majority white  
21 culture and the resulting unconscious bias.

22 Issues are not limited to recruitment, and greater  
23 effort is also needed to retain employees of color and women.

24 Some tech companies have taken the important step of

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1 reporting attrition rates of employees from diverse  
2 backgrounds, as well as supporting their employees through  
3 mentorship programs and employee resource groups. We applaud  
4 these efforts as positive steps toward understanding what is  
5 needed to retain diverse staff and eventually place them in  
6 the leadership pipeline.

7 Now it is a common understanding among civil society  
8 organizations that the prejudice, ignorance, and the hate we  
9 combat in real life live in the digital space as well. Tech  
10 companies that foster a majority white male employee base  
11 feed their own biases into the machines they create.

12 In the criminal justice system, we see disturbing  
13 examples of algorithmic bias. Courts have begun using  
14 predictive software to sentence convicted individuals.  
15 ProPublica published an account of two individuals who  
16 separately committed shoplifting. One was African-American,  
17 and the other was white. When a sentencing algorithm was  
18 used to predict the likelihood of each committing a future  
19 crime, the African-American individual was rated a higher  
20 risk, even though she had only committed misdemeanors as a  
21 juvenile, while the white individual had previously been  
22 convicted of attempted armed robbery. Two years later, the  
23 computer algorithm was proven wrong, with only the white  
24 individual having committed a felony.

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1 Further alarming is facial recognition technology. In  
2 2015, this technology came under scrutiny when software  
3 incorrectly categorized photos of African-Americans as  
4 primates. Despite this incident, companies have still failed  
5 to take adequate action. Studies published as recently as  
6 last year found that facial recognition algorithms had  
7 significantly higher error rates detecting the gender of  
8 darker-skinned individuals compared to lighter-skinned  
9 individuals.

10 Given the magnitude of the impact of lack of diversity  
11 in tech, a serious culture shift must take place. And civil  
12 rights organizations like Advancing Justice, AAJC, have  
13 already begun to play their part. Last month, we joined more  
14 than 40 advocacy groups in sending a letter to congressional  
15 leaders urging them to put civil and human rights at the  
16 center of the digital privacy discourse. And tech companies  
17 have begun engaging our organizations on diversity and  
18 inclusion issues and taking part in civil rights audits.

19 The tech sector has transformed the way we communicate  
20 and connect with one another. We must ensure that the  
21 development of technological products, services, and  
22 experiences leave no one behind and do not harm communities  
23 of color. In order to do so, employees who create these  
24 innovative tools must reflect the diversity of the

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1 communities that the companies seek to reach.

2 Thank you for this opportunity.

3 [The prepared statement of Ms. Kim follows:]

4

5 \*\*\*\*\* INSERT 4\*\*\*\*\*

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1 Ms. Schakowsky. Thank you.

2 We do have that letter in the record from last year,  
3 from the last hearing rather. So, thank you for that.

4 And next, I want to recognize Dr. Nicol Turner Lee for 5  
5 minutes.

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1 STATEMENT OF NICOL TURNER LEE

2

3 Ms. Turner Lee. Thank you. Good morning, Chairwoman  
4 Schakowsky, Ranking Member Rodgers, and members of the  
5 subcommittee.

6 I am encouraged by your interest in this topic,  
7 particularly as some of the members of the subcommittee have  
8 worked to diversity your own staff.

9 Let me start just by stating again what Congressman  
10 Lujan summarized from my written testimony. The absence of  
11 diversity among the people who make decisions around products  
12 and services, along with the markets that these companies and  
13 the tech serve, will ultimately lead the U.S. to abysmal  
14 failure.

15 With the U.S. population predicted to become minority  
16 white in 2045, tech companies that do not fully embrace  
17 diversity will ultimately compromise the quality of future  
18 technologies and make it difficult for all people to gain the  
19 benefits of the digital revolution.

20 Today, existing and emerging technologies are helping to  
21 solve complex social problems through automation, advanced  
22 scientific research, and artificial intelligence, while  
23 disrupting legacy industries and widely accepted norms. Yet,  
24 despite this growth, African-Americans and Hispanics remain

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1 vastly underrepresented in the computer and mathematical  
2 fields, 7.9 percent and 6.8 percent, respectively, compared  
3 to whites, which are over at least 12 to 14 percent.

4 In fact, African-Americans and Hispanics are the most  
5 underrepresented in certain tech jobs by nearly 50 percent.  
6 Less than 5 percent of the tech workforce in social media  
7 companies is African-American, with similar findings for  
8 Hispanics and certain Asian-American populations.

9 The irony here is that 35 percent of Hispanics and 24  
10 percent of African-Americans have no other online connection,  
11 except through their smartphones and mobile devices, compared  
12 to 14 percent whites, but they are connected to the  
13 applications and the platforms that actually run off these  
14 devices. Without them, they have no other way to live,  
15 learn, earn, vote, and network. These mismatched realities  
16 also make these populations most susceptible to digital  
17 disruption when the jobs that they once held are automated  
18 and eliminated or predatory products and services are  
19 marketed to them online on an ongoing basis.

20 So, this is why diversity matters. In certain sectors  
21 of tech, there is a talent pipeline problem, leaving empty  
22 pockets of workforce diversity in board, C-suite, and other  
23 leadership positions. And this human resource problem  
24 ultimately impacts the design, implementation, and evaluation

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1 of products and services, some of which are collectively  
2 profiling, surveilling, and even discriminating against  
3 protected classes. That is why we are here today.

4 I am going to just summarize in my closing remarks three  
5 things that I have actually put forth that I think Congress  
6 and the tech sector should do.

7 First, tech companies must be more deliberate and  
8 systematic in the recruitment, hiring, and retention of  
9 diverse talent and change the sources for where they find  
10 talent of color. Historically Black Colleges and  
11 Universities and Hispanic-serving institutions are often  
12 discounted in remedying pipeline concerns. Yet, 22 percent  
13 of African-American college students graduate from one of the  
14 101 HBCUs and offer some of the nation's most gifted talent  
15 which are prepared to work in Silicon Valley. Yet, those  
16 colleges are not the source for where we actually look for  
17 talent.

18 In addition to that, they may be challenged by the  
19 resources that HBCUs and HSIs find. The appropriations that  
20 go to those universities and colleges are often comparable to  
21 others; therefore, reducing their ability to entice a tech  
22 center to actually hire them. Congress, we must do better  
23 than that.

24 Second, tech companies must explore ethical and

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1 collaborative frameworks that explore the intended and  
2 unintended biases of algorithms and deploy solutions that  
3 quell these biases. With big data being collected in real  
4 time from users at all times, people are now being denied  
5 credit based on their web-browsing history or aggregated  
6 predictive analytics are wrongly determining a person's  
7 suitability for employment or applying a longer prison  
8 sentence. These are deplorable, and we need to work  
9 together, as my colleagues have said, to increase the  
10 pipeline, so we can make less of these mistakes. Even among  
11 members of the Congressional Black Caucus, facial recognition  
12 technology wrongly associated them with arrest records 90  
13 percent of the time, and I know my distinguished members of  
14 the CBC aren't those people.

15 And finally, I would say this inattentional blindness is  
16 a problem in the tech sector that should no longer be  
17 tolerable. The strength of the online economy proves that it  
18 is no longer insulated from the guardrails designed for other  
19 regulated industries, especially those that establish  
20 baseline protections against discrimination.

21 Congress should consider review and the potential  
22 modernization of civil rights law and apply them to certain  
23 online cases. We did it in the case of housing. We did it  
24 in the case of civil rights. We have done it in the case of

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1 equal opportunity, and we should do it in the online space.

2 Thank you very much, and I look forward to your  
3 questions.

4 [The prepared statement of Ms. Turner Lee follows:]

5 \*\*\*\*\* INSERT 5\*\*\*\*\*

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1 Ms. Schakowsky. Thank you very much.

2 Next, we will recognize Ms. Natalie Oliverio. You are  
3 recognized for 5 minutes. Welcome.

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1 STATEMENT OF NATALIE OLIVERIO

2

3 Ms. Oliverio. Thank you so much for allowing me to  
4 testify before you this morning.

5 My name is Natalie Oliverio, and I am a post-9/11 Navy  
6 veteran, the founder and CEO of Military Talent Partners.

7 And too frequently, too often, veterans and military  
8 spouses are left out of the diversity conversation. It  
9 doesn't naturally occur to you to think of them as diverse  
10 individuals, but less than 1 percent of our country today  
11 serves. So, when you serve in the military or you are a  
12 spouse supporting your significant other as they serve, time  
13 doesn't stand still. The world keeps moving without you  
14 while you are serving your country. The military is its own  
15 business and it has ever job type, skill, and capability to  
16 run on its own, and those skills really prepare veterans to  
17 do anything.

18 But I talk with companies every single day who feel that  
19 they don't have jobs suitable for veterans. They don't have  
20 security-type or protective work, which is what they believe  
21 that veterans are qualified and capable of doing. There have  
22 been massive steps forward in the programs offered, the  
23 trainings available, and the abilities that veterans can then  
24 leverage to their second careers. But not everyone knows

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1 about them because they are just left out of the  
2 conversation, even more so for military spouses.

3 For veterans, unemployment isn't really the issue  
4 anymore. It is more of underemployment. Meaningful careers  
5 make all the difference. From an extreme case of  
6 contributing to 22 suicides a day in the veteran communities,  
7 meaningful careers can put a stop to that. Meaningful  
8 careers for military spouses help them provide for their  
9 families when today's economy really needs a two-income  
10 household. Putting your life on hold to support your spouse  
11 as they are service member is a major sacrifice, but in  
12 today's job market they are seen as risky hires or job-  
13 hoppers, but that is not the case at all. So, we have a lot  
14 of stereotypes to overcome, but those challenges can be  
15 overcome by adding veterans and military spouses to the  
16 conversations around diversity and inclusion.

17 I, myself, had a very difficult transition from active  
18 duty post-9/11, and I thought I had it all figured out, but I  
19 didn't know what kind of resources were available to me and  
20 what kind of possibilities existed. So, I struggled for  
21 years to find my niche, and that has been my motivation to  
22 lead the way in mentorship and coaching for all active-duty  
23 transitioning service members, military spouses, and Gold  
24 Star families, to help them find and obtain the meaningful

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1 careers for them.

2 But that is just one small step. There is a lot of work  
3 to be done. It is really up to Congress to lead the way for  
4 more veteran initiatives, and not just the initiatives and  
5 programs that are benefitting us today, but to make it known,  
6 widespread, so there is no question about the capabilities  
7 that a military spouse or a veteran brings to the corporate  
8 world today.

9 Thank you so much.

10 [The prepared statement of Ms. Oliverio follows:]

11

12 \*\*\*\*\* INSERT 6\*\*\*\*\*

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1 Ms. Schakowsky. Thank you.

2 And now, Ms. Jill Houghton is recognized for 5 minutes.

3 Thank you.

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1 STATEMENT OF JILL HOUGHTON

2

3 Ms. Houghton. Chairman Schakowsky, Ranking Member  
4 McMorris Rodgers, members of the committee, thank you for the  
5 opportunity to testify today.

6 My name is Jill Houghton. I am the president and chief  
7 executive officer of a nonprofit called Disability:IN, and we  
8 exist to help business achieve disability inclusion and  
9 equality. We have over 50 affiliates across the country. We  
10 represent more than 170 major Fortune 1000 corporations, and  
11 almost one-quarter of those corporations operate within the  
12 technology industry.

13 My testimony is rooted in my personal experience. I am  
14 a female leader and I have a non-apparent disability. And I  
15 really want to focus on three issues today. I think it is  
16 really important that you remember that disability is an  
17 important component of diversity. No. 2, disability drives  
18 business performance. And No. 3, disability inclusion drives  
19 innovation.

20 Disability knows no stranger. Race, gender, ethnicity,  
21 sexual orientation, gender identity, it can happen to any one  
22 of us at anytime in our life. According to the Centers for  
23 Disease Control and Prevention, 1 in 4 Americans live with a  
24 disability, and disability is often forgotten. We are said

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1 to be the silent ``D" in diversity. And yet, there are 61  
2 million Americans living with disabilities. So, we are an  
3 integral part of diversity.

4 When the Americans with Disabilities Act was passed in  
5 1990, that was opportunity, economic opportunity, for people  
6 with disabilities, but the one thing that it couldn't do was  
7 legislate attitudes. And so, we know that, when we look at  
8 the Bureau of Labor Statistics in January of 2019, that the  
9 labor force participation rate for people with disabilities  
10 was 20.5 percent versus people without disabilities of 68.3  
11 percent.

12 At Disability:IN, we have committed our self to helping  
13 corporate America with data and insight. In that spirit, we  
14 have joined forces with the American Association of People  
15 with Disabilities to create something called the Disability  
16 Equality Index. This is the nation's trusted disability  
17 inclusion benchmark, because business wants to do better.  
18 and it looks at things like leadership and culture,  
19 employment practices, community engagement, enterprise-wide  
20 access, and supplier diversity. The technology industry  
21 actively participates in the DEI, and we are growing by 30  
22 percent every year.

23 The companies that score an 80 or above are publicly  
24 acknowledged on our website at [disabilityequalityindex.org](http://disabilityequalityindex.org)

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1 and ranked as the best place to work for people with  
2 disabilities. But I will tell you, even the companies that  
3 are scoring a hundred would be the first to tell you that  
4 they don't have it all figured out, that they want to do  
5 better, but there is a lot more work to do.

6 Using the Disability Equality Index, we teamed with  
7 Accenture, because what we know, if we are going to take  
8 disability inclusion and diversity to the board room, to the  
9 C-suite, we need the business case. So, we teamed with  
10 Accenture. They studied the first four years of data. They  
11 worked with Vanguard and algorithms. What they found in  
12 getting to equal the disability inclusion advantage is that,  
13 on average, companies, leading companies, that are driving  
14 disability inclusion rated 28 percent in higher revenue,  
15 double the net income, and 30 percent higher economic profit  
16 margins than their peers. Disability inclusion impacts  
17 business performance.

18 With that concrete evidence, we confirmed that  
19 disability inclusion is good for business and investors are  
20 viewing it as the next frontier in environment, social, and  
21 governance investing. We rolled out that report on the floor  
22 of the Stock Exchange and Wall Street. And the Comptroller  
23 DiNapoli from New York State has issued a letter -- he runs  
24 the third largest pension fund in the nation -- to the top

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1 Nasdaq companies calling on them to ask what they are doing  
2 around disability inclusion.

3 And last, disability inclusion drives innovation. We  
4 like to say that inclusion and disability, at the nexus is  
5 accessibility, and without accessibility, we have got  
6 nothing. And so, that is very important, that the tech  
7 sector continue to focus on building accessibility and  
8 driving disability inclusion.

9 Thank you.

10 [The prepared statement of Ms. Houghton follows:]

11

12 \*\*\*\*\* INSERT 7\*\*\*\*\*

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1           Ms. Schakowsky. And next, Dean David Lopez, you are  
2           recognized for 5 minutes.

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1 STATEMENT OF DAVID LOPEZ

2

3 Mr. Lopez. Thank you very much, Chairwoman Schakowsky,  
4 Ranking Member Rodgers, members of the subcommittee, for  
5 inviting me to this very important hearing.

6 My name is David Lopez, and I am currently the co-dean  
7 of Rutgers Law School in Newark. Over the last 100 years,  
8 Rutgers Law School has stood as an exemplary model of a  
9 public institution that both welcomes and promotes diversity,  
10 meaningful sociability, and leverages the law to achieve  
11 equality of opportunity in the public, private, and nonprofit  
12 sectors. We believe we have normalized the idea of  
13 opportunity.

14 From 2010 to 2016, I was the longest-serving general  
15 counsel of the U.S. Equal Employment Opportunity Commission,  
16 twice nominated by President Barack Obama and twice confirmed  
17 by the U.S. Senate. I was the first Latino selected to this  
18 position, and in the capacity as general counsel, I led the  
19 litigation program charged with enforcing federal anti-  
20 discrimination statutes nationwide. So, I come here both as  
21 an educator and as a lifelong civil rights practitioner.

22 During the last 30 years, technology has transformed our  
23 economy and changed our daily lives -- how we work, how we  
24 learn, how we make decisions, how we play. The tech industry

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1 has produced remarkable tools and resources, providing us  
2 with social media and new ways to connect with others, as  
3 well as instant access to huge amounts of information.

4 But, as we have heard, it is no secret that the tech  
5 industry has suffered with the persistent problem of the  
6 absence of diversity. We have heard many of the members here  
7 today, from many of you, from many of the panelists. And  
8 this all comes at a time when tech jobs are growing rapidly  
9 in our economy.

10 To use the words of a very common phrase today, ``The  
11 tech industry operates in a bubble." It operates in a  
12 bubble. It operates without the cross-currents of thinking,  
13 from reflecting the beauty of this country.

14 Of course, ideals of living in a discrimination-free  
15 society with equal opportunity, these are bedrock principles  
16 central to social mobility and the American dream. The  
17 elimination of arbitrary barriers ensures that hard work  
18 matters, that investing in your dreams matters.

19 It is well established that racial, gender, and other  
20 types of diversity in the workplace has a positive influence  
21 on teams, and we have heard many of those studies. Diverse  
22 teams are more productive. Teams that are made up of  
23 individuals of diverse backgrounds are more innovative,  
24 generally make more error-free decisions. Further, there is

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1 convincing evidence that increased diversity in the workplace  
2 leads to higher revenues and increases innovation.

3 One of the problems I believe that the tech industry  
4 faces is the problem of implicit bias. The science of  
5 implicit bias is recognized as the automatic associations of  
6 stereotypes or attitudes about a particular group. One study  
7 demonstrated implicit bias by showing that resumes with more  
8 white-sounding names received requests for interviews 50  
9 percent more frequently than the same resume with more  
10 African-American-sounding names, but with equal or better  
11 qualifications.

12 A number of recent studies also suggest that isolation  
13 and bias influenced women leaving STEM careers. Often, it is  
14 not simply the choices that employees make that influence the  
15 careers, but the workplace environment that drives denial of  
16 opportunity.

17 Now let's talk a little bit about the products. And we  
18 have heard many of the stories here today about the end  
19 results of perhaps the absence of diversity. Big data  
20 analytics allows your employer to know whether you are  
21 pregnant even before you disclose it. That is against the  
22 law. In one high-profile incident, one retailer, drawing on  
23 consumer data, knew a young woman was pregnant before her  
24 parents did. Software used by many police departments across

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1 the country that determines the likelihood of recidivism has  
2 been shown, as discussed today, to have a bias against  
3 African-Americans. Companies are using algorithms to  
4 determine who is likely to default on a loan or recommit  
5 crimes, despite the algorithm's tendency to reflect society's  
6 bias towards racial minorities.

7 So, all of this demonstrates that this is a very  
8 important discussion. Diversity is important not only  
9 because it is the right thing to do and it is a reflection of  
10 the American dream; diversity also has consequences on these  
11 tools and these products of predictive analytics and  
12 artificial intelligence rapidly changing our environment, and  
13 the way that we live and that we play in our society.

14 The public university has a very special role in  
15 addressing these issues because a public university provides  
16 an opportunity for interdisciplinary learning, for computer  
17 science, that enshrines values of equal opportunity,  
18 fairness, competition, and justice.

19 And I welcome your questions. Thank you.

20 [The prepared statement of Mr. Lopez follows:]

21

22 \*\*\*\*\* INSERT 8\*\*\*\*\*

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1 Ms. Schakowsky. Thank you so much. This has been  
2 really a wonderful panel that I think underscores how  
3 diversity is not just a side issue.

4 And now, we will move to a number of questions. Each  
5 member will have 5 minutes to ask questions of our witnesses,  
6 and I am going to start by recognizing myself for 5 minutes.

7 I just want the panel to know that there is a lot of  
8 things going on today. The fact that there are a number of  
9 empty chairs is not indicative of lack of interest in what  
10 you are saying. All of your statements will be in the  
11 record, and I expect people will be coming in and out.

12 So, I am going to focus on women. Just 31 percent of  
13 the employees at Facebook are women, and that's also true at  
14 Apple. The number of women who work in technical roles at  
15 these companies is even lower. We also see that the female  
16 share of computer science degrees has actually dropped from  
17 28 percent to 18 percent between 1993 and 2016, while at the  
18 same time the tech industry is booming and continuing to grow  
19 at an unprecedented rate.

20 This isn't a problem that will be solved overnight.  
21 But, starting at the top, getting more women into visible  
22 technical positions, providing role models for young women,  
23 college students deciding on choosing a technical path of  
24 study, seems to be a very good strategy.

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1           So, Dean Lopez, intentional efforts to reduce the bias  
2           that is not necessarily deliberate in recruiting have  
3           dramatically increased opportunities for women in other  
4           fields. For example, orchestra auditions where the  
5           musician's gender was hidden has increased the hiring of  
6           women by over 25 percent. What are some ways that tech  
7           companies can change their recruitment techniques in order to  
8           adapt to the need of diversity in the workforce?

9           Mr. Lopez. I thin the most important thing a tech  
10          company can do really is provide meaningful leadership at the  
11          top. If tech companies want to be diverse, they need to have  
12          the leadership making very clear pronouncements that they  
13          will examine every aspect of the work culture, the evaluation  
14          system, the recruitment system, the promotion system, to make  
15          sure that it is free from gender bias. And that means  
16          looking at issues of implicit bias.

17          You see this particularly in pay disparities based on  
18          gender, where you often have systems that are almost  
19          systematically stacked against women. So, it really takes a  
20          clear statement from leadership that diversity is important,  
21          that inclusiveness is important.

22          The other thing that is really important is to really  
23          examine how you conduct recruitment. Recruitment is often  
24          based on sort of the tap on the shoulder, the old boys' club.

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1 It is really important, I think, for high-tech companies to  
2 examine their networks. As the co-dean at a public  
3 university, as a graduate of Arizona State University, I  
4 certainly understand the grit and the talent that you get out  
5 of those universities, but often the Silicon Valley recruits  
6 in a very, very narrow way, right?

7 And then, the last thing I want to mention is that, as  
8 diversity relates to the end product, we have seen Amazon,  
9 for instance, they had to stop a hiring tool because they  
10 found out that the hiring tool itself was biased against  
11 women. The algorithms they used were biased against women.

12 We have seen lawsuits recently involving Facebook's  
13 dropdown box where women were excluded from certain job  
14 advertisements in traditionally male industries. So, there  
15 is a connection between the two.

16 Ms. Schakowsky. Thank you.

17 Funding for female entrepreneurs is minuscule compared  
18 to men. Women receive just 2.2 percent of the venture  
19 capital investment. This is despite the fact that women-  
20 founded businesses generate more than two times the revenue  
21 per investment dollar than businesses founded by men.

22 Ms. Kim, what do you think is happening here? What is  
23 going on?

24 Ms. Kim. Much like the other economic reasons for

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1 having diversity, you are seeing something that doesn't make  
2 sense. It is the system that exists that needs a complete  
3 culture shift in how to -- I mean, whether it is employee  
4 recruitment or whether it is investing in programs to recruit  
5 from diverse populations, as well as investing in building  
6 those opportunities for entrepreneurs as well. It doesn't  
7 make sense, what is going on, because there is a clear  
8 economic rationale to hire and promote from communities of  
9 color, hire and promote women, and invest in businesses led  
10 by people of color and women.

11 And so, we call on the tech sector to examine what  
12 within the culture is going on, and, also, to engage with  
13 civil society organizations, and civil rights organizations,  
14 in particular, to talk to us about what is going on in the  
15 hiring and investment practices that results in these very  
16 harmful impacts.

17 Ms. Schakowsky. Yes, I wish I could get to -- 5 minutes  
18 goes really fast. Maybe at the end I can open it up to  
19 others on the panel. But, in the meantime, I want to yield  
20 for questions to our ranking member, Ms. McMorris Rodgers.

21 Mrs. Rodgers. Thank you. Thank you, Madam Chair.

22 And thank you, everyone, for being here. Excellent  
23 testimony today.

24 I wanted to start with Ms. Houghton. I wanted to ask

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1 you to speak some more to how companies can build an  
2 inclusive workforce for people with disabilities, and address  
3 both the physical and intellectual disabilities, and what the  
4 benefits are that you see as a result.

5 I also wanted to ask you to speak and share some of the  
6 examples of the impact of having people with disabilities in  
7 the workforce and how that ensures products and services are  
8 accessible to everyone.

9 Ms. Houghton. Thank you, Congresswoman McMorris  
10 Rodgers.

11 I think that what we are seeing is really driven in  
12 tech. It is companies like Microsoft and SAP and DXC  
13 Technology that have created these inclusive hiring programs  
14 that are based on the premise that there is bias in their  
15 hiring process, and they want to tear down those walls. And  
16 so, they have created these hiring programs where they are  
17 sourcing talent with disabilities, with all different kinds  
18 of disabilities, and bringing them in, perhaps rather than in  
19 a typical interview, coming in and maybe doing a two-week  
20 program. And maybe the interview is with LEGOs and like a  
21 different kind of a process.

22 Because what they recognize is that the traditional  
23 models are screening the talent out. And so, they have grown  
24 these inclusive programs, these Autism at Work programs, and

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1 they are putting everything out in the public domain to try  
2 to help their peers.

3 I think what they are experiencing, as a result of this,  
4 is that this talent is coming in and helping them develop new  
5 products and tools and make things more accessible. Filing  
6 for patents, things that wouldn't have happened if they  
7 hadn't torn down those walls.

8 Mrs. Rodgers. Would you speak briefly as to the impact  
9 of job coaches or accommodations, the internships, just very  
10 briefly?

11 Ms. Houghton. Yes, people with disabilities, we come in  
12 different shapes and sizes. The on-the-job supports when  
13 individuals have the opportunity to perform with the right  
14 support, they far exceed their peers. Their productivity,  
15 their decrease in absenteeism, they stay.

16 Mrs. Rodgers. That is great. Thank you. Thank you for  
17 being here.

18 Dr. Ferrini-Mundy, I wanted just to ask you to speak a  
19 little bit more about how you see the commitment to science,  
20 technology, engineering, and math helping create the  
21 pipeline, and are you seeing that translate into the  
22 opportunities with the tech companies, in particular?

23 Ms. Ferrini-Mundy. Thank you.

24 Absolutely. The STEM field, science, technology,

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1 engineering, and mathematics, writ large, are often a key  
2 foundation for people who will pursue careers in the  
3 technology areas. And so, making certain that that basic  
4 preparation -- and I will speak specifically about  
5 mathematics; it is my own field. And also, it is an  
6 underpinning for so much of what goes on in the tech  
7 industry.

8 Making certain that our approach to engaging people in  
9 mathematics, to instruction, is inclusive, that it attends to  
10 differences and draws on those, and supports students to be  
11 successful, to draw on their grit, because mathematics is not  
12 necessarily seen as an easy kind of pursuit.

13 To continue, I wanted to just tack on a little bit on  
14 these questions about internships and how companies can be  
15 more fully engaged with diversity. Universities can be  
16 wonderful partners and are across our nation, our public  
17 universities, in particular, with the private sector. And we  
18 have found that U Maine, for example, in our engineering  
19 college, that a large percentage, maybe 75 percent of our  
20 students have actual internships in a variety of high-tech  
21 sectors, and those internships turn into positions. And so,  
22 getting to know students and making opportunities for diverse  
23 students early on is really crucial to this whole business.

24 Mrs. Rodgers. Thank you.

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1           And finally, Ms. Oliverio, would you speak, just in the  
2           20 seconds I have left, just what do you see veterans -- what  
3           are the unique qualities that veterans can add to this  
4           conversation?

5           Ms. Oliverio. Veterans are so unique. They are natural  
6           leaders and that leadership is cultivated in an authentic way  
7           throughout their military service. They are resilient. They  
8           can adapt and overcome to any situation and any challenge.  
9           If tech can just meet them where they are, they will be able  
10          to diversify on their own.

11          Mrs. Rodgers. Great. Thank you all.

12          I yield back.

13          Ms. Schakowsky. I recognize Representative Castor for 5  
14          minutes.

15          Ms. Castor. Thank you, Chairwoman Schakowsky.

16          Sharing diversity and inclusion in the technology sector  
17          workforce and products is critical to a thriving industry.  
18          Unfortunately, the U.S. Congress and the industry itself have  
19          overlooked this topic for too long. So, I am glad we are  
20          holding this hearing today.

21          Thank you very much, and I want to thank the witnesses  
22          for your expert advice on what Congress can do to make the  
23          workers in the tech sector more representative of America.  
24          Because I believe, when that happens, business will thrive

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1 and consumers will benefit.

2 In addition to your testimony, I have seen report after  
3 report that has been rather troubling about technology  
4 adversely affecting communities of color. Companies have  
5 given different prices and credit card deals to consumers  
6 based upon location, which can mean white neighborhoods are  
7 offered better deals and prices than minority neighborhoods.

8 Supposedly unbiased algorithms that companies use for a  
9 variety of different processes have been shown to produce  
10 discriminatory results. Facial recognition software often  
11 cannot accurately recognize people of color.

12 Ms. Turner Lee, these are just a few examples, but they  
13 illustrate a larger pattern in tech of discriminatory  
14 products and processes. What are some of the specific  
15 policies the tech industry could adopt right now to fix this,  
16 and what should Congress be doing?

17 Ms. Turner Lee. Yes, thank you for just acknowledging  
18 all those examples. Because as we go deeper and deeper into  
19 the tech space, I think we are going to see more of these.

20 I think it is important, as I recommended and, again,  
21 put into my written testimony, that we think about a  
22 guardrail that we have now, which are the anti-discrimination  
23 laws. I think as we see more of these offers become  
24 discriminatory or produce a discriminatory output, people

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1 being denied credit because of the fact that their web-  
2 browsing history suggests that they are not creditworthy,  
3 higher education using algorithmic decisionmaking on whether  
4 or not kids should be accepted into college, those types of  
5 things have, I think, implications that we have not really  
6 looked at in connecting the physical and the digital spaces.

7 So, I would implore Congress to just have a review and  
8 analysis of what those nondiscrimination laws are and see if  
9 there is any connection to what we actually see in the  
10 digital space that can generate these unintended  
11 consequences. I think that is the first.

12 I would also just add real quickly, I think there will  
13 be innocuous cases, as it was suggested, where the training  
14 data may not be correct and companies themselves will self-  
15 regulate. I think those conversations still need to be had.

16 Google voluntarily removed payday ads from their search  
17 query, just to make sure that low-income people were not  
18 being dragged into this pathway of inequality. I think we  
19 need to see more of that, and I think Congress can actually  
20 use the bully pulpit in some ways to suggest that those  
21 conversations should happen, as well as collaborations with  
22 civil society, who actually see the outputs of this.

23 It is the technologist that oftentimes sits within the  
24 vacuum, and civil society groups like AAJC, then, sort of

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1 have to clean it up. And then, Congress has to somehow get  
2 in the middle of these conversations.

3 I think more collaborative dialog to best understand how  
4 these ecosystems work and the application of guardrails that  
5 we have in our favor can actually help quell some of these  
6 biases.

7 Ms. Castor. Thank you very much.

8 Mr. Luckie, isn't there also a role for people of  
9 diverse backgrounds in decisionmaking positions in these tech  
10 companies? And how do we encourage that and what are the  
11 barriers that prevent that from happening now?

12 Mr. Luckie. I think there is a lot of focus on the  
13 managerial positions and having someone at the top that will  
14 filter down and make a workplace more diverse. I think it is  
15 more important on the employee level to have multiple people  
16 in the room who can say, hey, are we testing on this  
17 particular audience; have we thought about this particular  
18 impact on this community?

19 As I said in my opening statement, making sure that  
20 those voices are being heard, that there is an equal  
21 opportunity for people to share those concepts, and it is  
22 important for tech companies to do an audit of these  
23 individual teams and understand where are the gaps in  
24 diversity, not just in the company overall, but on the

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1 individual teams that are all impacting the company's overall  
2 goals.

3 Ms. Castor. Thank you very much.

4 I have a few other questions. I had a group of  
5 neighbors from Florida come and visit me who happened to be  
6 blind, and they had a number of suggestions. My time is  
7 running out. So, I am going to submit those to you for the  
8 record and ask you to please send in your specific answer to  
9 those.

10 Thank you.

11 And I yield back.

12 Ms. Schakowsky. Thank you.

13 And now, 5 minutes to Mr. Guthrie.

14 Mr. Guthrie. Thank you, Madam Chair. I appreciate it  
15 very much. Thanks for this hearing. This is a very  
16 important hearing.

17 A couple of things. One, and this is for Dr. Ferrini-  
18 Mundy, or anybody that would like to answer the questions,  
19 but I will focus on you. I understand that Facebook, Google,  
20 and all the tech companies have people in marketing in all  
21 different degrees, but I am going to focus on the STEM side  
22 of their businesses.

23 I think the chair just said in her questions that, as we  
24 need more computer science people, as that seems to be the

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1 initial higher, where big money is, people in tech fields, if  
2 I heard you correctly -- I know you said it correctly -- but  
3 if I heard you correctly, 28 percent of the computer science  
4 used to be women and now it is down to 18 percent. So, I  
5 guess my question is, does the tech workforce in Silicon  
6 Valley or in tech, the tech people, does it reflect the  
7 people in the tech programs, the demographics? So, is it  
8 kind of they are hiring who we are training or educating as a  
9 nation? And if so, how do we get more people into it? How  
10 do we get a more diverse STEM populace, so that there will be  
11 a more diverse technical? Because the other side is, if it  
12 doesn't reflect that, that means they are just really being  
13 biased in who they hire. Of course, I am talking on the STEM  
14 side of their business, their employees.

15 Ms. Ferrini-Mundy. Right.

16 Mr. Guthrie. Okay.

17 Ms. Ferrini-Mundy. Thanks. And so, there are several  
18 questions in there. I think in terms of the tech workforce,  
19 others in this panel are more expert in the dispersed  
20 expertise across that tech force, because I suspect it comes  
21 from a variety of areas. That all said, we must do better in  
22 higher education to attract people to these STEM fields, to  
23 computer science, and to make their time in higher education  
24 much more inclusive, so that they are a part of the groups

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1 that are, then, going to be taking on these product questions  
2 when they get into the tech workforce.

3 Mr. Guthrie. How do we get more people, a diverse  
4 group, into the --

5 Ms. Ferrini-Mundy. Right.

6 Mr. Guthrie. Because what happens in tech school, not  
7 just computer, if you are talking about a manufacturing  
8 company in Kentucky needs a computer science, I mean a  
9 numerical control person, whether it is male, female, or  
10 whatever, they can't find them, and we have all these people  
11 not going to secondary schools. So, there seems to be a  
12 breakdown in the market --

13 Ms. Ferrini-Mundy. Right.

14 Mr. Guthrie. -- for getting people into the right --  
15 no matter who they are.

16 Ms. Ferrini-Mundy. At U Maine, I just learned that  
17 about 47 percent of our students are in STEM fields, which is  
18 high. What that means is that we are creating pathways from  
19 our secondary schools that are welcoming. We do an early  
20 college program that gives students the opportunity to study  
21 with our faculty before they get out of high school.

22 I think a lot of it is about pathways and helping  
23 students be able to see themselves in these careers, see them  
24 as meaningful career options. And a lot of that has to do,

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1 then, with real-world kinds of problem-solving as  
2 undergraduates, so that it is real-world learning outside the  
3 classroom in internships, in clinical experiences, that put  
4 them together with people in these fields. A lot of  
5 collaboration with K-12 is crucial for this, too. It begins  
6 very early. So, all of the work in coding, for example, that  
7 we heard about is one piece of, I think, an important  
8 systemic effort to get people interested, to get diverse  
9 people interested in STEM.

10 Mr. Guthrie. I have got a few seconds. I want to ask  
11 another question. Anybody want to comment on how we get more  
12 people into, a more diverse, educated group to come out, so a  
13 pool?

14 Ms. Turner Lee. Yes. No, Congressman, I think it is a  
15 great question. I mean, overall, we have a national shortage  
16 of tech workers. So, let's just start there. I mean, in  
17 programming, we have seen that in government where years ago  
18 there were 10-15 thousand people we couldn't employ in  
19 cybersecurity tech jobs. So, if we look at the national  
20 shortage of where we are as a country, and then, you trickle  
21 that down to diversity, it becomes even more problematic,  
22 right?

23 But I think what we are seeing is this movement in  
24 colleges and universities to sort of focus on computer

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1 science, which I think may become a better shift. I mean, I  
2 have seen Members of Congress, your colleagues, sort of  
3 introduce computer science as a national initiative. It has  
4 not been a national priority.

5 People, you know, they change where they are in terms of  
6 their leaning towards STEM. There are studies that say, with  
7 African-American children, if a young African-American boy is  
8 not actually focused on math by sixth grade, it is less  
9 likely that he will pursue a STEM career when he goes to  
10 college.

11 That is why I say I think it is important for us to look  
12 at the sources of where we are recruiting students and build  
13 up where there is a possibility of more appropriations in  
14 these programs, opportunities. It is also important --

15 Mr. Guthrie. I do have one more quick question I want  
16 to get to.

17 Ms. Ferrini-Mundy. Okay.

18 Mr. Guthrie. I apologize for that.

19 Ms. Oliverio, I wanted to ask you a question about  
20 veterans. I served in the military myself. But I think you  
21 said to maybe Congresswoman McMorris Rodgers, you said,  
22 ``Tech will meet veterans where they are and they will  
23 diversify themselves." I mean, what does that mean, tech  
24 needs to meet veterans where they are?

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1 Ms. Oliverio. By more fellowships, apprenticeships, and  
2 opportunities for veterans to bridge their skills gap in a  
3 field such as coding. Coding is wildly popular, and there is  
4 a lot of professional opportunity across corporate America to  
5 get a job in coding. But that is one major skill that is not  
6 utilized in any branch of service.

7 Mr. Guthrie. And 5 minutes does pass too fast.

8 [Laughter.]

9 So, thank you, Madam Chair.

10 Thank you for your answers.

11 Ms. Schakowsky. Now I recognize Congresswoman Kelly for  
12 5 minutes.

13 Ms. Kelly. Thank you, Madam Chair.

14 Algorithms are the undercurrent of the internet. So  
15 much of what we do online is run by automated machine-  
16 learning algorithms. But it has become clear, as we have  
17 talked about, that bias of all kinds permeates many of these  
18 algorithms.

19 In his written testimony, Mr. Luckie pointed to several  
20 examples of bias output of algorithms. What makes this even  
21 more concerning is that, apparently, no one, often not even  
22 in the engineers and computer scientists creating the  
23 algorithms, really know how these machine-learning algorithms  
24 work. All they really know is what datasets are used to

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1 train the algorithms and what results come out of the other  
2 end. As we often hear, garbage in, garbage out.

3 Ms. Kim, can you expand on how the decisions made by  
4 algorithms can hurt vulnerable communities?

5 Ms. Kim. Thank you, Congresswoman.

6 Ms. Kelly. You're welcome.

7 Ms. Kim. In terms of, again, the specifics of the  
8 technical aspects of why things happen, it is upon industry  
9 to let us know, have more transparency, and work and engage  
10 with us in terms of civil rights organizations and  
11 communities of color to let us know why these things are  
12 happening.

13 But, in terms of the examples that have happened, we  
14 have seen, for instance, in Oakland, California, the police  
15 department using predictive software to send police to  
16 neighbors that are more often than not communities of color,  
17 regardless of the actual crime rate of those neighborhoods.  
18 You see examples again and again like this. And it is upon  
19 us, it is our job as civil society organizations to raise  
20 these issues to tech companies, but the tech companies must  
21 engage, and many have. And we appreciate companies that have  
22 engaged in civil rights audits and other opportunities to  
23 raise these concerns, and often to raise concerns before they  
24 become actual problems. And so, we look forward to

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1 additional engagement.

2 Ms. Kelly. So you feel the companies need to be more  
3 proactive?

4 Ms. Kim. Absolutely.

5 Ms. Kelly. Mr. Luckie, you said that some of the more  
6 major incidents that you listed can result in bad publicity,  
7 which can alienate customers, leading to profit loss. Is it  
8 fair to say that there are biased outcomes that have not been  
9 identified?

10 Mr. Luckie. Absolutely. One of the things about  
11 working at Facebook, in particular, is that you don't see the  
12 fires that the company has put out before it gets to the  
13 public. And there are whole teams that are just working on  
14 getting those out of the public eye.

15 What I will say is that companies like Facebook think  
16 about the best possible uses of their platform and not the  
17 worst. That is where you see issues like Russia and hackings  
18 and privacy, and then, they become issues that they have to  
19 fix later down the road.

20 Ms. Kelly. So, are you saying that companies, again,  
21 need to be more proactive and not just reactive --

22 Mr. Luckie. Absolutely. Absolutely.

23 Ms. Kelly. -- when something happens or when the press  
24 is looking?

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1           Mr. Luckie. And having more people in the room from  
2 different backgrounds will aid in that.

3           Ms. Kelly. Okay. Targeted online advertising has  
4 become so sophisticated that advertisers can skirt federal  
5 law by using interests as a proxy for disability, race, or  
6 other protected traits. Mr. Luckie, what do platforms need  
7 to do to address these loopholes and fight less blatant forms  
8 of discrimination?

9           Mr. Luckie. It is really about the education and making  
10 sure that that is being disseminated from the top. Too often  
11 what is happening is this is happening on a ground level,  
12 where employees are fighting the good fight and educating up,  
13 rather than that happening top-down. And so, it has to be a  
14 priority for leadership and them to be vocal and, also, to  
15 hold people accountable in order to make sure that these  
16 things aren't happening.

17           Ms. Kelly. Dr. Turner Lee, do you have anything more to  
18 add?

19           Ms. Turner Lee. Yes, I would add, the interesting area  
20 that we are in, Congresswoman, right now is the fact that we  
21 do not have demographic data collected about us by technology  
22 companies. And so, what you are suggesting is that use  
23 proxies, your zip code, maybe your profile picture, things  
24 that actually are subjective measures to sort of come at your

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1 identity. Because a lot of what we see in algorithms are  
2 inferential circumstances, right, it is inferring from my  
3 purchasing behavior where I visit, who I speak to and connect  
4 to, the type of person that I am; therefore, determine the  
5 type of product that I might be interested in. Thus, leading  
6 to targeted advertising.

7 I think there is an opportunity here for Congress as  
8 well as the tech sector to think about ways to look at how to  
9 correct bias. Are there secondary datasets that they can use  
10 to sort of ensure, as Mr. Luckie has said, that this  
11 algorithm is not going to generate an unintended consequence?

12 Are there cases where they want demographic data and want  
13 permission from consumers to collect that, to ensure that the  
14 algorithm will not be biased? I think as we go forward those  
15 conversations will need to be had.

16 I think it is also important for customers and consumers  
17 to have a feedback loop.

18 Ms. Kelly. Let me just get my last question in --

19 Ms. Turner Lee. Yes.

20 Ms. Kelly. -- which you can answer and anybody else.  
21 What is the role of the federal government? Do federal laws  
22 and guidelines need to be updated to reflect changes in  
23 advertising technologies? So, I just wanted to quickly get  
24 that.

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1 Ms. Turner Lee. Yes, and I will be quick. I have said  
2 it, and I will keep saying it. I think we need to revisit  
3 those nondiscrimination laws and, where they are applicable,  
4 apply them to digital space, and maybe not do it in a way  
5 that is punitive, but just extend those protections to  
6 consumers.

7 Everything that you have heard around algorithm bias is  
8 mitigated through existing guardrails, but I also think that  
9 it is important that we have self-regulatory measures where  
10 the tech sector sits down with civil society, it has been  
11 mentioned, to think through these cases. There are going to  
12 be use cases where data will be weaponized against  
13 communities of color, against women, against people with  
14 disabilities, and we need to find ways to stop that.

15 Ms. Kelly. Thank you.

16 Ms. Schakowsky. Now I recognize Congressman Gianforte  
17 for 5 minutes.

18 Mr. Gianforte. Thank you, Madam Chair.

19 And thank you for the panel today, for your testimony.  
20 This is a very important topic.

21 In our technology business, we found that internship  
22 programs and coding classes were effective ways to train and  
23 recruit good hires. And I would love to hear from Dr.  
24 Ferrini-Mundy. With that in mind, can you please discuss

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1 some of the steps your university is taking to engage with  
2 the local business community to match up the educational  
3 pursuits with the needs in the marketplace?

4 Ms. Ferrini-Mundy. Thank you for the question.

5 We, of course, are situated in Maine, in a rural state  
6 like yours. So, we are very, very eager to be certain that  
7 we are serving the economic development of the State of Maine  
8 with very well-prepared students who will engage that  
9 business and industry. And there are a few key fields where  
10 this is especially opportune for us in Maine, in the forest  
11 resources industry and agriculture fields, in the marine  
12 science areas, for a few. Those fields are all becoming  
13 increasingly technological. So, they are not high-tech in  
14 the sense that we are discussing here exactly, but they  
15 really do depend upon people who will bring the kind of  
16 knowledge that we are discussing.

17 So, we are very eager. We have a number of important  
18 internship opportunities. We have an incubator that allows  
19 students to work together with companies that are looking to  
20 expand and new companies coming into the state. We try to  
21 make those real-world problems that these companies are  
22 facing a part of the education of our students.

23 Mr. Gianforte. Okay. Thank you.

24 We have been talking a lot today about the shortage of

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1 workforce. One of the things we have experimented with --  
2 not experiment, we have done it in Montana -- was we,  
3 particularly in the computer science curriculum, we have  
4 introduced a bachelor of arts in computer science versus a  
5 bachelor of science --

6 Ms. Ferrini-Mundy. Right.

7 Mr. Gianforte. -- to attract more people.

8 Mr. Guthrie was asking about how do we broaden the net  
9 to attract more people into these STEM programs at a college  
10 level. Could you just talk to that a little bit, about other  
11 things we might try?

12 Ms. Ferrini-Mundy. Sure. And I should say that, prior  
13 to coming to the University of Maine, I worked at the  
14 National Science Foundation for a number of years, and was a  
15 part of a variety of conversations there. In part, the NSF  
16 has identified something called The Future of Work at the  
17 Human-Technology Frontier, as one of its initiatives that is  
18 described on their website. And that is a program that is  
19 calling for research that will help us to better understand  
20 these technological changes that our society is addressing  
21 and how we can really better understand what it takes to  
22 prepare people to work in these spaces.

23 So, within computer science, for example, there is a  
24 national conversation about what you described, creating the

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1 BA in computer science, but also the notion of computer  
2 science plus some other field as a kind of major. So,  
3 computer science plus biomedical engineering, computer  
4 science plus sociology. The idea that we want to advertise  
5 to students, the computer sciences is meant to help us solve  
6 a very wide range of problems, not only problems that are  
7 specifically in some vision of technology that may be an old-  
8 fashioned one.

9 Just one quick last point that I wanted to make relative  
10 to the discussion of the algorithms and the algorithmic bias.

11 I do think that a piece of addressing this should be sitting  
12 within universities as well, so that researchers are working  
13 within machine learning, within AI, to understand and help to  
14 shape these algorithms in ways that are consistent with the  
15 kind of diversity we are talking about.

16 Mr. Gianforte. Well, I certainly agree with you. It is  
17 a truism that computers are here to stay, and I can't imagine  
18 any degree that wouldn't benefit --

19 Ms. Ferrini-Mundy. Right.

20 Mr. Gianforte. -- without some minor in computer  
21 science --

22 Ms. Ferrini-Mundy. Right.

23 Mr. Gianforte. -- making a better candidate for any  
24 job in the marketplace.

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1 Ms. Ferrini-Mundy. Absolutely.

2 Mr. Gianforte. Yes. Ms. Oliverio, I understand your  
3 organization works with veterans. We have the second-highest  
4 per capita number of veterans of any state in the country in  
5 Montana. Some people might have a difficult time  
6 understanding how a ranch hand or a combat veteran might end  
7 up in the tech industry, but I believe the key to a good  
8 employee is always work ethic and selflessness. I am  
9 interested in having you just summarize for me briefly the  
10 work that you do to help veterans make that transition into  
11 the tech industry.

12 Ms. Oliverio. For us at Military Talent Partners, we  
13 believe that everything begins with mentorship, understanding  
14 the goals and the purpose and helping veterans and spouses  
15 really find their "why" and understand what they want to  
16 accomplish in their career. It may have absolutely nothing  
17 to do with their job in their service, but by aligning their  
18 goals and their purpose, they become empowered to find a  
19 meaningful career that is meant for them.

20 Mr. Gianforte. Okay. Great.

21 And just, Ms. Houghton, if I could, I understand some  
22 companies exclude people with disabilities. One of the  
23 reasons they give is the cost. Can you just comment briefly  
24 on how can companies accommodate costs associated with hiring

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1 people with disabilities and what impact that really has?

2 Ms. Houghton. So, I think that that is a myth, and that  
3 what we have found and what we have shown with the Accenture  
4 data is that it is quite the contrary. For companies that  
5 are committed to disability inclusion, they actually four  
6 times greater total shareholder returns.

7 Mr. Gianforte. Thank you for your enthusiasm.

8 With that, I yield back.

9 Ms. Schakowsky. Mr. O'Halleran, I recognize you for 5  
10 minutes.

11 Mr. O'Halleran. Thank you, Madam Chair.

12 And, Panel, I have really appreciated this discussion  
13 today.

14 Mr. Luckie had identified within his written testimony  
15 at least that there were 22 percent of rural residents that  
16 did not have the high-speed broadband ability to be able to  
17 even get prepared for the industry. Whether it is gender  
18 bias or racial bias or disability bias or geographic bias,  
19 and it really bothers a lot of us on all those fronts, along  
20 with our veterans, the bottom line is that it is still human  
21 input into this process and somewhere along the line these  
22 organizations need to identify that peer review, and input  
23 from the community is critically important to be able to get  
24 some fairness into the process. I would rather see that done

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1 through the companies themselves, and I think that that is  
2 the direction we need to go.

3 I am going to kind of go to the geographical issue right  
4 now. Dr. Ferrini-Mundy, you have mentioned a ton of programs  
5 at the university, but it gets down to how do we get students  
6 from those geographic areas. My district in Arizona has 12  
7 Native American tribes that make up 24 percent of the  
8 district's population. Twenty-some percent of the district  
9 population is Hispanic. A tremendous amount of poverty.  
10 Arizona is a big state. Sixty percent of the land mass of  
11 that state is in my district.

12 And so, the problem becomes that, when it gets down to  
13 just the sheer technology needs, and now that we are going  
14 from where we are at now to 5G, I think personally that that  
15 is going to put rural America and those areas back further,  
16 even though they will get better than what they have, they  
17 will lose ground from where people are going to be in urban  
18 areas. What is your experience in getting students from  
19 those areas, first, into the university, keeping them in the  
20 university, and getting them into these programs? Also, we  
21 have, obviously, many of those families that the first time  
22 they hit the university is the first person from that family  
23 ever to get there.

24 Ms. Ferrini-Mundy. Right, right. So, I can speak to

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1 that in a couple of ways. In the University of Maine, we are  
2 actually a part of a university system with several regional  
3 campuses across the state, many of them located in extremely  
4 rural areas. In fact, one of them, the University of Maine  
5 at Machias, is a regional campus of the University of Maine.

6 And so, we are very dependent upon making certain that those  
7 campuses, and particularly Machias, are responding to the  
8 challenges and issues of that particular geography. It is a  
9 coastal area. It is a very economically-disadvantaged area.

10 So, we are seeing that campus really thrive as a center for  
11 the community, as a way to address issues that are of  
12 interest there, to try to build a workforce that can thrive  
13 in such areas as health care and community services. So,  
14 some of this is about customizing what the institutions offer  
15 to the regions that are there.

16 The broadband issue is a serious challenge in Maine.  
17 And so, we face that in a variety of ways, working together  
18 with the state, with the legislature, to see what kind of  
19 progress we can make on that front. Because online  
20 opportunities will continue to abound, and we want to be  
21 certain that those are accessible to all students.

22 Mr. O'Halleran. How much of a disadvantage is this to  
23 those residents and their children from those areas versus  
24 urban areas?

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1 Ms. Ferrini-Mundy. It certainly is a major challenge.  
2 That is why at this point we want to be certain that our  
3 regional campuses are providing very good opportunities and  
4 services, ranging from programs for first-generation college-  
5 going students to other kinds of support. But it is a  
6 serious problem for us in our state.

7 Mr. O'Halleran. And just a comment towards the end here  
8 on our veterans. First of all, it is Women's Month and we  
9 need to make sure that -- we can't just take 50-some percent  
10 of our population and not them have an active high-level role  
11 in our society and leaders of our society. But our veterans,  
12 again, when you take a look at the training that our service  
13 personnel go through, that is a key indicator of leadership  
14 in the future, the ability. All they need is that little bit  
15 extra to be able to adapt. It is not changing; it is  
16 adapting to a new role. We all go through that in life, and  
17 we just need to make sure our veterans have that opportunity.

18 So, thank you for what you are doing.

19 I yield.

20 Ms. Schakowsky. Mr. Carter, you are recognized for 5  
21 minutes.

22 Mr. Carter. Thank you, Madam Chairman.

23 And thank all of you for being here. We appreciate  
24 this. This is certainly a very important subject.

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1 I want to start with you, Ms. Ferrini-Mundy. Is that  
2 right?

3 Ms. Ferrini-Mundy. Yes.

4 Mr. Carter. I'm sorry. Thank you.

5 Obviously, you have got an extensive background in  
6 developing policies that would help young people enter into  
7 the job market and into new opportunities, particularly as it  
8 relates to STEM and particularly as it relates to getting a  
9 number of minorities involved, a number of those who don't  
10 have the opportunities perhaps that some others do.

11 Would you agree that there is a major problem in the  
12 number of minority communities that have access to these STEM  
13 fields and tech-related jobs?

14 Ms. Ferrini-Mundy. Certainly if we look at the numbers  
15 of minorities well represented in the STEM fields, there is a  
16 problem.

17 Mr. Carter. Right.

18 Ms. Ferrini-Mundy. I mean, those numbers should be  
19 tracking at least with representation across the society.

20 Mr. Carter. So, let's talk about that for just a  
21 second. When you say ``STEM," I think we all think of just  
22 STEM and more engineering.

23 Ms. Ferrini-Mundy. Right.

24 Mr. Carter. But there is more to it than that.

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1 Ms. Ferrini-Mundy. Certainly, certainly.

2 Mr. Carter. In the State of Georgia, we have been very  
3 successful in building up our film industry through tax  
4 credits and different incentives, and through the work of the  
5 Georgia state legislature, and particularly the economic  
6 development committee in the house and our chairman.  
7 Chairman Ron Stephens has done an outstanding job. It has  
8 resulted in a lot of opportunities for these type of jobs.  
9 It has created a number of jobs.

10 One of the things that we are very proud of is the  
11 Georgia Film Academy. That was established through the  
12 state, and it runs through 12 different institutions, through  
13 the university system and the technical college system. They  
14 offer degrees and certificates, and that is the type of  
15 thing.

16 Can you think of any other examples like this where it  
17 necessarily might not be engineering jobs per se, which is I  
18 think what we think of when talk about STEM? But it is  
19 opportunities, nonetheless, and good opportunities and good-  
20 paying jobs.

21 Ms. Ferrini-Mundy. I would mention a few areas at least  
22 that are relevant for us along these lines in Maine and that  
23 do require some combination of background in science,  
24 technology, engineering, and mathematics. I will keep

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1 putting in plugs for mathematics and statistics as central  
2 features for these areas.

3 But industries such as the forestry industry in the  
4 State of Maine or aquaculture, a growing industry in our  
5 state, these are industries that do depend on technological  
6 solutions to some of the challenges that they face.  
7 Agriculture, more generally, is, of course, also facing  
8 opportunities with new technologies. So, people with a range  
9 of backgrounds really can come together to solve the sorts of  
10 problems that these industries face in states that are  
11 particularly suited to particular industries.

12 Mr. Carter. Great. And thank you for mentioning timber  
13 because Georgia is the No. 1 forestry state in the nation.  
14 That is something that is very important to us as well.

15 Real quickly, I am going to switch over to you, Ms.  
16 Oliverio. I'm sorry. I hope that is okay. But I am very  
17 blessed; in the First Congressional District of Georgia we  
18 have four military installations. We have a number of  
19 veterans. We are home to over 75,000 veterans. Our quality  
20 of life and all the things that we enjoy, our environment,  
21 lead to a lot of people retiring in our area, particularly  
22 after we have four military installations, a lot of them just  
23 stay there and retire.

24 The hiring of veterans, this is something that is very

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1 important. A lot of companies in the First District have  
2 really capitalized on this and found the veterans to be  
3 excellent employees. What are some of the challenges that we  
4 face, that veterans have faced, to being hired?

5 Ms. Oliverio. Specifically, to the major Atlanta area,  
6 there are a number, a massive number of veterans that want to  
7 relocate to that area and to work, and have struggled to find  
8 meaningful job opportunities to get in front of the  
9 interviews. So, while there is a huge footprint for veterans  
10 in that area in the beautiful State of Georgia, we can do  
11 better on the messaging on what is available for veterans and  
12 how we can better acclimate them into the businesses in that  
13 state, and then, therefore, retain them and mitigate turnover  
14 issues across the landscape of the corporate build in  
15 Georgia, and in specifically Atlanta. But if we can make it  
16 more well known as to what is available and welcome them in,  
17 we would have a much higher success rate.

18 Mr. Carter. Is there anything we can do from a state  
19 perspective or from a government perspective as far as  
20 certificates, as far as our technical schools are concerned?

21 Ms. Oliverio. Absolutely. I think encouraging  
22 mentorships or fellowships or apprenticeships of technical  
23 schools is an excellent idea. It is making it known. We  
24 create a lot of great programs and ideas, but the word

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1 doesn't get out, and it becomes too difficult for people to  
2 understand how they can apply to it or how they qualify or  
3 how their business will fit into that model. So, by making  
4 it more accessible, they can take more advantage.

5 Mr. Carter. Great. Well, thank you all very much.

6 This is extremely important.

7 And thank you, Madam Chair, and I yield back.

8 Ms. Schakowsky. Thank you.

9 And now, I am calling on Congresswoman Blunt Rochester  
10 for 5 minutes.

11 Ms. Blunt Rochester. Thank you, Madam Chairwoman, and  
12 thank you for having this very important panel.

13 Diversifying and including folks in the tech industry is  
14 one that I think all of us on the committee can agree with.  
15 I really wanted to use this time to talk about the fact that,  
16 whether it is diversifying the workforce or whether it is the  
17 products that are being created, if you don't have  
18 representation, we don't get a good product. We have already  
19 heard the stories of facial recognition that might not  
20 recognize darker-skinned people or voice-enabled devices that  
21 have a hard time with accents. And at its worst, we have  
22 seen algorithmic bias result in criminal risk assessment  
23 software predicting that black offenders were almost twice as  
24 likely to reoffend than white offenders, even though their

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1 history showed otherwise.

2 So, it is really vitally important to have this panel.

3 I am grateful to the diversity even of the panel that is

4 represented here and for the work that you do.

5 My first question is for Dr. Turner Lee. In your

6 written testimony, you mention COMPAS, the AI software used

7 across the country by judges to determine how likely a

8 convicted criminal is to commit more crimes. Can you speak

9 more about the real-world consequences of the bias found in

10 the program?

11 Ms. Turner Lee. Thank you, Congresswoman.

12 Yes. I think as a researcher -- and I have a degree in

13 sociology -- I think that is a really important use case that

14 deserves some more discussion. What we are talking about in

15 the COMPAS algorithm is the ability of judges to rely upon

16 automated decisionmaking to assess whether or not people

17 should have longer sentences, be released on bail, et cetera.

18 But the challenge with that comes -- and I think we have

19 heard it a few times -- in the training data. We all know in

20 the criminal justice system that African-Americans are more

21 likely to be arrested. They, therefore, are more likely to

22 be populated within this training set. As a result of that,

23 when it comes to sentencing, they are more likely to be

24 penalized or assessed larger penalties because of their

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1 overrepresentation there.

2 That is problematic because what that is suggesting is  
3 that we are not taking technology and assessing against  
4 settled research, settled stereotypes, or information that we  
5 know are assumptions about stereotypes, which brings in, I  
6 think, what was discussed around implicit and conscious bias,  
7 and it also brings in structural race and the discrimination.  
8 Unless we fix those, we, then, develop products that will  
9 continue to pick up on those errors.

10 Ms. Blunt Rochester. Right.

11 Ms. Turner Lee. And so, again, Congressman, you picked  
12 up on something that is quite problematic because there are  
13 irreparable consequences to being incarcerated longer that we  
14 cannot solve.

15 Ms. Blunt Rochester. Thank you.

16 And it leads me to Mr. Lopez. I know you were the  
17 longest-serving general counsel at the U.S. EEOC. What role  
18 should the EEOC play in all of this? And do you have the  
19 tools?

20 Mr. Lopez. Yes. No, I think the EEOC has been very  
21 active in terms of collecting the data on the absence of  
22 diversity in the high-tech field. It has also held, I  
23 believe, three commission meetings which focused on  
24 developing information on the use of big datasets as

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1 employment screens, which is, I think, one of the more  
2 controversial and one of the most important areas in terms of  
3 how predictive analytics are now being used as a way to  
4 recruit and to select applicants.

5 And I think what happens is that many of the companies  
6 involved in these efforts market them as a way to actually  
7 eliminate bias, and that is a possibility. I mean, really  
8 big data, data analytics, if used correctly, is not  
9 necessarily a bad thing. I don't think any of us are coming  
10 here as Neo-Luddites against the technology. But I think the  
11 EEOC has been very active in terms of talking about the  
12 problem of bad data in, bad data out, some of the inherent  
13 biases in these tools in terms of addressing discrimination.

14 Ms. Blunt Rochester. Thank you.

15 And, Ms. Houghton, I want to briefly say that I was  
16 pleased to see the work that you are doing, and I also wanted  
17 to reinforce what you said about the statistics for people  
18 with disabilities. When you intersect that with being a  
19 woman or being a person of color, it is even double. In the  
20 last 20 seconds, could you talk about some of the myths that  
21 people, particularly employers, have for hiring individuals  
22 with disabilities?

23 Ms. Houghton. I think that that is a great question,  
24 Congresswoman. And there are a lot of myths. There are

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1 myths that the talent doesn't exist. There are myths that,  
2 if I hire these people, that they are going to cost me money,  
3 that they are going to sue me, and on and on and on.

4 Ms. Blunt Rochester. Great. And I yield the balance of  
5 my time.

6 Ms. Schakowsky. Mr. Bucshon, you are recognized for 5  
7 minutes.

8 Mr. Bucshon. Thank you very much.

9 My daughter is currently majoring in computer science at  
10 Cornell University. She is a junior, and she is primarily in  
11 STEM because, when I first came to Congress, I heard all  
12 these stories about how we needed more diversity in STEM,  
13 which is very true, and we all agree on that, I think. I  
14 told her, look, if you want a job, you should probably look  
15 at computer science, and she did. So, it is the only kid  
16 that has listened to me so far. The rest of them, you know,  
17 they won't listen.

18 [Laughter.]

19 And she will be interning in a large bank in New York  
20 City this summer.

21 And so, in this discussion I think -- and I apologize, I  
22 had another hearing -- but we a lot of times focus on edge  
23 providers like Facebook, Google, Twitter, and other tech  
24 companies like that. But, really, these opportunities are

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1 growing across all sectors of our economy.

2 And so, Dr. Ferrini-Mundy, can you explain how  
3 universities are working to promote these types of tech  
4 opportunities to their students, including, for example, the  
5 big banks which are hiring more tech people than they are  
6 bankers?

7 Ms. Ferrini-Mundy. So, again, I think there are many  
8 things universities are doing and can do. One is to make  
9 sure that the education that we provide our students both  
10 deep and broad enough to enable them to seek those kinds of  
11 opportunities.

12 The second is to continue to work to have internships,  
13 apprenticeships, opportunities for students along the way as  
14 undergraduates to get access to chances to work in some of  
15 these different sectors, and to both show what they bring  
16 because of their diversity and their knowledge, and also get  
17 a chance to imagine whether they could work there. Those  
18 frequently turn into offers at those kinds of companies.

19 Mr. Bucshon. Based on American Community Survey-PUMS  
20 data, 1.1 percent of people from Indiana have a degree in  
21 computer science. Again to you, diversity is important in  
22 all industries, including diversity of ideas and background.

23 Can you provide examples of what efforts universities might  
24 be taking to promote STEM degrees like computer science in

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1 rural communities? And honestly, I think this may be as  
2 applicable to urban settings also, but particularly rural  
3 communities that may not have the knowledge of these job  
4 opportunities offered in the tech sphere.

5 Ms. Ferrini-Mundy. A lot of the examples that I am  
6 aware of have to do with working at the K-12 level, to  
7 actually go into schools, to create after-school learning  
8 opportunities, coding kinds of programs. So that students  
9 can get a picture of what it might be like, rural students  
10 particularly who may not have a good opportunity to see these  
11 options, and then, imagine what they could be in those  
12 careers. So that they can follow a pathway that will take  
13 them toward an undergraduate major.

14 Mr. Bucshon. Dr. Turner Lee, why do you think we are  
15 having a discussion about the lack of diversity in tech? I  
16 mean, what is your fundamental view about -- I mean, why? I  
17 think we have answered some of that today and we have given  
18 some opinions today. But that is fundamentally why we are  
19 here, right? We all believe that diversity is very  
20 important, diversity based on like my daughter; she is a  
21 woman. And then, what is your view? I mean, fundamentally,  
22 when you get really cut to the chase? And what can we do  
23 about it?

24 Ms. Turner Lee. Yes, I think, fundamentally, we are

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1 having this conversation because we are in this fourth  
2 Industrial Revolution, right? And this Industrial Revolution  
3 has people tethered to technology, and we are seeing the  
4 consumption trends sort of amplify itself to the extent to  
5 which people who are now consuming these products are not  
6 part of the decisionmaking of these products.

7 And just like we saw in other industries, let's just go  
8 back, we saw in the '60s and '70s the same type of diversity  
9 programs initiated to bring in more representation, and they  
10 made companies better. And so, I think, going forward, we  
11 are --

12 Mr. Bucshon. Yes, for medicine, for example.

13 Ms. Turner Lee. Yes, medicine.

14 Mr. Bucshon. I am a doctor. My wife is a doctor.

15 Ms. Turner Lee. That is right. Automobiles --

16 Mr. Bucshon. Right. If you look back at the '60s, the  
17 makeup of people who are physicians was not very diverse,  
18 right?

19 Ms. Turner Lee. Yes. I just think we are at a turning  
20 point, Congressman. I think it is one of those conversations  
21 that for years people have been discussing, but, as  
22 technology becomes more entrenched and the boundaries between  
23 the physical space and the digital space become much more  
24 connected, that we are just trying to figure out as a

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1 country, for us to be internationally competitive, how do we  
2 bring in more diverse perspectives and minds. That is why  
3 the diversity of this panel reflects this conversation.

4 By the same token, we don't want these products that  
5 people are depending upon -- we are no longer an in-line  
6 economy; we are in an online economy -- to hurt them or harm  
7 them. And that is why we are having a discussion around  
8 consumer protection. So, I think that is at the crux of why  
9 we are here today.

10 Mr. Bucshon. Okay. Thank you. I yield back.

11 Ms. Schakowsky. Beautiful.

12 I am calling on Mr. McNerney right now for 5 minutes.

13 And I just want to say, you are seeing that people are  
14 coming back. They really feel that this panel and this  
15 discussion is very important.

16 Mr. McNerney?

17 Mr. McNerney. Well, thank you. I thank the chair.

18 And I thank the witnesses. I apologize for missing most  
19 of your testimony.

20 But, first of all, I want to say I am a mathematician by  
21 education. I co-chair the Congressional AI Caucus. And I  
22 represent a district that is very, very diverse. So, while I  
23 am excited about many of the technology innovations that we  
24 are witnessing today, I am also concerned that many people

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1 will be left behind, and what that means for my district and  
2 my constituents.

3 Specifically, I am worried about how automated  
4 decisionmaking can impact my constituents' ability to obtain  
5 a loan, to receive social services, to see housing ads, to be  
6 promoted in jobs, or even to get consideration for a job in  
7 the first place. So, it is clearly critical that the teams  
8 designing these products are representative of who the  
9 products are going to serve.

10 Now there is a real need for greater transparency in how  
11 these algorithms are produced and the decisionmaking is made.

12 Mr. Lopez, in your written testimony you noted that  
13 algorithms are often predicated on data that amplifies,  
14 rather than reduces, the already present biases in society,  
15 racial, ethnic, and socioeconomic. Can you elaborate on that  
16 a little bit, please, and maybe provide an example?

17 Mr. Lopez. I mean, I think a good example would be  
18 using social media to advertise for housing opportunities and  
19 to limit the advertisement to certain zip codes. Zip codes  
20 have traditionally, due to the history of housing segregation  
21 in this country, have often been used as a proxy for minority  
22 --

23 Mr. McNerney. So, is that being done by algorithms or  
24 by human beings, those decisions, or both?

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1           Mr. Lopez. Everything that we are talking about is  
2 being done by human beings at the end of the day. I think  
3 what happens is that the algorithms -- and let me use a  
4 different example from the employment context. Let's say  
5 there is a correlation between having an interest in manga  
6 comic books and being somebody who might be a good computer  
7 engineer. This is a real example. But, again, the  
8 individuals -- it is correlation, not causation -- and the  
9 individuals that tend to have an interest in manga comic  
10 books tend to be men, right? And so, if you start to use  
11 that algorithm to select computer engineers, what you do is  
12 you sort of reinforce and you replicate, I think, the general  
13 systemic exclusion of women.

14           Mr. McNerney. So, that is an example of why machine  
15 learning makes bias more difficult, right?

16           Mr. Lopez. Yes, yes.

17           Mr. McNerney. Thank you.

18           Ms. Turner Lee, in your testimony you mentioned that you  
19 will be issuing a paper next month addressing a course of  
20 developing quality instruments and questions to measure  
21 algorithmic bias. Do some of these instruments already  
22 exist?

23           Ms. Turner Lee. There are some instruments, and I think  
24 it has been mentioned that we have seen companies more on the

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1 tail end that do audits. The paper that we will be releasing  
2 at Brookings is more of a forward-thinking paper, to your  
3 point, and it is coming up with questions. Do we need an  
4 algorithm for this actual use case? If we do, is there  
5 diversity in design? A lot of the questions that you are  
6 asking. Are the right people at the table? Is civil society  
7 part of the conversation and debate? Is there a feedback  
8 loop? I think that is part of the pathway toward more  
9 responsible governance over the way that we are constructing  
10 algorithms, evaluating, et cetera.

11 But I do want to suggest to you, Congressman, something  
12 in your previous question. I don't want us to put in a  
13 bucket that all technologies are acting discriminatory or  
14 racist.

15 Mr. McNerney. Right.

16 Ms. Turner Lee. I think the way the technology has been  
17 structured and how opaque the internet has become, these  
18 algorithms are adapting to our human behavior. So, there are  
19 cases where a developer, a technologist, may not say, "I  
20 want to flag women for this particular job." But how the  
21 internet has actually become layered, it will see the name  
22 Mary and assume that Mary is a woman, and populate itself and  
23 operate and function pretty much adapting to the historical  
24 biases that we have as a society.

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1 Mr. McNerney. Again, that is machine learning, a  
2 machine-learning tool.

3 Ms. Turner Lee. That is machine learning, yes. And I  
4 think the paper that we are going to be putting out is really  
5 trying to help companies have a more proactive stance to  
6 actually how you look at these conditions and how you look at  
7 these teams, and how you look at these outputs, and come up  
8 with solutions to do something about it.

9 Mr. McNerney. Well, you also mention that businesses  
10 have taken action to correct bias, such as Facebook and  
11 Google, but that was only after a lot of public pressure.  
12 Are there examples of companies that have proactively acted  
13 or do you think that is a trend that we could expect to see  
14 without significant motivation from Congress?

15 Ms. Turner Lee. I actually want to say that there are  
16 companies that are taking advantage of this. Microsoft is  
17 another case where they are actually very proactive in how  
18 they design algorithms. They had a case where they put out a  
19 voice-activated computation or application that was picking  
20 up -- it was taking in people's voices and, basically,  
21 putting out very antisemitic and racist stuff. They took it  
22 off market, right, because the developer did not anticipate  
23 those consequences.

24 So, I think we are seeing a blend, which is why I said

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1 previously and put it in my testimony, self-regulation is not  
2 a bad idea. It is just a combination of how do we combine  
3 that framework with what we already have existing in our  
4 resource kit.

5 Mr. McNerney. Thank you. I yield back.

6 Ms. Schakowsky. Mr. Soto, for 5 minutes. Welcome back.

7 Mr. Soto. Thank you, Madam Chair.

8 It was briefly mentioned before, a report came out from  
9 the ACLU about new facial recognition technology where they  
10 downloaded 25,000 arrest records, used them against pictures  
11 of every current Member of Congress in the last term. There  
12 are 28 false matches. People of color made up 20 percent of  
13 Congress at that time, more now, by the way. And 40 percent  
14 of the false matches were people of color, including  
15 legendary civil rights hero John Lewis. Obviously, the  
16 software as it stood there would disproportionately target  
17 minorities. This is a technology that is being used in my  
18 hometown of Orlando, only voluntarily, to track officers to  
19 test the technology, but certainly it is something that is  
20 concerning for us.

21 Recently, I got to join Representatives Brenda Lawrence,  
22 Ro Khanna, and others, on ethical guidelines for AI  
23 development, including transparency and process, empowering  
24 women and underrepresented populations, and accountability.

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1 So, it really brings up sort of a broader topic of what  
2 Congress' role is in being able to address these things.

3 I will start with Dr. Turner. Some of the algorithmic  
4 bias mentioned today is the result of bias datasets, are  
5 there practices and procedures that can be implemented to  
6 reduce the bias in training data that could be helpful?

7 Ms. Turner Lee. Yes, I would say start with  
8 overrepresentation, right, of what those faces look like.  
9 So, an MIT researcher -- and I don't want to butcher her last  
10 name; maybe Mr. Luckie can help me -- Joy Buolamwini has  
11 actually done a lot of studies where she has actually said a  
12 lot of facial recognition technologies do not work because  
13 they are underrepresented in terms of African-Americans or  
14 darker skin used. So, we have to actually populate the  
15 training data where it reflects the entire population.

16 I think part of the problem we have, Congressman, why  
17 people don't do that, as a researcher, I am subjected to  
18 guidelines when it comes to IRB requirements and human  
19 conditions. We are rushed to market when we come to  
20 proprietary algorithms, right? It is who gets there first.

21 And so, I think having some attention to  
22 overrepresentation is really important. Also, feedback loops  
23 also help with the training data. The paper that we will be  
24 releasing will talk a little bit about the technical side.

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1 Again, I'm not a computer scientist. I am interested in the  
2 civil rights outputs that actually come as a result of that  
3 and what legislators should actually be looking for. But I  
4 think combining those conversations and having multi-  
5 stakeholder conversations is also helpful because the left  
6 hand often doesn't know what the right hand is doing.

7 Mr. Soto. Thank you.

8 And for Ms. Kim, what is the role for increased  
9 transparency and explainability in reducing algorithmic bias?

10 Ms. Kim. Thank you, Congressman.

11 In looking at the decisionmakers within the tech sector,  
12 the employees, the professionals, the technicians, as well as  
13 the executives that make much of the decisions, we need to  
14 have more diversity. And the transparency that we need is  
15 more data. We applaud the efforts of companies that  
16 voluntarily release diversity data for recruitment,  
17 retention, and attrition data.

18 But, for the AAPI community, that data is incomplete  
19 because it is not disaggregated. Our communities are so  
20 diverse, and we have to look beyond the glare of the model  
21 minority and say, what is actually going on behind the  
22 aggregated number? Yes, there are more Asian tech workers  
23 than other minority groups, but, in fact, if you look deeper  
24 -- and we don't have these numbers, but based on other

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1 industries and other Census data and other information, we  
2 know that there are communities that have incredibly high  
3 poverty rates, low educational attainment levels, and high  
4 limited English proficiency levels that don't get represented  
5 at educational levels in schools, in other sectors. And so,  
6 we need more data and more information and transparency from  
7 tech companies, so that we can see what is actually going  
8 on underneath that model minority myth of Asian-Americans are  
9 doing okay.

10 Mr. Soto. Thank you, Ms. Kim.

11 And I just want to end with sort of a personalized story  
12 from my own family. My little cousins, I can't get them off  
13 of video games. They are of Puerto Rican descent, like I am.

14 And it turned out that when one of my cousins went into the  
15 Air Force, that skill set ended up serving him well to be one  
16 of only two people out of two dozen to actually pass the  
17 drone aviation course.

18 And it occurs to me how critical having access to  
19 technology at an early age is. When you look at Bill Gates  
20 or Bill Joy, or others, the stories go about how they had  
21 access to computers early on, and that proved critical in  
22 them getting their 10,000 hours ahead of everybody and being  
23 able to really change the world. So, those are things that  
24 we also will be taking very seriously to get into, access at

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1 an early age for young people of all communities.

2 Thank you, and I yield back.

3 Ms. Schakowsky. So, I want to thank our panel, but I  
4 also want to see -- I spoke to our ranking member. I would  
5 like 5 more minutes, and I would welcome her taking 5 more  
6 minutes.

7 Mr. Luckie, we have talked a lot about the pipeline and  
8 making sure of the educational system and educational  
9 opportunities. But you said something that really struck me.

10 It is that, even where women and minorities, and others that  
11 aren't represented in the tech industry, are available, that  
12 they still are not hired for those jobs and advancing in the  
13 positions. We also see women leaving those jobs earlier than  
14 men.

15 So, rather than blame the victims, you know, you have  
16 got to go to school and you have got to take these courses,  
17 what are we going to do about -- there is obviously some  
18 discrimination. I really want to stop here, but ask the rest  
19 of the panel, what should we be doing? You have mentioned,  
20 Dr. Turner Lee, that there are discrimination laws that are  
21 in place. You have talked about the EEOC, Dean Lopez. I  
22 mean, what should we be doing, both about the algorithmic  
23 bias that is there, but also just about hiring people,  
24 investing in people right now?

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1           Mr. Luckie. Well, it is like you said, a lot of the  
2           onus has been put on the people who are graduating from STEM  
3           or who have not heard about STEM to break into these tech  
4           companies. But what we are finding is that the stopgap is  
5           actually happening within the interview process, where  
6           employees are not seeing people who look like them. And so,  
7           they are choosing the people who look like them, come from  
8           the same backgrounds, come from the same schools, which puts  
9           others at a disadvantage. We are seeing it in the  
10          discrimination that people face once they are inside of the  
11          companies. What is happening is that people are graduating  
12          from STEM, but end up choosing other industries because they  
13          see the discrimination.

14           I think the most important point that we should take  
15          away from this is that the people who come from diverse  
16          backgrounds are the representatives of these companies who go  
17          back out into the communities and say, yes, you should be  
18          STEM, be in the STEM areas. And so, we have to call on those  
19          people to say, hey, we need you to go back to the  
20          communities; the people who are coming from Maine and from  
21          Texas, and from these locations, to go back and say, you can  
22          do this because I am inside of the company now and I am  
23          making it work.

24           Ms. Schakowsky. I wonder, Dr. Turner Lee, how can we

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1 use the current laws to help here?

2 Ms. Turner Lee. Yes, I think we have some tools in our  
3 toolkit. A lot of the stories that we have heard today, it  
4 is not just the one-time action where it happen, but it is  
5 this latter consequence.

6 The former Obama administration was real key about  
7 putting out reports on algorithmic bias. It is not a new  
8 topic to us. The difference is, as we go over time and we  
9 let this evolve, that we are going to find people being  
10 denied loans. And I don't think we want to see structural  
11 discrimination actually find its place into the internet,  
12 which has always been the low-hanging fruit for opportunity.

13 So, I think what Congress does have at its disposal are  
14 tools to have a conversation around nondiscrimination and to  
15 see which ways do we extend that. And companies, I think, in  
16 the tech sector are starting to realize that. Facebook, in  
17 particular, last year pulled down a process that was  
18 discriminating in the case of housing, where advertisers were  
19 able to click off who they did not want to serve, and they  
20 immediately stopped that process. But they didn't realize  
21 that the Fair Housing Act was one of the levers for why you  
22 shouldn't do that in the first place.

23 So, I think Congress has an opportunity to have  
24 conversations about that, as we have had in the past, as we

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1 see these transitions happen. And I also think it is  
2 important, just to complement your previous question,  
3 Congresswoman, STEM has to be a national priority. This is  
4 no longer a conversation of investing in programs. We have  
5 to invest in people. And if we invest in people, we will  
6 have an international competitive edge on any of these  
7 careers, particularly as digital access becomes much more  
8 permeated and much more embedded in our society.

9 Ms. Schakowsky. There is almost a minute left. Anybody  
10 else want to comment on that? Dr. Lopez? Go ahead.

11 Mr. Lopez. Congresswoman, as part of Congress'  
12 oversight responsibilities over the agencies, I think there  
13 is a real opportunity to ask the relevant agencies, EEOC,  
14 HUD, Department of Justice, FTC, anybody operating in this  
15 space, what they are doing in this area. And it doesn't,  
16 obviously, have to be hostile. I came out of the EEOC. I  
17 happen to think that they have been very forward-thinking in  
18 this area. They continue to be forward-thinking. But I  
19 think that the oversight responsibility and the power of the  
20 purse is very important.

21 Ms. Schakowsky. Go ahead. And did you say something?  
22 Anybody else? Okay.

23 Mr. Luckie. I would just like to say, in terms of the  
24 larger conversation, that we have to stop treating AI and

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1 algorithms as omnipotent, as if they know everything. They  
2 are still being programmed by humans, and we need to  
3 recognize that in order to curb this bias.

4 Ms. Schakowsky. Thank you very much.

5 Mrs. Rodgers. Okay. Madam Chair, I wanted just to  
6 follow up on your line of questioning right there.

7 As I said in my opening statement and opening remarks,  
8 part of the challenge here is that it does demand change. It  
9 is going to demand change in our culture. A lot of the focus  
10 today was on recruitment, and I think that is an important  
11 piece of this. We have to focus on the pipeline. That is  
12 very foundational. Education is important, skills training,  
13 access, and exposure to what is possible. Helping people  
14 imagine is important.

15 We have talked a lot about the value of teams and having  
16 teams -- Mr. Lopez, in your testimony it says, you  
17 highlighted that teams that are made up of individuals of  
18 diverse backgrounds are more innovative and generally make  
19 more error-free decisions.

20 I, too, just wanted to take this at the close here to  
21 kind of those next steps. So, even after we get some of  
22 these individuals hired, what is working as far as the  
23 retention and the promotion? Because there are these next  
24 steps. We have to do better at retaining these employees,

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1 and then, promoting them to leadership positions.

2 I know I have seen some of the work on women where women  
3 respond to the coaching and to giving that feedback. But,  
4 often, when they are given a chance for leadership, they  
5 shine.

6 So, I, too, just wanted to open this up at the end and  
7 ask, what do you see working when it comes to the retention,  
8 and then, the promotion to leadership? And how do we better  
9 invest in these people after they are hired?

10 Do you want to start it, Mr. Luckie?

11 Mr. Luckie. Sure. So, I will say the best thing that  
12 is driving retention is the employee resource groups that are  
13 in major tech companies and businesses everywhere, where  
14 women are helping women, black people are helping black  
15 people. Part of the reason why I stayed at Facebook as long  
16 as I did is because of the black ad group, which was the  
17 employees that were coming together, mentoring each other,  
18 exploring other opportunities inside the company. The more  
19 you empower those employee resource groups, give them the  
20 budget, give them the space in which to operate, the more you  
21 are going to see that retention increase within these  
22 companies.

23 Mrs. Rodgers. Thank you. Okay.

24 And so, do you want to --

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1 Ms. Ferrini-Mundy. Yes, I will just add to that. What  
2 Mr. Luckie is explaining has to do with cultures within these  
3 environments, and those cultures get built by the people who  
4 are there. And so, I would still make my argument that  
5 education and the pathways that get provided through  
6 education, which include early opportunities to work together  
7 in groups, to learn how to be resourceful within particular  
8 subgroups, all of that is critical to building that kind of  
9 culture.

10 Mrs. Rodgers. All right. Thank you.

11 Ms. Kim or whoever is next? Yes?

12 Ms. Turner Lee. If I can, in a previous life I worked  
13 with the cable industry doing some work. What I found there  
14 is that, internally, companies have to have metrics, they  
15 have to have accountability, and they also have to have some  
16 type of executive support. Without it, it doesn't work.

17 Where we know diversity and inclusion works is when  
18 there are bonuses tied to leadership. We know that it works  
19 when the executive claims that this is the only way we are  
20 going to actually conduct business, training, et cetera. And  
21 those invested resources happen at an internal level.

22 Obviously, we can't manage what companies do inside, but  
23 what we can do -- and this is something I think in terms of  
24 what is next -- is we can place a level of stewardship and

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1 responsibility on companies through their reporting, whether  
2 it is mandatory or voluntary. There are tons of regulated  
3 industries that provide voluntary information and scorecards  
4 on how they are doing with diversity. And that is something  
5 I think is going to be an acceptable practice going forward,  
6 because we, as consumers, want to know that people are doing  
7 the right thing. And so, I think, going forward, it is going  
8 to take a mix of the internal pressure and the external  
9 pressure to actually move to a place of, I want to say peace,  
10 where everybody can just get along, but where we actually  
11 indulge ourselves in diversity in ways that make us more  
12 profitability and much more successful as a country.

13 Mrs. Rodgers. Thank you.

14 Do you have any thoughts?

15 Ms. Oliverio. Yes, thank you.

16 I spent more than 10 years in recruiting all across  
17 technical fields, across the U.S. And in any company, in any  
18 demographic, in any background, the key to retention is  
19 making employees feel like they belong. Much like Mr. Luckie  
20 was stating, employee resource groups are amazing, but the  
21 core value there is making employees feel valued, making them  
22 feel like they belong. That is where veterans and military  
23 spouses struggle most to feel like they are a part of a unit  
24 again, to feel like they are welcomed in their work

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1 environment, that they have reasonable accommodation, and  
2 that they belong there. There, they are more likely to stay  
3 and to be happy and to do well.

4 Mrs. Rodgers. Thank you.

5 Ms. Houghton. In addition to seeing yourself and  
6 feeling a sense of belonging, I think one key thing that I  
7 want to make sure gets on the record is that, internally,  
8 within these companies we need accessible technology. If  
9 people are going to grow, technology accessibility has to be  
10 built in from the beginning, not as an afterthought.

11 Mrs. Rodgers. Okay. Thank you, everyone.

12 Ms. Schakowsky. Thank you so much.

13 I think this has been a terrific panel and something  
14 that we, as a Congress, need to follow up on now. Thank you.

15 I request unanimous consent to enter the following  
16 documents into the record. Where are they? okay. The  
17 National Urban League letter on diversity in tech; a letter  
18 from the Electronic Privacy Information Center; the Internet  
19 Association's letter for the record; testimony from Jennifer  
20 Huddleston, research fellow at the Mercatus Center at George  
21 Mason University; a letter from Maxine Williams, Facebook's  
22 chief diversity officer; statement from Representative Maxine  
23 Waters; a blog post and case study from Charter  
24 Communications. Is that it?

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1 Without objection, so ordered.

2 [The information follows:]

3

4 \*\*\*\*\* COMMITTEE INSERT 9\*\*\*\*\*

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1 Ms. Schakowsky. Oh, I have one more page? This? Okay.

2 I would like to thank the witnesses for their  
3 participation in today's hearing.

4 I remind members that, pursuant to committee rules, they  
5 have 10 business days to submit additional questions for the  
6 record, to be answered by the witnesses who have appeared. I  
7 ask each witness to respond promptly to any such question  
8 that you may receive, and you may receive them because a  
9 number of people were traveling from different hearings.

10 So, at this time, the subcommittee is adjourned.

11 [Whereupon, at 12:46 p.m., the subcommittee was  
12 adjourned.]

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