

**PREPARED STATEMENT OF PROFESSOR MEG LETA JONES**

**For the**

**COMMITTEE ON ENERGY AND COMMERCE OF THE U.S. HOUSE OF  
REPRESENTATIVES,  
SUBCOMMITTEE ON COMMERCE, MANUFACTURING, AND TRADE**

**On**

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ADVANCED ROBOTICS**

**Meg Leta Jones, JD, PhD**

**Assistant Professor of International Technology Policy**

**Communication, Culture, & Technology**

**Science, Technology, & International Affairs**

**Georgetown University**

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Prepared Statement of Professor Meg Leta Jones

Chairman Burgess, Ranking Member Schakowsky, and distinguished members of the subcommittee, thank you very much for initiating the Disrupters Series and for giving me the opportunity to testify today on some of the ethical and policy issues surrounding advanced robotics.

I am a professor of international technology policy at Georgetown University working in the Communication, Culture, & Technology program and an affiliate faculty member of the Science, Technology, & International Affairs program and the law school's Center on Privacy and Technology. The views I am expressing here today are my own.

“Robotics” is a broad term that encompasses many technologies and relates to even more. You are no doubt already familiar with some of the ethical and policy issues that arise from robotics. Many of them have been introduced in other sessions of the Disrupter Series, particularly those on drones, wearables, apps, and 3D printing. These include maintaining or improving privacy, security, prosperity, dignity, transparency, accountability, and efficiency across society.

Robotics shares many of these challenges, but all ethical issues are not shared by all robotic systems. For instance, driverless cars does not have the exact same problems as drones or caregiving robots. I will highlight one aspect of advanced robotics that is relevant to robots as information machines: privacy. In my testimony, I make three points:

- 1) Robots present a tremendous opportunity to innovate privacy protection.
- 2) Robots present a range of pressing ethical and policy challenges today that require interdisciplinary attention.
- 3) The federal government can contribute research funding, alternative governance structures, and deliberative spaces to these issues.

## Robot Innovation, Policy Innovation

Without a strict definition, robots can simply be described as the category of technologies that sense (take in information about the environment), think (process that information), and act (take some action in or on the physical environment).<sup>1</sup> Another popular conception of robots is a computer that can perform the job of a human, which includes those that are stationary, mobile, software, and hardware.<sup>2</sup> Robots are often part of other technology categories such as aircraft or motor vehicles. I will be discussing robots as technologies within the internet of things (“IoT”). IoT is the label that encompasses the movement to computerize and connect everything in our lives. Already everyday objects like thermostats, light bulbs, mattresses, pregnancy tests, refrigerators, and cars are internet-enabled. Many of these objects are robots.

Advancements in robotics and artificial intelligence brings along concerns about ethical design and use as well as policy considerations. “Robot ethics” and “robotics policy” conjure fascinating, complex questions like how to avoid creating robot overlords<sup>3</sup> or whether and when robots should be granted rights.<sup>4</sup> My remarks are confined to ethical and policy concerns arising today or in the near future from human interaction with robots. I will use my oral testimony time to speak about privacy issues and have included additional brief descriptions of other relevant topics and potential governance strategies in my written testimony.

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<sup>1</sup> Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103 Calif. L. Rev. 513 (2015).

<sup>2</sup> “March of the Machines,” 60 Minutes CBS News (Jan. 13, 2013).

<sup>3</sup> James Barrat, *Our Final Invention: Artificial Intelligence and the End of the Human Era* (2013); Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (2014).

<sup>4</sup> Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 North Carolina L. Rev. 1231 (1992); Kate Darling, *Extending Legal Protection to Social Robots: The Effects of Anthropomorphism, Empathy, and Violent Behavior Towards Robotic Objects*, in *Robot Law* (Ryan Calo, Michael Froomkin, and Ian Kerr, eds. 2016).

## 1. Robots and Privacy

Robots are information machines. They take in and crunch an extraordinary amount of data to function properly, optimize performance, and tailor experience. And they are poised to herald in a new wave of technological disruption. In 2007, Bill Gates observed, “The emergence of the robotics industry is developing in much the same way that computer business did 30 years ago.”<sup>5</sup> Similar social, ethical, and legal challenges like security threats, alienation from the real world, alterations of cognitive workings, intellectual property disputes, deterioration of human relationships, and changes in the nature of work present themselves in the robotics context. Notable among these concerns is privacy. Those robots intended to interact with people will take in information about individuals, and some will collect, store, process, and share personally identifiable information to provide more tailored or optimized engagement – or simply because they can.

People care about privacy, even if their actions sometimes suggest otherwise.<sup>6</sup> In May 2015, Pew Research Center found that 93% of adults felt it was important to have control over *who* could get information about them and 90% felt it was important to have control over *what* information is collected about them.<sup>7</sup> In January 2016, a report from the TRUSTe/National Cyber Security Alliance (NCSA) Consumer Privacy Index revealed that more Americans are worried about their data privacy than about losing their main source of income.<sup>8</sup> So, in order to encourage

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<sup>5</sup> Bill Gates “A Robot in Every Home,” *Scientific American* (Feb. 1, 2008), <http://www.scientificamerican.com/article/a-robot-in-every-home-2008-02/>.

<sup>6</sup> Alessandro Acquisti and Jens Grossklags, *Privacy and Rationality in Individual Decision Making*, 2 *IEEE Security & Privacy* 24 (2005); Alessandro Acquisti, Laura Brandimarte, and George Loewenstein, *Privacy and Human Behavior in the Information Age*, 347 *Science* 509 (2015).

<sup>7</sup> Mary Madden and Lee Rainie, “Americans’ Views about Data Collection and Security,” Pew Research Center (May 20, 2015), <http://www.pewinternet.org/2015/05/20/americans-views-about-data-collection-and-security/>.

<sup>8</sup> Brian Mastroianni, “Survey: More Americans Worried About Data Privacy than Income,” CBS News (Jan. 28, 2016), <http://www.cbsnews.com/news/truste-survey-more-americans-concerned-about-data-privacy-than-losing-income/>.

the innovation and adoption of robotics, as well as actively participate in the creation of technologies that shape society on behalf of constituents, the opportunity to innovate policy approaches to privacy should be seized.

### 1.1 Notice and Choice

For at least the last fifty years in the Computer Age, notice and choice, as part of the Fair Information Practices Principles, has dominated the meaning and effectuation of privacy in U.S. policy. Notice and choice regimes are intended to notify users of information collected, processed, and used, then provide users with a choice of whether to engage with an information system; the regime establishes a form of informational consent. For the last twenty years in the Internet Age, if you wanted to know how a website or platform gathered and used your information, you could locate and read the privacy policy, usually found hyperlinked at the bottom of each page on a screen. Users can also navigate many online environments in privacy-preserving states using various settings like Google's incognito mode and are often provided and encouraged to revisit their privacy settings through dashboards on screens. These forms of user participation are often given as justification for limited regulations to protect privacy.

Problems with this regime have been uncovered and detailed by researchers since the early 2000s.<sup>9</sup> These include the inability of users to read<sup>10</sup> and understand<sup>11</sup> so many policies and whether a real choice<sup>12</sup> can be made. Participation is hampered by users' inability to know who will be given access to and potential uses of their information in the future, and retroactive

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<sup>9</sup> Daniel Solove, *Privacy Self-Management and the Consent Dilemma*, 126 Harv. L. Rev. 1880 (2013).

<sup>10</sup> Aleecia M. McDonald and Lorrie Faith Cranor, *The Cost of Reading Privacy Policies*, 4 I/S: A Journal of Law and Policy for the Information Society 540 (2008), [http://moritzlaw.osu.edu/students/groups/is/files/2012/02/Cranor\\_Formatted\\_Final.pdf](http://moritzlaw.osu.edu/students/groups/is/files/2012/02/Cranor_Formatted_Final.pdf).

<sup>11</sup> Helen Nissenbaum, *A Contextual Approach to Privacy Online*, 140 Daedalus 32 (Fall 2011), [http://www.amacad.org/publications/daedalus/11\\_fall\\_nissenbaum.pdf](http://www.amacad.org/publications/daedalus/11_fall_nissenbaum.pdf).

<sup>12</sup> Kirsten Martin, *Transactions Costs, Privacy, and Trust: The Laudable Goals and Ultimate Failure of Notice and Choice to Respect Privacy Online*, 18 First Monday (2013) <http://firstmonday.org/ojs/index.php/fm/article/view/4838/3802>

correction or deletion is rarely provided as information moves from the original collector to other parties.<sup>13</sup> Today, apps and wearables add a layer of difficulty to notice and choice because it is simply hard to find and read the privacy policies on the devices.<sup>14</sup>

## 1.2 Privacy without Screens

In an age of smart objects, the Robotic Age, notice and choice breaks down almost fully. Screens, like those on your phone and computer, have formed the foundation of our experience with connected content and information exchanges and participation in the collection and use of our personal data. Robots don't have screens. And a lack of screens promises to further complicate the notice and choice arrangement.

The Federal Trade Commission's internet of things report advises designers and manufacturers of IoTs to protect privacy. The FTC report explains:

Staff acknowledges the practical difficulty of providing choice when there is no consumer interface and recognizes that there is no one-size-fits-all approach. Some options include developing video tutorials, affixing QR codes on devices, and providing choices at point of sale, within set-up wizards, or in a privacy dashboard. Whatever approach a company decides to take, the privacy choices it offers should be clear and prominent, and not buried within lengthy documents.<sup>15</sup>

One can imagine opening up their new drone or robotic personal assistant and watching a video tutorial or clicking through a setup wizard making various selections about data collection and use. Smart objects include the same issues with participating in one's data online but adds an

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<sup>13</sup> Meg Leta Jones, *Ctrl+Z: The Right to be Forgotten* (2016).

<sup>14</sup> Notice and choice *can* work effectively in many contexts to give people confidence and comfort in their information exchanges. See Ryan Calo, *Against Notice Skepticism in Privacy (and Elsewhere)*, 87 *Notre Dame L. Rev.* 1027 (2012).

<sup>15</sup> *Internet of Things: Privacy & Security in a Connected World*, FTC Staff Report (Jan. 27, 2015), available at <https://www.ftc.gov/system/files/documents/reports/federal-trade-commissionstaff-report-november-2013-workshop-entitled-internet-things-privacy/150127iotrpt.pdf>.

extra step because it requires the user to go find a screen. Take for instance Hello Barbie, Mattel’s newest wifi-enabled smart toy that uses voice-recognition to allow kids to have a “real” conversation with Barbie. When one asks Barbie, who records every single interaction, about her privacy policy, she does not ask if you want her to keep your conversation for a certain amount of time or if there are some things she should keep a secret; instead, she explains that an adult can find details on page 2 of the manual that came in the box.<sup>16</sup>

### 1.3 The Internet of Other People’s Things

The robotic future will not be filled with *your* robots and your robots alone. We will regularly interact with other people’s robots. In a world where you get into a driverless Uber, walk into someone else’s smart home, look up to see a couple drones flying overhead, or play with someone else’s Hello Barbie, when and how are you to know what the information practices are and choose to avoid the system? Moving through a smart environment with robots working in various contexts does not present many opportunity to work through a setup wizard or watch a video tutorial. It does not present opportunity to participate in the use of your data.

Even if it did, it’s not your robot. The information practices are selected by someone else. In fact, many elements of the Fair Information Practices Principles that relate to an individual’s ability to control their information, including access to and correction of personal information, are very challenging, if not impossible, in a robotic environment. This is the problem of the Internet of Other People’s Things.<sup>17</sup>

### 1.4 Innovating Privacy

While the FTC should be applauded for proactively considering IoT, an opportunity to invest in solving problems from the Internet Age is being missed. Robotics offers a moment to

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<sup>16</sup> Meg Leta Jones, *Your New Best Frenemy: Hello Barbie and Privacy Without Screens*, 2 eSTS 242 (2016).

<sup>17</sup> Meg Leta Jones, *Privacy Without Screens and the Internet of Other People’s Things*, 51 Idaho L. Rev. 639 (2015).

consider new concepts, new policies, new rules for new technology instead of treating IoT and robots as extensions of the internet. Even the opt-in versus opt-out debate is a stale in the Robotic Age. How can one opt-in or out of data collected by a robot barista or a coffee shop that uses a facial recognition assistant to improve service for regulars? The Robotic Age may be one of an ever-public wherein information is relentlessly collected and processed by unknown entities.<sup>18</sup> But, it does not have to be.

I suggest there are at least two alternative approaches to privacy. The first alternative is a set of legal standards similar to those enacted by the European Union in the Data Protection Regulation; the Article 29 Working Party has published a report outlining its approach to IoT and has a working group on robotics.<sup>19</sup> The second alternative retains notice and choice as central but reverses it. Individuals could notify robotic systems of their information choices and expect that those choices would be respected unless otherwise informed. You can think of this in terms of a robots.txt file – used by web site operators to instruct web robots like search engine crawlers to *not* visit certain pages – for people. By working with roboticists, ethicists, and policy researchers, more ideas will emerge.

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<sup>18</sup> Margot Kaminski, *Robots in the Home: What Will We Have to Agree To?*, 51 Idaho L. Rev. 661 (2015).

<sup>19</sup> Article 29 Data Protection Working Party, Opinion 8/2014 on Recent Developments on the Internet of Things (Sept. 16, 2014), [http://ec.europa.eu/justice/data-protection/article-29/documentation/opinionrecommendation/files/2014/wp223\\_en.pdf](http://ec.europa.eu/justice/data-protection/article-29/documentation/opinionrecommendation/files/2014/wp223_en.pdf).

## 2. Other Ethical and Policy Issues of Note

A plethora of ethical and policy issues exist for today's robotics community. Below is a select set of these issues.<sup>20</sup>

### 2.1 Laws and Liability

It would be nice if robots could simply be programmed to obey the laws or follow a code of ethics, but that is much easier said than done. Laws are vague, difficult to interpret, challenging to translate into computer code, context specific,<sup>21</sup> and generally grant individuals the autonomy to break them if they choose.<sup>22</sup> Determining any ethical code presents similar challenges – should the designers, companies, policymakers, public,<sup>23</sup> or individual make the choices that dictate the actions of robots?<sup>24</sup>

Robotics as an industry faces legal uncertainty similar to that which faced personal computers and internet sites before it. For instance, Ryan Calo argues that in order to open up robotics to additional innovators – to turn robots into platforms that can be improved upon or altered for additional functions with third party or open-source software or physically adapted like personal computers and smart phones (“open robotics”) – liability should be limited similarly to the way Section 230 of the Communications Decency Act immunizes platforms from liability arising from content posted by users on the platform.<sup>25</sup> Other liability issues exist

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<sup>20</sup> Many of these problems have been presented at the We Robot Conference, an annual conference that brings together engineers, computer scientists, ethicists, social scientists, and law scholars to discuss robotics policy.

<sup>21</sup> Lisa Shay, Woodrow Hartzog, John Nelson, Dominic Larkin, and Gregory Conti, *Confronting Automated Law Enforcement*, in *Robot Law* (Ryan Calo, Michael Froomkin, and Ian Kerr, eds. 2016).

<sup>22</sup> Ian Kerr, *Digital Locks and the Automation of Virtue*, in *From Radical Extremism to Balanced Copyright: Canadian Copyright and the Digital Agenda* (Michael Geist, ed. 2010).

<sup>23</sup> “Why Self-Driving Cars Must be Programmed to Kill,” MIT Technology Review (Oct. 22, 2015) (detailing early stages of the “Moral Machine” project, a kind of crowdsourcing for ethical determinations in the trolley problem available at [moralmachine.mit.edu](http://moralmachine.mit.edu)), <https://www.technologyreview.com/s/542626/why-self-driving-cars-must-be-programmed-to-kill/>.

<sup>24</sup> Jason Millar, “You Should Have a Say in Your Robot Car’s Code of Ethics.” *Wired* (Sep. 2, 2014).

<sup>25</sup> Ryan Calo, *Open Robotics*, 170 Maryland L. Rev. (2011); Ryan Calo, “The Need to Be Open: U.S. Laws Are Killing the Future of Robotics,” *Mashable* (Jan. 1, 2014), <http://mashable.com/2014/01/01/us-law-robotics-future/#XVDAU.9TKsqV>.

in traditional settings such as healthcare facilities that may utilize robotics equipment in surgeries, pharmaceutical distribution, or expert diagnosis systems.<sup>26</sup> The opacity of robotic systems, the mix of numerous technologies from various sources, and complexity of human-machine interaction<sup>27</sup> complicates traditional notions of accountability.

## 2.2 Automated Decisions and Communication

Algorithms – the “thinking” portion of robotics – currently make decisions that impact our lives every day in highly controversial ways. They may be used to present news on Facebook, search results on Google, credit offers, job interviews, and stock prices.<sup>28</sup> How those processes can be “fair” and transparent is one aspect of the problem.<sup>29</sup> Whether, when, and how humans are and should be involved in these processes is another.<sup>30</sup> Algorithms, as communication producers, can also lie and demean. In 2012, Google repeatedly called Bettina Wulff, former first lady of Germany, a prostitute. When users typed “Bettina Wulff” into the search bar, Google – intending to be helpful – filled in the rest with suggestions based on the searches of other users. In this case the phrase “Bettina Wulff prostitute” emerged from Google’s algorithm and was presented to users around the world in various languages.<sup>31</sup> In 2016, it took the Twittersphere less than a day to teach Microsoft’s guileless AI chatbot @Tay, designed as an experiment in “conversational understanding,” to be misogynistic, racist, and xenophobic, causing the company to pull her off the platform.<sup>32</sup> These are problems that derive from the

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<sup>26</sup> Jason Millar and Ian Kerr, *Delegation, Relinquishment and Responsibility: The Prospect of Expert Robots*, in *Robot Law* (Ryan Calo, Michael Froomkin, and Ian Kerr, eds. 2016).

<sup>27</sup> Nicholas Carr, *The Glass Cage: Automation and Us* (2014).

<sup>28</sup> Frank Pasquale, *The Blackbox Society: The Secret Algorithms That Control Money and Information* (2015).

<sup>29</sup> Malte Ziewitz, ed., *Governing Algorithms*, 41 Special Issue of *Science, Technology, and Human Values* (2016).

<sup>30</sup> Meg Leta Jones, *A Right to a Human in the Loop*, SSRN Working Paper (2016),

[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2758160](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2758160).

<sup>31</sup> Meg Leta Ambrose and Ben M. Ambrose, *When Robots Lie: A Comparison of Auto-Defamation Law*, IEEE Workshop on Advanced Robotics and its Social Impacts (2014);

<sup>32</sup> James Vincent, “Twitter taught Microsoft’s AI Chatbot to be a Racist Asshole in Less than a Day,” *The Verge* (Mar. 24, 2016), <http://www.theverge.com/2016/3/24/11297050/tay-microsoft-chatbot-racist>.

underlying data (and sometimes design oversight). No one at Google actually called Ms. Wulff a prostitute; instead its algorithms processed the information, data, and clicks input by users to present searchers with what they were probably looking for. Algorithms learn by being fed data by engineers and users. Smart technologies can thus exacerbate existing inequalities and stereotypes<sup>33</sup> and cause new types of informational harms and injustices.

### 2.3 Jobs and the Economy

For those that have lost their jobs to robots, they suffered what economist call technological unemployment,<sup>34</sup> one of the primary concerns surrounding automation in American policy throughout the 20<sup>th</sup> century.<sup>35</sup> The impact robots will have on the national and international economy and workforce is highly disputed. MIT economists Erik Brynjolfsson and Andrew McAfee argue that technological unemployment explains a recent jobless recovery and that while technology has always destroyed and created jobs, the pace of current technological replacement prevents the previous adaption made by human job creators and workers.<sup>36</sup> Other commentators disagree about the pace of displacement, the agility of workers, the eventual outcomes, and on what present attention should focus.<sup>37</sup>

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<sup>33</sup> Kate Crawford, “Artificial Intelligence’s White Guy Problem,” NY Times (June 25, 2016); Zeynep Tufekci, “The Real Bias Built In at Facebook,” NY Times (May 19, 2016).

<sup>34</sup> John Maynard Keynes, *Economic Possibilities for our Grandchildren*, in *Essays in Persuasion* (1972, originally published 1930).

<sup>35</sup> Thomas Rid, *The Rise of the Machines: A Cybernetic History* (2016).

<sup>36</sup> Erik Brynjolfsson and Andrew McAfee, *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (2014); Erik Brynjolfsson and Andrew McAfee, *Race Against the Machine* (2012).

<sup>37</sup> See e.g. Martin Ford, *The Rise of the Robots: Technology and the Threat of a Jobless Future* (2015) and Jerry Kaplan, *Human’s Need Not Apply: A Guide to Wealth and Work in the Age of Artificial Intelligence* (2015).

### 3. What the Federal Government Can Do: Invest, Innovate, & Organize

Today, the answers to these ethical dilemmas matter less than how we answer them. An American approach to robotics should not interfere with but foster the establishment of human-robotic systems that promote trusted, reliable, transparent, and interactions,<sup>38</sup> that protect the dignity of not only those engaged with robotics but also those that are not.<sup>39</sup> To establish such an approach, the federal government can continue to invest in robotics broadly, innovate existing governance structures, and organize deliberative spaces.

#### 3.1 Invest

Investing in robotics not only means funding improvements of sensors, algorithms, kinetics, or telecommunications. It also means supporting those investigating human robotic interaction, the sociology of robotic integration, the ethics of design, and new policy approaches. The National Robotics Initiative is a five-year-old, multi-agency effort among the National Science Foundation, NASA, the National Institutes for Health, the U.S. Department of Agriculture, the Department of Defense, and the Department of Energy to accelerate the development and integration of robots that work beside or cooperatively with people. NRI's call is expansive:

Methods for the establishment and infusion of robotics in educational curricula and research to gain a better understanding of the long-term social, behavioral and economic implications of co-robots across all areas of human activity are important parts of this initiative. Collaboration between academic, industry, non-profit and other organizations is strongly encouraged to establish better linkages between fundamental science and technology development, deployment and use.

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<sup>38</sup> David A. Mindell, *Our Robots, Ourselves: Robotics and the Myth of Autonomy* (2015).

<sup>39</sup> Sheila Jasanoff, *The Ethics of Invention* (2016).

These types of broad calls are welcome and will benefit the resolution of ethical and policy issues moving forward.

### 3.2 Innovate

As investments are made in the robotic future, bringing a broad array of perspectives to its formation is vital to ethical robotics. “The law cannot keep up with technology” is a well-established idiom but is not a necessary truth. Robotic innovations present an incredible opportunity to move many of the conversations relevant to law and policy from the end of technological integration to the conception, design, and implementation of technology. This may include experimenting with increased ethical training for roboticists,<sup>40</sup> embedding ethicists in robotics teams,<sup>41</sup> engaging with the broader public to find contemporary answers to ethical questions,<sup>42</sup> promoting diversity in robotics,<sup>43</sup> and/or creating ethical guidance or standards through working groups.<sup>44</sup>

### 3.3 Organize

Finally, the federal government can organize diverse, multidisciplinary deliberative spaces,<sup>45</sup> as well as events for public participation in the robot revolution. In January 2016, Ryan Calo and Dr. James Kuffner organized an incredible event entitled Policy for Autonomy Workshop, co-sponsored by the National Science Foundation and the Department of Homeland Security. Bringing together industry participants from the car, computing, and other

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<sup>40</sup> Byron Newberry, *The Dilemma of Ethics in Engineering Education*, 10 *Science and Engineering Ethics* 343 (2004).

<sup>41</sup> A. van Gorp and S. van der Molen, *Parallel, Embedded or Just Part of the Team: Ethicists Cooperating Within a European Security Research Project*, 17 *Science and Engineering Ethics* 31 (2011).

<sup>42</sup> Sheila Jasanoff, *Technologies of Humility: Citizen Participation in Governing Science*, 41 *Minerva* 223 (2003).

<sup>43</sup> See Carnegie Mellon University’s Girls of Steel Robotics initiative, <http://www.frc.ri.cmu.edu/girlsofsteel/our-team/about-us/>.

<sup>44</sup> Meg Leta Jones, *The Ironies of Automation Law: Tying Policy Knots with Fair Automation Practices Principles*, 18:1 *Vanderbilt Journal of Entertainment & Technology Law* 77 (2015).

<sup>45</sup> Sheila Jasanoff, *The Ethics of Invention* (2016).

technology sectors, ethicists and legal researchers, and university roboticists, the workshop represented a unique and exciting ongoing conversation. For two days, the group brought forward complicated policy problems, uncovered inconsistencies in language and concepts, and sought to identify similarities and differences among various contexts. Organizing these and other types of deliberative spaces, including events open to the public, is an important role for the federal government to play.

Thank you for your time and attention, and the opportunity to testify today. I would be pleased to answer your questions.