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University of Washington School of Law

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Letter From the Directors

The Tech Policy Lab at the University of Washington has become an indispensable source for tech policy research, education, and local, national, and international thought leadership. The Lab has worked directly with policymakers, published research and guides on emerging technologies, and provided opportunities for the public to learn from experts. Here are just a few highlights from our fifth year:

**Cutting-Edge Research.** This year, the Lab initiated exciting new work in areas such as adversarial machine learning and cybersecurity, mitigating bias in training datasets for natural language processing systems, the materiality of digital systems, and the prospect of intelligence gathering using advertising. We also continued work on ongoing projects such as Tech Policy Breakdowns and modeling of DNA and Internet of Things security.

**Global Summit.** In August the Lab convened our second Global Summit, bringing together a global network of ethicists, designers, political scientists, policymakers, and technologists from Africa, Asia, Europe, and North and South America to surface implications of cultural responsiveness for artificial intelligence. To explore these questions, we focused on storytelling as a uniquely appropriate vehicle for discussing pressing issues around artificial intelligence (AI). Stories, authored by participants and accompanied with commissioned art, will be made available in 2019.

**Policy Impact.** We had observable impacts on national and local policy. For example, our work influenced new legislation on AI, including California’s bot disclosure bill and legislation proposing the creation of a federal advisory committee for AI. Lab members have shared our research with the Congressional Research Service, national and state policymakers, and at Federal Trade Commission hearings.

**Diverse Perspectives.** Continuing our efforts to introduce diverse perspectives into tech policy, over the past year the Lab used our Diverse Voices process to garner feedback from non-mainstream stakeholders on the State of Washington Access to Justice Technology Principles – principles employed to guide the use and procurement of technology in the Washington state court system.

**Distinguished Lecture Series.** Our fourth annual Distinguished Lecture Series brought to the University of Washington anthropologist James Suzman to provide a hunter-gatherer perspective on technology and our future; and Kate Crawford, co-founder the AI Now Institute, to discuss how AI technologies are structuring our social, economic, and interpersonal lives. Each lecture was vibrant and well attended.

As we close our fifth year, the Lab is poised to have an even greater impact on critical tech policy issues.

RYAN CALO / BATYA FRIEDMAN / TADAYOSHI KOHNO
Research

The Lab has engaged in cutting edge, high impact research on emerging technologies while developing tools for inclusive, forward-thinking policy.

ADVERSARIAL MACHINE LEARNING

Cars and robots, as well as other devices, rely increasingly on sensing their surroundings to make decisions. Previous research has shown that images can be digitally altered - by adding "noise," for example, to cause machine learning systems to misclassify the images. Research with Lab members took this question a step further by looking at real-world alterations to objects. By placing stickers or posters on objects such as a stop sign, the team, which included researchers from the UW Tech Policy Lab as well as Samsung Research North America, Stanford University, Stony Brook University, University of California at Berkeley, and University of Michigan, was one of the first to fool a machine learning system through real world alterations, in this case tricking the system into misreading the stop sign as, for example, a speed limit sign. The team recently published this work at Computer Vision and Pattern Recognition (CVPR) 2018 in a paper titled “Robust Physical-World Attacks on Deep Learning Visual Classification.”

In related work, the Lab is investigating legal implications of such adversarial machine learning. Specifically, Lab faculty and students with expertise in computer security, law, and machine learning are investigating the ways adversarial machine learning alters the nature of hacking and the cybersecurity landscape, uncovering a gap in the Computer Fraud and Abuse Act of 1986. The Lab presented early findings at WeRobot 2018 in a paper titled “Is Tricking a Robot Hacking?”

DATA STATEMENTS

Machine learning systems are only as good as the datasets used to train and evaluate them. Moreover, biases present in these datasets carry over into these systems. To address these issues, Tech Policy Lab faculty have proposed data statements - a schema and practice for documenting the characteristics of natural language processing datasets. Data statements include information on curation, language, speakers and annotators, and the setting and topic of the text. This critical information positions those adopting machine learning systems to evaluate the systems' match to anticipated users, minimizing the potential for unanticipated bias and enabling better science. Their initial work, “Data Statements for Natural Language Processing: Toward Mitigating System Bias and Enabling Better Science,” was published in the Transactions of the Association of Computational Linguistics, with extensions planned to non-linguistic data types.
DIVERSE VOICES

A HOW-TO GUIDE FOR FACILITATING INCLUSIVENESS IN TECH POLICY

DIVERSE VOICES
All too often, policy development for emerging technology neglects under-represented populations. The Diverse Voices Project at the UW Tech Policy Lab offers a method for mitigating these shortcomings, specifically by including under-represented groups in early-stage tech policy document development. After successfully piloting the method with tech policy documents focusing on augmented reality and autonomous vehicles, in fall 2017 we released a detailed How-To Guide to empower others to use the method. The Guide was well-received; we distributed over 100 printed copies to local and national policymakers, technologists, and researchers. In response to interest from the community and with the aim of engaging others in creating more inclusive tech policy, this year the Diverse Voices team began developing training workshops. We plan to hold trainings in the 2018-19 academic year to familiarize and provide hands-on experience with Diverse Voices to policymakers and technologists.

GLOBAL SUMMIT: TOWARD CULTURALLY RESPONSIVE ARTIFICIAL INTELLIGENCE

The Tech Policy Lab’s Global Summit initiative, began in 2016, is a convening of 20-30 thought leaders from around the world representing governance, policy, and technology. The Summit, held biennially, aims to frame and begin progress on pressing grand challenges for tech policy, providing opportunities for designers, ethicists, lawyers, policymakers, technologists, and others from around the world to collaborate on global and local issues.

In August 2018 the Tech Policy Lab held our second Global Summit on Grand Challenges for Tech Policy, focusing on culturally responsive artificial intelligence. Building on the Lab’s collective experience deploying innovative methods and toolkits, we used storytelling as a uniquely appropriate vehicle to engage these questions and discuss pressing issues around AI. Over the three days of the Global Summit, experts from ethics, governance, policy, and technology from Africa, Asia, Europe, and North and South America surfaced implications of cultural responsiveness for artificial intelligence systems by developing stories situated within their own culture and perspective. The stories generated by participants in the Global Summit will be made available in spring 2019.
THE “INVISIBLE” MATERIALITY OF IT
There is something inescapably material in the digital—raw materials, waste, disposal, energy use, and so forth. Yet, this materiality largely remains invisible to policymakers and the public. An interdisciplinary team of computer and information scientists, designers, and planners at the Tech Policy Lab are investigating the forces behind this “invisibility” of the material impacts of information technology. For while the materials that support information technology, as well as the energy the technology uses, have significant negative impacts, these receive substantially less attention than discussion of benefits or technical aspects.

In early work, presented at the Fourth Workshop on Computing within Limits (LIMITS 2018) titled “What Pushes Back from Considering Materiality in IT?”, the team asks what forces push back from considering the “materiality” of information technology. They identify three types of forces: metaphors that obscure the physical resources behind technology; economic forces; and norms and practices in computer science that can abstract away physical manifestations in order to concentrate on information and computation. To counter these forces, the team discusses approaches involving computer science education, metaphor development, technology to support visibility, economic measures, and implementing laws and regulations to help appropriately account for material impacts.

PRIVACY AND SECURITY IN THE INTERNET OF THINGS
Computers are now integrated into everyday objects, from medical devices to children’s toys. This integration brings many benefits, however, without the appropriate checks and balances these emerging technologies also have the potential to compromise our digital and physical security and privacy. Our work in the Internet of Things (IoT) aims to provide a strong foundation for improving the security and privacy of IoT devices, particularly for devices in the home. Over the past year, Lab members have developed new tools to improve the security of smarthome systems.

We looked at trigger-action platforms that, for example, enable users to set up conditional rules for their smart devices like: If there is a smoke alarm, turn off the oven. These platforms have privileged access to a user’s online services and physical devices; thus they are an attractive target for attackers. To address this risks, Lab researchers, with a team from Samsung, Stony Brook University, and the University of Michigan, introduced the concept of Decentralized Trigger-Action Platforms (DTAP). This security principle ensures that an attacker who controls a compromised trigger-action platform can only invoke actions for a user’s trigger-action rule if they can prove that the corresponding trigger occurred in the recent past, reducing the risk of malicious use. This work was presented at the Network and Distributed System Security Symposium (NDSS) 2018 in a paper titled “Decentralized Action Integrity for Trigger-Action IoT Platforms.”

We also explored smarthome users’ preferences for device access. Any given smarthome device might simultaneously interact with multiple users—something not common in traditional computing systems. Complicating matters, users in a household often have complex social relationships with each other. For example, mischievous children, parents curious about what their teenagers are doing, and abusive romantic partners are all potential threats amplified in home IoT environments. Based on a user study exploring how users’ access preferences vary for different devices, relationships (e.g., a spouse, child, babysitter, or neighbor), and contexts, we suggest default policies for user authorization and authentication in home IoT systems. This work was published at USENIX Security 2018 in a paper titled “Rethinking Access Control and Authentication for the Home Internet of Things (IoT).”

TECH POLICY BREAKDOWNS
Effective rulemaking in the area of information technology often leaves much to be desired and all too often simply fails. Despite the profound transformations taking place in society due to rapid technological change, governments and other regulating bodies frequently struggle to fulfill their roles as both guardians of the public interest, and as enablers of innovation and opportunity. The complexity and potentially disruptive novelty of emerging technologies can make it challenging for decision makers to respond effectively to new developments. As a result, policymaking action frequently lags behind technological change, leading to uncertainties and missteps that may adversely affect the direction of technological innovation and its impact on society. Leveraging our rich, interdisciplinary resources, the Lab is developing a toolkit and taxonomy that provide a framework for discussing the evidence of, and mechanisms by which, these tech policy breakdowns occur.
Impact

The Tech Policy Lab is having observable impacts on local and national technology policy. The Lab’s research and experts increasingly appear at important hearings, in reports, and in the mainstream media.

OPEN DATA IN THE CITY OF SEATTLE AND BEYOND

Following the conclusion of a study with the City of Seattle on open data, city managers have implemented all but one of the recommendations for data privacy. These 25 recommendations are detailed in the Lab’s report, “Push, Pull, Spill: A Transdisciplinary Case Study in Municipal Open Government,” one of the first sustained, cross-disciplinary assessments of an open municipal government system. These recommendations have also been adopted in cities across the U.S. Recently, the City of Seattle and Future of Privacy Forum built on this work to release their report, Open Data Risk Assessment, which provides tools and guidelines to help cities navigate the complex issues around open data programs.

TECHNOLOGY IN THE COURT SYSTEM

Feedback gathered through Diverse Voices panels facilitated by the Lab in the spring resulted in substantive changes to revised Washington State Access to Justice (AtJ) Technology Principles, which guide the use and procurement of technology in the state’s court system. Aiming to solicit feedback from under-represented stakeholders, the Lab facilitated panels reviewing the proposed revisions with experiential experts representing formerly incarcerated, immigrant, and rural communities, as well as legal professionals. Based on feedback from these panels, AtJ amended the revised principles, adding entirely new principles around human touch and language access as well as making other changes. AtJ has submitted the updated technology principles to the Washington State Supreme Court for adoption, having incorporated feedback from the Diverse Voices process. If adopted, these principles will not only guide the use and procurement of technology in the state’s court system, but also serve as a model for other court systems aiming to improve access to justice.

LEGALIZING ARTIFICIAL INTELLIGENCE

Lab research on artificial intelligence (AI) has had significant impact on state and national legislation over the past year. In January, a prominent tech policy center held a roundtable discussion on a proposal to create an artificial intelligence office or standalone commission within the federal government, legislation which drew on the Lab’s paper, “The Case for a Federal Robotics Commission.” In July, the New York Times covered the Lab’s work on the free speech implications of bot disclosure laws, apparently resulting in changes to the language of California’s bot disclosure bill. The work received widespread press coverage including an op-ed by the authors in Buzzfeed News; it considers how efforts to regulate bot speech might fare under the First Amendment.
NATIONAL AND INTERNATIONAL CONVERSATIONS ON ADVERSARIAL MACHINE LEARNING

Research with Lab members on the ability to cause machine learning systems to misclassify an image drove national and international conversations around adversarial machine learning. Lab researchers have served as experts on adversarial machine learning to the Army Research Office, the Intelligence Advance Research Projects Activity (IARPA) within the Office of the Director of National Intelligence, and JASON, a group of elite scientists who advise the U.S. government in science and technology. And our research has reached broad audiences as well – the team’s initial paper on image classifiers and follow-on work discussing object detectors received widespread news coverage, including in IEEE Spectrum, Wired, Telegraph, and Fortune. And our work, including stop signs developed over the course of the research, will be featured in an exhibit to appear at the Science Museum of London, which annually welcomes over 3 million visitors.

TOYS THAT LISTEN AT PRIVACYCON

In early 2018, the Lab’s research on the privacy of internet-connected toys was presented at the Federal Trade Commission’s third annual PrivacyCon. PrivacyCon brings together leaders in privacy and security from academia, industry, and government to explore consumer privacy implications of emerging technologies such as artificial intelligence, internet of things, and others. Toys that Listen, presented at the Conference on Human Factors in Computing Systems (CHI) 2017, provides recommendations for designers and policymakers drawn from interviews exploring parents’ and children’s mental models of connected toys. This paper was presented as part of a panel focusing on consumer preferences, expectations, and behaviors, and contributes to the on-going public dialogue on consumer expectations for data privacy.
DISTINGUISHED GUESTS

The Lab was honored to be joined by a number of distinguished visitors over the past year. In March, Tech Policy Lab Co-Directors convened a meeting between Senator Maria Cantwell and experts from across UW to discuss artificial intelligence technologies. Later in March, Denmark’s first tech ambassador, Casper Klygne, visited with Lab faculty and students to discuss their work with TechPlomacy – allocating diplomatic resources and outreach to technology. In April, Admiral Michael S. Rogers, then director of the NSA and commander of the US Cyber Command, visited UW School of Law. The Tech Policy Lab organized a small reception for Admiral Rogers with Lab Co-Directors, Faculty Associates, and other faculty from across campus. And in June, Dr Carmen Schicklberger, visiting head of the Science and Innovation Team from the British Consulate General in San Francisco, visited the Lab with Robin Twyman from the UK Government Office in Seattle to discuss the Lab’s work around AI in the public interest.
Education

A core goal of the Lab is to improve not only current technologists’ and policymakers’ understanding of tech policy issues, but also to prepare the next generation of technologists conversant in policy and policymakers conversant in technology.

EDUCATION MODULES

Through our tech policy education modules, the Lab aims to prepare the next generation of technologists and policymakers by enhancing tech policy capacity and fluency. These modules can be introduced in early engineering education and are adaptable to other settings. They prompt students to consider the socio-technical aspects of a setting and to engage a design activity that involves both technical and policy design. Current modules explore drones and peer-to-peer services, with forthcoming modules planned on the internet of things and artificial intelligence. In the coming year, these modules will be available on our website for use by others.

PRIMER VIDEOS

To help bridge the gap between technologists and policymakers, in 2016 the Lab developed a set of primer videos on basic topics of robotics policy. Created by a group of interdisciplinary students, these videos cover topics such as bots, machine learning, and robots; as well as administrative law and product liability. These videos are available for use at UW and beyond by the general public; over the past two years they have received over 260,000 views combined.

WEEKLY DISCUSSIONS

The Lab continues to organize our popular weekly tech policy discussion group. Discussion topics range from newsworthy tech policy items to deep dives into areas of interest to the students attending. The discussion group is joined by graduate students from communications, computer science, electrical engineering, human-centered design and engineering, information science, law, and public policy, among others. Frequent participants have included a graduate student teaching an ethics seminar with computer science undergraduates, and the inaugural TechCongress congressional innovation scholar.
TRAINING THE NEXT GENERATION

Each year, the Tech Policy Lab brings together students from across campus to join interdisciplinary teams tackling important tech policy questions. In 2018, 24 students from departments across UW, including law, computer science, and information science, as well as communications, philosophy, and human-centered design worked with us.

And every year, students who have worked with the Lab graduate to continue working in tech policy. This past year the Lab graduated five students who are now working on, for example, AI policy with a leading consultancy, with the Reporters Committee for the Free Exercise of the Press, and joining faculty at leading universities. They join a network of Lab alumni who, over the past five years, have gone on to make important contributions in government, academia, activism, and industry. These include students who have worked with the Federal Trade Commission on tech policy, interned with the Electronic Frontier Foundation, studied privacy in Japan on a Fulbright scholarship, joined faculty to teach in computer science, and worked with leading industry companies such as Microsoft, Amazon, and Deloitte.

As Lab students graduate to become policymakers and technologists, we are excited to welcome new students to join the Lab each year; this year we welcomed our first member from philosophy and an LLM student focusing on the intersection of artificial intelligence and innovation policy. By growing our members in new departments and programs, we continue to be able to bring together deeply interdisciplinary teams that bring important, diverse perspectives to our work.
Events & Workshops

Our Distinguished Lecture Series brings to Seattle individuals the public might not otherwise hear from and shares their work with the community. Over this past year we were joined by anthropologist James Suzman to provide a distinct perspective on technology and our future, and AI researcher Kate Crawford to address how AI technologies are structuring our social, economic, and interpersonal lives.

DISTINGUISHED LECTURE SERIES

James Suzman: Poison Arrows and Other ‘Killer Apps’: A Hunter-Gatherer Perspective on Tech and our Future

On November 2, 2017, anthropologist and best-selling author James Suzman presented the Tech Policy Lab’s fall Distinguished Lecture. Dr. Suzman’s Lecture, titled “Poison Arrows and Other ‘Killer Apps’: A Hunter-Gatherer Perspective on Tech and our Future,” discussed what we might learn from a better understanding of hunter-gatherers about technology and sustainability. Dr. Suzman, a leading anthropologist working with hunter-gatherer groups in southern Africa, discussed these groups’ experiences in the face of forced modernity, and how their experiences provide a perspective on how to respond to the social and economic impacts of modern technologies. Dr. Suzman holds a Ph.D. in social anthropology from Edinburgh University which he was awarded in 1996. Since then he has lived and worked with every major Bushman group in southern Africa, from the war ravaged Vasakele !Kung of southern Angola during the final phases of that civil war, to the highly marginalized Hai//om of Namibia’s Etosha National Park. Dr. Suzman is the Author of Affluence without Abundance: The Disappearing World of the Bushmen, published by Bloomsbury in 2017.

Kate Crawford: AI Now: Social and Political Questions for Artificial Intelligence

On March 6, 2018, Kate Crawford, co-founder of leading AI research center AI Now, presented the Tech Policy Lab’s Spring Distinguished Lecture. In her lecture titled “AI Now: Social and Political Questions for Artificial Intelligence,” Crawford discussed the social implications of artificial intelligence technologies. During her lecture, Crawford looked carefully at the ways in which these technologies are being applied now, whom they’re benefiting, and how they’re structuring our social, economic, and interpersonal lives. Kate Crawford is the co-founder (with Meredith Whittaker) of the AI Now Institute, a New York-based research center working across disciplines to understand the social and economic implications of artificial intelligence. She is a principal researcher at Microsoft Research New York City, a visiting professor at MIT’s Center for Civic Media, and a senior fellow at NYU’s Information Law Institute.
WORKSHOPS AND CONFERENCES

Regulating Robots

As robots and artificial intelligence are on the rise, so too are questions around regulation. Over the past year, the Tech Policy Lab supported domestic and international conferences that bring together a variety of disciplines and sectors to consider the question of regulating robotics. In April 2018, the Lab supported and shared work at We Robot 2018, a leading robotics law conference hosted this year by Stanford Law School. We Robot brings together academics, policy makers, roboticists, economists, ethicists, entrepreneurs, and lawyers to discuss robotics, law, and policy. In May 2018, the Lab sponsored an inaugural conference on regulating robotics and AI in Italy, which brought together academia, government, and industry for dialogue on current and future challenges of regulation. The conference, “Opportunities and Challenges in Regulating Robotics and Artificial Intelligence: A Comparative Approach,” aimed to build a network of support around EU policymaking on regulating robotics and artificial intelligence.
INVITED TALKS

**Brian Israel: Law in the Fourth Domain | October 2017**

In October, Brian Israel gave a talk titled "Law in the Fourth Domain: Governing the Second Half Century of Outer Space Activities." Brian Israel is General Counsel to Planetary Resources, an asteroid mining company. Prior to joining Planetary Resources, he served at the State Department as the U.S. Representative to the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space. His talk explored how legal and governance frameworks will evolve as our relationship with outer space changes in the coming decades, from scientific exploration, to resource consumption, to future residence.

**Prof. Andrew Ferguson: The Rise of Big Data Policing | January 2018**

In January, Professor Andrew Ferguson gave a talk on his new book, *The Rise of Big Data Policing: Surveillance, Race, and the Future of Law Enforcement*, which introduces cutting-edge technology that is changing how the police do their jobs and shows why it is more important than ever that citizens understand the far-reaching consequences of big data surveillance as a law enforcement tool. Andrew Guthrie Ferguson is Professor of Law at the University of the District of Columbia's David A. Clarke School of Law. Professor Ferguson is a national expert on predictive policing, big data surveillance, and the Fourth Amendment. He is the author of *Why Jury Duty Matters* (NYU Press, 2012).

**Dr. Hao Yuan: AI and the Law | February 2018**

Dr. Hao Yuan joined the Tech Policy Lab in February for a talk on "AI and the Law: Setting the Stage in China." Dr. Hao discussed China’s AI awakening, the challenges it poses, and how law might address those challenges. Dr. Hao is a researcher at the Tsinghua-Microsoft Innovation and IP Research Center. Her current fields of interest include patent law, anti-monopoly law, and how patent law facilitates innovation in China. Dr. Hao has a B.S. in Physics from Peking University, a Ph.D. in Applied Physics from Pennsylvania State University, and a J.D. from Brooklyn Law School.

**Cyrus Farivar: HabeasData | May 2018**

In May, journalist Cyrus Farivar gave a talk on his recent book, *Habeas Data: Privacy vs. the Rise of Surveillance Tech*. *Habeas Data* explores through 10 crucial legal cases the tools of surveillance that exist today, how they work, and what the implications are for the future of privacy. Cyrus Farivar is the Senior Business Editor at Ars Technica and the author of *The Internet of Elsewhere*. He is also a radio producer and has reported for the Canadian Broadcasting Corporation, National Public Radio, Public Radio International, The Economist, Wired, The New York Times, and others.
Looking Ahead

We've had a tremendously rewarding first five years and look forward to continued growth in research and impact. Here are just a sampling of our plans and goals going forward:

**New Research.** The Lab plans to continue our cutting-edge research, including new projects exploring how envisioning future scenarios can help policymakers create better tech policy. We will continue to deepen our work on cell site surveillance systems, and their privacy implications, from both a technology and a policy perspective. And we will continue to explore the technical and policy aspects of the emerging field, which we helped found, of bio-cyber-security. We will continue to conduct leading research and educational efforts on Internet of Things security.

**Diverse Voices Training.** Building upon our Diverse Voices How to Guide released last fall, and drawing from the Lab’s own experience, we will organize training workshops in fall 2018 to empower interested organizations to create their own mechanisms for more inclusive tech policy.

**Public Discourse.** As part of our commitment to enhance tech policy fluency and capacity, the Lab is launching a new Public Discourse initiative which aims to increase public awareness and engagement with critical issues that concern technology and society. Initial projects for this initiative include a collaboration with a community radio station in Eastern Washington and a UW campus “trick-a-thon” to bring attention to the capacity of smart systems to be fooled.

**Education.** We will continue to develop our curriculum modules to enhance tech policy capacity and fluency, and plan to share them with the general public for broad use. In addition, over the coming year the Lab will work to streamline the process by which tech students at UW working on cutting-edge privacy and security issues can get answers on their law and policy questions.

Thank you for your interest in the Tech Policy Lab!
About the UW Tech Policy Lab

The Tech Policy Lab is a unique, interdisciplinary research unit at the University of Washington. With co-directors from UW’s Law School, Information School and Allen School of Computer Science & Engineering, the Lab aims to bridge the gap between technologists and policymakers to help develop wiser, more inclusive tech policy. Situated within a globally renowned research university, the Tech Policy Lab is committed advancing technology policy through interdisciplinary research, public discourse and education, and the cultivation of a diversity of expertise and perspectives. To learn more about the Lab’s cutting edge research, thought leadership, and education initiatives, go to techpolicylab.uw.edu.