

CSET at FIVE 2023 Annual Report



GEORGETOWN UNIVERSITY

A policy research organization within Georgetown University's Walsh School of Foreign Service, the Center for Security and Emerging Technology provides decision-makers with data-driven analysis on the security implications of emerging technologies.

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This report was designed by Jason Ly and produced by CSET.



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Letter from the Executive Director

Dear Friends of CSET,

I have one of the best jobs in the world! I get to lead a vibrant analytic think tank that helps inform critical conversations on emerging technology policy with insight that is hard to find elsewhere. In the 5 years since our founding in 2019, we've grown from 2 people to 60+ full time employees, produced 250+ reports, and 100+ data visualizations. We aren't done innovating. In 2023, CSET made significant strides to increase our responsiveness to decision-makers by experimenting with new ways of communicating our findings with blogs and reports on a page. Plus, we continue to increase our library of 500+ original source translations and released a brand new Chinese tech-news-discovery tool called Scout from the Emerging Technology Observatory. I'm always happy to learn about how our work informs policy and decision-making please keep sharing!

Personally, I am proudest of the organizational culture we've developed that focuses on providing evidence-based, useful research to decision-makers. We follow the data and information to where it leads and work hard to capture perspectives from an increasingly wide variety of lived experiences.

This report focuses on our accomplishments in 2023, but I'd also like to highlight a few more. CSET's early work on the <u>semiconductor supply chain</u> laid part of the groundwork for what eventually became the CHIPS and Science Act of 2022.



Dewey Murdick

Executive Director

The CyberAl Project's <u>disinformation work</u>, published in May 2021, provided policymakers with an 18-month head start on the release of ChatGPT and its implications for dis/misinformation.

We've contributed new insights on the global gain of function landscape, bridged tech and policy communities' perspectives on securing Al systems and generative Al, and worked hard to contribute empirical evidence and careful analysis to policy discussion that can drift toward groupthink in areas such as compute and Al governance. CSET's evidence-based approach busts myths on immigration, provides new frameworks for approaching export controls, outbound investment, and Al harms at a time of rapid Al progress.

In 2024, CSET will continue to do this vital work, while diversifying our funding and research to ensure we will remain DC's go-to source for non-partisan, hard-to-find insights at the intersection of public policy, emerging technology, and security.

Enjoy!

Davey Matik



CSET Culture Statement

CSET was formed to examine emerging technology through an evidence-based, data-driven approach independent of government, funder or ideological perspectives.

CSET staff come from a variety of backgrounds and disciplines, bringing a robust wealth of perspectives and experiences to inform research at the intersection of technology and national/international security. We are committed to fostering a diverse, equitable, and inclusive culture rooted in intellectual curiosity and respect.

At CSET, we:

- Challenge assumptions, follow the evidence, understand how data can inform decisions and formulate policies, and serve as trusted advisors to the national security community.
- Are lifelong learners who understand that intellectual humility is essential to ongoing growth. We seek and absorb feedback and actively work on self and organizational improvement.
- Celebrate individuality and encourage all team members to welcome one another to create a sense of belonging.
- Collaborate because we know that problems are best solved as a team.
- Are empowered to take agency in the workplace and participate in meaningful decision-making.
- Support and encourage open dialogue across all teams.
- Know that while our work is important, our individual and familial needs come first. We value our time outside of work, respect a healthy work/life balance, and support one another in times of need.
- Measure our success as a team.
- Place acting with integrity and respect above all.

Our Impact in 2023

By the Numbers

100+

Data-rich analyses published in 2023:



- **50+** blog posts and commentaries
- **50+** reports
- **25+** translations
- 4 interactive data tools

63

Full-time staff in 2023, plus:



- 37 Georgetown University student interns
- 2 external interns
- 3 part-time employees
- 8 visiting fellows
- 7 affiliates

41

New colleagues



- **10** FTE
- 8 affiliates, interns and part-time support
- 23 student assistants

600+

Engagements with decision-makers



- 300+ briefings
- **300+** media interviews/quotes
- 8 testimonies

CSET in the Media



TIME

November 2023

Every day the American military entrusts the world's most powerful weapons to hundreds of thousands of service members ... The military mitigates the potential risks of all this powerful technology ... through a three-pronged approach: they regulate the technology, the users, and their units. The government has the opportunity to do the same with AI."

- Emelia S. Probasco and Dewey Murdick



Forbes

July 2023

If we give the impression that disinformation campaigns using deep fakes will inevitably be successful, which they won't, we may undermine trust in democratic systems.

- Josh A. Goldstein



Washington Post

September 2023

"We're just on the cusp of beginning to understand and unravel what genes do. Whoever gets there first is going to control a lot of really amazing things. But there is also a potential for misuse..."

- Anna Puglisi



<u>Issues in Science</u> <u>and Technology</u>

April 2023

"Ukraine's response to Russia's invasion is reshaping our understanding of modern warfare along with defense research and development."

> - Jaret C. Riddick and Cole McFaul

Highlights of 2023



[2/23]

Research Fellow Emily Weinstein moderated a discussion with <u>U.S. Secretary of Commerce Gina</u>

Raimondo about the CHIPS Act

Generative Language Models and Automated Influence Operations: Emerging Threats and Potential Mitigations

> Josh A. Goldstein^{1,3}, Girish Sastry^{*2}, Micah Musser^{*1}, Renée DiResta³, Matthew Gentzel², and Katerina Sedova¹

[3/16]

CSET researchers briefed White House OSTP on Forecasting Potential Misuses of Language Models for Disinformation Campaigns—and How to Reduce Risk



[4/25]

Drew Lohn and Krystal Jackson presented at RSA Conference on Reinforcement Learning for Autonomous Cyber Defense



[5/19]

Steph Batalis, Caroline Schuerger, and Vikram Venkatram presented on bio-related supply chains and pandemic preparedness at the <u>ASU Governance of Emerging Technologies and Science Conference</u>



[2/24]

Dahlia Peterson and Anna Puglisi testified before the <u>U.S. China Economic and Security Review</u> <u>Commission</u> on <u>China's education system and</u> <u>workforce training</u>



[4/1]

Stanford HAI released <u>2023 AI Index</u> with CSET as a data partner for a chapter on AI Research and Development



[5/2]

The National AI Advisory Committee releases its <u>Year</u>
<u>1 Report</u> which heavily cited CSET research and highlighted CSET's recommendations on immigration



[6/22]

Dewey Murdick testified before the House Science, Space and Technology Committee for a hearing, Artificial Intelligence: Advancing Innovation Towards the National Interest

NATIONAL Sciences ACADEMIES Medicine

Engineering

[6/29]

CSET researchers and alumni testified before the National Academies of Science, Engineering and Medicine as they prepare their consensus study on "International Talent Programs in the Changing **Global Environment**"



[7/27]

Research Fellow Jenny Jun testified before the House Foreign Affairs Indo-Pacific Subcommittee for its hearing, "Illicit IT: Bankrolling Kim Jong Un



[9/19]

Dewey Murdick testified before the Senate Homeland Security and Governmental Affairs Subcommittee on Emerging Threats and Spending **Oversight**



[12/6]

Huey Meei-Chang, Daniel Chou, and Anna Puglisi participated in Al Insights Forum organized by Senators Schumer, Rounds, Heinrich, and Young on Al Risk and AI & National Security



[7/12]

CSET co-hosted a workshop with Google DeepMind to assess the potential risks of frontier AI, the most advanced and capable AI systems



[9/7]

Senior Fellow Anna Puglisi testified before the Senate Committee on Energy and Natural Resources



[10/19]

Lead Analyst Bill Hannas testified before House Judiciary Subcommittee on Courts, Intellectual Property, and the Internet

Lines of Research

CSET conducts data-driven research on artificial intelligence, cybersecurity, and biotechnology. Utilizing extensive data resources, expert translations, and in-depth subject matter knowledge, we assess the benefits and risks of emerging technologies. Our work is structured around five lines of research, all underpinned by a focus on the security aspects of advanced technologies. These technologies, increasingly influential, are intricately interconnected. Advancements in AI not only heighten bio and cyber risks, but also expose AI systems and their data to potential misuse and manipulation.

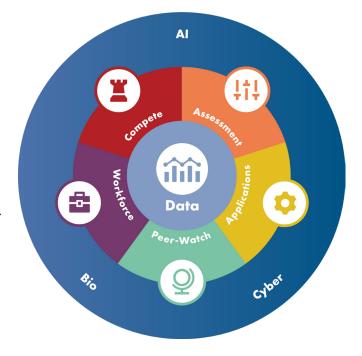
CSET's unique data science and applied machine learning capabilities are at the core of our approach to policy research. Our team includes data scientists, data research analysts, software engineers, and survey and translation specialists. These subject-matter experts collaborate across the organization to address research questions: developing methods, datasets, models, and analytic solutions for use at CSET and public release. Our data science work can be found across CSET's publications, at academic conferences, and as public code and interactive tools.

APPLICATIONS

How can the U.S. government and its allies make effective use of artificial intelligence/machine learning (AI/ML) and other emerging technologies? CSET researchers examine AI-enabled emerging technologies relevant to national security, opportunities and challenges for adoption and application, and opportunities for alliances in the development and deployment of AI-enabled systems.

ASSESSMENT

AI/ML systems are failure-prone, unreliable, and opaque. This research line seeks to understand and contribute to the development and adoption of AI standards, testing procedures, best practices,



regulation, auditing, and certification. CSET researchers identify areas where U.S. policy could promote the responsible, safe, and reliable deployment of AI/ML capabilities. It encompasses exploration of AI/ML accidents, harms, and vulnerabilities; AI trustworthiness, safety, standards, testing, and evaluation; AI adoption, regulation, and policy; and attempts to understand when systems work well, when they fail, and how such failures could be mitigated.

COMPETE

What role does the state of technological innovation and competitiveness in the United States have in national power? CSET researchers offer recommendations for research and development policy, science and technology strategy, and research security. We also weigh in on the use of investments and incentives to strengthen the innovation ecosystem; export controls, sanctions and related policies to protect intellectual property and sensitive technologies; and trade rules and antitrust approaches to promote a fair and vibrant competitive environment.

PEER-WATCH

Countries such as China are using multiple means, including talent development and recruitment, investment and internal policies, to stimulate domestic research and development, promote scientific progress, and drive technological innovation. We document the role of legal, illegal, and extra-legal mechanisms used by countries for these purposes. The research involves analysis of budgets, investment patterns, patent trends, talent recruitment, and other potential indicators using official and open-source foreign-language documents, translated by a CSET expert linguist.

WORKFORCE

Workforce research explores the global AI workforce and policies that affect it, including immigration, education pipelines and talent recruitment and retention. We explore the supply and demand of the AI workforce in the United States and China, the state of AI education in the United States and China, technical talent migration trends within the United States, strengthening DOD's AI workforce and access to talent, and preparing all U.S. workers to compete and succeed in an AI-enabled world. We also look at the role of non-traditional educational pathways in growing the AI workforce and the status and immigration dynamics of top AI-research talent.

Cross-Cutting Projects

CyberAl Project

The CyberAl Project focuses on topics at the intersection of Al and cybersecurity, including the use of Al in cyber operations, how the cybersecurity of Al systems affects their safe and trusted development and operations, Al's impact on disinformation campaigns, and geostrategic competition centered around cyber and Al/ML.



Foundational Research Grants

The Foundational Research Grants program builds bridges between technical insights and CSET's policy-focused mission. FRG has funded technical research on topics including how to secure AI against adversaries, how to ensure increasingly general-purpose AI systems operate as intended, and how to enable external scrutiny of privately held AI assets. The program also hosts workshops that bring together policymakers and technical experts on crucial forward-looking topics, such as figuring out how to manage risks from the most advanced AI systems.

The Emerging Technology Observatory

The Emerging Technology Observatory creates public analytic resources to inform decisions on emerging technology issues. Drawing on CSET's deep technical capabilities and subject-matter experts, ETO integrates diverse sources of information to enable analysis of the global emerging technology landscape. Our interactive tools include the <u>Map of Science</u>, <u>Scout</u>, and the <u>Supply Chain Explorer</u>, offering insight for decisions in national security, R&D strategy, economic policy, and other domains. ETO resources are available at the <u>eto.tech</u> website.



Foreign Language Translation and Discovery

Foreign-language sources of data often contain unique information and perspectives that are largely inaccessible to U.S. researchers and policymakers due to the language barrier. CSET maintains an ondemand translation service, providing both CSET analysts and external stakeholders with professional-quality translations of foreign-language—chiefly Chinese—documents related to security and emerging technologies. CSET's translation capability thus both informs CSET's analysis and serves the broader national security and emerging technology community. Translation Manager Ben Murphy, an expert Chinese linguist, leads this translation effort and also serves as a resource for all things China-related, contributing to CSET research as an author, reviewer, and sounding board.

To date, CSET has translated 510 documents, of which 192 are available to the public via the <u>translation</u> <u>section</u> of CSET's website. CSET's translation "greatest hits" include <u>China's 14th Five-Year Plan</u>, "<u>Made in China 2025</u>," <u>Russia's national Al strategy</u>, and <u>Israel's foreign investment screening process</u>. Each translation includes a brief synopsis, a description of the source, and terminology notes that provide additional context and a framework for understanding the significance of the document.



Additionally, the <u>ETO Scout</u> tool combines state-of-the-art machine translation, large language models, human annotation and subject matter expert review to compile and summarize timely emerging tech-related content from influential Chinese media sources that are otherwise unavailable in English. CSET's Data Team also maintains a bulk machine translation capability based on Google's cloud translation API to provide instant rough-and-ready translations of large volumes of documents in support of foreign language-heavy analytic projects.



Research Spotlights



Researcher Spotlight

Ali Crawford

Ali Crawford is CSET's CyberAl workforce expert. Her expertise in Al, cyber education, and workforce development programs has been recognized by the White House, Congress, non-profits, and state governments. The Office of the National Cyber Director's National Cyber Workforce and Education Strategy highlighted many aspects of Crawford's previous work, including her research on the CyberCorps scholarship program.

Ali has presented her work on high school cybersecurity competitions with the National Initiative for Cybersecurity Education and moderated a discussion on the benefit of these competitions at the NICE K-12 Cybersecurity Education Conference in December 2023, attended by officials and educators from all 50 states. Her work on the role of prize competitions in promoting innovation was directly referenced in the White House National Artificial Intelligence Research and Development Strategic Plan 2023 Update and has helped inform congressional discussions about how the U.S. government can make greater use of these tools to spur U.S. technological leadership.

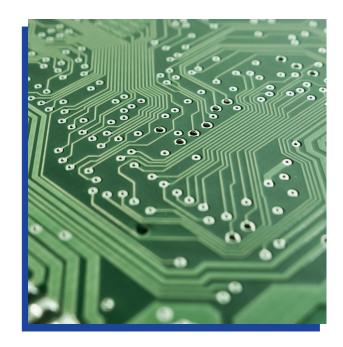
Large Language Models

CSET has been at the cutting edge of research on large language models, like the one powering ChatGPT, and their potential to generate automated disinformation. In October 2021, more than a year before ChatGPT's public release, CSET researchers hosted a workshop with colleagues from OpenAI and Stanford to further explore the possible implications of LLMs. Their widely read follow-up report forecasted the potentially harmful effects of generative AI.

CSET continues to work at the frontier of the field, collaborating with researchers from the world's top AI labs and translating findings into concrete policy recommendations. In July 2023, researchers from CSET and Google DeepMind hosted a workshop on the potential risks posed by frontier AI systems. The workshop's outcomes were documented in a comprehensive roundtable report, which offered valuable insights for policymakers on how to proactively anticipate and effectively manage these emerging risks.

Chips, Export Controls, and Supply Chain Resilience

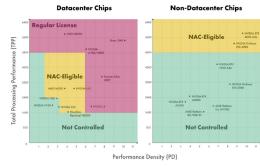
CSET has played a critical role in informing U.S. government efforts to protect semiconductor supply chains and manage the flow of advanced semiconductor technologies to China. CSET's foundational research was the first to highlight how important cutting-edge chips are for AI research and U.S. economic and national security, and its research mapping global semiconductor supply chains identified opportunities to strengthen U.S. access to cutting-edge chips.

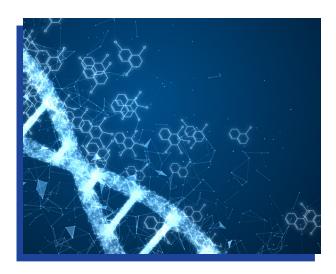


As supply-chain disruptions made semiconductors front-page news and policymakers looked to take action, CSET established relationships with key stakeholders in the executive branch and Congress. These relationships, fueled by CSET's research and expertise, helped to lay the groundwork for the 2022 Chips and Science Act, which allocated billions of dollars to ensure continued U.S. access to the advanced chips needed to support the U.S. economy and drive innovation.

CSET's research on semiconductor supply chains also identified opportunities for limiting China's access to the same semiconductor technology crucial to advances in AI. CSET work helped inform thinking across multiple administrations on how to control Chinese access to semiconductor manufacturing equipment that would be crucial to China's efforts to build up its own chip production capacity. When the Biden administration then moved to control advanced chips themselves on October 7, 2022, CSET pivoted to helping understand what the U.S. could do to restrict China's ability to access clouds containing those same controlled chips. CSET researchers produced a two-part series explaining what could and could not be done with existing authorities to manage China's access to cloud-computation around the world. They followed up with a detailed explanation of the far more complex updated chips export controls announced in October 2023.







Bio-Risk and Al

As the public and policymakers have become increasingly worried about the risks posed by AI tools in the hands of nefarious actors, CSET experts are uniquely qualified to weigh in. In both accessible explainers and prominent publications like Foreign Policy, CSET researchers challenged commonly held beliefs and offered recommendations for strengthening existing policies in the face of AI-enhanced bio-risk.

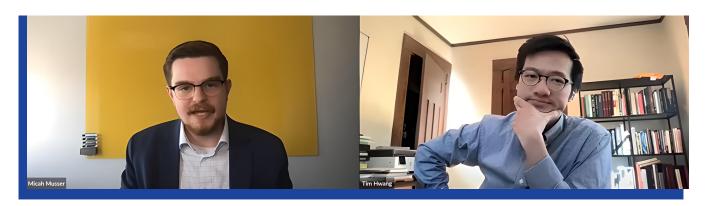
Recent papers have explored the <u>domestic vaccine manufacturing landscape</u>, proposed concrete steps <u>to enhance U.S. pandemic preparedness</u>, and delved into the hot-button world of <u>gain-of-function research</u>.

Emerging Technologies Talent Pipeline

CSET's earliest research identified the vital importance of talent to the United States' competitiveness in the fields of AI, cybersecurity, advanced computing, and other emerging technologies. Since 2021, a team of CSET experts have examined the global AI workforce and policies that affect it, including immigration, education pipelines and talent recruitment and retention—with particular emphasis on the national security workforce. The researchers explore the supply and demand of the AI workforce in the United States and China, the state of AI education in the United States and China, technical talent migration trends within the United States, strengthening DOD's AI workforce and access to talent, and preparing all U.S. workers to compete and succeed in an Al-enabled world. They also look at the role of non-traditional educational pathways in growing the AI workforce and the status and immigration dynamics of top Al-research talent.



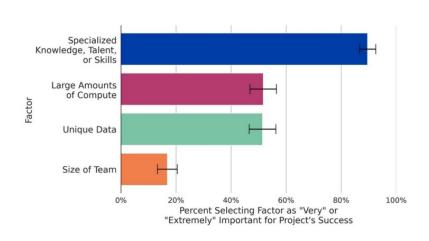
CSET's team has helped inspire AI training & education legislation and informed White House policies, among other notable accomplishments. For example, Luke Koslosky's research informed recently introduced legislation aimed at increasing federal support for AI literacy training. Additionally, Ali Crawford served as an expert reviewer of the White House's National Cyber Workforce and Education Strategy.



Al: The Main Resource Is the Human

Data, compute, and algorithms, built by people, are the three main ingredients for developing and deploying Al models—the so-called "Al Triad." Some Al researchers and firms suggest that the only constraint on building ever more capable Al models is computing power. As early as January 2021, we identified in Al and Compute that the trend of using ever more compute to train and run Al models was slowing.





We also wanted to understand what top AI researchers thought about this deceleration. Drawing on a survey of more than 400 AI researchers, CSET found that, "the main resource is the human." These results have provided a counternarrative to the popular assumption that the only way towards further AI progress is by applying more compute resources.

CSET on the Hill

CSET played a central role in informing policy conversations and shaping debates on AI in 2023. The release of ChatGPT spurred explosive interest in the opportunities and challenges posed by AI, both among policymakers and the general public. Having recognized the coming advances in AI, CSET stood ready to assist as Congress, the executive branch, the media, and the broader public sought to understand the technology and its implications.

In early 2023, CSET experts briefed congressional and executive officials on some of the policy questions posed by advances in Al. By June, CSET Executive Director Dewey Murdick appeared before the House Science Committee to discuss ways the U.S. could appropriately advance innovation in Al while protecting the public from Al harms. Senior Fellow Anna Puglisi appeared before the Senate Energy and Natural Resources Committee, discussing the Department of Energy's role in advancing Al and how it could better protect innovation against security threats from China and others.

Dr. Murdick also testified before the Senate
Homeland Security and Governmental Affairs
Subcommittee on Emerging Threats on how
Congress could act now to address risks posed by
AI. Finally, Senior China Science and Technology
Specialist Huey-Meei Chang served as an expert
panelist as part of an AI Insights Forum hosted by
Senators Schumer, Rounds, Young, and Heinrich.
Ms. Chang briefed Senators on China's AI
research portfolio and its efforts to pursue Artificial
General Intelligence. In these public appearances
and in additional private discussions with leading
Members of Congress and their staff, CSET
experts helped policymakers grapple with the most
pressing challenges posed by AI.



Featured Reports

U.S. Outbound Investment into Chinese AI Companies

February 2023 • Emily S. Weinstein and Ngor Luong

CSET published a first-of-its-kind report assessing the extent of U.S. investment in Chinese AI companies. The report, written by Emily S. Weinstein and Ngor Luong, identified 160+ U.S. entities that invested in Chinese AI companies and highlighted the need for more granular data on U.S. capital flowing to China's AI industry. Published at the height of policymaker debates over restricting outbound U.S. investment into China's tech sector, the report found an audience with key congressional and executive branch decision makers. The Biden Administration's executive order on outbound investment ultimately reflected some of the same policies recommended by CSET's report.



Volunteer Force

February 2023 • Christine H. Fox and Emelia S. Probasco

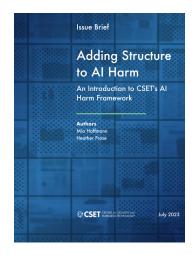
CSET's Emelia Probasco and former Acting Deputy Secretary of Defense Christine Fox authored an article highlighting Big Tech's role in the early stages of the Ukraine War. This work inspired a later roundtable with high-ranking former government officials and tech sector leaders to discuss the technology community's role in conflict, the capabilities the sector can provide and the challenges faced when government and tech work together. The discussion brought to the fore that informal relationships between U.S. government and tech sector officials helped spur the private sector into action following Russia's invasion and noted the unnecessarily adversarial relationship that develops between the two when there isn't an immediately pressing unifying cause. This effort inspired recently published work that explores the tech sector's potential role in future conflicts more deeply.



Adding Structure to AI Harm

July 2023 • Mia Hoffmann and Heather Frase

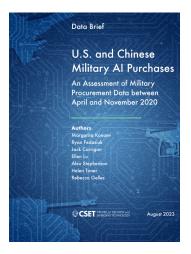
In the last year, policymakers have consistently raised concerns about the risks that AI systems could cause in the near- and long-term. AI systems are already causing harm today, but our understanding of the type and scale of those harms is incomplete. CSET experts have proposed the need for a more rigorous collection and classification of real-world AI harms so that we can appropriately tune our governance and regulatory structures accordingly. In this piece, Mia Hoffmann and Heather Frase, PhD, presented a conceptual framework for defining, tracking, and classifying these harms.



U.S. and Chinese Military AI Purchases

August 2023 • Margarita Konaev, Ryan Fedasiuk, Jack Corrigan, Ellen Lu, Alex Stephenson, Helen Toner, Rebecca Gelles

Leaders in the U.S. and China have made clear that AI is a national security and economic priority. What that looks like in practice can be hard to decipher, but CSET is devoted to analyzing the data that can provide insights into how the U.S., China, and others are investing in AI and other emerging technologies. This report, in turn, examines U.S. and Chinese military procurement data to understand the types of AI systems the U.S. and Chinese militaries are investing in and the kinds of vendors selling AI systems.



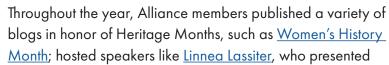
policy.ai

CSET's newsletter, written by Alex Friedland, breaks down the latest news in Al and emerging tech policy, from the state-of-the-art model releases to behind-the-scenes DOD experimental programs. It rode the surge of interest in Al to its best year yet, eclipsing 11,000 subscribers and more than 100,000 views across 15 editions in 2023. In January, policy.ai debuted a new feature — the Expert Take — which gave readers access to CSET experts' candid analysis on the biggest news of the day. Sign up to receive the CSET newsletter at policy.ai.



CSET Inclusion Alliance

Established in 2023, CSET's Inclusion Alliance is committed to fostering an inclusive workplace where each CSET team member feels valued, respected, and supported. Through professional development, educational opportunities, and open dialogue, the Inclusion Alliance strives to promote diversity, equity, inclusion, and belonging. Amplifying and celebrating diverse voices and perspectives makes CSET more dynamic, forward-thinking, adaptable, and rigorous.





on the intersection of technology policy and the interests of people with disabilities; and hosted researcherled presentations on themes in Asian American history.

The Alliance is also working to analyze and continuously improve CSET's work, to ensure that its evidence-based, data-driven research is informed by a diverse variety of relevant sources and perspectives and considers the impact of emerging technology issues on different communities.

Donors

Five years ago, CSET was founded with generous seed funding from Open Philanthropy. In 2021, Open Philanthropy gave a second significant grant. CSET has been fortunate to receive additional funding from other individuals and organizations.

As CSET grows, we look forward to engaging more stakeholders seeking to support our mission. CSET's single-minded commitment to providing nonpartisan, data-driven analysis sets us apart from other think tanks and policy research organizations. It means we are trusted by decision-makers across political parties and affiliations, positioning us to inform policy discussions for many years to come.

Thank you to our donors:

\$100,000,000+

Open Philanthropy

\$1,000,000 - \$6,000,000

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Timothy McDonald