IMPACT REPORT

2019-2024

Carnegie Mellon University

The Block Center

FOR TECHNOLOGY AND SOCIETY

Contents

A Letter from Block Center Leadership

I'm pleased to share The Block Center for Technology and Society's 2019–2024 Impact Report - a reflection on five years of groundbreaking research, public policy engagement, and cross-sector collaboration at Carnegie Mellon University. As we mark the fifth anniversary of the Center, our team is honored to share this inaugural report and reflect on the journey that has brought us to this important milestone.

Founded with the conviction that technological advancement must be guided by ethical, equitable, and evidence-based insight, The Block Center has spent the past five years at the intersection of innovation and social responsibility. In that time, The Block Center has cultivated a vibrant research community, produced scholarship that informs public discourse and policy, and forged meaningful collaborations across disciplines and sectors.

This report offers a comprehensive view of our progress— each achievement is a result of the collective efforts of our faculty, staff, partners, and supporters, whose shared commitment to the responsible governance of technology has made our work possible.

As the incoming Interim Faculty Director, I'm honored to help carry this mission forward. I look forward to working alongside our faculty, students, and partners as we continue to push the boundaries of research and policy to ensure technology truly serves society.

Kirsten Martin
Dean, Heinz College of Information Systems and Public Policy

I want to recognize and thank Ramayya Krishnan, our founding Faculty Director, whose vision and leadership have guided the Center since its inception. As he steps down from the Faculty Director role, we celebrate the extraordinary foundation he has built.

Looking ahead, we remain dedicated to advancing research and dialogue that illuminate the complex relationship between technology and society. As the challenges and possibilities of our digital era continue to evolve, so too will our mission: to ensure that the future of technology reflects our highest public values.

Thank you for your engagement, your collaboration, and your belief in the work we do. We invite you to explore this report as both a reflection of the past and a foundation for what comes next.

A Letter from our Founding Faculty Director

As I reflect on the five-year journey of The Block Center for Technology and Society, I am filled with immense pride and gratitude for what we have built together. This report describes how a vision that began as a bold idea has since grown into a nationally recognized center of excellence - one grounded in rigorous research, interdisciplinary collaboration, and a deep commitment to shaping technology for the public good.

None of this would have been possible without the foresight and generosity of our founders, Keith Block and Suzanne Kelley. Their vision and philanthropy laid the foundation for this Center and for its bold mission: to bring together experts across disciplines to confront the societal challenges posed by rapid technological change. Their support has empowered us to ask hard questions, convene diverse voices, and produce research that informs better policy and practice.

I would also like to thank CMU President Farnam Jahanian, Provost James Garrett, Dean Martial Hebert and the School of Computer Science, and the Heinz College of Information Systems and Public Policy for supporting the startup phase of The Center and helping us grow into what we are today.

The Block Center has benefited greatly from the guidance of a distinguished Advisory Board, whose thoughtful insights have helped steer us through these turbulent times. I am deeply grateful to all board members - you readily said yes when asked and have generously shared your time and expertise to help build The Block Center. And none of this would have been possible without my faculty colleagues, and staff, who have helped to drive the research and policy impact that has defined our work over the past five years.

As I conclude my tenure as Faculty Director, I am honored to have been part of The Block Center's founding chapter. I look forward to seeing the next era of leadership build on this strong foundation and carry forward The Center's mission with renewed energy and purpose. The work ahead remains vital, and I have every confidence that this community will continue to lead with integrity and innovation.

With deep appreciation,
Ramayya Krishnan
Founding Faculty Director

INTRODUCTION

About Us

Since our founding in 2019, The Block Center for Technology and Society has been dedicated to exploring the intersections of technological innovation, public policy, and society. Housed at Carnegie Mellon University, The Block Center fosters interdisciplinary research that addresses the complex challenges posed by rapid technological advancements through our two focus areas: the future of work and responsible use of artificial intelligence. The Block Center promotes a thoughtful and inclusive approach to technological innovation through our research and outreach. We are ultimately striving for a future where technology serves the common good.

The Block Center and our affiliated faculty's hard work is captured and highlighted in this report. Over the past five years, The Block Center has remained at the forefront of cutting-edge research, leveraging interdisciplinary expertise and collaborative partnerships to produce meaningful insights. As we reflect on these achievements, we look ahead to the opportunities and challenges that will define the next chapter of our mission.

Our Areas of Work

The Block Center works at the intersection of technology and society, with a particular interest in deploying research for equitable impact alongside key community partners, primarily within our focus areas:

The Future of Work

The Block Center investigates the various ways in which emerging technologies benefit and impact workers at all skill levels. We foster research that investigates the impact of disruptive innovation on the U.S. labor market and leverages advanced technologies to address the social and economic needs of those being left behind as a result of technological change.

Responsible AI

The Block Center brings together a multi-disciplinary team of researchers spanning computer science and engineering to ethics and public policy to make progress with stakeholders and decision makers on how to develop and deploy trustworthy AI to support consequential applications.

CONNECTING CHANGEMAKERS TO EXPERTS

Artificial Intelligence 101

As part of our commitment to fostering dialogue around responsible AI, The Block Center facilitates a range of engagement opportunities for stakeholders and experts alike. The Block Center hosts in-person meetings, online discussions, and webinars where community groups, advocacy organizations, and private companies have the opportunity to engage with policy makers and AI experts to discuss their concerns and collaboratively explore solutions. These engagements have included roundtable discussions and presentations, often involving dialogues on topics like human-machine interaction, AI tools for upskilling workers, and the development of transparent AI systems.

Taking Expertise to DC

The Block Center plays an active role in informing public policy by sharing its expertise with lawmakers and shaping the national conversation around responsible AI governance. Block Center faculty have frequently provided expert testimony on Capitol Hill and briefed legislators from groups like the bipartisan Problem Solvers Caucus and the New Democrat Coalition AI Working Group. The Center's faculty have provided insight on AI's current and potential societal impact, offering guidance to help shape federal and state policies that ensure responsible AI use. These briefings emphasize AI's potential for innovation while highlighting the need for transparency, accountability, and equitable outcomes in technology deployment.

Block Center leadership has been an ongoing advisory partner of the Chief Digital and Artificial Intelligence Office (CDAO), the high-level entity within the U.S. Department of Defense (DoD) established to lead and coordinate the DoD's digital transformation and AI initiatives. Block Center Faculty Director Ramayya Krishnan (Chair) and Rachel Dzombak (Executive Director) lead and facilitate the CDAO Responsible AI (RAI) Academic Council and regular CDAO RAI Community of Interest meetings for knowledge sharing on pressing issues for the DoD's responsible AI community.

CONNECTING CHANGEMAKERS TO EXPERTS

Faculty Testimony

Carnegie Mellon faculty brought their AI expertise to national and global policy conversations:

Ramayya Krishnan, Block Center Faculty Director, testified before the U.S. Senate Commerce Subcommittee on the importance of transparency in AI, advocating for tools like watermarking and a federal rapid response team for emerging technologies.

Rayid Ghani, Distinguished Career Professor, spoke before the Senate Homeland Security Committee on ethical AI procurement, emphasizing the need for evaluating AI systems based on values, development processes, and human impact.

Jodi Forlizzi, Herbert A. Simon Professor at CMU's HCII, joined U.S. senators during the AI Insight Forum. She advanced four recommendations: integrate workers into AI design; define sustainable, generalizable AI frameworks; bake sustainability into development from day one; and offer broad digital literacy training.

CONVENING FOR IMPACT


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The Block Center for Technology and Society at Carnegie Mellon University has established itself as a vital hub for addressing complex technological challenges through collaborative convenings. These events bring together our affiliated faculty, leading academics from institutions worldwide, industry practitioners, policymakers, and community stakeholders to engage in dialogue about technology's societal impacts. The gatherings emphasize not only the exchange of research findings, but also the development of actionable insights and policy frameworks that can be implemented in real-world contexts. By creating spaces where diverse perspectives can converge from computer science and economics to ethics and public policy, we foster cross-disciplinary collaboration that generates more nuanced and comprehensive approaches to technology governance. These convenings have proven instrumental in shaping research agendas, informing policy discussions, and building a community of practice committed to ensuring that technological advancement serves the broader public interest.

For a full list of past events, check out The Block Center's events page and YouTube channel.

Preparing the Workforce of the Future

2022

In October of 2022, The Block Center for Technology and Society hosted a full-day academic conference examining the evolving demands of the labor market and the implications for education, training, and workforce policy. The event, organized with Block affiliated faculty members Lee Branstetter, Anna Salomons, and Rahul Telang, convened researchers and practitioners to share findings and discuss emerging strategies to better prepare individuals for an economy emerging from the disruptions caused by the global pandemic.

The conference focused on workforce development and the persistent gap between training programs objectives and labor market outcomes. Presenters highlighted the potential of employer-informed, data-driven approaches, particularly public-private partnerships, to more effectively align training with actual job needs. Discussions also examined the limitations of current program evaluation methods and the **importance of linking interventions to firm-level hiring and growth data**.

The discussions also explored the role of educational technology in expanding access and improving learning outcomes. Evidence from recent studies underscored the **value of high-dosage tutoring, intelligent tutoring systems, and personalized learning platforms**, while also emphasizing the continued importance of human support, motivation, and thoughtful instructional design.

Throughout the conference, common themes emerged: the necessity of supporting learning across the lifespan, the need for systems that serve diverse learners equitably, and the importance of integrating technology with pedagogical best practices. The conference reinforced the value of interdisciplinary collaboration in addressing these challenges and offered a clear direction for future research and policy development aimed at building a more inclusive and adaptable workforce.

Workforce Resilience in a Changing Technological Landscape

2024

In October 2024, The Block Center for Technology for Society hosted the "Workforce Resilience in a Changing Technological Landscape" conference, bringing together academic experts and industry leaders to address workforce challenges in the era of AI and automation. The day-long event, was organized with Block affiliated faculty members Lee Branstetter, Andy Garin, Felix Koenig, Brian Kovak, Anna Salomons, and Lowell Taylor.

Throughout the event, speakers presented research and insights that converged on several key findings:

- As technology reshapes work, decision-making and problem-solving skills have become increasingly valuable while **rote execution diminishes in importance**;
- Workforce development programs are most effective when they **maintain close connections with employers and focus on adaptable skills** applicable across industries; and
- Initial **job placement quality** is often more important than the specific training received;
- While technology can streamline hiring processes, **human input remains essential for specificity and nuance**.

The conference concluded that building workforce resilience requires a combination of forward-thinking education, adaptive policies, cross-sector collaboration, and intentional programs that expand access and opportunity, particularly for historically disadvantaged groups.

Artificial Intelligence and the Future of Work

2024

The Block Center for Technology and Society co-hosted a public webinar exploring the National Academies' report, *Artificial Intelligence and the Future of Work*, along with Stanford's Digital Economy Lab. Featuring the report's co chairs, Block Center Advisory Board Member Erik Brynjolfsson and Block Center Chief Technologist Tom Mitchell, the discussion delved into how emerging AI systems, including generative AI, are reshaping the nature of jobs, worker experiences, and the broader U.S. economy.

The webinar highlighted key findings from the report, including the potential of AI to increase productivity and economic growth, while also confronting the risks of job displacement and widening inequality. Through Q&A with the co-chairs, the webinar provided direct access to expert insights for a diverse audience.

The event reflects The Block Center's commitment to convening thought leaders across disciplines and sectors to examine the societal implications of AI. By connecting national policy expertise with CMU's research ecosystem and public audiences, The Block Center continues to serve as a catalyst for responsible technology governance and inclusive economic development.

> *"The deployment of AI in the workplace is not preordained. The choices made by governments, employers, workers, and other stakeholders will determine whether the technology is used in ways that benefit society broadly."*

Operationalizing NIST's AI Management Framework

2023

In July 2023, The Block Center and the National Institute of Standards and Technology (NIST) convened a workshop at Carnegie Mellon University to explore practical ways to operationalize NIST's AI Risk Management Framework (AI RMF) across various sectors. The two-day event, organized with Block affiliated faculty Jodi Forlizzi and Hoda Heidari, brought together experts nationwide to discuss potential use cases in financial services, labor, healthcare, local government, and non-profit organizations.

Through examination of real-world applications, including Allegheny County's Homeless Support System, hotel housekeeping operations, banking services for underserved populations, and city planning initiatives, four critical themes emerged for effective AI RMF implementation:

- Evaluating AI systems through a **sociotechnical lens** that acknowledges human interfaces and social contexts;
- Developing public sector procurement guidelines to **ensure responsible AI development**;
- Enhancing stakeholder engagement through **innovative educational tools and exercises**;
- Providing **practical and context-aware training** to build AI fluency across all workforce levels.

Supporting NIST's Development of Guidelines on Red-Teaming for Generative AI

2024

In February 2024, Carnegie Mellon University's K&L Gates Initiative and The Block Center hosted a workshop to support NIST's development of red-teaming guidelines for generative AI, as mandated by Executive Order 14110. The event, organized with Block affiliated faculty Hoda Heidari and Alex John London, brought together experts from academia, industry, and public sectors across three panels discussing research frontiers, industry practices, and policy implications. Key findings emphasized several critical components for effective AI red-teaming:

- Establishing a clear **functional definition** with structured criteria spanning pre-activity planning, execution protocols, and post-activity evaluation;
- **Addressing AI systems holistically** rather than focusing only on individual components; ensuring diverse expertise in red team composition;
- **Standardizing best practices** while maintaining flexibility for specific contexts; and
- Recognizing how **market forces and regulations will shape implementation**.

Participants highlighted that while red-teaming is a powerful method for identifying AI risks, it should be viewed as one component within a comprehensive risk management framework, with particular attention to defining success metrics, establishing disclosure processes, and clarifying responsibility allocation across the AI development lifecycle.

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AIMSEC – Advancing the Science of AI Evaluation

The Block Center's engagements with NIST provided an important foundation for NIST's $6 million investment in the CMU / NIST AI Measurement Science and Engineering Cooperative Research Center (AIMSEC). Established in partnership with The Block Center, the objective of AIMSEC is to facilitate collaborative research and experimentation focused on advancing the national capability for testing and evaluation of modern AI capabilities and tools.

Researchers within AIMSEC, including many Block-affiliated faculty, are working to advance the state of the art in evaluating and mitigating the risks associated with the development, deployment, and evolution of AI-based systems for diverse applications. A key role that The Block Center is playing in support of AIMSEC is to convene the necessary diversity of stakeholders from academia, industry, public sector, and impacted communities to ensure a comprehensive perspective on the development of AI risk management practices as well as to validate evaluation approaches through stakeholder partnerships.

AIMSEC and The Block Center together will work to translate assessment capabilities and methodologies into practice. Our goal is to cultivate a research ecosystem that connects stakeholders and catalyzes a rich collaboration between NIST and CMU. In doing so, we hope to support a more rapid translation of emerging AI evaluation and risk management capabilities into state of the practice, through the building of methodologies and software toolkits with ultimate benefit to the broader evaluation and deployment of AI systems.

BOLSTERING THE ROBOTICS ECOSYSTEM

Accelerating research-informed training in the regional robotics industry

Southwestern Pennsylvania's Build Back Better Coalition

In 2022, Southwest Pennsylvania was one of 30 winners of the Department of Commerce's Build Back Better Regional Challenge, securing $63 million over three years to promote growth and inclusion in the robotics and manufacturing industries. The Block Center has taken on a pivotal role in the Southwest Pennsylvania New Economy Collaborative, helping establish a well-coordinated upskilling system by funding a variety of training options beyond traditional four-year and advanced degrees. Doing so ensures that the programs stay responsive to evolving industry needs and are accessible to all communities.

The Block Center awarded over **$1.4M to eighteen regional partners** over the first two rounds of funding. These awardees worked on curriculum development and training projects designed to reskill and mentor underemployed adults to prepare them for industry jobs. To date, **more than 600 students have participated** in robotics and advanced manufacturing courses, workshops, and training programs.

Through these efforts, The Block Center is advancing education and workforce development and fostering an inclusive environment for future robotics and advanced manufacturing growth in Southwest Pennsylvania.

18 Funded Projects

60+ Programs, training, & curricula deployed

815+ Individuals gained or upgraded skills

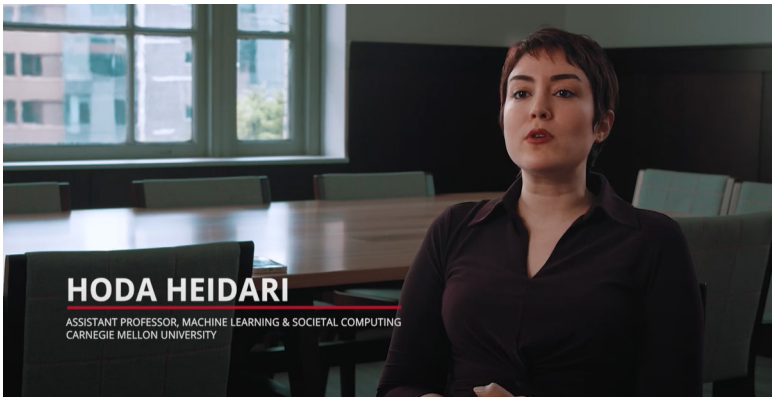
300+ Women

150+ Black, Indigenous, & People of Color

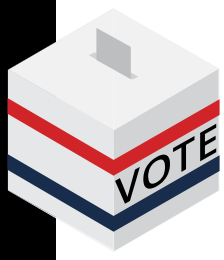
THE RESPONSIBLE VOTERS GUIDE

The Block Center's affiliated faculty members Kathleen Carley, Hoda Heidari, and Alex John London collaborated on the Responsible Voters Guide. The guide was developed in response to growing concerns about the deceptive use of Generative Artificial Intelligence (GenAI) ahead of the November 2024 U.S. presidential election. The guide encouraged voters to actively preserve the integrity of the democratic process by critically analyzing information they encounter on social media, and fact-checking their sources. At the time of the guide's release, more than half of U.S. states were considering legislation to address the deceptive and malicious misuse of GenAI in elections. Educating voters was therefore a key objective. The guide also urged individuals to contact their legislators in support of stronger GenAI regulation.

The Responsible Voter Guide was further expanded with the Responsible AI Voter Video Guide. The video emphasizes the same points as the original guide, while also providing visual examples of common election-based GenAI images found on the internet.



A RESPONSIBLE VOTER'S GUIDE TO GENERATIVE AI IN POLITICAL CAMPAIGNING



Carnegie Mellon University

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GEN AI IN POLITICAL CAMPAIGNING

Generative AI (GenAI) allows its users to create realistic images, videos, audio and text, rapidly, cheaply and at scale. These capabilities can be useful in many contexts, but during elections, they could also be misused to manipulate and deceive voters.

HOW CAN WE PROTECT OUR DEMOCRACY?

Take action to support the integrity of the democratic process:

- If content appears shocking or dramatic, take a step back from social media, examine the claims it makes and the source!
- Ask candidates questions about their campaign's use of GenAI.
- Find your representatives and send them our letter asking them to support stronger AI regulation.

2

GEN AI: DECEPTION ON STEROIDS!

Ideally, democracy is a contest of ideas and competing visions for the future of America. To choose between these visions and to **hold elected leaders accountable**, citizens need **accurate information**, not just about **candidates** and their policies, but about the **democratic process itself**.

The use of generative AI to fabricate compelling images, videos, audio or text poses a real threat to democracy. GenAI is particularly problematic because users don't need powerful computers, expensive software or access to hours of video footage — they can just ask GenAI to create realistic content that depicts events that ***never happened***.

3

HOW CAN THIS HURT OUR DEMOCRACY?

By robbing voters of the ability to discern truth from fiction, the deceptive use of AI tools can manipulate voters, suppress voting and sow doubt and uncertainty around our democratic process itself, leading to distrust of our democratic institutions, our leaders and each other.

It is an enormously powerful tool that, in the hands of an unethical person or group, can cause lasting harm and even, in its worst instances, drive people to commit violence. As we have seen in previous elections, this disinformation is often being generated by foreign adversaries whose goal is to weaken and divide us as a nation.

4

DID YOU KNOW?

Political speech is protected by the First Amendment, with very few exceptions, such as hate speech. In addition, it is often difficult to tell that information is not true. Not all misinformation and disinformation are inaccurate facts; in fact, much of it is simply innuendo that leads people to an inaccurate fact.

WE CURRENTLY HAVE NO STRONG GUARDRAILS AROUND THE USE OF GEN AI IN CAMPAIGNS.

The Block Center FOR TECHNOLOGY AND SOCIETY

Carnegie Mellon University Responsible AI

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WHAT GUARDRAILS ARE ON THE HORIZON?

The Federal Election Commission, or FEC, may regulate AI-generated "deep fakes" in political ads in the 2024 elections.

Companies that have created these powerful generative AI tools have voluntarily pledged to identify and clearly mark AI-generated content to help people recognize when an image, voice, video or text has been created or altered using AI.

A growing group of **bipartisan legislators** supports enactment of comprehensive legislation to implement safeguards on these tools.

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CALL TO ACTION: WHAT CAN YOU DO?

If content appears shocking or dramatic, take a step back from social media to examine the claims it makes and the source!

Ask candidates questions about their campaign's use of GenAI.

Find your representatives and send them our letter asking them to support stronger AI regulation.

RESEARCH IN ACTION

Including worker voice in policy research

To ensure a grounded, inclusive perspective on AI's impact, The Block Center has made it a priority to engage directly with labor unions and worker organizations—recognizing that those closest to technological change must have a seat at the table.

Our longstanding partnership with the AFL-CIO Technology Institute reflects this commitment, fostering sustained dialogue between labor leadership, technologists, and policymakers. We've hosted union delegations from groups like the Communications Workers of America (CWA) to explore how AI can support - not sideline - workers, from improving training systems to shaping the development of new tools.

These convenings offer labor leaders the opportunity to engage directly with cutting-edge research, and ensure that worker perspectives are embedded in conversations about the future of work. This approach has also informed our broader stakeholder engagement efforts, such as hosting the Pennsylvania House Committee on Communications and Technology for research briefings on the societal implications of AI.


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UNITE HERE: Integrating Worker Voice

The Block Center has partnered with the AFL-CIO Technology Institute since the Center's inception. This long-running collaboration hosts various union leadership on campus to learn more about faculty's research in regards to the intersection of labor and technology.

The Block Center's affiliated faculty Jodi Forlizzi and Sarah Fox have had a close working relationship with the hospitality focused labor union, UNITE HERE. This resulted in the CMU-UNITE HERE partnership, which has since received a number of grants from the National Science Foundation (NSF) and The Block Center's seed grants to conduct a case study on the use and deployment of AI by workers in the hospitality industry. The objective of the study was to to develop policy recommendations to regulate automation and ensure worker health.

In both 2020 and 2021, the CMU-UNITE HERE team conducted workshops and interviews with union members specifically focusing on two types of hospitality based automation technology in use. One of which were systems designed with the goal of saving time and labor by assigning and prioritizing cleaning tasks for housekeepers. The other focused on systems meant to replace labor, in this case an automatic "bartender" that was programmed to prepare drinks.

The results of the study established what UNITE HERE members valued in their work. Data also revealed that both automation systems studied, created more work for certain hospitality workers. The systems also directly threatened one of their most important values; forming social connections with their customers. Workers also expressed frustration with the lack of training in using the automation systems and the assumption of more responsibility beyond their service work.

The CMU-UNITE HERE team was able to compile a list of recommendations for policy makers based on the results of the case study. In 2023, Jodi Forlizzi shared these recommendations with U.S senators at The AI Insight Forum on AI Innovation.

IATSE

International Alliance of Theatrical Stage Employees (IATSE)

In early 2024, The Block Center was asked by The International Alliance of Theatrical Stage Employees, Moving Picture Technicians, Artists and Allied Crafts of the United States, Its Territories, and Canada (IATSE), a union represented by the AFL-CIO, to assemble an interdisciplinary team of faculty experts to develop policy analysis and recommendations. These recommendations explore how new artificial intelligence technologies will impact industry jobs. IATSE members and the entertainment industry are already being impacted by rapid advances in AI technology across almost all job categories – in some cases enhancing and, in others, threatening jobs. These concerns had been amplified by the 2023 strikes led by the Writers Guild of America (WGA) and the Screen Actors Guild - American Federation of Television and Radio Artists (SAG-AFTRA), which brought national attention to the potential for AI to disrupt creative and technical labor in film and television.

Block Center staff synthesized insights from existing literature and convened a set of faculty working groups centered on three core areas of interest regarding AI impact – technology, intellectual property, and governance. The team iteratively met with IATSE leaders who were most engaged with technology issues several times during this process.

As a result, CMU researchers developed a framework that explores how AI and emerging technologies impact the roles of IATSE members that union leadership could use in their contract negotiations with employers. Success in negotiations and broader policy advocacy will support the ability of workers to benefit from change while adjusting to new technology use.

After months of negotiations, IATSE and the Alliance of Motion Picture and Television Producers reached a Memorandum of Understanding in August 2024.

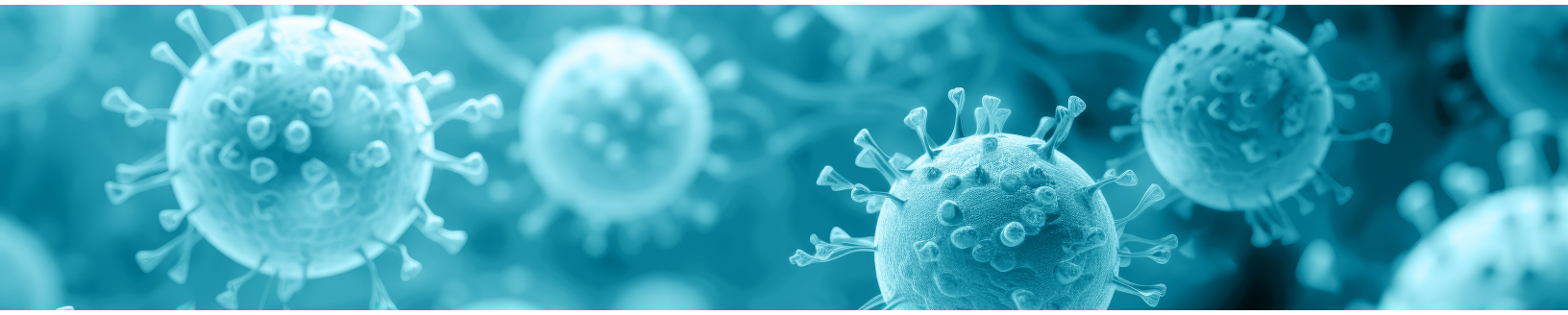
Data Driven Pandemic Response

The COVID-19 pandemic brought unprecedented challenges to Pennsylvania's economy and workforce, demanding rapid, evidence-based responses from policymakers. Soon after its founding, The Block Center played a pivotal role in the Commonwealth's response, partnering with former Governor Tom Wolf and state agencies to deliver real-time, data-driven decision-making support during this critical period.

The Block Center faculty, including Ramayya Krishnan, Rayid Ghani, and Roni Rosenfeld, led an interdisciplinary team that developed a dynamic dashboard for state leaders. This tool integrated data from public health, labor, and economic sources to assess the risks and benefits of reopening various sectors, with special attention to vulnerable workers and businesses. The dashboard enabled policymakers to model "what-if" scenarios, projecting the public health and economic impacts of potential reopening strategies at both the industry and county levels. This approach provided actionable insights for safeguarding both lives and livelihoods and was recognized as a national model for data-driven pandemic response:

> **In the near-term, every governor should commission a data-driven support tool—designed with input from economists, medical professionals, and machine learning experts—which integrates both economic and public health data to inform their state's reopening process. Pennsylvania has led the way in this effort, as Governor Tom Wolf recently announced *a partnership with Carnegie Mellon University to develop exactly such a tool, which should serve as a model for other states.*"**
>
> **-National Security Commission on Artificial Intelligence**

This work directly advanced The Block Center's mission to research the Future of Work and Workforce Development while advancing societal futures that are equitable and just. The pandemic accelerated shifts in workplace norms, exposed gaps in workforce resilience, and highlighted the need for adaptive skills and equitable economic recovery. The Block Center's efforts not only informed immediate crisis management but also contributed to long-term strategies for building a more inclusive workforce, ensuring that innovation and policy keep pace with the changing world of work.



Engagement with State Policy Making and Implementation

In September 2023, Governor Josh Shapiro signed an Executive Order which set Pennsylvania's priorities for the use of Generative AI (GenAI) in state operations while visiting Carnegie Mellon University. The executive order established governance structures and policies to guide the responsible deployment of AI technology within the state government. A key component of the initiative is the GenAI Governance Board, tasked with overseeing the adoption and implementation of AI tools. The Block Center plays a pivotal role in supporting these efforts, offering expertise in promoting the responsible use of GenAI while addressing potential risks to privacy, security, and governance.

The Block Center has already taken several steps to support the Governance Board's efforts, including hosting educational workshops to ensure board members understand the technology's capabilities, risks, and governance needs. Workshop topics included AI fundamentals, privacy and security in the public sector, and governance of AI tools through procurement processes. Additionally, The Block Center has facilitated engagement with the Director for Emerging Technologies and supported graduate student research, including the development of an AI landscaping tool to help Commonwealth employees identify and implement AI solutions.

Looking ahead, The Block Center plans to further assist Pennsylvania (and other states) through several proposed initiatives. These include an educational conference and workshop covering critical topics like problem scoping, privacy, and workforce engagement with GenAI tools, followed by a comprehensive report of key discussions and recommendations. The Block Center is also working on an AI Readiness Toolkit, which will serve as a centralized resource for organizations preparing, procuring, and evaluating AI technologies. Additionally, faculty will collaborate with the Commonwealth to pilot AI solutions in real-world policy challenges, guiding the state through the entire lifecycle of AI tool adoption and evaluation.

Student Capstone Experiences

The Block Center facilitates Heinz College graduate students systems synthesis capstone projects with the Commonwealth of Pennsylvania. Students had the opportunity to engage with the Commonwealth's Emerging Technology Team in the Office of Administration (OA), working with the team to create deliverables such as a Comparative Analysis of Executive Policy on GenAI, a Generative AI Explainer, and a Generative AI Prompting Guide for Commonwealth leadership and employees to enhance their understanding of this critical emerging technology.

Workforce Supply Chains Initiative

The Workforce Supply Chain Initiative at The Block Center for Technology and Society is developing an end-to-end portfolio of data-driven tools, assessments, and policy guidance to help workers, employers, and policy makers navigate challenges and opportunities related to meeting the United State's workforce needs. The Initiative is co-led by Christophe Combemale and Ramayya Krishnan and includes a multidisciplinary team of experts from across CMU. The Initiative has been supported by the Advanced Robotics for Manufacturing Institute, the Richard King Mellon Foundation, the National Science Foundation, and the Alfred P. Sloan Foundation.

The increase in ambitious public and private investments that seek to improve national industrial capacity, economy security, and competitiveness can create regional skill demand shocks to both construct and staff capacity (e.g. semiconductor fabs), sometimes for industries without a historic regional presence. Firms, trainers, government, labor groups and other key decision-makers lack consistent, data-driven methods for evaluating workforce feasibility. Rather than a one-time study for a specific project or technology, a flexible and repeatable capability is needed for decision-support across a range of industrial scenarios. This identifies any given investment proposal the conditions under which that proposal may be feasible from a workforce standpoint, and to support the development of a data-driven strategy for meeting workforce needs.

The Workforce Supply Chains (WSC) tool offers a decision support framework to inform site-selection and expansion strategy for investments based on labor market readiness, as well as highlighting instances where recruitment and training alone cannot close supply-demand gaps.

This methodology quantifies the supply of different types of skills in the U.S. labor market and the potential readiness of workers in one occupation to transition into another. With this set of candidate occupations that meet a minimum level of readiness designated by the user, the tool provides estimates of the number of workers available in any region of the country to meet a given level of demand, their demographics, and their current wages. Along with this stock of talent, the WSC tool also estimates the size of the annual pipeline of workers that could be recruited into a new role.

The Initiative's teams have briefed U.S Departments of Labor and Commerce as well as the National Science Foundation on research on workforce needs for technology transitions, to help support advanced technology workforce efforts for critical and emerging technology industries.

Studying the Labor Implications of Artificial Intelligence

Starting in 2025, as a part of the Workforce Supply Chains Initiative, The Block Center will leading a joint research project with other leading institutions, including Massachusetts Institute of Technology, University of Pittsburgh, Northeastern University, University of Virginia, University of California, and the U.S. Chamber of Commerce Foundation.

This multi-institutional effort will work in to develop evidence-based foundations for understanding the impact of AI on the workers and labor markets.

$2.4
million
distributed

49
projects
funded

88
faculty
funded

6
colleges
represented

The Block Center Seed Fund

Investing in the CMU research ecosystem

Each year, The Block Center invests in a Seed Fund portfolio of early-stage applied research projects.

From 2019 to 2024, The Block Center supported over 50 projects through its Seed Fund, awarding an average of $50,000 per initiative across interdisciplinary teams. These projects spanned our two focus areas: Future of Work and Responsible AI. The projects addressed policy-relevant challenges such as enhancing human-AI collaboration, designing equitable labor markets, and improving community-centered applications of technology.

Examples include initiatives to optimize human-AI team dynamics, develop ethical AI procurement practices in municipalities, and enhance equity in job market accessibility. The Fund also enabled the creation of tools and methods, like AI risk audits and generative AI training frameworks, that have attracted follow-on funding and influenced public policy. Additional projects uncovered employer biases against geographically distant candidates and helped communities evaluate housing algorithms to improve AI-driven public services.

The Seed Fund has played a critical role in advancing CMU's mission to leverage research for social good and long-term societal impact.Notably, faculty projects launched from a NIST-inspired seed fund call laid the groundwork for AIMSEC, a federally funded research center, demonstrating the powerful return on early investment in interdisciplinary innovation. The following seed fund projects highlight how faculty address urgent societal challenges through interdisciplinary innovation.

ASSETMAPPR

Building the Case for Informed Community Investments

Heinz College's Rick Stafford grew up in the Appalachian region, and is all too familiar with the dire straits of the region's economy and infrastructure. This is what led Stafford to develop AssetMappr, a web-based tool developed in conjunction with students that allows Appalachian communities to take part in asset mapping, a system that allows residents to highlight the needs of their community. Stafford and his students hope for AssetMappr to become a widely used tool that disadvantaged communities can use to discuss their needs.

Across multiple semesters, over twenty students worked on coding the software and testing the application with the Uniontown and Monongahela communities. Through this work, they discovered that Monongahela, in particular, has an aging population and a history of riverfront entertainment as a once-thriving local industry.

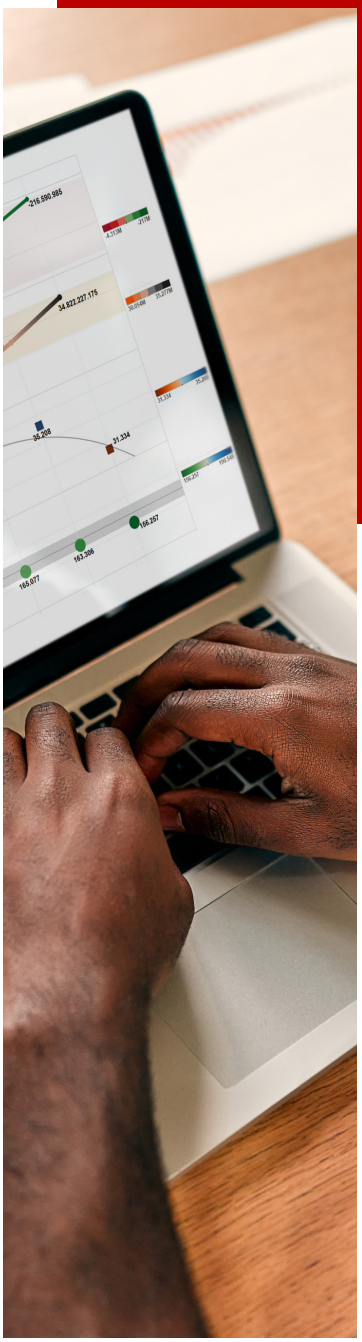
Stafford believes that CMU needs to engage with the region we are in, as a strong region benefits a strong university. Stafford's project is only adding to the many projects CMU has in place to reach out to the community like Metro 21: Smart Cities Institute.

Funding from The Block Center also allowed Stafford to develop a new course at Heinz College, "Jobs and Communities Left Behind". In this course students are able to participate in site visits around the region in which they were able to view the infrastructure and interact with community leaders. During these site visits, Stafford and his students found that a major issue communities had was a lack of capacity for residents to report their needs. This issue is why AssetMappr was designed - to increase capacity for community input and prepare the materials needed for these communities to receive grants and funding.

Having retired in 2024, Stafford has left a lasting legacy of regional attention within the Heinz college and CMU.

Navigating the Intersection of the Gig Economy and Entrepreneurship

A Data Driven Approach



Matthew Denes from the Tepper School of Business has spent the last four years investigating the impact the gig economy has on entrepreneurship. Denes has accomplished this by analyzing administrative data on U.S. tax returns. This dataset was risky to use as there is currently no established literature of this data being used to analyze patterns in finance and economics, indeed the dataset itself mirrors the "risky firms" Denes studied in this project.

Denes and his team are finding that gig economy workers are more likely to become entrepreneurs. The results of this project have opened the door for more research to be conducted. Denes mentions for instance that the COVID-19 pandemic saw an increase in the amount of entrepreneurial endeavors, specifically amongst women with dependents. Furthermore, the research implies that the nature of the gig economy itself may help individuals develop the skills needed to be a successful entrepreneur.

> *"...the COVID-19 pandemic saw an increase in the amount of entrepreneurial endeavors, specifically amongst women with dependents."*

One of major roadblocks for Denes' team was time. The unconventional nature of the U.S. tax return dataset made the approval process lengthy. Funding from The Block Center enabled Denes and his team to rapidly analyze large, complex tax return datasets and produce timely insights and policy recommendations.

Guiding Future Civil Engineers in Responsible Generative-AI:

Transformation of Critical Civil Infrastructure Workflows

Pingbo Tang, an associate professor in CMU's Civil and Environmental Engineering department recently completed a project concerning Architecture, Engineering, and Construction workers (AEC). Tang's research team included collaborators from Yale University and Kent State University.

Tang's project investigated the integration of AI programs into AEC based projects. This brings about a number of concerns, one of which being job security. AEC workers are currently inundated with projects and AI tools are sorely needed to assist them, but these workers and their tasks cannot be completely offloaded or replaced by AI. Tang highlights common concerns with AI such as its limited creative capabilities and legalities regarding ownership and intellectual properties. Tang's ultimate goal for this project would be to develop an AI policy that can be used throughout the industry.

Tang's research team noted that the first step in ethically integrating AI into AEC workspaces would be to provide AI training programs for these workers. These training programs will ideally be incorporated into Tang's plans for a nationwide AEC based AI policy. Tang emphasizes the fact that most AEC workers do not have formal training in the use of AI tools and that a major issue right now is the fact that organizations across the country have varying levels of knowledge in regard to AI usage and risks.

These organizations consequently end up having equally varying stances on AI, from some banning it entirely to others being "overly enthusiastic" and veering towards a dangerous trajectory of using AI for everything. Ultimately the AEC industry needs to develop a more balanced view on AI, considering both the benefits and risks.

Tang highlights the fact that more research needs to be conducted in order to gain a clearer understanding of the scope of AI. Future research however needs to be a collaborative effort between both AI experts and AEC industry workers. This is especially crucial when it comes to developing industry-wide AI policies. It is safe to say that AI holds a lot of potential, but before that can be further explored, AI needs structure.

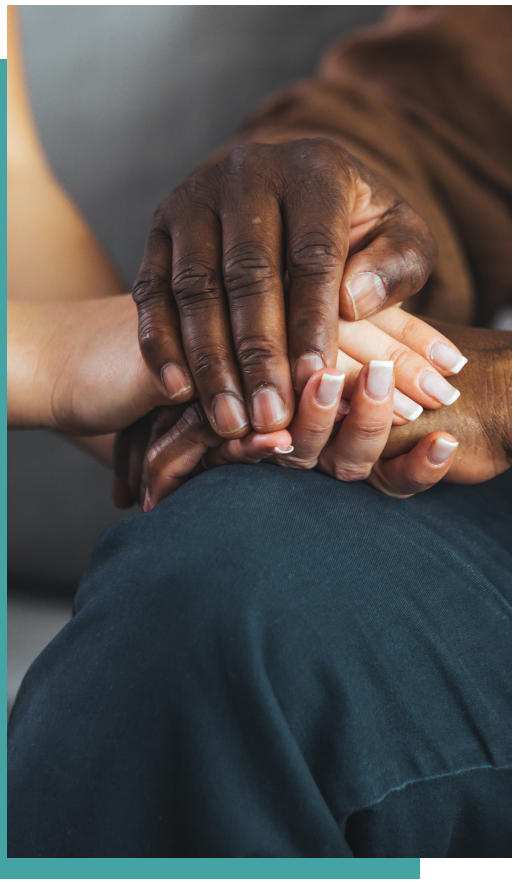
CommunityAI

Supporting Community-centered Evaluation of Social Service AI via the AI Risk Reports

CMU's Human-Computer Interaction Institute Associate Research Professor Hong Shen spent the past year working on the beginning stages of a long term project that will bring about AI literacy to underserved populations. Shen's project specifically focuses on the previous failures of AI decision systems used to serve high-stakes social service domains. The main failure being that both community members and social service workers are unable to successfully use these tools.

Shen notes that a potential cause for these failures is the fact that there is a disconnect between the AI tools and the community members. That is, the tools were developed by researchers who are not members of the serviced community. This disconnect has inevitably led to failures that at best have no impact on the community, and at worst actively harm the community they were intending to serve

Shen's team currently collaborates with the University of Pittsburgh's School of Social Work and a number of local social service organizations. Shen also developed AI Failure Cards, which assist with Shen's research goal of bringing AI literacy to underserved communities. The AI Failure Model actively involves the community in which frontline workers or social workers can provide input regarding design and concerns they have with AI. This method provides the necessary data for researchers to update the AI decision systems.



"Sometimes AI takes the 'human' out of the equation,"

- Hong Shen

Shen's project arrives at a crucial time in which AI usage is expanding. This expansion however is happening at such a rapid pace that a large number of communities, particularly those who do not have technical backgrounds, have the potential to be excluded. To prevent this from happening, projects like Shen's are crucial in ensuring that AI is used to better society.

"Sometimes AI takes the 'human' out of the equation," Shen explains. "Involving everyone in the community feels like the most appropriate way to move forward and make sure people aren't being left behind."

ParticipAI

Anticipating and governing future AI use cases and dilemmas with participatory frameworks and democratic process

Maarten Sap, an Assistant Professor at CMU's Language Technologies Institute, has used The Block Center's funding to develop ParticipAI. ParticipAI is a framework that allows members of the general public to share their opinions on the design and usage of different types of AI programs.

Sap's project consisted of 295 participants from different backgrounds. The participants' responses to ParticipAI revealed that a large majority of people want to see AI programs implemented to assist in their personal lives and societal issues. This is a stark contrast to the AI programs that currently exist which were developed for corporate uses.

AI for business is especially concerning for people, as ParticipAI concluded that most of the distrust of AI stems from the fear of technology replacing humans. This would potentially result in the devaluing of human independence and self-worth. The results of Sap's project indicate that researchers should develop AI that strictly assists humans and does not take away their agency and power.

"There's a true dilemma of developing technology that could prevent harm, but also cause it," Sap explains.

Sap's project offers, as he puts it, a "democratic" approach to AI development. That is, directly involving the very people social service programs are meant to serve, and not limiting the advancement of these programs to researchers and technological experts. Sap explains that ParticipAI is only the beginning of their work, especially as AI becomes more ingrained in society. AI development should in essence be a continuous collaborative effort between researchers and the general public.

Sap was able to kickstart ParticipAI with The Block Center's Funding. Sap explains that smaller seed funds like The Block Center's are extremely helpful in getting projects from junior faculty members started. "Even a little bit of money can make a big difference," Sap says.

ParticipAI is ultimately the first phase in Sap's long term project. Sap plans on moving into the second phase of this project, which involves identifying how each individual's identity and experience with technology impacts their opinions in regards to AI.

Willingness to Pay for Workplace Safety

The COVID-19 Pandemic resulted in a number of major changes in workspaces, one of the most pertinent being workplace health.

With the consequences of the pandemic still being fairly new, Heinz College's Felix Koenig aimed to investigate how much workers are willing to sacrifice (monetarily) in order to preserve their health. Koenig's project specifically tracked workers paid on an hourly basis. Koenig analyzed the decisions workers made in regards to their working hours and correlated that with levels of COVID-19 risks at the time. This process is known as a revealed-preference approach, one in which researchers study the choices people make in order to determine their preferences.

Koenig found that workers significantly value their health over their income. Workers are willing to lose 9% of their income for a reduction in fatality risk of 1 in 100,000. These results bring about a number of implications for policies regarding workplace safety and payment.

Koenig used seed funding from The Block Center in order to build a unique data infrastructure. This infrastructure was particularly novel because Koenig was able to retrieve data from companies across multiple states on a real-time basis. That is, Koenig was able to access data on a daily or weekly basis. Furthermore, Koenig was able to access data from multiple states which was significant as different states have varying policies regarding hours, payment, and unemployment insurance (UI) which were all aspects they studied.

Workers aren't as worried about losing a finger, but more concerned about "hidden" dangers such as burnout and mental health issues.

Koenig emphasizes how workplace safety today has changed in the last century. There needs to be an increased awareness on mental and hidden health challenges to highlight the importance of understanding workplace risks, even at a time when physical injuries might be declining.

CONCLUSION

As we reflect on the past five years, we are incredibly proud of how far The Block Center has come. From launching innovative research initiatives and supporting interdisciplinary collaboration through our seed fund grants, to shaping public discourse and informing policy on technology and society, our growth has been both meaningful and mission-driven. Our faculty have shaped global conversations on responsible AI and the future of work—appearing in top academic journals, policy briefings, and public discourse. We've grown our team, deepened our collaborations across campus and beyond, and established ourselves as a trusted, forward-thinking partner to policy makers in one of the most critical areas of our time.

None of this would have been possible without the passionate and thoughtful community that surrounds us. We extend our heartfelt thanks to our advisory board, whose guidance continues to shape our strategic direction; to our affiliated faculty members, who bring bold ideas and rigorous scholarship to our work; to our seed fund recipients, who transform funding into groundbreaking insights; to our community partners, who help us ensure our research addresses real-world needs; and to our dedicated staff, who bring our mission to life every day. To all who have contributed to the success of The Block Center - thank you.

As we look toward the next five years, we remain committed to advancing responsible technology, fostering innovation, and delivering policy-relevant research that meets the challenges of our time.

APPENDIX - Photography

1. Pictured: Ramayya Krishnan
2. Pictured from left: to right: Victoria Espinel, Ramayya Krishnan, Sam Gregory, Rob Strayer
3. Pictured from left to right: Ramayya Krishnan, Tom Mitchell, Hoda Heidari, Rayid Ghani
4. Pictured from left to right: Rayid Ghani and Governor Josh Shapiro
5. Pictured: Avinash Collis
6. Pictured: Alex John London
7. Pictured: Ken Holstein
8. Pictured from left to right: Sarah Fox and Nikolas Martelaro
9. Pictured from left to right: Anna Salomons, David Autor, Avi Goldfarb, Sameena Shah, Majd Sakr
10. Pictured: Brian Kovak
11. Pictured from left to right: Jodi Forlizzi and Hoda Heidari
12. Pictured from left to right: Zico Kolter, Matt Frederickson, Sanmi Koyego, Graham Neubig
13. Pictured from left to right: Curtis Tate, Amanda Ballantyne, Jodi Forlizzi, Nikolas Martelaro, Ben Begleiter
14. Pictured: Hoda Heidari
15. Pictured: Christophe Combemale
16. Pictured from left to right: Lisa Kahn, John Horton, Matthew Holjes, Kathy Mayle

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Amelia Haviland
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