

New Jersey at the Intersection of AI and Quantum: Innovation, Resources, and Regional Opportunity

ABSTRACTS AND SPEAKER BIOGRAPHIES



We thank the NJ AI Hub as the host for today's event.

THE NJ AI HUB *Liat Krawczyk, NJ AI Hub*

This talk will provide updates about the NJ AI Hub initiatives and activities. The Hub is a first of its kind entity created through a partnership between four partners who together reflect key foundational components of the AI economy: Princeton University, NJEDA, Microsoft, and CoreWeave. The Hub's role is to help proactively prepare New Jersey for the AI-era economy by connecting frontier research, educational institutions, workforce development organizations, startups and entrepreneurs, industry adopters, and public-sector stakeholders into a cohesive statewide ecosystem focused on translating AI into broad-based economic and societal value. The Hub serves as New Jersey's center of gravity for AI, helping align institutions, accelerate collaboration, and ensure the state both participates in the AI economy, and helps shape how AI is responsibly developed, deployed, and translated into real-world impact.

THE EMERGING QUANTUM ECONOMY *Don Grust, QuantumToMarket*

Quantum is a generational technology (like AI) that has enormous global economic and national security impact. It harnesses quantum mechanics to solve the world's hardest problems that are beyond the reach of classical computing techniques. Applications include high-value use cases to:

- Simulate advanced molecules for drug discovery and material science.
- Deliver highly precise sensing for medical imaging and GPS-free navigation.
- Optimize computationally hard logistics and financial models.
- Enhance AI and machine learning.
- Employ unbreakable cryptographic techniques.

This talk will provide an overview of the quantum market, describe the regional quantum ecosystems and discuss the NJ opportunity to capitalize on this emerging market. We will cover quantum computing, sensing, networking and cryptography. No math needed!

TOWARDS DIAMOND BASED QUANTUM AND MICROELECTRONIC *Kiran Kovi Kumar, Ph.D, Princeton Plasma Physics*

Diamond is an exceptional material with its excellent material, electrical and quantum properties. At PPPL we are working toward producing high quality diamond films for quantum and microelectronics applications. In my talk, we shall discuss the efforts of PPPL towards achieving this.

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DIAMOND AGENT: AGENTIC CONTROL OF FEDERATED HPC RESOURCES AS A SERVICE *Zhao Zhang, Ph.D., Rutgers University*

Efficiently aggregating and orchestrating computing across heterogeneous clusters for HPC workflows faces four practical challenges: preserving workflow context across independently administered clusters, moving large datasets between sites, reasoning about site-specific environments and scheduler policies, and exploiting live queue and resource states for efficient task scheduling. To this end, we design Diamond Agent, an agentic system that enables intelligent execution of HPC workflows across heterogeneous clusters with typed skills as the interface. Diamond Agent provides an agent-facing workspace and skills that unify cross-site resource discovery, resource specification, data movement, task execution, and result retrieval. A centralized Diamond Agent instance can operate multiple supercomputers without being deployed separately on each login node. Diamond Agent translates high-level agent actions into valid site-specific executions, moves data through Globus Transfer, and uses live system capability and queue information to select feasible placements. Its event-driven continuation mechanism decouples agent actions from long-running batch jobs: persistent services monitor remote execution and resume the agent only when a result or decision-relevant event is available.

GEOMETRIC INDUCTIVE BIASES FOR HIERARCHICAL LEARNING AND REASONING *Mengjia Xu, Ph.D., NJIT*

Many real-world problems, from forecasting evolving systems to understanding language, contain hierarchical and multiscale structure, but conventional AI representations often struggle to capture these relationships efficiently. This talk explores how geometric structure, particularly hyperbolic geometry, can provide AI with a more natural way to represent, learn, and reason over such complex information, spanning temporal prediction, language modeling, and multi-step reasoning.

MITRE AS A QUANTUM CONNECTOR *Daniel Lum, Ph.D., MITRE*

As a nonprofit organization serving the public interest and providing independent technical advice to the U.S. government, MITRE is uniquely positioned at the intersection of government, academia, and industry. This position allows MITRE to independently assess emerging quantum technologies, connect government sponsors with leading researchers and technology developers, and help accelerate promising advances in quantum sensing from laboratory demonstrations toward real-world applications and products. This talk will briefly introduce several of MITRE's current roles in the quantum ecosystem, highlight examples of our work in quantum sensing and metrology, and discuss some of the academic, government, and industry partners with whom we collaborate.

AI AND QUANTUM TECHNOLOGY RESEARCH AT SRI INTERNATIONAL *Rakesh "Teddy" Kumar, Ph.D., SRI*

Rakesh (Teddy) Kumar will present AI and Quantum technologies being developed by SRI International at their Princeton, NJ location. The topics will include AI for Healthcare, Smart Robots, 3D Mapping, low power AI chips and Quantum Sensing.

FROM QUANTUM DISCOVERY TO QUANTUM INFRASTRUCTURE: BUILDING NEW JERSEY'S NEXT INNOVATION ENGINE *Michael Eggleston, Ph.D., Nokia Bell Labs*

Quantum technologies are approaching an inflection point. While early progress has focused on scientific breakthroughs and individual devices, the next phase will require the infrastructure needed to connect, scale, and operate quantum systems in practical environments.

In this talk, I will share how Nokia Bell Labs is approaching the transition from quantum discovery to quantum infrastructure, including our work in topological quantum computing, quantum networking, and quantum sensing. These efforts are united by a common belief: the long-term impact of quantum technologies will depend not only on advances in individual devices, but on the systems, networks, and infrastructure that enable them to operate at scale.

NEW JERSEY COMPUTER SCIENCE DEPARTMENT CHAIRS: HISTORY AND 2026 CONVENING *James Geller, Ph.D., NJIT*

The talk will review the history of the New Jersey Computer Science Chairs and the most recent convening.

NEW JERSEY COUNCIL OF COUNTY COLLEGES (NJCCC) *Catherine Stargill, Esq., NJCCC*

This session will provide information about the core mission of NJCC and updates on current programs and initiatives. The New Jersey Council of County Colleges provides statewide leadership, coordination, and support for New Jersey's 18 county community colleges.

U.S. NATIONAL SCIENCE FOUNDATION FUNDING OPPORTUNITIES *Sharon Broude Geva, Ph.D., U.S. National Science Foundation*

The National Science Foundation's Office of Advanced Cyberinfrastructure (OAC) continues to address the evolving needs of the science and engineering research and education community nationwide through funding and investment for broad cyberinfrastructure (CI) initiatives and programs. The continuing growth in systems capabilities, speed and scale, and data availability, enable exciting new research opportunities across CI dimensions, and create challenges to ensuring broad access to, and participation in, these opportunities that OAC is increasingly addressing.

Presentation topics will include an overview of current funding opportunities and highlights from previously funded awards in program areas such as:

- Advanced Computing Systems,
- CI Workforce Development,
- Data and Software, and
- Networking and Cybersecurity.

The presentation will include highlights from the first two years of the National AI Research Resource (NAIRR) activities as well as planned activities going forward. Led by the U.S. National Science Foundation, in partnership with 13 federal agencies and 28 private-sector contributors, NAIRR is building a scalable, national infrastructure designed to support the entire U.S. scientific community, including researchers, educators, students, startups and small businesses. By providing access to world-class AI computing, data, tools and training opportunities, NAIRR enables researchers across the country to contribute to the AI innovation ecosystem, regardless of their geographic location. In addition to expanding research capacity, NAIRR provides students and educators with hands-on opportunities to use AI resources, strengthening the pipeline of an AI-ready workforce.

Time permitting, the talk will include updates on other ongoing current initiatives such as the Leadership-Class Computing Facility (LCCF), Findable Accessible Interoperable Reusable Open-science (FAIROS), Cybersecurity Innovation for Cyberinfrastructure (CICI), Integrated Data Systems & Services (IDSS), and others. Please note that NSF is not able to discuss future funding opportunities before they are released publicly, so at time of abstract submission, it is not possible to indicate exactly which other funding opportunities will be presented.

ADVANCED RESEARCH PROJECTS AGENCY – ENERGY (ARPA-E) AREAS OF EMPHASIS *Andrea Tsapralis, Department of Energy*

This presentation will discuss the Agency, what we do, how we fund innovation, how researchers can engage, and examples of current energy technology programs.

ARPA-E was created to support high-risk, high-impact energy R&D that could strengthen U.S. economic and energy security. Its statutory goals include improving energy efficiency, radioactive-waste management, and infrastructure resilience while reducing energy imports and emissions, with the broader aim of maintaining U.S. leadership in advanced energy technologies. Since its launch, ARPA-E has generated 1,850+ awards across 96 programs. 282 projects have attracted more than \$16.3 Billion in private-equity follow-on funding with 1,449 patents issued by the U.S. Patent & Trademark Office.

A central theme of ARPA-E is to act as the Department of Energy's "disruption wing." It tries to move unconventional energy ideas from early research and proof-of-concept through prototypes and toward commercial deployment, especially in areas where traditional investors may be unwilling to take the initial risk. ARPA-E evaluates projects based on potential impact, technical transformation, a credible bridge to market, and the strength of the team.

The presentation highlights several ways to engage with ARPA-E: researchers can respond to Focused Program funding opportunities, contact Program Directors regarding Exploratory Topics, or apply through the broad OPEN 2027 solicitation in January of 2027. Graduate students can also apply for the Summer Scholars 2027 program; applications are scheduled to open in November 2026.

ARPA-E's role is to be positioned at the intersection of academia, industry, investment, and government, with the goal of turning early-stage technical breakthroughs into technologies with real commercial and industrial impact.

SPEAKER BIOGRAPHIES



Forough Ghahramani, Ed.D.

Vice President for Research and Innovation, Edge
Vice President for Advanced and Emerging Technologies, NJBDA

Forough Ghahramani is a leader in research, innovation, and advanced technology ecosystem development, with experience spanning industry, academia, and entrepreneurship. As Assistant Vice President for Research, Innovation, and Sponsored Programs at New Jersey Edge, she operates at the intersection of research infrastructure, economic development, workforce strategy, and public-private partnership building to strengthen regional competitiveness in AI, quantum, and emerging technologies. She previously served on the executive leadership team of the Rutgers Discovery Informatics Institute, advancing interdisciplinary research growth and large-scale institutional partnerships.

Dr. Ghahramani began her career at Digital Equipment Corporation and Hewlett Packard, leading high-performance computing initiatives and advising Fortune 500 organizations, and later founded entrepreneurial ventures focused on technology commercialization.

She leads and collaborates on federally funded initiatives focused on regional cyberinfrastructure, AI, and emerging technologies, with a consistent emphasis on expanding access and strengthening talent pipelines. A Senior Member of IEEE, she serves on the NSF Engineering Research Visioning Alliance (ERVA) Standing Council, is Vice President of the New Jersey Big Data Alliance's Advanced and Emerging Technologies, serves on the Steering Committees of the Northeast Big Data Innovation Hub and the Ecosystem for Research Networking (ERN), and co-chairs the ERN Broadening the Reach committee and Quantum Education Alliance. She is consulted nationally and internationally on STEM workforce and innovation ecosystem strategy.

Ghahramani holds a doctorate from the University of Pennsylvania, an MBA from DePaul University, an MS in Computer Science from Villanova University, and a BS in Mathematics from Pennsylvania State University.



Liat Krawczyk

Executive Director, NJ AI Hub

Liat Krawczyk is the inaugural Executive Director of the New Jersey AI Hub, a first-of-its-kind public-private partnership between Princeton University, the New Jersey Economic Development Authority (NJEDA), Microsoft, and CoreWeave, designed to accelerate innovation in artificial intelligence and position New Jersey as a global leader in the field. Its aim is to bring together AI researchers, entrepreneurs, industry, educational institutions, and the public sector to advance world-class research and development; drive transformative AI innovation; empower the workforce for the AI era; and shape the future of responsible AI deployment.

Previously, she served as Senior Advisor for Workforce Strategy and Head of Child Care at the U.S. Department of Commerce's CHIPS Program Office, supporting the rollout of a \$300M workforce effort aligned with \$37B in semiconductor investments and shaping the care economy strategy. Before that, Liat was Vice President of Innovation Industries at the NYC Economic Development Corporation, where she led workforce strategy across emerging tech, the green economy, and life sciences. She founded the NYCEDC Childcare Innovation Lab and co-led Cyber NYC, a \$100M public-private initiative focused on inclusive talent pipelines and R&D to grow NYC's cybersecurity ecosystem. She also served as Head of Strategy for a machine learning PropTech startup.

Liat brings over a decade of experience across government, startups, and nonprofits at the intersection of technology, workforce, the care economy and industrial policy, driving the creation of inclusive innovation ecosystems.

Don Grust

Founder, Quantum Driven New Jersey and Managing Director, QuantumToMarket

Don Grust is Managing Director of QuantumToMarket, an advisory firm that helps companies commercialize their technology. He began his career at Bell Labs before joining the early wireless industry to pioneer and commercialize mobile enterprise software. This led to a series of executive roles at early-stage companies including CEO of a successful venture-funded turnaround. Don founded the Quantum Driven New Jersey Meetup, is helping to lead New Jersey's initiative to develop a quantum strategy and is an active member of the Quantum Economic Development Consortium (QED-C). Don holds a BS in Computer Science from the University of Illinois, an MS in Computer Science from University of Southern California, and an MBA from Rutgers.

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**Kiran Kovi Kumar, Ph.D.****Research Scientist at Quantum Diamond Lab, The Department of AMSS, Princeton Plasma Physics**

Dr. Kiran Kumar Kovi is currently working as Staff Research Scientist at Quantum diamond Lab, PPPL. Previous to joining at PPPL, Dr. Kovi worked as Director of Research at AKHAN Semiconductor Inc, Gurnee, Illinois. Dr. Kovi also worked as a Research Scientist for Euclid TechLabs and the Swedish Institute of Space Physics. Dr. Kovi has extensive background in diamond materials and diamond electronics. He received his Masters from Chalmers University of technology, Sweden and Ph.D. in from Uppsala University, Sweden, both in Electrical Engineering with Post-Doctoral appointment at the Center for Nanoscale Materials at Argonne National Laboratory.

**Zhao Zhang, Ph.D.****Assistant Professor, Department of Electrical and Computer Engineering at Rutgers University**

Dr. Zhao Zhang is an assistant professor in the Department of Electrical and Computer Engineering at Rutgers University. Before joining Rutgers in 2023, he was a computer scientist and lead the machine learning group at Texas Advanced Computing Center (TACC). Dr. Zhang has extensive experience in high performance computing (HPC) and big data systems. His recent research focus is the fusion of HPC and deep learning (DL) with a wide range of topics of optimization algorithm, I/O, architecture, and domain applications. He co-leads the cyberinfrastructure thrust of the NSF ICICLE AI Institute. He is the PI of two NSF software institutes: Diamond and hpcGPT. Dr. Zhang received his NSF CAREER award in 2023.

**Mengjia Xu, Ph.D.****Assistant Professor Department of Data Science, Ying Wu College of Computing, New Jersey Institute of Technology**

Mengjia Xu is an Assistant Professor in the Department of Data Science at the New Jersey Institute of Technology (NJIT). Her research focuses on geometric deep learning, multimodal machine learning, and large language models, with applications in dynamical systems, neurodegenerative disease and human brain aging, electronic health records and genomics for cancer detection, and solar physics. Her work has appeared in leading venues including NeurIPS, ACL, MICCAI, SIAM Review, IEEE TNNLS, and Research, and has been featured by NJIT, MIT, and ScienceDaily. Her research has been supported by the DOE, AFOSR, and the NJIT Grace Hopper Research Institute. Before joining NJIT, she was a postdoctoral fellow at MIT and Brown University.

**Daniel Lum, Ph.D.****Lead Quantum Physicist at MITRE**

Daniel Lum received a Ph.D. in Physics from the University of Rochester in 2018, with a background spanning quantum optics, imaging, remote sensing, and computational imaging. Since joining MITRE, Dr. Lum has worked across a broad range of quantum sensing and metrology efforts, including assessing atomic clock architectures, wind LiDAR, atomic magnetometry, quantum hacking, and quantum-enhanced imaging. His work focuses on evaluating emerging quantum technologies, understanding their practical capabilities and limitations, and helping connect advances in fundamental research with real-world applications and government needs.

**Rakesh "Teddy" Kumar, Ph.D.****Vice President, Information and Computing Sciences and Director, Center for Vision Technologies, SRI**

Dr. Rakesh "Teddy" Kumar is Vice President, Information and Computing Sciences and Director of the Center for Vision Technologies at SRI International. He has received the Outstanding Achievement in Technology Development award from his alma mater, University of Massachusetts Amherst, the Sarnoff Presidents Award, and Sarnoff Technical Achievement awards. He has co-authored more than 60 research publications and received more than 50 patents. Kumar received his Ph.D. in Computer Science from the University of Massachusetts at Amherst in 1992.

**Michael Eggleston, Ph.D.****Quantum Program Lead, Nokia Bell Labs**

Michael S. Eggleston received his B.S. degree in Electrical Engineering and Physics from Iowa State University and his Ph.D. in Electrical Engineering from UC Berkeley. He joined Nokia Bell Labs in 2015 and currently leads the Bell Labs Quantum Program, driving research and innovation across quantum computing, quantum networking, and quantum sensing.

With a background in photonics, devices, and advanced communications technologies, Michael's career has focused on translating fundamental scientific advances into practical systems. Today, his research interests center on Quantum 2.0 technologies and the systems, networks, and infrastructure needed to realize the next generation of quantum computing, communications, and sensing.

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James Geller, Ph.D.

Professor and Chair of the Data Science Department, The New Jersey Institute of Technology

Dr. James Geller is Professor and Chair of the Data Science Department at the New Jersey Institute of Technology (NJIT). He served as Associate Dean for Research of the Ying Wu College of Computing at NJIT from 2015 to 2020. He received his PhD from the State University of New York at Buffalo in 1988 in Computer Science, with a focus on Artificial Intelligence/Knowledge Representation.

Dr. Geller cofounded SABOC (the Structural Analysis of Biomedical Ontologies Center) at the Department of Computer Science at NJIT. He has published over 230 journal and conference papers and 14 book chapters in Medical Informatics, Semantic Web Technology, Object-Oriented Database Modeling, Knowledge Representation, etc.

Between 2006 and 2012 Dr. Geller was Co-Principal Investigator on several federal grants from NIH, totaling over \$2,500,000, on auditing methods, abstraction algorithms and software tools for important medical terminology systems such as the Unified Medical Language System (UMLS) and the Systematized Nomenclature of Medicine – Clinical Terms (SNOMED CT). From 2012-2015 he was co-PI on an NSF grant for teaching Cyber Security (iSECURE). From 2014 to 2019 he was co-PI on a major NIH grant on family-based quality assurance for Biomedical Ontologies. Subsequently he was co-PI on an NSF grant on “Increasing Urban Youth Participation in Computing through Mentorship and Coding Resources.” Currently he is a co-PI on an S-STEM grant: Applying Student Knowledge for Success in Cybersecurity and Data Science. He is also an investigator on the NJ ACTS program: 1/6 NJ ACTS: A Platform for Translational Science in New Jersey.

Dr. Geller is a founding participant of the BRAID Consortium of Harvey Mudd College and is actively involved in bringing women and minorities into the computing field. He has founded the NJIT WiCS, G-WiCS, and HACCS clubs for Women/Hispanics in Computing.

In 2012 Dr. Geller was inducted as a Fellow of the American College of Medical Informatics (ACMI).

Dr. Geller received the NJIT Master Teacher Designation (2005) and three other NJIT teaching awards in 2002, 2003 and 2011. Dr. Geller also received an NJIT College Research Award (2010). In September 2020 Dr. Geller received the NJIT Constance A. Murray Award for Advancing Diversity. In Fall 2024 Dr. Geller received the Robert W. Van Houten Award for Teaching Excellence. This award is granted by the NJIT Alumni Association. Awardees cannot “apply” for it.



Catherine Stargill, Esq.

Vice President of the New Jersey Council of County Colleges and Executive and Director of the New Jersey Community College Consortium for Workforce and Economic Development

Catherine Frugé Starghill, Esq. is Vice President of the New Jersey Council of County Colleges and Executive Director of the New Jersey Community College Consortium for Workforce and Economic Development. She developed and leads the statewide New Jersey Pathways to Career Opportunities initiative, which brings together more than 1,800 industry and education partners to align education and workforce needs, strengthen the economy, and expand economic mobility. She also hosts the annual NJ Pathways Summit, convening more than 500 partners and national thought leaders.

Previously, Catherine served as Deputy Commissioner of the New Jersey Department of Labor and Workforce Development, overseeing major program areas including Research and Information, Income Security, and Labor Standards and Safety Enforcement. In an earlier NJDOL leadership role, she managed One-Stop Career Center operations, more than 300 employees, and a \$45 million budget. Her public-sector career also included leadership positions with the New Jersey Department of Community Affairs and the Government Records Council.

Before entering public service, Catherine worked at PricewaterhouseCoopers and Ford Motor Company. She earned both a Bachelor of Business Administration and a Master of Accounting from the University of Michigan, a Juris Doctor from Wayne State University Law School, and a Six Sigma Black Belt Certification from the New Jersey Institute of Technology.

Catherine was named to NJBIZ’s Top 50 in Education in 2022 and 2023. She is the mother of two children, Britt Andrew and Brie Alexandra, and was married to the late Rev. Dr. Britt A. Starghill.



Sharon Broude Geva, Ph.D.
U.S. National Science Foundation Program Officer

Sharon Broude Geva is a Program Director in the Office of Advanced Cyberinfrastructure (OAC) at the U.S. National Science Foundation (NSF). Sharon's portfolio in OAC includes the ACCESS and SCIPe programs. Sharon also co-chairs the NAIRR Pilot Program Management Office (PPMO).



Andrea Tsapralis
Technology-to-Market Advisor, Department of Energy

Andrea serves as a Technology-to-Market Advisor at the Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E). Andrea's career has spanned more than 30 years in the high-tech industry. Driving technology and I.T. advancements into the business have always been a passion, starting with her 28-year tenure at Hewlett-Packard. As a Director and Account-General-Manager of Global Accounts, Andrea worked closely with HP Labs to enable customers to leverage HP's advancements and investment in R&D for business benefit and competitive advantage.

Most recently, Andrea was the Director of Solutions Development and Innovation at Avnet Integrated Solutions where she worked with liquid cooling and artificial intelligence solutions providers, server OEMs, data center infrastructure partners and financial services companies to bring liquid cooling and Edge technologies to market. This included addressing the operational, legal, service, data center and insurance challenges relative to bringing these technologies to operational scale. Also, Andrea has had the pleasure of working with the ARPA-E team and its COOLERCHIPS Performers since the inception of the program in 2023.

Andrea has a Bachelor of Science degree from Drexel University in Commerce & Engineering Sciences, with a concentration in Production Operations Management.

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Edge (njedge.net) serves as a member-owned, nonprofit provider of high performance optical fiber networking and internetworking, Internet2, and a vast array of best-in-class technology solutions for cybersecurity, educational technologies, cloud computing, and professional managed services. Edge provides these solutions to colleges and universities, K-12 school districts, government entities, hospital networks and nonprofit business entities as part of a membership-based consortium. Edge's membership spans the northeast, along with a growing list of EdgeMarket participants nationwide. Edge's common good mission ensures success by empowering members for digital transformation with affordable, reliable and thought-leading purpose-built, advanced connectivity, technologies and services.

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The New Jersey Big Data Alliance (njbda.org) was established in 2013 by Rutgers University, along with 8 higher education partners, to catalyze collaboration among New Jersey academia, industry and government in building advanced computing and data analytics capabilities and expertise.

Today, NJBDA is an alliance of higher education institutions, industry corporations and government institutions, that catalyzes collaboration in advanced computing and data analytics research, education, technology and AI.

This unprecedented alliance was recognized in 2014 by the New Jersey State Legislature as "New Jersey's Advanced Cyberinfrastructure Consortium." This legislation formalized the partnership among the State's higher education institutions in building the computational and analytics capabilities and expertise in New Jersey.