

CELEBRATING THE INNOVATORS DRIVING ILLINOIS' RESEARCH AND DISCOVERY FORWARD

RESEARCHERS TO KNOW 2025

Presented by



ILLINOIS SCIENCE &
TECHNOLOGY COALITION
from idea to impact



From the Illinois Science & Technology Coalition

Innovation isn't a moment—it's a movement. It's a constant drive to push boundaries, challenge the status quo, and create something better for our communities and our world. And here in Illinois, we're proud to be home to one of the most dynamic, diverse, and determined research ecosystems in the country.

Each year, through our Researchers to Know list, the Illinois Science & Technology Coalition (ISTC) honors a select group of faculty members from across the state who are not only advancing their fields—but also redefining what it means to make an impact. These researchers represent the bold, brilliant, and deeply human side of science and discovery.

For 2025, we invited nominations from across Illinois' academic institutions. Our goal was simple: to identify individuals whose work exemplifies excellence across research impact, leadership, recognition, and public engagement.

After a rigorous review process—and many difficult decisions—we're proud to feature 12 researchers in this year's spotlight. Each brings something unique to the table. They're leading cutting-edge laboratories, publishing world-renowned research, mentoring the next generation of scientists, and building bridges between academia and industry.

Their work is not just important—it's necessary. In a world facing climate challenges, health inequities, technological disruption, and social transformation, these researchers remind us that innovation isn't abstract. It's tangible. It's hopeful. And it starts with people.

As we publish this feature, our goal is not only to celebrate individual accomplishments but also to strengthen the culture of recognition in Illinois' research community. The Researchers to Know list is one part of a much larger story—one that includes mentors, peers, graduate students, community members, and university leaders who help make this work possible.

To everyone who submitted nominations: thank you. Your time, insights, and care made this list possible. And to the researchers featured this year: congratulations. You've earned this moment, and we're honored to share your story.

With appreciation,

❖ The ISTC Team

TOP 12 RESEARCHERS TO KNOW 2025

Across Illinois, researchers are exploring the unknown, solving real-world problems, and helping us better understand the world we share. This year's Researchers to Know list highlights twelve outstanding faculty whose work represents the very best of inquiry, creativity, and impact in our state.

The 2025 cohort spans a diverse mix of disciplines—from health and materials science to artificial intelligence and environmental research. Some are uncovering the building blocks of disease. Others are shaping the future of computing or unlocking insights into human behavior and learning. What connects them isn't a single field—it's a shared commitment to research that improves lives, informs public understanding, and builds stronger, healthier communities.

This year's selection process was our most competitive yet. We received a wide range of nominations from across Illinois' universities, each showcasing meaningful and impressive contributions.

To guide our selection, we evaluated nominees across five criteria:

- **Research Impact** – how their work is advancing knowledge and practice in meaningful ways
- **Recent Achievements** – standout publications, grants, technologies, or breakthroughs from the last few years

- **Leadership & Influence** – mentorship, service, and shaping the research culture at their institution and beyond
- **Recognition & Awards** – honors earned at the institutional, national, or global level
- **Public Visibility** – how they share their work with broader audiences through media, events, or partnerships

What emerged from this process is a group of researchers who are as committed to discovery as they are to making a difference. From advancing sustainable agriculture and AI-driven analytics to improving public health and understanding the universe itself, their work reflects the full range of Illinois' research excellence.

The diversity of their institutions—spanning large research universities, regional campuses, and private institutions—reminds us that innovation thrives in every corner of the state. And while their fields differ, they all share a common thread: the belief that research should serve people.

As you read their stories, we hope you'll see more than just academic achievement. You'll see the human drive to ask hard questions, build better systems, and imagine new futures. That's what research in Illinois looks like. And that's why these are the 2025 Researchers to Know.

DR. MATT CAPLAN

Associate Professor, Department of Physics

BIO

Matt Caplan is an Associate Professor of Physics at Illinois State University whose work explores the extreme frontiers of astrophysics and nuclear physics. He earned his PhD from Indiana University, where he received the American Physical Society's Dissertation Award in Nuclear Physics. He is a Kavli Scholar and 2023 Cottrell Scholar. In addition to leading groundbreaking research, Caplan is a passionate science communicator.

He contributes as a scriptwriter and consultant to the popular YouTube channels Kurzgesagt and PBS Space Time, translating complex ideas into engaging stories. He also has hosted the NPR audio podcast, *Twelve Thousand Bombs*, which explores the global risks of nuclear weapons through conversations with experts and advocates.

RESEARCH SUMMARY

Dr. Caplan's research focuses on the dense matter found in neutron stars, black holes, and white dwarfs. As a computational physicist, he uses large-scale GPU simulations to model plasma behavior and nuclear interactions in extreme environments.

His work lies at the intersection of astrophysics, nuclear physics, and materials science, revealing how dense matter behaves under the most intense conditions in the universe. He also investigates the overlap between astrophysics and nuclear weapons, with an eye toward public awareness and policy relevance. Through interdisciplinary collaboration, Caplan aims to uncover new physical insights while also sparking critical conversations about science's role in society.

HIGHLIGHTS & AWARDS

Dr. Matt Caplan has received multiple national honors for his contributions to nuclear and astrophysics, including the 2023 Cottrell Scholar Award, KITP Scholar (2022), Kavli Scholar, and the APS Dissertation Award in Nuclear Physics. His research has attracted federal funding through the Simons Foundation and a Department of Energy collaboration with Lawrence Livermore National Laboratory, supporting his work on dense matter physics in extreme environments.

Caplan's recent publications demonstrate the technical depth and range of his scholarship. In *Physical Review Letters*, he co-authored "Universal Diffusion in Coulomb Crystals," shedding light on matter transport in stellar interiors. In *The Astrophysical Journal*, he contributed to research on "Solar Evolution Models with a Central Black Hole," and in *Monthly Notices of the Royal Astronomical Society*, he examined diffusion in white dwarf plasmas. His scholarship also explores topics like primordial black hole morphology and neutron star crust behavior.

Equally committed to public engagement, Caplan was the host of NPR's *Twelve Thousand Bombs* podcast and contributes as a scriptwriter and consultant to *PBS Space Time* and *Kurzgesagt – In a Nutshell*. His work has been featured in *National Geographic*, *Science Magazine*, *New Scientist*, and *CBC Radio's Quirks & Quarks*, helping demystify advanced physics through accessible and visually rich science communication.

"You know more than you realize and, when you speak, people will listen. Go speak about something important."

- Dr. Caplan



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DR. JEREMY D. DRISKELL

*University Professor, Analytical Chemistry,
Department of Chemistry*

BIO

Jeremy D. Driskell is a University Professor at Illinois State University whose interdisciplinary research bridges chemistry, nanotechnology, and diagnostics. A first-generation college student, Driskell discovered his passion for science through hands-on undergraduate research and collaborative mentorship.

His work reflects a belief that innovation stems from both curiosity and cross-disciplinary teamwork. Now an NIH- and NSF-funded investigator, he mentors students while advancing diagnostic technologies for real-world health challenges. His journey includes leading Department of Defense research teams, serving on national review panels, and earning campus-wide awards. Through research, mentorship, and service, Driskell champions the belief that scientific progress begins with people—and thrives through collaboration.

RESEARCH SUMMARY

Driskell's research focuses on designing nanoscale biosensors to improve early disease detection. His lab engineers surface-enhanced Raman spectroscopy (SERS) platforms, antibody-nanoparticle systems, and enzyme-modified nanostructures that power next-generation diagnostics. Current projects include vertical flow immunoassays that use plasmonic particle assembly and gold nanoparticles that retain enzyme activity—efforts supported by major NIH and NSF grants.

His long-term vision includes integrating AI and wearable biosensors to expand diagnostic access. Driskell's work not only advances chemical sensing technology but also trains the next generation of researchers. He believes diagnostics can be faster, smarter, and more inclusive—and that chemistry is key to enabling health innovation.

HIGHLIGHTS & AWARDS

Dr. Jeremy Driskell has secured more than \$3.75 million in research funding from the NIH, NSF, and Department of Defense to support the development of next-generation diagnostic platforms. His interdisciplinary work in nanoscale biosensing has led to breakthroughs in vertical flow immunoassays, plasmonic particle assembly, and enzyme-modified nanostructures, which are advancing early disease detection. Recent publications include articles in *Sensors and Actuators B: Chemical*, *ACS Applied Nano*



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Materials, Analyst, and Biomedical Microdevices, among others—demonstrating both his technical range and commitment to translational impact. In addition to leading federally funded research teams, Driskell has been recognized with university-wide honors at Illinois State University for both scholarship and mentorship. He has served on national peer review panels and contributed to the advancement of biosensing research through conference presentations and collaborative networks.

As a dedicated mentor and principal investigator, Driskell is training a new generation of scientists while developing tools that make diagnostics faster, more accessible, and more equitable. His work reflects a deep commitment to real-world health solutions through chemistry and collaboration.

“Science should meet people where they are—not just in labs, but in daily life.”

- Dr. Driskell

DR. EUNJUNG HWANG, PhD

Assistant Professor, Cell Biology and Anatomy,
Stanson Toshok Center for brain Function and Repair

BIO

Eun Jung Hwang, Ph.D., bridges engineering and neuroscience to explore how brain circuits shape behavior—and how they can be restored in aging or disease. Her research blends systems-level thinking with in-depth neurophysiological experimentation, grounded in the belief that understanding circuit-level function holds the key to reversing cognitive decline. Inspired by recent discoveries showing that targeted brain stimulation can rejuvenate learning in aged mice, she's focused on translating these breakthroughs into therapies for age-related neurological conditions.

Dr. Hwang's journey has been shaped by generous mentors, interdisciplinary training, and a deep commitment to making curiosity actionable—transforming insights into tangible impact.

HIGHLIGHTS & AWARDS

Dr. Eun Jung Hwang has received prestigious honors for her work in neuroscience, including the 2022 Sloan Research Fellowship in Neuroscience, the NIH Pathway to Independence Award (K99), the Schweppe Scholar Award, and the Monica Ply Innovative Research Award. Her research is supported by major funding from an NIH R56 award, and a DePaul–RFUMS AI in Biomedical Innovation Pilot Grant.

She has authored influential studies as a senior author in the *Journal of Neuroscience*, including research on transcriptional dynamics in cortical glutamatergic neurons underlying long-term learning. Additional publications appear in *Neuron*, *Nature Communications*, *Journal of Neural Engineering*, and *Current Biology*, highlighting her interdisciplinary impact across neural circuitry and engineering.

In addition to research, Dr. Hwang is committed to mentorship and public engagement, actively participating in events like the Biomedical Innovation Day Symposium and advancing institutional efforts to support women in science.

“Curiosity fuels our science, but the hope of restoring brain function—and independence—drives the mission behind every experiment.”

- Dr. Hwang

RESEARCH SUMMARY

At Rosalind Franklin University, Dr. Eun Jung Hwang leads a lab focused on the neural circuits that drive learning, decision-making, and cognitive flexibility—particularly in aging. Her team uses a combination of behavioral modeling, multi-region neural recordings, and targeted stimulation to uncover how the brain operates as a dynamic, interconnected system. Rather than isolating single brain regions, her work emphasizes how cognition arises from the integration of activity across circuits.

One promising area of research involves using stimulation to reactivate exploratory behaviors and restore plasticity in aged mice—offering early insight into potential circuit-based therapies for age-related cognitive decline. With support from the NIH and the Sloan Foundation, her lab is building the foundation for personalized brain interventions that could one day reverse the course of neurodegenerative conditions.



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DR. RAMASWAMY KALYANASUNDARAM, DVM, PhD

Department Head, Professor of Microbiology and Immunology; Assistant Dean for Research, Michael L. and Susan M. Glasser Professor of Rural Health Professions Education and Research

BIO

Ramaswamy Kalyanasundaram's journey into global health innovation began with a personal memory—growing up in India, he witnessed firsthand the suffering caused by lymphatic filariasis, a parasitic disease that leaves patients with severe limb swelling. That early exposure shaped his life's mission: to develop long-lasting vaccines that prevent both human and animal parasitic diseases. A trained veterinarian and parasitologist, he now leads efforts to create the world's first vaccines for lymphatic filariasis and canine heartworm. As a professor and department head at the University of Illinois College of Medicine Rockford, he brings together science, compassion, and international collaboration to solve some of the world's most persistent public health challenges.



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RESEARCH SUMMARY

Driven by the belief that vaccines can prevent what medicine alone cannot cure, Dr. Kalyanasundaram's research focuses on combating two neglected yet devastating diseases—lymphatic filariasis and heartworm. While mass drug treatments have struggled to eliminate filariasis in over 50 countries, his vaccine aims to disrupt transmission and protect vulnerable communities for generations. At the same time, his canine heartworm vaccine is already advancing through clinical trials, responding to rising drug resistance and offering veterinarians a powerful new tool. Grounded in immunology and parasitology, his work bridges global

HIGHLIGHTS & AWARDS

Dr. Ramaswamy Kalyanasundaram is internationally recognized for his contributions to parasitic disease research and vaccine development. In 2020, he was named Inventor of the Year by the University of Illinois Chicago for his work advancing novel vaccine candidates, and he currently holds the Michael L. and Susan M. Glasser Professorship of Rural Health Professions Education and Research. A longtime leader in translational science, he served as a Fulbright Specialist from 2015 to 2023 and was recently invited to speak at the 2025 World Vaccine Congress in Washington, D.C.

His lab has developed multiple promising vaccine candidates targeting lymphatic filariasis and canine heartworm, several of which are in advanced pre-clinical or early clinical trial stages. His group has also identified and characterized over 40 novel functional genes from parasitic organisms, providing critical insight into host-parasite interactions and identifying potential drug and vaccine targets. His research has received consistent support from federal agencies, including the NIH, and continues to build collaborations across veterinary science, immunology, and tropical medicine. Dr. Kalyanasundaram's work exemplifies how high-impact discovery in the lab can lead to real-world solutions—particularly for underserved global populations affected by neglected tropical diseases.

“True innovation serves the public good—whether it’s in a rural clinic or a veterinary hospital.”

- Dr. Kalyanasundaram

DOROTHY KOZLOWSKI, PhD

Chair and Vincent de Paul Professor, Neuroscience

BIO

Dorothy Kozlowski, Ph.D., has long studied the biology of traumatic brain injury—but her recent work moves beyond the lab and into the lives of those most often overlooked: survivors of intimate partner violence (IPV). As the Vincent dePaul Professor and Chair of Neuroscience at DePaul University, and co-founder of the Illinois Coalition to Address Intimate Partner Violence-Induced Brain Injury, she is leading the charge to illuminate and address a silent epidemic.

Her path has been shaped by early encouragement, formative mentors, and a firm belief that science must speak to truth and elevate the most vulnerable. Through cross-sector partnerships and data-driven advocacy, she's redefining how neuroscience serves public health.

HIGHLIGHTS & AWARDS

Nationally recognized for leadership in neuroscience and public health, Dr. Dorothy Kozlowski has made critical contributions to the study of traumatic brain injury (TBI). Her foundational research explored gene therapy, rehabilitation, neuroplasticity, and neurogenesis in rodent models, with later work creating a model of repeat concussion and using it to investigate sex differences and genetic risk factors in neurodegeneration. This body of research has earned support from the National Institutes of Health and the U.S. Department of Defense, resulting in publications across peer-reviewed journals and book chapters, as well as national speaking invitations.

In 2020, the Chicago Society for Neuroscience honored Kozlowski with its Career Achievement Award, recognizing both her scientific impact and service as the organization's President from 2015 to 2017. Her current work centers on IPV-related brain trauma, leading a Michael Reese Trust-funded collaboration with CAPriCORN, The Network, and Rush University to assess prevalence across Chicago communities. As Co-Founder and Director of the Illinois Coalition to Address Intimate Partner Violence-Induced Brain Injury, she unites clinicians, researchers, and advocates to raise awareness and expand survivor access to care. By applying neuroscience to urgent social challenges, Kozlowski is reshaping how science identifies—and addresses—the hidden injuries carried by many survivors.

RESEARCH SUMMARY

Dr. Kozlowski is a pioneering figure at the intersection of neuroscience and intimate partner violence research. Her work focuses on understanding how brain injury—often undiagnosed and unaddressed—impacts survivors' ability to seek help, access services, and heal. In partnership with clinicians, social workers, and data scientists, she's investigating the prevalence of IPV-related brain trauma across Chicago through a Michael Reese Trust-funded initiative.

As Director of the statewide [coalition](#) she helped found, she's fostering collaboration between academia, medicine, law, and community-based organizations. Her goal: to build a future where survivors have access to specialized care, systemic support, and the scientific attention they deserve.

"Science has the power to illuminate what's been hidden—especially in communities that have long gone unheard."

- Dorothy Kozlowski



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BIO

Dr. Prem Kumar has spent his career turning the once-impossible into engineered reality. A pioneer in quantum optics, he helped observe squeezed light early in his career—work that laid the foundation for major discoveries like LIGO. Now at Northwestern, he leads efforts to make quantum systems scalable by developing communications that allow quantum machines to speak to one another.

His team recently demonstrated quantum teleportation over active internet cables—an unprecedented milestone that could shape the future of secure data transfer. Motivated by real-world challenges like climate change and drug discovery, Kumar sees quantum networks not as abstract science, but as critical tools. He's also committed to mentoring the next generation of researchers who will scale these discoveries even further.

“We’re not building for today. We’re building so that tomorrow’s scientists can think bigger, go further, and solve faster.”

- Dr. Kumar

DR. PREM KUMAR

*Professor of Information Technology in the McCormick School of Engineering and Applied Science,
Department of Electrical and Computer Engineering*

RESEARCH SUMMARY

Dr. Kumar’s research focuses on making quantum computing scalable through robust, photonic-based communication between quantum devices. His work spans entanglement distribution, teleportation, and the integration of quantum signals within classical fiber networks.

Among several technical firsts, his lab recently demonstrated quantum teleportation over an active internet cable—an achievement that could transform the future of both classical and quantum infrastructure. Collaborations with national laboratories, universities, and international partners help ensure these systems are designed for global impact. By developing technologies that bridge disciplines and geographies, Kumar is helping shape a more connected, energy-efficient, and powerful era of quantum innovation.

HIGHLIGHTS & AWARDS

Nationally regarded for his contributions to quantum optics and photonic communication, Prem Kumar has amassed a research portfolio that spans over 500 scholarly outputs, including 200+ peer-reviewed journal papers, six patents, and an edited book. He serves as Editor-in-Chief of *Optica*, the flagship journal of The Optica Publishing Group, and has co-chaired the National Academies Committee on Atomic, Molecular, and Optical Physics.

His expertise has been tapped for high-impact efforts such as NASA’s Independent Panel Report on quantum sensing capabilities. His recent breakthrough—demonstrating quantum teleportation over live internet cables—was published in *Optica* and earned media coverage across over two dozen outlets including *New Scientist*, *BBC Science Focus*, *India Today*, and *Phys.org*. The work offers a game-changing model for combining quantum communication with existing internet infrastructure. His projects continue to receive competitive support from agencies such as NSF, DARPA, ARO, and ONR. Kumar’s commitment to applied quantum systems, combined with decades of technical leadership and a global media footprint, position him as a central figure advancing scalable quantum infrastructure for the 21st century.

DR. KHALID MEKSEM

Professor of Genome Biotechnology

BIO

Dr. Khalid Meksem is a Distinguished Professor of Genome Biotechnology at Southern Illinois University Carbondale, where he has dedicated more than two decades to advancing plant genomics and agricultural innovation. A Fulbright Senior Scholar and prolific researcher, Meksem is known for translating molecular discoveries into real-world applications that enhance global food security.

His work spans continents and disciplines—collaborating with international research institutions while mentoring the next generation of scientists in crop improvement. With more than 100 peer-reviewed publications, multiple patents, and major funding from USDA, NSF, and industry partners, Meksem's impact extends from the lab bench to the farm field. He believes that breakthroughs in plant genetics must go hand-in-hand with accessibility and farmer adoption—ensuring science serves both sustainability and equity.

RESEARCH SUMMARY

Dr. Meksem's research focuses on the genetic and genomic dissection of agronomic traits in crops, with a primary emphasis on soybean and tomato. His lab applies map-based cloning, genome editing, and marker-assisted selection to improve yield, resistance to pests and pathogens, and nutritional quality. Recent work includes identifying candidate genes for nematode resistance, developing soybean varieties with higher sugar and oleic acid content, and reducing antinutritional factors through gene editing. His contributions have resulted in seven patents and numerous high-impact publications. Through international partnerships and cutting-edge techniques like single-cell analysis, Meksem's research aims to future-proof crops against climate change while boosting productivity and sustainability across global agriculture.

HIGHLIGHTS & AWARDS

Dr. Khalid Meksem's research has earned over \$24 million in external funding from federal, state, industry, and commodity sources. He holds seven patents related to soybean seed improvement, including two issued in April 2025 on increasing oleic acid content and reducing saturated fats in soybean lines. In 2023, he was awarded a Fulbright Senior Scholar Award and hosted by Abdelmalek Essaadi University in Morocco. That same year, he secured funding from USDA-NIFA to develop soybean varieties with reduced antinutritional properties and received additional grants from the United Soybean Board to enhance sugar content and improve nematode resistance using single-cell technology.

Meksem has published 117 peer-reviewed international journal articles, edited three books, and led seven publications in top-tier journals in the past two years alone. He also serves as editor-in-chief or associate editor for six scientific journals. His global engagement includes organizing four international conferences on plant genomics and delivering invited talks in the U.S., Morocco, France, and Germany—most recently at the Soy 2025 conference. With active collaborations across international universities and a robust presence in research dissemination platforms, Meksem continues to translate complex plant genomic discoveries into practical advances in crop improvement.

“With every discovery comes an unsolved question, that’s what provides the motivation to keep going until the puzzle is solved.”

- Dr. Meksem



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DR. SUSAN E QUAGGIN, MD

Irving S. Cutter Professor of Medicine and Chair, Department of Medicine, Director, Feinberg Cardiovascular and Renal Research Institute.

BIO

Dr. Susan Quaggin's path to research was shaped by the patients she encountered during her medical training—individuals facing complex conditions without clear treatments. That experience sparked a determination to pursue discovery science, even without a formal background in bench research.

Guided by renowned mentors in physiology, nephrology, and molecular biology, she developed the skills to investigate pressing clinical questions at their roots. Today, as Chair of the Department of Medicine at Northwestern University, she leads with a focus on translational research and cross-disciplinary collaboration—advancing therapeutic breakthroughs in kidney and eye disease while championing innovation across Chicago's biomedical landscape.

RESEARCH SUMMARY

Dr. Quaggin's research investigates the molecular and vascular mechanisms that underpin kidney and eye diseases. Her lab has developed cutting-edge genetic models to manipulate functional genes, enabling critical discoveries around the VEGF pathway and the integrity of the glomerular filtration barrier. These insights have had far-reaching impacts, including identifying potential risks in cancer therapies and informing bioengineered kidney development.

Through her role at the Feinberg Cardiovascular and Renal Research Institute, she's shaping the next generation of treatments—especially for complex conditions like diabetic nephropathy, nephrotic syndrome, and glaucoma—by turning fundamental science into therapeutic opportunity.

HIGHLIGHTS & AWARDS

A globally recognized leader in nephrology and vascular biology, Dr. Susan Quaggin has made transformative contributions to kidney and eye research. She was elected to the National Academy of Medicine (2019), National Academy of Inventors (2021), and the American Academy of Arts & Sciences (2023). She has also been honored with the prestigious Lefoulon-Delalande Grand Prix in Cardiovascular Science from the Institut de France.

In 2024, the American Society of Nephrology named her the recipient of the John P. Peters Lifetime Achievement Award. She also received the A. Peter Lundin MD Award

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from the American Association of Kidney Patients for advancing patient care and the ARVO David L. Epstein Award for breakthroughs in glaucoma research.

Her pioneering work has elucidated the role of the VEGF pathway in kidney function and disease, directly influencing cancer treatment guidelines and sparking new directions in regenerative medicine. Her team's findings—supported by models enabling cell- and time-specific gene manipulation—have advanced understanding of the glomerular filtration barrier and the vascular underpinnings of diabetic nephropathy and glaucoma.

Through these discoveries and leadership roles—including past president of the American Society of Nephrology—Dr. Quaggin continues to elevate the field and inspire clinical innovation.

“Curiosity is the compass. Discovery is the reward.”

- Dr. Quaggin



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BIO

Dr. Mahdi Vaezi is an applied engineering researcher pushing the boundaries of sustainability through innovation in bioplastics, waste management, and biomass transportation. As Associate Professor at Northern Illinois University, he leads the WASTE Lab—an interdisciplinary hub driving impact at the intersection of environmental science, engineering, and public health. His curiosity is grounded in reimagining legacy systems, from how we transport biomass to how we package food.

With support from the USDA and partners like the Illinois Soybean Association, Vaezi's work translates lab-scale solutions into real-world infrastructure. By embedding sustainability into everyday materials and systems, he's not just reducing waste—he's redesigning the future of manufacturing, energy, and resource use.

“Just because something has always been done a certain way doesn't mean it's the best way. That's where innovation begins.”

- Dr. Vaezi

DR. MAHDI VAEZI, PhD

Associate Professor, Department of Engineering Technology

RESEARCH SUMMARY

Dr. Mahdi Vaezi's research blends mechanical engineering with data science to address pressing sustainability and public health challenges. His work integrates AI, geospatial analysis, and techno-economic modeling to assess the environmental and economic viability of new technologies—ranging from cancer risk indices to the optimization of waste-to-energy facilities. His publications span topics such as drag coefficient prediction, vertical slurry flow behavior, and satellite-informed health disparities.

Vaezi's multidisciplinary collaborations with economists, chemists, and public health experts underscore his belief in system-wide innovation. Whether modeling lung cancer risk or developing indices to evaluate life expectancy gaps across Chicago, his research goes beyond the lab—advancing data-informed policy, circular economy solutions, and sustainable infrastructure design.

HIGHLIGHTS & AWARDS

Dr. Mahdi Vaezi's work has been recognized for its breadth, rigor, and practical value in addressing sustainability, health, and engineering challenges. As Director of the WASTE Lab at Northern Illinois University, he leads several grant-funded initiatives, including a USDA-supported research program focused on biomass hydrotransport and a seed grant exploring cancer risk reduction through data modeling. His portfolio includes over 60 scholarly outputs, with more than 30 peer-reviewed journal articles and conference papers in high-impact venues like *Science of The Total Environment* and *Renewable and Sustainable Energy Reviews*. He is co-author of publications on topics such as lung cancer disparities, life expectancy modeling, and environmental emissions forecasting.

Dr. Vaezi's research has been supported by diverse funding sources, including the USDA, Argonne National Laboratory, and the Illinois Soybean Association. He also serves as an active peer reviewer for multiple scientific journals. His work has been highlighted in public-facing platforms such as *Chicago Tribune* and *Yahoo! News*, particularly for its impact on understanding health disparities through satellite data. By combining computational precision with real-world relevance, Vaezi is building a research agenda that advances environmental equity and sustainable development, while providing data-driven tools for policymakers and industry leaders alike.

DR. DASHUN WANG

Kellogg Chair of Technology; Professor, Kellogg School of Management and McCormick School of Engineering, Northwestern University

BIO

Dr. Dashun Wang stands at the forefront of a new field: the science of science. A physicist by training, Wang has built a career on uncovering the hidden mechanics of discovery itself—blending tools from complexity science, artificial intelligence, and network theory to decode how innovation happens.

At Northwestern University, he serves as the Kellogg Chair of Technology and directs several interdisciplinary institutes focused on innovation, complexity, and research impact. Wang's work isn't just theoretical—it offers data-driven frameworks to optimize how institutions fund, organize, and evaluate scientific progress. By illuminating the patterns that shape breakthrough ideas, his research is transforming how science supports society at scale.

RESEARCH SUMMARY

Dr. Dashun Wang's research tackles one of the most foundational—and often overlooked—questions in innovation: what drives the success of science itself? His lab uses large-scale datasets to analyze everything from research funding and team structure to citation networks, institutional dynamics, and cross-disciplinary collaboration.

Recent projects have explored how partisanship influences science use in policy, how AI tools can accelerate discovery, and how pivoting across disciplines affects long-term impact. His NSF-funded APTO initiative builds predictive models linking scientific investments to real-world outcomes, aiming to enhance national innovation strategies. By revealing the systemic forces behind discovery, Wang is helping institutions design more effective, resilient, and forward-looking research ecosystems.

HIGHLIGHTS & AWARDS

Dr. Dashun Wang's work has garnered recognition across scientific, academic, and public domains. In 2023, he was honored with the Young Scientists Award from the German Physical Society, and he received the Complex Systems Society's Junior Scientific Award in 2020. His growing influence is further reflected in the prestigious APTO Award in 2024 and selection for the Thinkers50 Radar list. As a Poets & Quants "Best 40 Under 40" professor, Wang has also been recognized for excellence in teaching.

His research has been featured widely, with major studies published in journals like *Nature*, *Science*, and *PNAS*. These publications span topics including pivot penalties in science, AI's role in accelerating discovery, and partisan disparities in science use in policy.

Wang's work has drawn national media attention, including features in *The New York Times*, *Wall Street Journal*, and *The Economist*, among others. He also leads a National Science Foundation-funded initiative, "Measuring, Understanding, Predicting, and Accelerating Technology Outcomes," which builds predictive models linking research funding to marketplace impact. Through his publications, awards, and ongoing collaborations, Wang continues to shape the landscape of science policy, innovation strategy, and institutional research impact.

"Beneath complexity lies order—and that order can help guide better decisions."

- Dr. Wang

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DR. LIANGCHENG YANG

Professor of Environmental Health and Sustainability

BIO

Dr. Liangcheng Yang is a Professor of Environmental Health and Agriculture at Illinois State University, where he holds a joint appointment bridging public health and agricultural sciences. His research is driven by a deep commitment to sustainability, with a focus on improving air quality and advancing anaerobic digestion technologies. From controlling agricultural emissions in environmental justice communities to converting organic waste into renewable energy,

Dr. Yang's work addresses real-world environmental challenges with practical, community-focused solutions. A dedicated mentor and collaborator, he draws inspiration from both industry leaders and interdisciplinary peers, and believes research is a long-term investment—not just in technology, but in people. At the heart of his work is a mission to create a greener, healthier future for all.

HIGHLIGHTS & AWARDS

Dr. Liangcheng Yang has secured over \$2.5 million in funding from federal agencies, industry partners, and foundations including the U.S. Department of Energy, USDA, USEPA, BP Technology Ventures, and the Iowa Soybean Association. He is currently leading or co-leading multiple projects on air quality, nutrient recovery, and renewable energy—including the EPA-funded BN-CARE initiative, USDA-supported research on vegetable farm waste, and a DOE feasibility study on renewable natural gas production in Illinois.

His scholarship includes 46 peer-reviewed journal articles, with over 3,750 citations as of March 2025. Twelve of these publications appeared in journals with an impact factor above 10—a metric indicating frequent citation and strong academic influence. His recent studies explore anaerobic digestion of cover crops, biofuel potential, and emissions control, with articles published in *Chemical Engineering Journal*, *Chemosphere*, and *Fermentation*.

Dr. Yang has been honored with the 2024–25 Illinois State University Environmental Stewardship Award and the 2023–24 College Outstanding Researcher Award. He also received ISU's University Outstanding Cross-Disciplinary Team Research Award and was named 2023 RSO Advisor of the Year. A frequent grant reviewer for NSF, USDA, and EPA, Dr. Yang is recognized as a research mentor, collaborator, and sustainability leader shaping Illinois' environmental future.

RESEARCH SUMMARY

Dr. Yang's research explores two core areas: improving air quality in urban and agricultural settings, and optimizing anaerobic digestion (AD) as a waste-to-energy solution. He leads efforts to mitigate emissions in environmental justice zones and develop efficient AD systems using food waste and lignocellulosic biomass. His work includes community-centered projects like the EPA-funded BN-CARE initiative and USDA-supported innovations in farm waste recycling.

Currently, he's integrating AI into environmental research to enhance monitoring, prediction, and process control. Dr. Yang collaborates extensively across disciplines—partnering with institutions like Argonne National Laboratory, UIUC, and Virginia Tech—and with community groups like the Ecology Action Center. His research ultimately seeks to drive scalable innovations in sustainability, agriculture, and public health.

“Sustainability starts with science—and succeeds through collaboration.”

- Dr. Yang



[CLICK HERE TO LEARN MORE ABOUT HIS/HER WORK](#)


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ABOUT HIS/HER WORK](#)

BIO

Sera Young is a Professor of Anthropology at Northwestern University, where she also serves as a Morton O. Schapiro Faculty Fellow and Co-Director of the Center for Water Research. Her work is driven by a mission to make visible the overlooked experiences of water insecurity—especially in places that, like Illinois, sit beside abundant freshwater yet still face inequities.

Originally focused on food insecurity, her research shifted after listening closely to communities where water was the central concern. Today, she leads global efforts to turn lived water experiences into actionable data that can drive systems-level change using the [Water Insecurity Experiences Scales](#). The WISE Scales draw on anthropology, global health, statistics, and public scholarship to advocate for water security for all. She also collaborates with her husband, synthetic biologist Julius Lucks, to democratize water safety through rapid [diagnostics](#) and community-driven tools.

“The most powerful insights come when we listen—really listen. That’s when research becomes transformation.”

- Dr. Young

DR. SERA YOUNG, MA, PhD

*Professor of Anthropology, Northwestern University
Morton O. Schapiro Faculty Fellow, Institute
for Policy Research
Co-Director, Center for Water Research*

RESEARCH SUMMARY

Dr. Young is the co-developer of the Water InSecurity Experiences (WISE) Scales, a groundbreaking tool used to measure household- and individual-level water access, quality, and reliability around the world. By capturing the lived experience of water insecurity, her work is helping reshape how policymakers, nonprofits, and communities understand and address this critical issue.

She also co-leads the [WISE-Latin America and Caribbean](#) network, which unites researchers and practitioners to influence regional water policy. Her newest project, WISE-Dx, focuses on piloting low-cost, rapid biosensor tests for lead in drinking water across greater Chicago—bringing cutting-edge diagnostics directly to households while fostering trust, participation, and real-time awareness.

HIGHLIGHTS & AWARDS

Dr. Sera Young is an internationally recognized anthropologist whose pioneering work has transformed how the global community measures and addresses water insecurity. She is the co-developer of the Water Insecurity Experiences (WISE) Scales, used in more than 80 countries and adopted by governments, the World Bank, UNICEF, and other institutions to inform water access policies. Her research has earned widespread recognition, including an Andrew Carnegie Fellowship, the Norman Kretchmer Memorial Award in Nutrition and Development, and the Margaret Mead Award for her book *Craving Earth*.

In 2025, she received the inaugural Champions of Health Award from the Director of Mexico’s National Institute of Public Health, further solidifying her global influence. Her work has been supported by the NIH, NSF, McKnight Foundation, Robert Wood Johnson Foundation, and Wenner-Gren Foundation. Media coverage includes features in *The New York Times*, BBC, NPR, National Geographic, *Scientific American*, and mentions by figures like Erin Brockovich and Nicholas Kristof.

Most recently, she delivered a keynote address at Chicago’s Field Museum 2025 Women in Science Luncheon and published a high-impact study in *Nature Communications*. Through advocacy, innovation, and partnerships, Young continues to reshape how the world values and protects its most essential resource: water.

An abstract graphic on the left side of the page. It features a dense collection of small yellow and orange spheres, some of which are arranged into larger, irregular, molecular-like structures. The background is a gradient of light orange and yellow. The overall effect is one of dynamic energy and scientific exploration.

LOOKING AHEAD:

Innovation That Will Define the Next Decade

Innovation is no longer the sole domain of technologists or scientists—it's a guiding principle shaping every sector of society. As we navigate a future marked by climate volatility, global health challenges, evolving technologies, and deep questions of equity and access, innovation is becoming both more urgent and more expansive. The boundaries between disciplines are blurring, and solutions are emerging at the intersections of data and ethics, biology and policy, materials and design.

Today's research environment reflects a world in transition. Artificial intelligence is revolutionizing how we analyze problems and synthesize knowledge. Health systems are shifting toward personalization and prevention. Sustainability is not just a buzzword but a framework guiding how we build, grow, and consume. And across all these changes, collaboration—across disciplines, institutions, communities, and even countries—is proving essential.

In this dynamic landscape, Illinois researchers are not only keeping pace—they are setting the pace. The Researchers to Know 2025 offers a vivid snapshot of where innovation is heading, what new paradigms are emerging, and how our present efforts are carving out the path for the next decade of discovery. Their work underscores a powerful message: that meaningful progress depends not just on breakthrough ideas, but on shared purpose, public engagement, and the ability to adapt.

From emerging technologies in biotechnology to reimagined approaches in physics and public health, the next decade of innovation will be defined by adaptability, cross-sector collaboration, and a commitment to inclusive impact. The 2025 Researchers to Know offer critical insights into what's on the horizon—and how today's work in Illinois is laying the foundation for tomorrow's breakthroughs.

Data-Driven Discovery and the Future of Research Itself

One of the most transformative forces in research is the integration of data science and artificial intelligence. Across disciplines, researchers are embracing computational tools to accelerate discovery, refine methodologies, and rethink traditional approaches to knowledge creation.

At Northwestern University, Dr. Dashun Wang is leading efforts in the emerging field of the "science of science," which applies large-scale data analysis to the research process itself. As Wang puts it, "we can harness machine learning to guide how science is done—who collaborates, how ideas evolve, and what makes research successful." This meta-level study of innovation provides insights into what drives scientific impact, the dynamics of collaboration, and the evolution of ideas.

Looking ahead, data will increasingly inform how research is conducted, evaluated, and shared. AI is not just automating processes—it's becoming an active partner in shaping the direction of science. These changes also present a challenge: ensuring transparency and equity in AI-assisted research processes. As algorithmic tools grow more complex, interdisciplinary oversight and responsible AI practices will be essential.

Biomedical Advancements: Personalization, Prevention, and Precision

One area demanding urgent innovation in the coming decade is the battle against infectious and parasitic diseases. Dr. Ramaswamy Kalyanasundaram, a leading researcher at the University of Illinois College of Medicine at Rockford, is working at the intersection of immunology and drug development. "The future of global health will be shaped by how we tackle neglected diseases with scalable solutions," he notes, highlighting his efforts to develop vaccines and delivery platforms for parasitic diseases that disproportionately affect underserved populations. His work on tropical parasitic diseases, including vaccine design and delivery platforms, represents a vital push toward addressing global health inequities.

Infectious disease research will remain a cornerstone of innovation, especially as climate change continues to influence the spread of pathogens and the risk of emerging pandemics. The future will depend on the integration of basic biomedical research with translational and community-based health strategies. As Dr. Kalyanasundaram's work illustrates, tomorrow's breakthroughs will not only rely on scientific advancement but also on our collective ability to ensure access and impact across borders.

In the health sciences, the coming decade will see a major pivot toward individualized care and early interventions. Precision medicine, which tailors treatment to a patient's genetic profile and lifestyle, is rapidly transitioning from theory to standard practice.

Leaders like Dr. Susan Quaggin and Dr. Prem Kumar, both at Northwestern University, emphasize that tools like gene editing, genomic screening, and advanced diagnostics are reshaping the medical landscape. These technologies will enable clinicians to identify diseases earlier, reduce treatment side effects, and improve outcomes through more targeted therapies.

The integration of wearable technologies and real-time patient monitoring systems is also expanding the frontiers of patient-centered care. Researchers are exploring how continuous health tracking can detect early signs of cardiovascular disease, neurological disorders, and metabolic syndromes—enabling proactive treatment plans.

Beyond medical devices, a shift in public health models is also underway. Addressing the social determinants of health, including housing, access to nutritious food, and environmental factors, will require partnerships between healthcare providers, researchers, and community organizations.

Sustainable Innovation in Agriculture and Energy

As climate resilience becomes a priority across sectors, innovation in agriculture and materials science is gaining urgency. Researchers are developing technologies that support sustainable food systems, reduce environmental waste, and enable circular economies.

At Southern Illinois University, Dr. Khalid Meksem is pioneering soybean genome editing to enhance crop resistance and improve yield, supporting global food security amid environmental uncertainty. "Our goal is to help crops withstand stress—drought, pests, disease—while producing more," Meksem explains. "The key is combining genetics with field-based research in real time" to enhance crop resistance and improve yield, supporting global food security amid environmental uncertainty. These innovations are part of a broader shift in agricultural science that emphasizes resilience and adaptability in the face of climate change.

Meanwhile, Dr. Mahdi Vaezi at Northern Illinois University is applying engineering innovation to transform agricultural byproducts into bioplastics and renewable materials. "Agricultural waste shouldn't just be discarded," he says. "It can be a high-value input for sustainable materials, if we rethink the system" to transform agricultural byproducts

into bioplastics and renewable materials, signaling a shift toward low-waste, high-value industrial systems. His team is also exploring how biomass hydrotransport systems can improve the efficiency of agricultural logistics, reducing carbon emissions in the supply chain.

Looking forward, the convergence of biotechnology, environmental science, and circular economy principles is expected to redefine how industries operate. Innovation in these areas is not only environmentally necessary—it's increasingly economically viable, attracting new investment and policy attention.

Advanced Materials and Natural Product Discovery

Innovation in chemistry and materials science is expanding the possibilities for both health and industry. The search for new molecules, materials, and compounds is enabling novel therapies and smarter, more adaptable technologies.

Dr. Liangcheng Yang's research at Illinois State University focuses on natural product chemistry—exploring biologically active compounds from natural sources. "We're learning to synthesize and engineer natural molecules in ways that were unimaginable a few years ago," he says. "These compounds have the potential to revolutionize both medicine and industry."—exploring biologically active compounds from natural sources. These molecules have shown promise in treating diseases and developing next-generation industrial applications. This work is increasingly supported by advancements in synthetic biology and nanotechnology, fields that will grow significantly over the next decade.

In particular, the development of bio-inspired materials—substances designed based on biological systems—is expected to gain momentum. These materials offer potential in diverse sectors, from regenerative medicine to smart packaging, and illustrate how blending biology with engineering can generate practical, scalable solutions.

Neuroscience, Mental Health, and Equity

The intersection of neuroscience, trauma recovery, and public engagement is a growing focus for researchers committed to equity-driven innovation. Scientific understanding of the brain is expanding rapidly, with implications that stretch far beyond the clinic.

Dr. Dorothy Kozlowski of DePaul University and Dr. EunJung Hwang at Rosalind Franklin University are both exploring how the brain adapts and responds to injury, chronic illness, and social conditions. "We're recognizing how brain injuries intersect with mental health, education,

and social equity," Kozlowski shares. Hwang adds, "Science is a team sport. The sooner students learn that, the better their science—and their impact—will be." Through their exploration of brain function in the context of trauma, illness, and social challenges, their work affirms neuroscience's growing relevance to educational reform, health equity, and public well-being.

A common theme across this area of research is the importance of inclusivity: making sure that innovation reaches—and reflects—the communities it seeks to serve. Neuroscience is becoming more engaged with public discourse, particularly in areas like trauma-informed care, youth mental health, and educational design.

There is also a growing movement toward open science in neuroscience, with researchers increasingly committed to data sharing, public education, and community-engaged research. The result is a more transparent and collaborative model for advancing mental health equity.

Measuring and Solving Global Challenges Through Collaboration

Global challenges like water insecurity demand equally global solutions. But rather than relying on top-down models, researchers are increasingly emphasizing co-creation and interdisciplinary collaboration.

Dr. Sera Young of Northwestern University exemplifies this trend, blending anthropology, epidemiology, and public policy to develop tools that measure household water insecurity. "Innovation is not just about creating new things," she says. "It's about listening deeply, building trust, and empowering people to lead their own solutions." Her approach is participatory, engaging directly with affected communities to ensure that solutions are relevant and sustainable.

This reflects a growing understanding that innovation is not simply about invention—it's also about context, culture, and partnership. Dr. Young's work has contributed to the development of global metrics for water insecurity that are now used by policymakers, NGOs, and researchers around the world.

In this space, the value of innovation lies not in novelty but in relevance. The challenge for the next decade will be to scale solutions in ways that remain responsive to local needs.

Next-Generation Physics and Biosensing

Theoretical and applied physics continue to push boundaries that shape not only our understanding of the universe, but also the tools we use to navigate it.

Dr. Matt Caplan's astrophysics research on neutron stars has potential implications for quantum computing and energy systems—technologies that could redefine computational and energy infrastructure. "We're getting closer to understanding exotic matter in neutron stars and beyond," Caplan explains. "And that has implications for what's possible with quantum technologies right here on Earth." His findings are a reminder that even the most abstract research can have practical consequences in how we build and power the technologies of tomorrow.

Quantum physics, long a theoretical frontier, is now informing practical technologies in computing, sensing, and encryption. Caplan's research, while astrophysical at its core, intersects with materials science and computer engineering, exemplifying the increasingly interdisciplinary nature of foundational science.

In applied chemistry, Dr. Jeremy Driskell is developing biosensors that combine diagnostics, therapeutics, and real-time disease detection. "What excites me is the pace," Driskell says. "We're not talking about incremental changes anymore—we're talking about paradigm shifts in how we approach healthcare and access." These innovations promise to improve public health monitoring and response, particularly in underserved or remote communities.

With growing interest in decentralized diagnostics—especially post-COVID—biosensors represent a critical area of innovation. The next decade will likely see these devices become faster, cheaper, and more widely adopted, especially when paired with mobile health platforms.

Innovation as Inclusion, Adaptability, and Impact

Across every domain, the researchers profiled in this year's "Researchers to Know" emphasize that innovation is not limited to high-tech labs or breakthrough inventions. It's about adaptability, collaboration, and a commitment to solving meaningful problems.

This emphasis on impact signals a broader redefinition of what innovation looks like. Rather than isolated discoveries, the most transformative advances are likely to emerge through ongoing, community-informed processes that prioritize equity, usability, and sustainability.

In Illinois and beyond, the next decade of innovation will be defined not just by what we build, but by who we engage. It will reflect a broader cultural shift—toward openness, interdisciplinarity, and human-centered progress.

These researchers offer more than just foresight. They are creating the frameworks, networks, and opportunities that

will allow innovation to flourish in ways that are inclusive, equitable, and enduring. The future isn't a distant horizon—it's being built right now, across the state's labs, classrooms, clinics, and communities.

As we look ahead, one thing is clear: the challenges of the next decade will be complex, but so too are the capacities of Illinois' research community. Innovation is not a static concept—it is a living process, evolving in response to the world's most pressing questions. What's next in innovation is already taking shape through the hands, minds, and collaborations of those pushing boundaries today.

From the laboratories decoding the mysteries of the universe to the field researchers co-creating tools with global communities, Illinois researchers are helping define not only where innovation is heading—but how it will transform our lives. The next decade will be about building systems that are smarter, more sustainable, and more just. It will be about crossing silos to make lasting change, and designing technologies and policies that reflect human values.

The Researchers to Know in 2025 offer a powerful, collective vision of the future. They are not just looking ahead—they are building what's next in innovation: bold, inclusive, interdisciplinary, and rooted in purpose.

Their words are as forward-looking as their work. Across interviews, a common message resonated: the future of innovation is as much about courage and conviction as it is about technology. Many researchers emphasized the importance of using one's voice and expertise to drive meaningful change—of believing that ideas, no matter how small, have the power to shape the world.

It's a reminder that innovation isn't reserved for labs or funded projects alone. It happens every time someone takes a risk to challenge the status quo, speaks up for an overlooked issue, or commits to solving problems that truly matter. Whether it's championing equity in science, building public trust, or mentoring the next generation, innovation is made human through intention and action.

WHAT'S NEXT IN INNOVATION?

It's not just breakthroughs or inventions—it's the bold act of building a better future together.

Congratulations to the 2025 Researchers to Know



Dr. Matt Caplan



Dr. Jeremy Driskell



Dr. EunJung Hwang, PhD



Dr. Ramaswamy Kalyanasundaram, DVM, PhD



Dorothy Kozlowski, PhD



Dr. Prem Kumar



Dr. Khalid Meksem



Dr. Susan E Quaggin, MD



Dr. Mahdi Vaezi, PhD



Dr. Dashun Wang



Dr. Liangcheng Yang



Dr. Sera Young, MA, PhD

With Gratitude to Our Nominators & Collaborators

Thank you to all of this year's nominators and points of contact for your thoughtful submissions, edits, and continued support of the Researchers to Know initiative. Your time, insight, and collaboration were essential in helping us highlight researchers whose work is transforming Illinois—and the world. We're incredibly grateful for your partnership in making this recognition possible and look forward to connecting with you again in 2026.

Congratulations to our 2025 Researchers to Know—your work is more than discovery; it's a blueprint for what's possible. Thank you for daring to ask bold questions, forging new paths, and elevating Illinois as a hub of innovation. Your dedication, curiosity, and leadership inspire us to imagine a future shaped by science, equity, and bold collaboration.



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