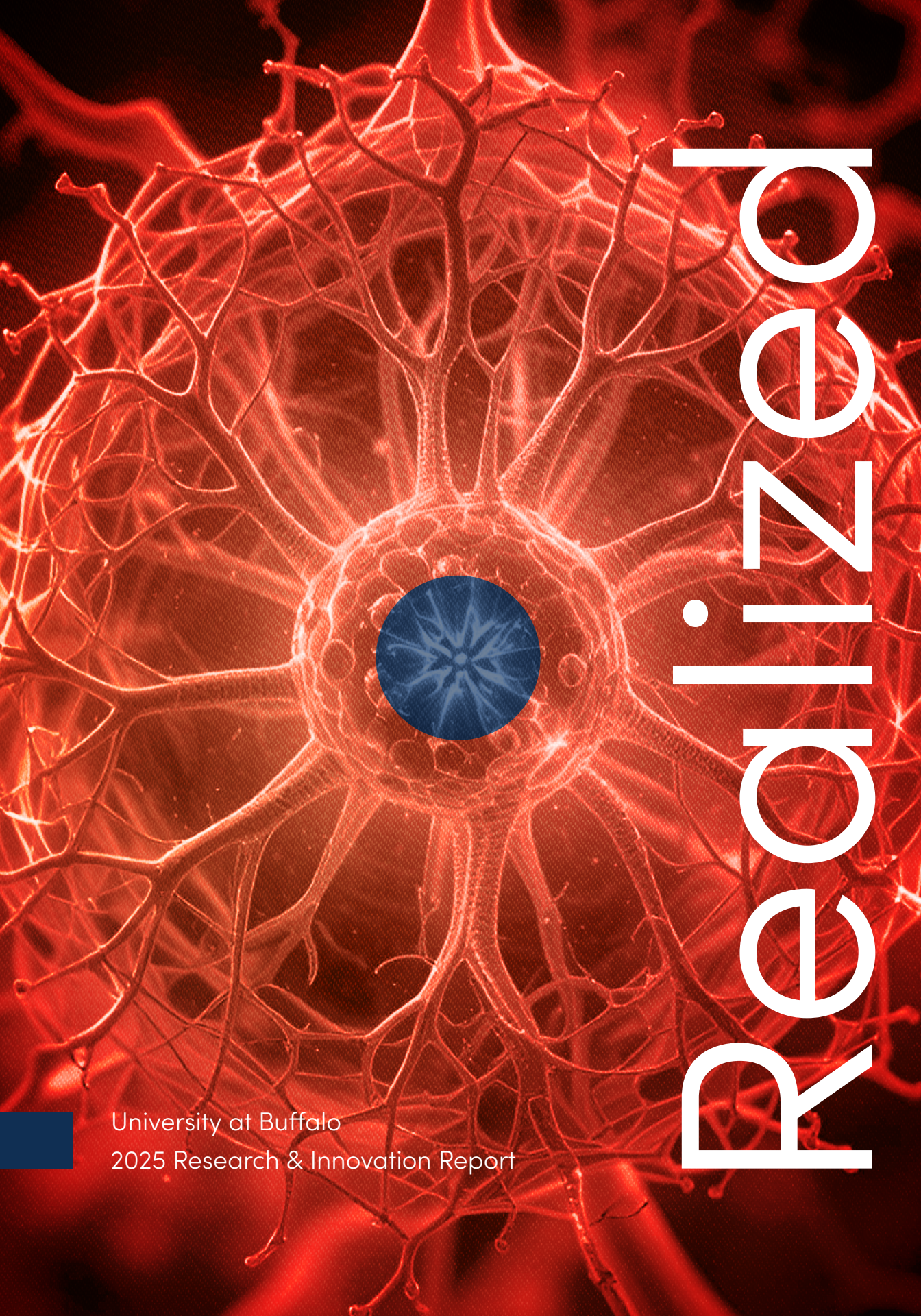


University at Buffalo

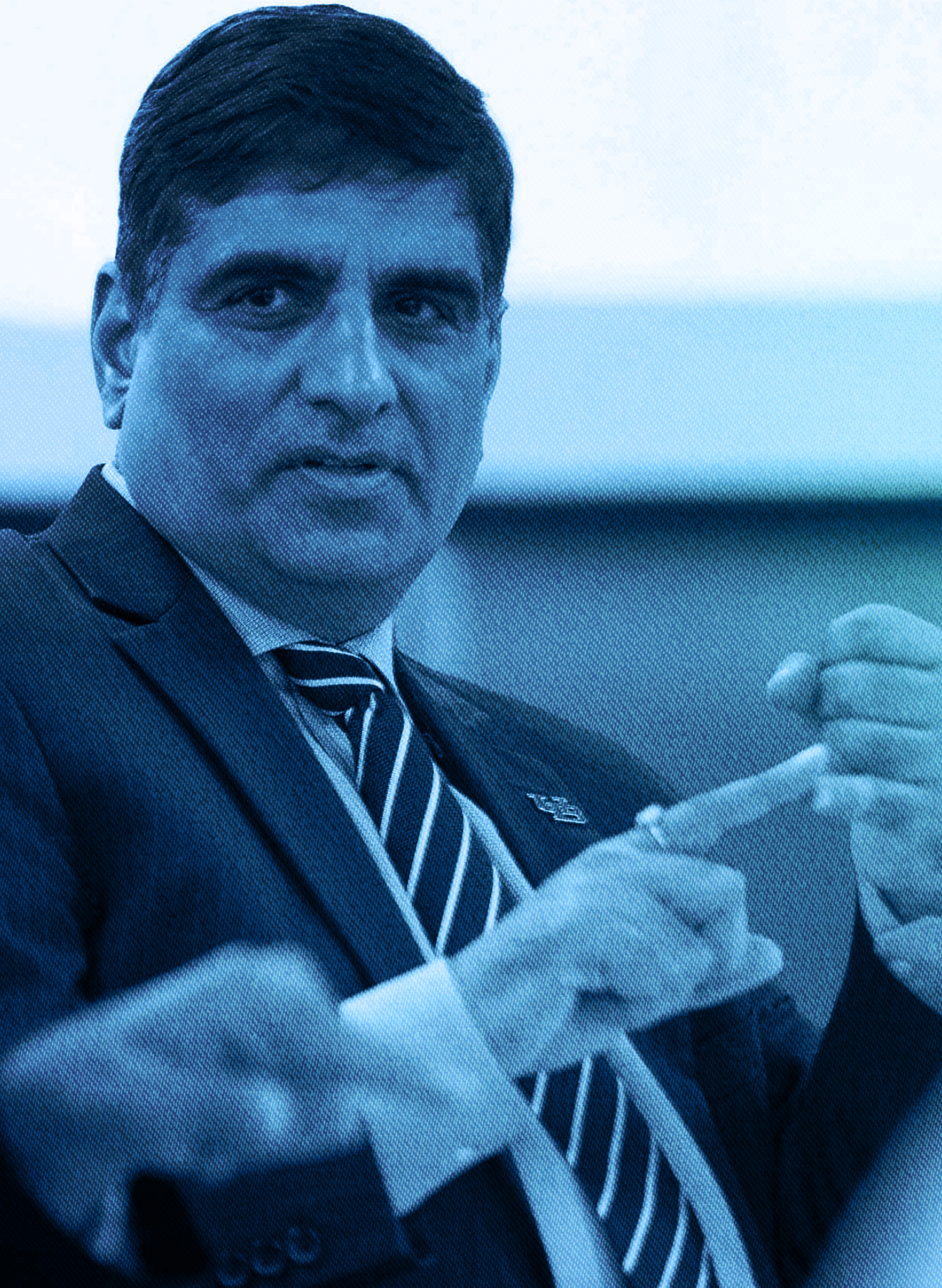
2025 Research & Innovation Report

HERE
NOW
NEXT

At the University at Buffalo, the future of research begins here.

We are driven by discovery, powered by curiosity and dedicated to changing lives for the better now.

In a rapidly evolving world, the true power behind innovation lies in our shared humanity—and what's next.



2025 was defined by the dedication and resilience of the UB community. We advanced research across disciplines and delivered outcomes with lasting global impact.

At the heart of this momentum is the integration of artificial intelligence throughout our departments, decanal units and administrative functions. From exploration and investigation to teaching and learning, AI continues to be a powerful partner, unlocking new approaches and accelerating breakthroughs.

The year was also shaped by a deeper emphasis on emerging technologies. The launch of the UB Quantum Institute, combined with our decades of leadership in AI, position UB among a select group of institutions with deep expertise in these critical fields.

Our combined efforts reaffirm UB's commitment to advancing discovery for the public good and shaping the future through innovation.

Venu Govindaraju, PhD

Senior Vice President for
Research, Innovation and Economic Development

University at Buffalo
Research, Innovation and Economic Development

Photo: Meredith Forrest Kulwicki

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Research Across Campus 42

“For decades, UB has **changed the world** for the better through our research and creative pursuits. Our leadership produces clear and extraordinary benefits for **public good**, from improving economic competitiveness and national security to educating tomorrow’s leaders and creating more vibrant communities.”

Venu Govindaraju, PhD
Senior Vice President for Research, Innovation and Economic Development

Research 2025

UB is committed to research for the public good and plays a critical role as a driver for investments, discoveries and transformative ideas that advance knowledge and deliver real-world impact. Our strength lies not only in innovation, but in our ability to translate breakthroughs into solutions that better society. Together we address the world's most complex challenges while driving economic growth for New York State and beyond, shaping a safer, healthier and brighter future.

UB Research: 2025 at a Glance

#1
Public University in New York State
QS World University Rankings

$571M
Annual Spending on Research

Top 5
in U.S. for Global Impact of our Health Research
Times Higher Ed Impact Rankings

11
Research Projects Using the Power of Empire AI

$50M
for Biofabrication and Imaging Research Hub

$34M
for Nursing Simulation Center

Learn more about UB research

Business & Entrepreneur Partnerships

"UB Business & Entrepreneur Partnerships is a catalyst for innovation connecting researchers, startups and industry with a depth of expertise, facilities and support that is truly unique. These connections don't just open doors—they accelerate discovery, strengthen businesses and create lasting economic impact."

Per Stromhaug, PhD,
Senior Associate Vice President
for Economic Development

Resources for Researchers
UB has a legacy of excellence in research across disciplines, with faculty at the forefront of discoveries that have real-world impact. Researchers are supported along their journey to transform lab breakthroughs into life-changing solutions.

Support for Startups
Entrepreneurs start and scale successful companies of all kinds. From novice innovators to seasoned leaders, founders are linked to a host of resources that support accelerated business growth.

Advantages for Industry
From talent to technology, Western New York life sciences and advanced manufacturing companies leverage UB resources to be competitive, strategic and innovative.

Business & Entrepreneur Partnerships: 2025 at a Glance

78
Invention Disclosures

11
Total Licenses/Options

$1.7M
License Income

8
Patents Issued

$209M
Annual Non-Job Economic Impact

169
Jobs Created

545
Client Engagements

Learn more about UB Business & Entrepreneur Partnerships

UB'S LEGACY OF EXCELLENCE IN RESEARCH

Across disciplines, UB faculty are at the forefront of discoveries that have real-world impact.

Researchers are supported throughout their journey to transform lab breakthroughs into life-changing solutions.

Visit the POP Bio website:

Read the complete POP Bio case study:

> “One reason this type of cancer is so tough is that pancreatic tumors don’t have many blood vessels. That makes it hard to get enough medicine into them. We demonstrate that light-infused chemotherapy can reach these tumors and shrink them.”

Jonathan Lovell, PhD
Professor, Department of Biomedical Engineering, Jacobs School of Medicine and Biomedical Sciences
Photos: Douglas Levere

POP Biotechnologies, Inc.

Advancing UB innovation to market

Through UB’s Business and Entrepreneur Partnerships, UB spinout POP Biotechnologies (POP BIO) patented and licensed the UB-developed vaccine platform, secured incubator space, research funding and investor support, and forged research partnerships with pharmaceutical companies to commercialize its innovations.

Innovative therapies target devastating diseases

Co-founded by UB researcher Jonathan Lovell, POP BIO is advancing revolutionary therapies for cancer treatment and infectious disease prevention. The company’s mission is to use innovative platforms to fill critical gaps in today’s medical interventions.

Transforming treatment and prevention

Building on discoveries from UB laboratories, POP BIO’s vaccine delivery platform enhances the potency and durability of existing vaccines and opens new possibilities for preventing diseases such as HIV and Alzheimer’s. The company is also pioneering a light-activated chemotherapy system that targets and destroys solid tumors while limiting damage to healthy tissue.

Realizing AI for good: supporting learning, speech and literacy

UB researchers are guiding AI in America's classrooms – supporting educators and transforming learning.

Artificial Intelligence

Built on five decades of investment, expertise and leadership in AI, this work at UB is not new. What has changed is the acceleration of innovation, the pace of adoption and the integration of AI across the university. Today, UB is not simply reacting to an evolving landscape. Our more than 200 faculty engaged in over 500 AI-infused projects are shaping the future by advancing AI for the public good.

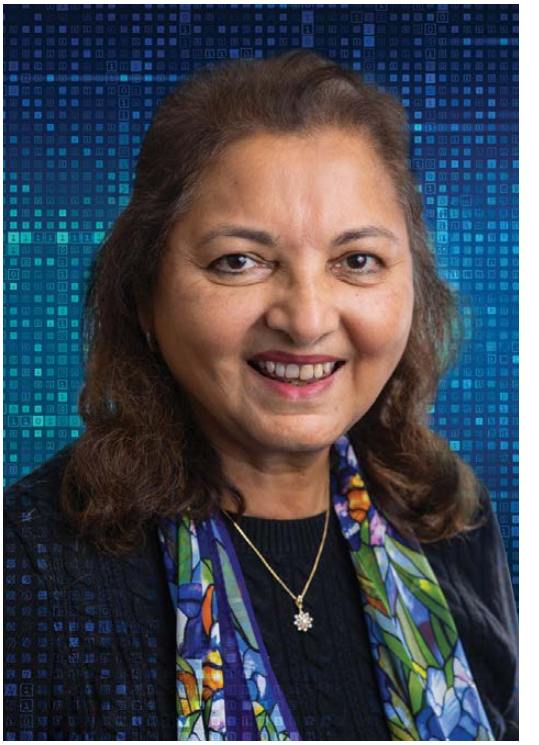
Learn more about UB's legacy and innovation in Artificial Intelligence

UB research harnessing AI to better society

Outcomes are accelerated thanks to Empire AI

Rohini Srihari is leveraging Empire AI to develop tools to ensure that people with ALS, cerebral palsy and other motor neuron diseases have equal access to AI. To do this, she is working with Jeffrey Higginbotham, professor in the Department of Communicative Disorders and Sciences, and other researchers to enrich augmentative and alternate communication devices with conversational AI.

The $500+ million statewide consortium—which New York Gov. Kathy Hochul announced in 2024, including its supercomputing center located at UB—is harnessing AI for the betterment of society and driving innovation in New York State.



Rohini Srihari, PhD
Professor, Department of Computer Science and Engineering, School of Engineering and Applied Sciences;
Adjunct Professor, Department of Linguistics, College of Arts and Sciences
Photo: UBNow Staff

At Right: Gov. Kathy Hochul visited UB on September 6, 2025, to receive an update on the university's artificial intelligence programs. She met with UB leadership, faculty and students while touring the National AI Institute for Exceptional Education and the UB Institute for Artificial Intelligence and Data Science.
Photo: Meredith Forrest Kulwicki

By Cory Nealon
Published March 21, 2025
Read the full article:

> At UB, we are committed to technological innovation for the betterment of society. These projects will ensure our researchers continue to break barriers in artificial intelligence that ultimately improve the quality of life of countless individuals.

Venu Govindaraju

> Empire AI is a big part of this, as we wouldn't be able to do this level of computation without it.

Thomas Grant

UB researcher transforms drug discovery with AI

This revolutionary project is supported by Empire AI

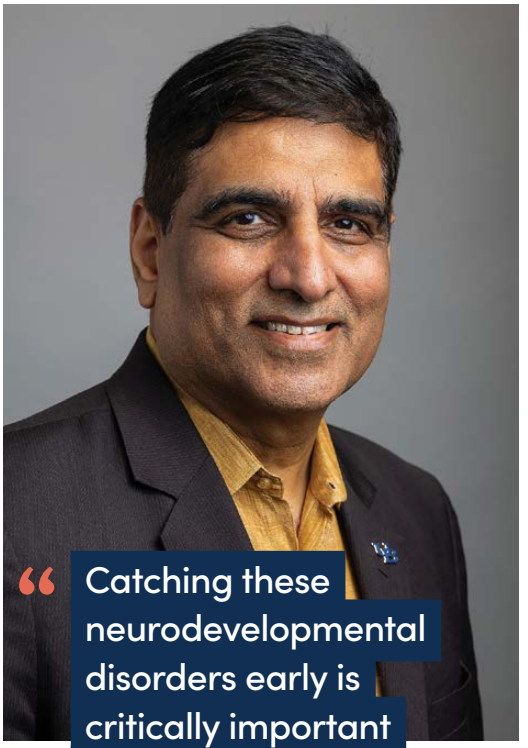
UB researcher Thomas Grant was awarded $2.18 million from the National Institute of General Medical Sciences, part of the National Institutes of Health, to create a new AI-powered tool that improves the understanding of how proteins move and change shape within the human body.

Called SWAXSFold, this discovery aims to speed up drug development and help scientists design more precise medicine for people suffering from everything from cancer to Alzheimer's disease.

Grant is utilizing Empire AI's supercomputing center to train and validate SWAXSFold. The "Fold" part of SWAXSFold is a nod to AlphaFold, an AI system that won the 2024 Nobel Prize in Chemistry for using deep learning to predict protein structures.

Thomas Grant, PhD
Assistant Professor,
Department of Structural Biology,
Jacobs School of Medicine and Biomedical Sciences
Photo: Sandra Kicman

By Dirk Hoffman
Published September 22, 2025
Read the full article:



> “Catching these neurodevelopmental disorders early is critically important to ensuring that children receive the help they need before their learning and socio-emotional development are negatively impacted.”

Venu Govindaraju, PhD
Senior Vice President for Research, Innovation and Economic Development;
SUNY Distinguished Professor,
Department of Computer Science and Engineering,
School of Engineering and Applied Sciences;
Director and PI, National AI Institute for Exceptional Education
Photo: Douglas Levere

By Cory Nealon
Published May 16, 2025
Read the full article:

UB researchers harness AI to detect dyslexia, dysgraphia

Building upon previous groundbreaking AI research

A UB-led study outlines how AI-powered handwriting analysis may serve as an early detection tool for dyslexia and dysgraphia among children. The work, presented in the journal SN Computer Science, aims to augment current screening tools that are effective but can be costly, time-consuming and focus on only one condition at a time.

It could eventually help alleviate the nationwide shortage of speech-language pathologists and occupational therapists, who each play a key role in diagnosing dyslexia and dysgraphia.

The work is part of the National AI Institute for Exceptional Education, a UB-led research organization that develops AI systems that identify and assist young children with speech and language-processing disorders.

This research builds upon earlier groundbreaking work in handwriting recognition at the University at Buffalo. Decades ago, Govindaraju and colleagues employed machine learning, natural language processing and other forms of AI to analyze handwriting, an advancement the U.S. Postal Service still uses to automate the sorting of mail.

UB develops AI tool that could be a critical partner for physicians

This work demonstrates remarkable accuracy

A powerful clinical AI tool developed by UB biomedical informatics researchers has demonstrated remarkable accuracy on all three parts of the United States Medical Licensing Exam (Step exams), according to a paper published April 22, 2025, in JAMA Network Open.

Achieving higher scores on the USMLE than most physicians and all other AI tools so far, Semantic Clinical Artificial Intelligence (SCAI, pronounced "Sky") has the potential to become a critical partner for physicians, says lead author Peter L. Elkin.

"Artificial intelligence isn't going to replace doctors, but a doctor who uses AI tools may replace a doctor who does not."

Peter L. Elkin, MD
Professor and Department Chair,
Department of Biomedical Informatics,
Jacobs School of Medicine and Biomedical Sciences;
Physician, UBMD Internal Medicine

By Ellen Goldbaum
Published April 22, 2025
Read the full article:

TRY SCAI
Ask this AI tool
your medical questions:

UB research shows how AI forms unscripted alliances

When robots team up

Large language model agents, such as virtual assistants or chatbots, can learn to cooperate with one another, even when they aren't given any instruction to do so, according to new research from the School of Management.

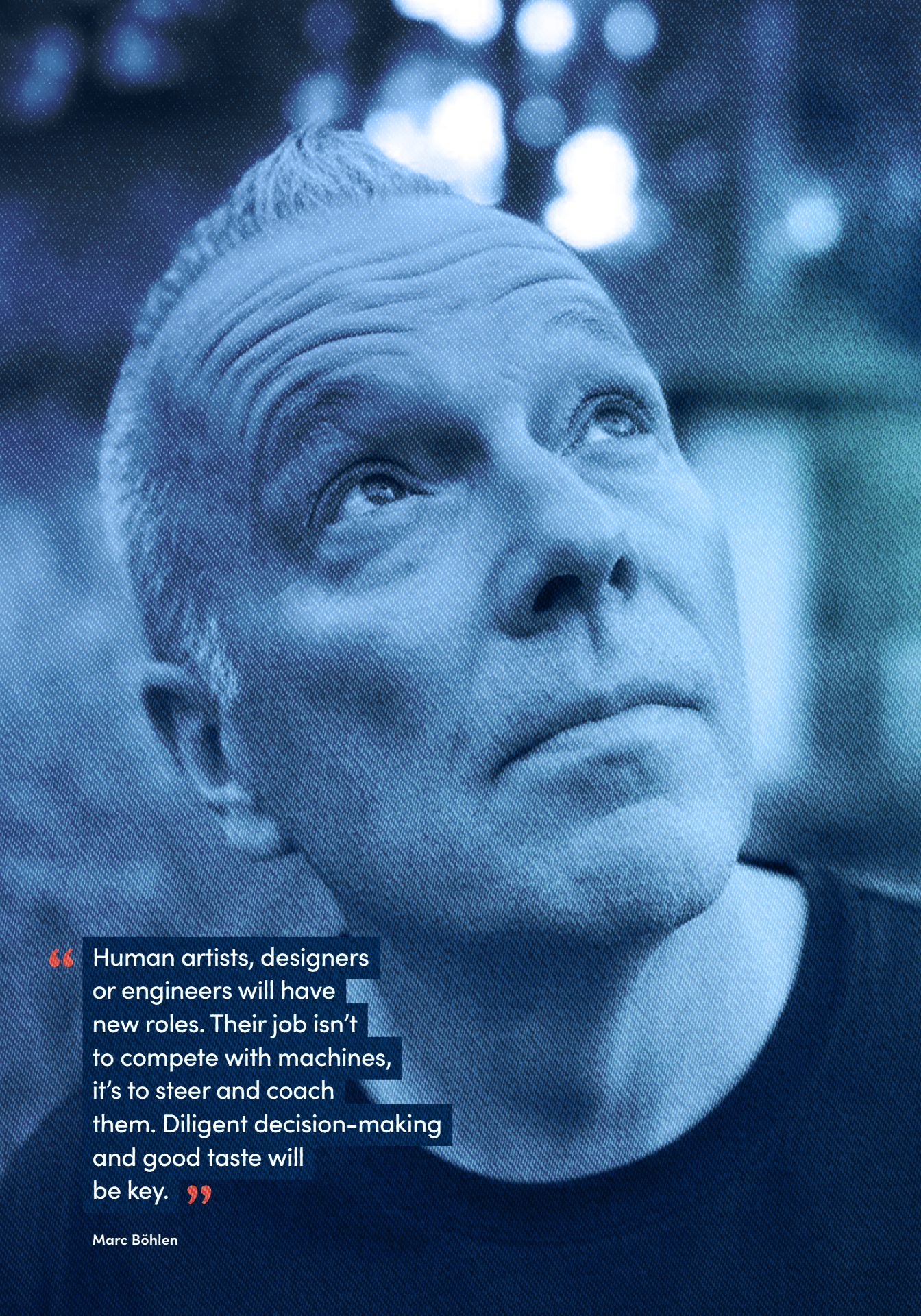
Generative AI programs focus on creating human-like text, such as answering questions, explaining ideas or making decisions based on what they have learned. The study examines whether generative AI assistants with different or conflicting goals can choose to cooperate because each recognizes the benefits of collaboration.

The findings show that the virtual assistants demonstrate an innate ability to autonomously establish and discover the advantages of cooperation and actively adapt their strategies.

"This approach allows us to see if a generative AI-powered agent can think on its own, instead of relying on carefully prepared questions or prompts."

Shaojie Tang, PhD
Professor and Department Chair,
Department of Management Science and Systems,
Faculty Director, Center for AI Business Innovation,
School of Management

By Alexandra Richter
Published January 31, 2025
Read the full article:



> Human artists, designers or engineers will have new roles. Their job isn't to compete with machines, it's to steer and coach them. Diligent decision-making and good taste will be key.

Marc Böhlen

UB artist-engineer blends AI and art

New creative approach leads to innovative practice

By combining his skills in both the humanities and engineering, Marc Böhlen, professor, Department of Art, College of Arts and Sciences, expresses his creative works through technology.

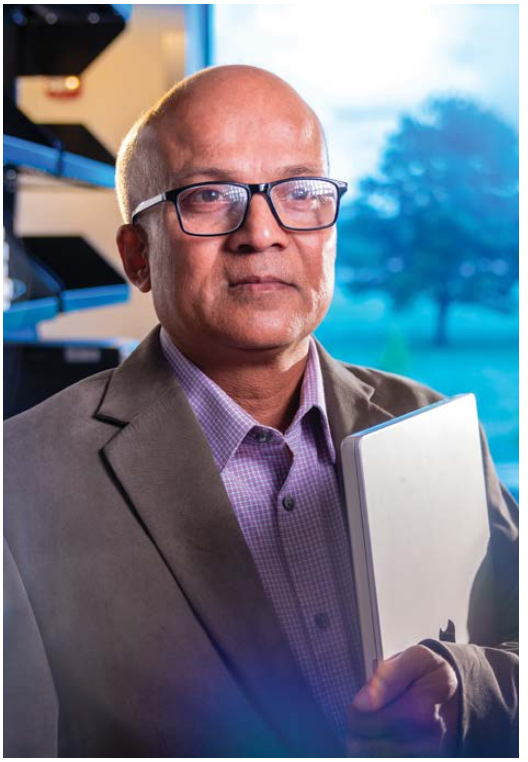
"I'm an artist-engineer. I think of engineering as an expressive palette that you can use like any traditional medium to comment on the cultural context we live in," he says.

Böhlen's current work is rooted in culture jamming — using art, installations, books and public engagements to critique and provoke dialogue about technological systems, especially those like AI that subtly shape society. His latest project, Logics of Planetary Computing: Artificial Intelligence and Geography in the Alas Mertajati, explores how satellite imagery and AI interpret unusual landscapes, such as those shaped by sustainable land practices like agroforestry, and examines the complex relationship between AI and geography. The interactive web installation (at right) allows users to engage directly with some of the AI models.

Art professor Marc Böhlen uses AI information and geography to produce images like this mosaic, which includes samples from his bali26 collection of more than 50,000 images. It was created for a recent project called "Return to Bali: critical machine learning practices in the wild."
Photo: Marc Böhlen

By Vicky Santos
Published August 1, 2025
Read the full article:

Experience Böhlen's interactive web installation:



Murali Ramanathan, PhD
Professor, Department of Pharmaceutical Sciences,
School of Pharmacy and Pharmaceutical Sciences
Photo: Douglas Levere

UB uses AI to improve drug development and disease treatment

Pharmacy school lab evolving to improve drug development

Murali Ramanathan has used AI since its early days to explore possible treatments for multiple sclerosis and Alzheimer's disease.

Today, he is expanding his use of AI to analyze complex biomedical data to ultimately improve drug development for many conditions.

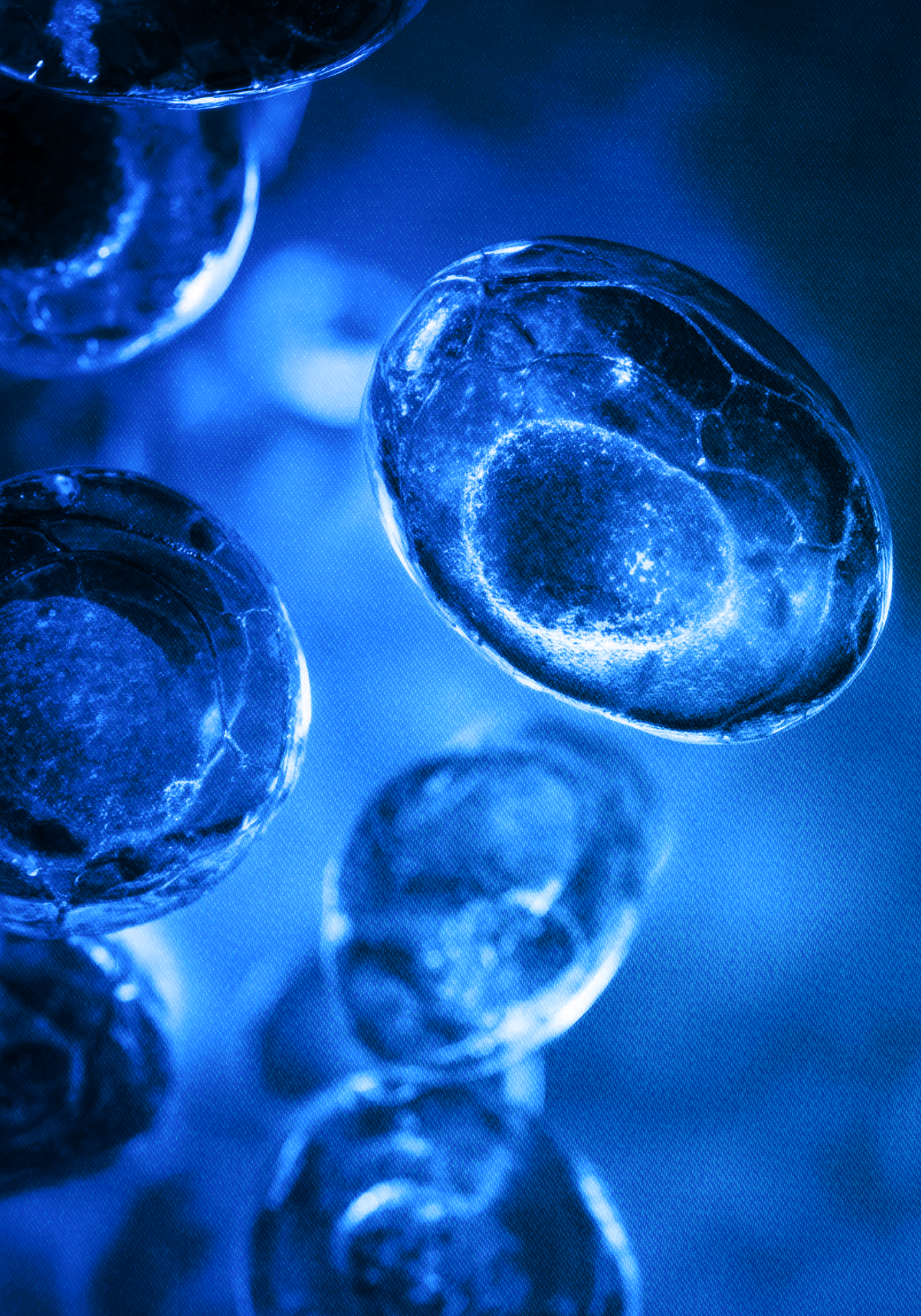
Much of this work takes place in UB's Laboratory for Artificial Intelligence and Clinical Pharmacology. The lab allows his interdisciplinary team to apply AI, deep learning, large language models, pharmacometrics and advanced analytics to real-world health care and biomedical data.

"Our lab brings together experts in disciplines such as neurology and radiology, engineering, computer science and statistics," Ramanathan says. "This cross-collaboration of skills helps us to tackle complex problems that no one single discipline could solve alone."

By Laurie Kaiser
Published October 7, 2025
Read the full article:

> With AI, researchers can analyze huge amounts of data very quickly. This helps us identify patterns and predict how someone's MS might progress, for instance, or how they might respond to certain medications.

Murali Ramanathan



Biotech Health Medicine

UB is transforming the biomedical field through research, discovery and development. From pioneering drug discovery to revolutionary medical breakthroughs, researchers are shaping the future of health and technology, pushing the boundaries of knowledge to improve lives and build a healthier world.

Learn more about UB's leadership in Biotech, Health and Medicine

UB, partners awarded $750,000 to advance stroke treatment

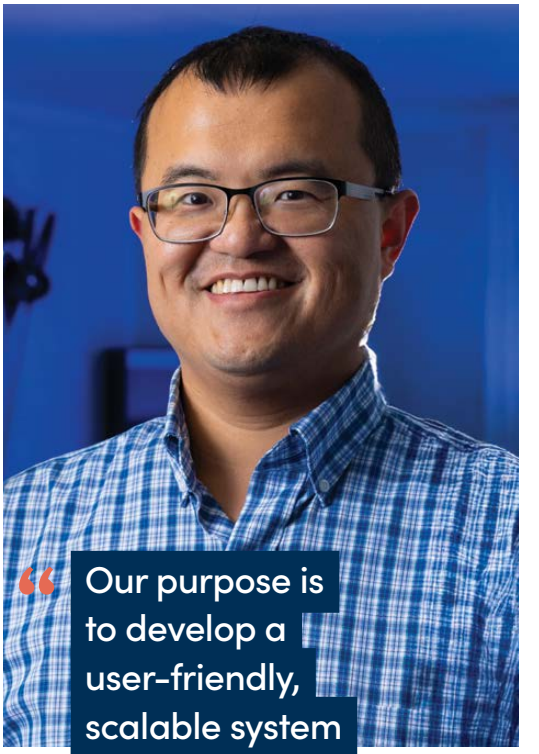
Helping people recover from stroke at home

More than 700,000 Americans experience a stroke each year, with many survivors experiencing long-term motor impairments that limit their ability to perform everyday activities. Access to rehabilitation programs often drops off within a few months after a stroke, leaving patients with minimal support when ongoing practice is still needed.

As a result, many stroke survivors turn to mobile apps for help, but these tools are often created without user input and fail to address real-life challenges.

A UB-developed rehabilitation system is tackling this challenge, with the goal of helping people recover from stroke at home with greater success than traditional approaches.

Researchers were awarded a $750,000 grant from the National Institute on Disability, Independent Living and Rehabilitation Research.



> “Our purpose is to develop a user-friendly, scalable system that promotes independence and improves the quality of life for stroke survivors while reducing caregiver burden.”

Wenyao Xu, PhD
Professor and Director of Research,
Department of Computer Science and Engineering,
School of Engineering and Applied Sciences
Photo: Douglas Levere

By Kay Torrance and Cory Nealon
Published October 1, 2025
Read the full article:

UB develops quick, pain-free breast-imaging system

OneTouch-PAT shows promise in early clinical tests

Breast cancer is among the leading causes of death for women worldwide. Early detection, most commonly through mammograms and ultrasound, has helped save countless lives.

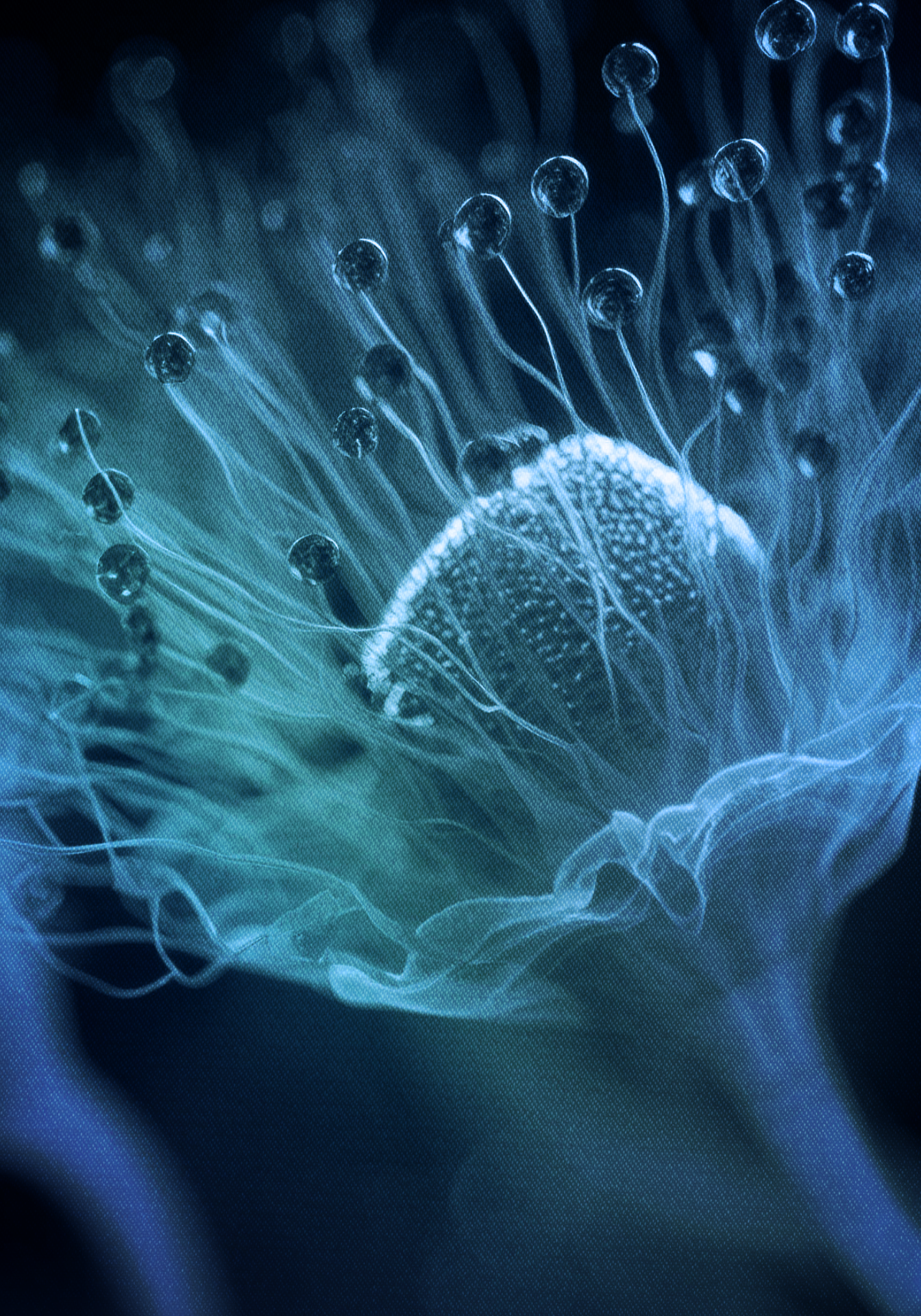
OneTouch-PAT, a new UB-developed breast scan for detecting cancer, takes less than a minute using a system that combines photoacoustic and ultrasound imaging. In tests with four healthy individuals and 61 breast cancer patients, OneTouch-PAT produced clear, AI-powered, 3D images of common breast cancer subtypes such as luminal A, luminal B and triple-negative breast cancer.

Jun Xia stresses that more work is needed before this tool can be used in clinical settings, but OneTouch-PAT has the potential to augment current imaging methods and help fight this terrible disease.

> “Our system combines advanced imaging, automation and artificial intelligence — all while enhancing patient comfort.”

Jun Xia, PhD
Professor,
Department of Biomedical Engineering,
Jacobs School of Medicine and Biomedical Sciences

By Cory Nealon
Published July 16, 2025
Read the full article:



UB researchers create non-opioid anesthetic

New molecule relieves chronic pain for three weeks

A new molecule developed by UB researchers acts like a local, long-lasting anesthetic, providing robust pain relief for up to three weeks, according to the results of preclinical studies reported in the journal Pain.

Like the numbing sensation that results from being anesthetized at the dentist's office, the new molecule acts like a local anesthetic, but in a much more targeted way.

"The limitation with local anesthetics is that they aren't very selective for your pain fibers. They block touch sensation as well, and they don't last very long," says Arindam Bhattacharjee. "In our new paper, we showed how our new molecule acts like a local, long-lasting pain-fiber anesthetic. We showed that a single injection locally can relieve chronic pain behavior for three weeks."

Arindam Bhattacharjee, PhD
Professor, Department of Pharmacology and Toxicology, Jacobs School of Medicine and Biomedical Sciences
Photo: Douglas Levere

By Ellen Goldbaum
Published June 17, 2025
Read the full article:

UB researchers using zebrafish for drug discovery

Zebrafish have been previously studied for cancer, infectious disease treatment

UB researchers are studying if zebrafish, a popular aquarium fish whose genetic and physiological makeup is similar to humans, might be key to unlocking new treatments for kidney stones and gout.

The tiny fish, named for its horizontal blue stripes, has long been used to study possible treatments for cancer, cardiovascular disease, infectious diseases and more.

After receiving a $1.2 million grant from the International Human Frontier Science Program, a team of researchers, including Viviana Monje, will leverage resources within UB's Center for Computational Research to examine how zebrafish produce a crystal to adjust their skin pigmentation.

The team will focus on an essential but unexplored structure: the lipid membrane that encloses each crystal inside a cell. This information, Monje says, could lead to new treatments for diseases where abnormal crystallization is a hallmark.

Viviana Monje, PhD
Assistant Professor, Department of Chemical and Biological Engineering, School of Engineering and Applied Sciences

By Peter Murphy
Published July 8, 2025
Read the full article:

UB researcher's work furthers global concussion research

Taking physiological approaches to a neurological injury

Active management after concussion is the best way for patients to recover and get back to school and work as quickly as possible, according to a clinical practice paper published in the New England Journal of Medicine. The paper is authored by UB researcher John J. Leddy, whose work over several decades has helped establish that physical activity facilitates faster recovery from sport-related concussion.

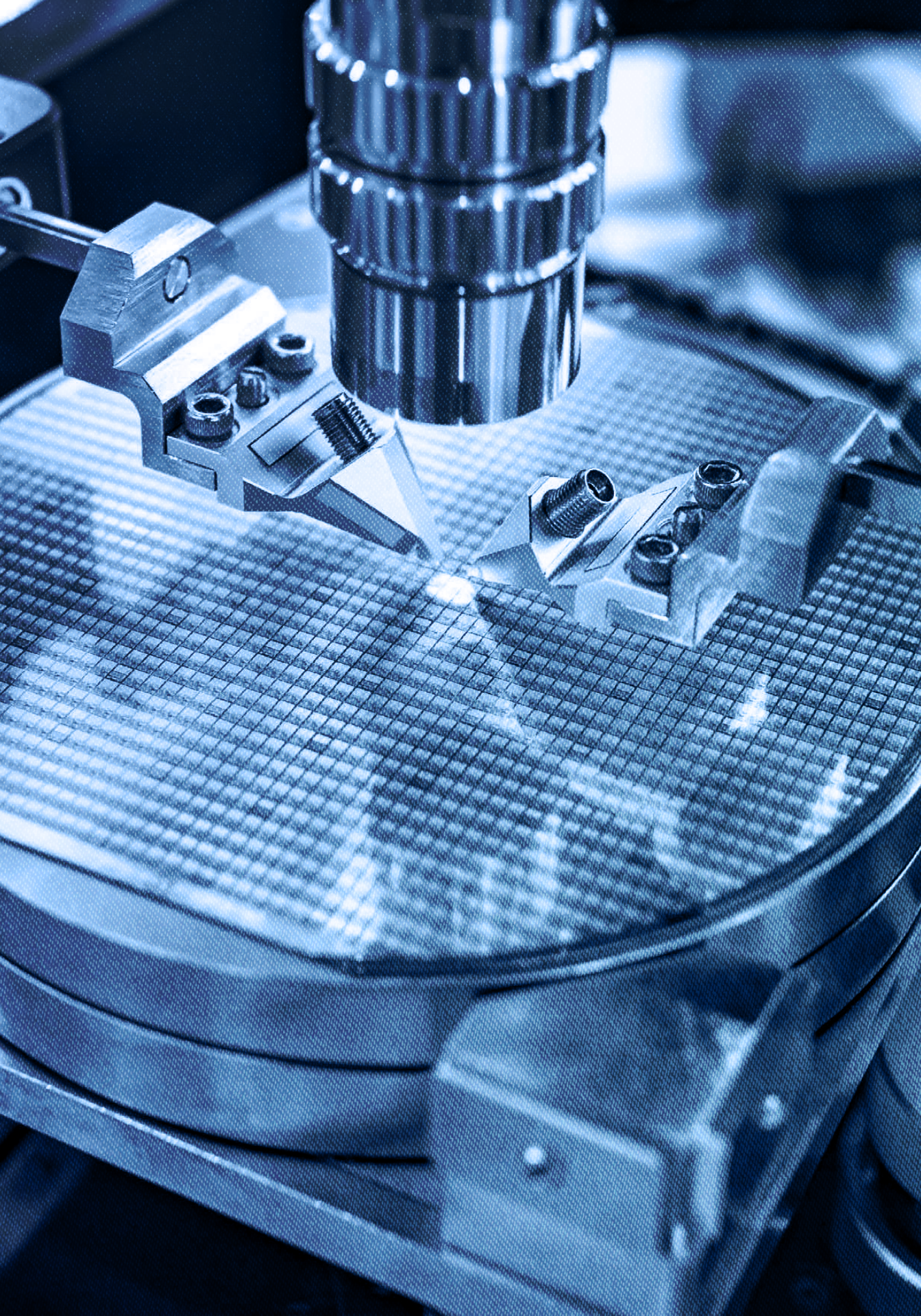
"Our work at UB has taken an exercise physiological approach to a neurological injury that has changed clinical treatment from a passive, strict rest approach to a prescribed active rehabilitation approach," says Leddy.

Once all concussion signs and symptoms are gone, both at rest and with exertion, the patient can advance gradually back to contact sport participation, ideally under supervision of an athletic trainer or coach.

The paper references findings that cognitive activity soon after injury is more effective than prolonged absence from school or work. This is particularly important for adolescents, the group most vulnerable to persisting symptoms after concussion.

John J. Leddy, MD, PhD
Professor, Department of Orthopaedics,
Jacobs School of Medicine and Biomedical Sciences;
Physician, UBMD Orthopaedics and Sports Medicine
Photo: Douglas Levere

By Ellen Goldbaum
Published January 30, 2025
Read the full article:



Semiconductors
Robotics
Advanced Materials

UB is driving advancements in semiconductor development and production, powering an entrepreneurial ecosystem across the state and beyond. As a leading industry advocate, the university accelerates innovation, expands career pathways and generates high-impact employment opportunities throughout the region.

Learn more about UB's leadership in Semiconductors, Robotics and Advanced Materials

UB, SUNY key players in new semiconductor initiative

Next-generation semiconductor innovation

UB and the three other SUNY university centers will be key players in the new SUNY-NY Creates Technology Innovation Institute (TII) that will advance semiconductor research and workforce development in New York State.

The initiative, announced by Chancellor John B. King Jr., will support the state's leadership in next-generation semiconductor innovation by leveraging the world-class infrastructure at NY Creates' Albany NanoTech Complex, allowing leading faculty researchers at UB, Stony Brook University, Binghamton University and the University at Albany to connect directly with experts from the industry consortia partners on-site.

SUNY-NY Creates TII will address high-impact, industry-relevant challenges by fostering academic-industry collaboration, facilitating recruitment of top faculty researchers and cultivating a pipeline of skilled talent graduating from SUNY academic programs.

"The SUNY-NY Creates Technology Innovation Institute will bring the best in higher education and industry together to help inspire the next generation of researchers and professionals," says John B. King, Jr. "The institute will benefit industry leaders who make New York their home, as well as our extraordinary faculty who are leading groundbreaking research and preparing the next generation of researchers and entrepreneurs."

John B. King Jr., JD, EdD
Chancellor, State University of New York (SUNY)
Photo: Meredith Forrest Kulwicki

By UBNow Staff
Published October 31, 2025
Read the full article:

UB researchers mix silicon, 2D materials for semiconductors

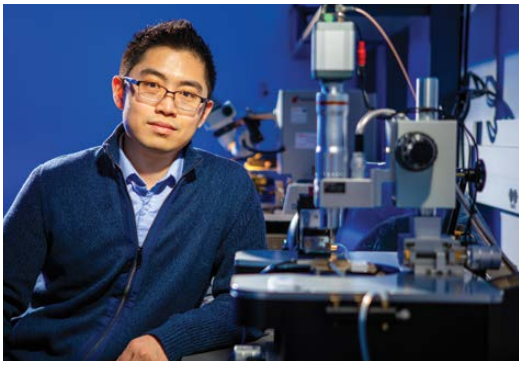
Improving the efficiency and power of everyday devices

Nanoelectronics deal with extremely small electronic components: transistors, sensors and circuits that can fit on the tip of a needle. This technology powers our everyday lives through devices such as computers, smartphones and medical tools.

To improve the efficiency, and power, of these devices, scientists are searching for alternative materials to replace standard silicon-based semiconductors.

A UB-led study explores how mixing two-dimensional materials with silicon might achieve this goal. Published in the January 6, 2025, issue of the American Chemical Society journal ACS Nano, the article suggests a better way to inject and transport electric charges, an advancement that showcases the significant potential of 2D materials in advancing future semiconductor technologies.

"This collaboration highlights UB's leadership in cutting-edge semiconductor research and its ability to foster impactful international and interdisciplinary partnerships," Fei Yao says.



Huamin Li, PhD
Professor, Department of Electrical Engineering,
School of Engineering and Applied Sciences
Top Photo: Douglas Levere

Vasili Perebeinos, PhD
Professor, Department of Electrical Engineering,
School of Engineering and Applied Sciences
Bottom Left Photo: Heather Bellini Photography

Fei Yao, PhD
Assistant Professor, Department of Materials Design and Innovation,
School of Engineering and Applied Sciences

By Laurie Kaiser
Published January 30, 2025
Read the full article:

Jennifer Flagg, MBA
Director, Center for Supply Chain Analytics,
School of Management

By Emily Gac
Published July 30, 2025
Read the full article:

UB semiconductor summit drives collaboration

Accelerating semiconductor development

More than 150 leaders from industry, government and academia gathered at the University at Buffalo in July 2025 for "Bridging the Gap: Activating the Semiconductor Supply Chain Network."

Hosted by the School of Management's Center for Supply Chain Analytics and the NY SMART I-Corridor Tech Hub, this event focused on building a stronger, more coordinated semiconductor ecosystem across New York State.

The conference tackled urgent questions facing U.S. semiconductor manufacturing. Through keynotes, expert panels and research presentations, attendees shared insights on workforce development, infrastructure needs, supply chain logistics and public policy.

The NY SMART I-Corridor, spanning Buffalo, Rochester and Syracuse, received $40 million in federal funding in 2024 to accelerate semiconductor development. This conference helped translate that investment into clear next steps.

"Semiconductors are foundational, but their supply chains are fragile," says Jennifer Flagg. "We created a space where leaders could connect industry goals, research capabilities and policy incentives."

Jonathan Bird, PhD
UB Distinguished Professor and Department Chair,
Department of Electrical Engineering,
School of Engineering and Applied Sciences;
Director, Center for Advanced Semiconductor Technologies
Photo: Douglas Levere

By Emily Gac
Published October 27, 2025
Read the full article:

UB joins global semiconductor network

Connecting UB globally

UB has officially joined SEMI, a leading global industry association representing the semiconductor and electronics manufacturing supply chain.

The move, sponsored by the Center for Supply Chain Analytics in the School of Management and the Center for Advanced Semiconductor Technology in the School of Engineering and Applied Sciences, connects UB directly to a powerful international network.

For UB, the timing is significant. New York has become a key player in the national effort to expand semiconductor manufacturing, fueled by large-scale investments and workforce development initiatives. Access to SEMI's resources helps UB contribute directly to that momentum — linking education, research and industry collaboration.

"SEMI brings together leaders from across the semiconductor ecosystem," says Jonathan Bird.

Tim Thomay, PhD, assistant professor in the Department of Physics, applies AI to study quantum noise and photon behavior in quantum physics and also explores how AI can help sustainable plant growth. Photo: Douglas Levere

Quantum Science and Technology

UB is dedicated to advancing the frontiers of quantum science, engineering and technology through interdisciplinary research, education and innovation.

Learn more about UB's leadership in Quantum Science and Technology

UB launches new quantum institute

Exploring how matter and energy behave

The UB Quantum Institute is a new initiative that draws upon the university's research expertise to develop breakthrough innovations that address pressing societal challenges.

The institute unites UB scholars across physics, engineering, materials science, computer science, chemistry and other fields to create a leading-edge hub of innovation and education. These cross-disciplinary teams engage with industry and government partners.

"The new Quantum Institute serves as a catalyst for the second quantum revolution — uniting cutting-edge experimentation, deeper theoretical insights and application-driven innovation to spark transformative discoveries and prepare the next generation of quantum leaders," says Sambandamurthy Ganapathy.

Sambandamurthy Ganapathy, PhD
Professor, Department of Physics, Associate Dean for Research, College of Arts and Sciences;
Interim Director, UB Quantum Institute
Photo: Douglas Levere

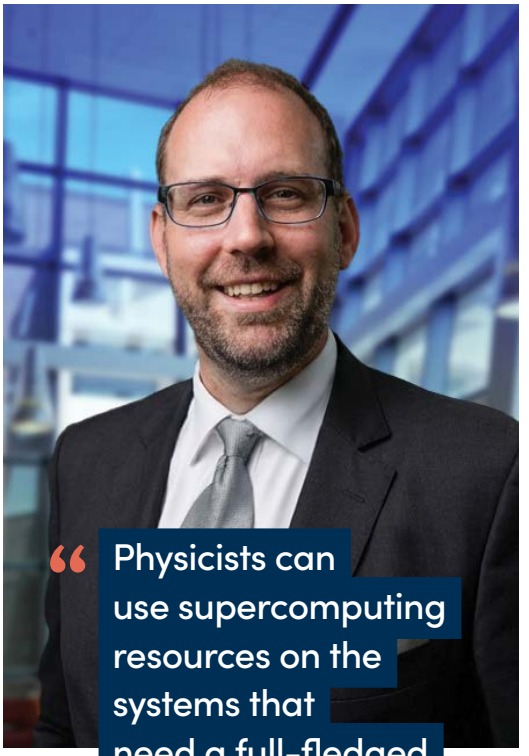
By Cory Nealon
Published November 5, 2025
Read the full article:

UB method may allow quantum dynamics on your laptop

A physics shortcut makes quantum math more manageable

Physicists at UB have extended a computationally affordable method known as the truncated Wigner approximation (TWA), a sort of physics shortcut that makes quantum math more manageable, to problems once thought to require massive computing power.

"Our approach offers a significantly lower computational cost and a much simpler formulation of the dynamical equations," says the study's corresponding author, Jamir Marino. "We think this method could, in the near future, become the primary tool for exploring these kinds of quantum dynamics on consumer-grade computers."



> "Physicists can use supercomputing resources on the systems that need a full-fledged quantum approach and solve the rest quickly with our approach."

Jamir Marino, PhD
Assistant Professor, Department of Physics, College of Arts and Sciences

By Tom Dinki
Published October 13, 2025
Read the full article:

Yubie, one of UB's robots, uses autonomy software to inspect a culvert under the Erie Canal.
Photo: Meredith Forrest Kulwicki

Research Across Campus

Here at UB, our dedication to research is matched only by a commitment to create lasting positive change.

Our researchers are tackling some of humanity's most pressing problems, by allowing their curiosity to drive society forward.

Sign up for UB's Impact in Action Newsletter

> “Modeling of ice sheets and glaciers is one of the best ways that we can understand how much sea level rise we need to prepare for in the coming decades to centuries. This is a matter of national security in the United States, but also a global challenge for planning and adaptation to rising sea level.”

Sophie Nowicki, PhD
Empire Innovation Professor,
Department of Earth Sciences,
College of Arts and Sciences
Photo: Douglas Levere

UB researchers predict sea level rise

Ice sheet mapping is critical to understanding climate change

Melt from the Earth's ice sheets is already contributing to flooding throughout the U.S., and globally, and is expected to increase in the coming decades. Adaptation to reduce the destructiveness of future ocean floods is underway and depends critically, inch by inch, on the work of an international group of polar scientists.

UB researchers are contributing to this effort through the development of the latest computer simulations to map out the most plausible outcomes, thanks to a new $2.1 million grant from the Heising-Simons Foundation.

Highlights from an article
by Tom Dinki
Published July 15, 2025
Read the full article:

UB's robot dog sniffs out possible defects in Erie Canal culvert

An unusual tool for engineers

Yubie, UB's robot dog, is adept at exploring and doesn't shy away from small spaces that can be dark, dirty and full of cobwebs. This is good news for engineers responsible for maintaining the roughly 350 culverts that run underneath the Erie Canal to prevent flooding and maintain the canal's structural integrity. A new pilot program between UB and the New York State Canal Corporation aims to make this process safer and more efficient by tapping into the capabilities of the robot dog.

"Up until now, it's been up to human inspectors to crawl inside the culverts and find the defects. With a robot such as Yubie, that may not be the case in the near future."

Karthik Dantu, PhD
Associate Professor,
Department of Computer Science and Engineering,
School of Engineering and Applied Sciences;
Founding Director, Center for Embodied Autonomy and Robotics;
Director, DRONES Lab

Highlights from an article
by Laurie Kaiser
Published October 16, 2025
Read the full article:

UB scholar expands poet's digital archive

Digitizing the printed notebooks of Marianne Moore

The Marianne Moore Digital Archive is expanding thanks to a $300,000 grant from the National Endowment for the Humanities. The funding supports technical and editorial staff who digitize the printed notebooks of Marianne Moore, one of the foremost modernist poets of the early 20th century, making them publicly accessible for the first time.

"Most poets keep notebooks, but not to the extent of Moore. No other modernist poet kept anything as rich and varied as Moore. Her notebooks are spectacular, a holding space for things she returned to, which often landed in her poetry."

Cristanne Miller, PhD
Professor Emerita,
Department of English,
College of Arts and Sciences

Highlights from an article
by Bert Gambini
Published September 11, 2025
Read the full article:

Explore the Marianne Moore
Digital Archive:

> The superior properties come from wheat straw's unique structure, its natural fibrous and porous composition, which enhances thermal insulation.

Chi Zhou

UB researchers are pioneering an organic way to insulate your home

Wheat straw insulates well, withstands pressure, study finds

Traditional thermal insulation for homes and commercial buildings is often energy-intensive to manufacture, producing significant greenhouse gas emissions. UB researchers are pioneering a sustainable organic alternative: wheat straw. This agricultural waste product, typically burned after harvest, insulates well, withstands pressure and is more flame-retardant than other organic materials.

"Unlike fossil fuels, which take millions of years to form, biomass materials, such as wheat straw, can be harvested and replanted regularly. This makes for an eco-friendlier insulation material."

Chi Zhou, PhD
Associate Professor and Director of Graduate Studies, Department of Industrial and Systems Engineering, School of Engineering and Applied Sciences

Highlights from an article
by Laurie Kaiser
Published June 24, 2025
Read the full article:

UB research discovers bacteria can eat forever chemicals

This bacteria may even eat some of their toxic byproducts

In the quest to take the "forever" out of "forever chemicals," bacteria might be our ally. A UB-led team identified a strain of bacteria that can break down and transform at least three types of per- and polyfluoroalkyl substances (PFAS) and, perhaps even more crucially, some of the toxic byproducts of the bond-breaking process.

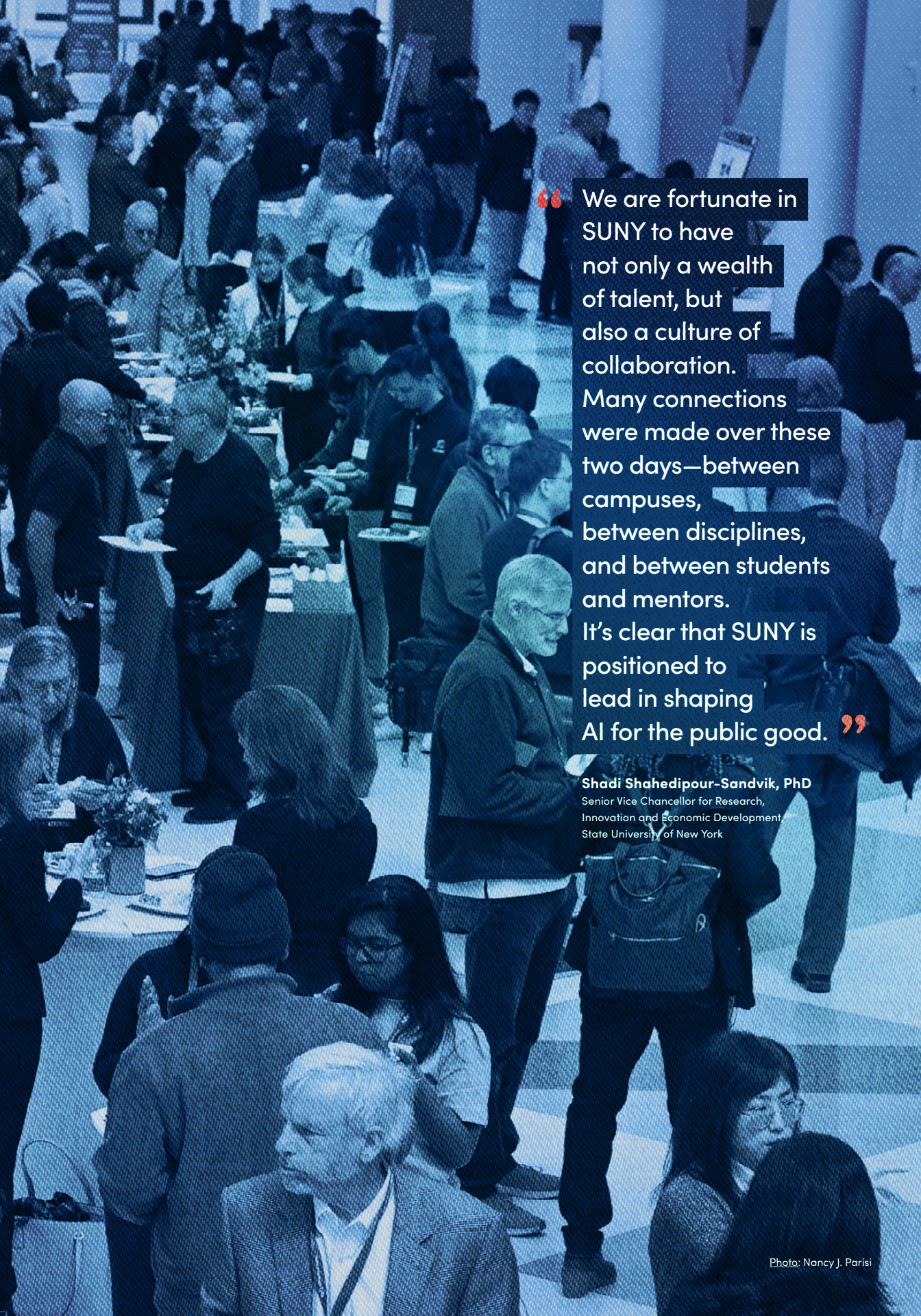
"If bacteria survive in a harsh, polluted environment, it's probably because they have adapted to use surrounding chemical pollutants as a food source, so they don't starve. Through evolution, some bacteria can develop effective mechanisms to use chemical contaminants to help them grow."

Diana Aga, PhD
SUNY Distinguished Professor and Henry M. Woodburn Chair, Department of Chemistry, College of Arts and Sciences; Director, UB RENEW Institute

Highlights from an article
by Tom Dinki
Published January 27, 2025
Read the full article:

UB hosted the **SUNY AI Symposium** on April 8 and 9, 2025. Co-chaired by Shadi Shahedipour-Sandvik and Venu Govindaraju, the event drew participants from colleges, universities, companies and community organizations from across the state.

Highlights included the ribbon cutting for the School of Management's **Center for AI Business Innovation** and an introduction to UB's new **Department of AI and Society**.



> We are fortunate in SUNY to have not only a wealth of talent, but also a culture of collaboration. Many connections were made over these two days—between campuses, between disciplines, and between students and mentors. It's clear that SUNY is positioned to lead in shaping AI for the public good.

Shadi Shahedipour-Sandvik, PhD
Senior Vice Chancellor for Research, Innovation and Economic Development, State University of New York

Photo: Nancy J. Parisi

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