

From cyberspace to outer space, 7 ASU engineering faculty earn NSF Awards for trailblazing research

By Kelly deVos, ASU News
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Every year, the [National Science Foundation](#) Faculty Early Career Development, or CAREER, Program recognizes the nation's most promising early-career faculty with support for research, teaching excellence and the integration of the two.

In 2025 thus far, seven faculty members in the [Ira A. Fulton Schools of Engineering](#) at Arizona State University have earned this honor, reflecting the Fulton Schools commitment to cultivating talent that can solve urgent global challenges.

From fighting cybercrime to managing urban traffic, improving physical rehabilitation, rethinking data storage, advancing space-based artificial intelligence tools and more, these projects embody the Fulton Schools spirit of innovation and public impact.

[Tiffany Bao](#): Outsmarting hackers before they strike

Cyberattacks are relentless. The FBI logs [more than 2,000 cybercrime complaints](#) each day, with damages exceeding [\\$16 billion annually](#). With nearly [750,000 unfilled cybersecurity jobs](#) in the U.S., defenses need more than manpower.

[Tiffany Bao](#), an assistant professor in the [School of Computing and Augmented Intelligence](#), is meeting this challenge with SE-bot, an AI-powered tool that mimics the intuition of elite security experts to find vulnerabilities in software before hackers can exploit them.

Her CAREER-funded project focuses on symbolic execution, a powerful but complex bug-hunting technique, and teaches AI to make the strategic choices that seasoned analysts do instinctively.

Bao's open-source tools could help software developers without deep security backgrounds safeguard their code, making protection more accessible worldwide. Beyond research, she's contributing to gamified training programs like [pwn.college](#) and cybersecurity summer camps to inspire the next generation of ethical hackers.

Zhichao Cao: Smarter data storage for the AI era

The AI boom has fueled an explosion in data and in the [massive data centers](#) needed to store it. These facilities consume huge amounts of energy and water, making their sustainability a pressing issue.

[Zhichao Cao](#), an assistant professor in the School of Computing and Augmented Intelligence, is tackling this with new methods for managing persistent key-value stores, or systems that store data long term while allowing quick retrieval.

His CAREER research optimizes these systems for modern disaggregated data center architectures, enabling precise control over computing and storage resources to cut waste without sacrificing performance.

Cao partners with industry leaders such as Samsung, Meta, Snowflake and Western Digital to ensure his solutions meet real-world needs. He's also creating hands-on research opportunities for students, from undergraduate student camps to K–12 outreach, ensuring the next generation is ready to manage the world's growing data footprint.

Heejin Jeong: AI-guided rehab with a human touch

Not everyone has access to in-person physical therapy, especially older adults or those in rural areas. [Heejin Jeong](#), an assistant professor in [The Polytechnic School](#), is using AI to make self-directed rehabilitation more effective, starting with hand and finger mobility.

His CAREER project integrates sensors and AI feedback to detect patient frustration, provide encouragement and ensure exercises are performed correctly. Collaborating with surgeons, therapists and [ASU Health](#) colleagues, Jeong is building tools that supplement — not replace — human therapists.

He also aims to spark interdisciplinary collaboration between engineering and medical students, promote AI literacy and encourage student entrepreneurship. By combining technical innovation with human-centered design, Jeong is creating affordable rehab tools for those who need them most.

Mohamed Houssem Kasbaoui: Pushing the boundaries of computational fluid dynamics

When it comes to advancing science, speed matters. [Mohamed Houssem Kasbaoui](#), assistant professor of mechanical and aerospace engineering in the [School for Engineering of Matter, Transport and Energy](#), is tackling one of the biggest bottlenecks in research: fluid dynamics

simulations that can take months to run on the world's largest supercomputers.

With support from the CAREER Award, Kasbaoui is creating new ways to run fluid simulations that dramatically speed up results from months to just hours without losing accuracy.

These faster methods could help scientists and engineers tackle problems ranging from predicting how rivers carry sediment to improving medical devices that interact with blood flow to designing more efficient aircraft and spacecraft.

Kasbaoui's lab is also building educational tools, including a virtual reality platform to help undergraduates and the public explore fluid dynamics in an interactive way. By making simulations faster and more accessible, his work opens the door to accelerated discovery and innovation.

Hannah Kerner: Turning satellite data into local action

Satellites generate vast amounts of data about Earth's landscapes, climate and agriculture, but using that information effectively remains a challenge.

[Hannah Kerner](#), an assistant professor in the School of Computing and Augmented Intelligence, is closing that gap with AI tools that can adapt to new regions, conditions and languages without extensive retraining.

Her CAREER research includes “zero-shot mapping” algorithms that enable users to query satellite data in plain language and get accurate, actionable insights, even for data-scarce regions. Kerner's work already powers projects like [Fields of The World](#), which defines cropland globally to improve food security, and the Maui Nui Crop Monitor, which delivers satellite-driven insights to Hawaiian farmers.

Through her “AI for ??ina” education program, she's bringing culturally grounded AI education to Maui County students, ensuring local communities benefit from the same innovations shaping global trends.

Dina Verdín: Centering lived student experiences in engineering education

Engineering is a demanding field and the way students stay motivated can look different from what traditional theories predict.

[Dina Verdín](#), an assistant professor of engineering in The Polytechnic School, is tackling that challenge head-on.

With support from her CAREER Award, she is building a new framework that helps education researchers better capture how engineering students actually set goals, stay engaged and persist through difficult programs.

Her project interrogates widely used motivational theories, many borrowed from psychology, that don't always fit the realities of engineering education, especially for students from minoritized backgrounds. She is developing tools that are more responsive to the lived experiences of engineering students that are shaped by culture and context, starting with reimagining

[achievement goal theory](#).

Her work not only advances research but also provides practical instruments, including new survey tools, to guide future studies of student success. By giving researchers sharper ways to analyze student motivation, Verdín is helping ensure that more students, including those from historically underserved communities, can persist in their programs, graduate and join the nation's engineering workforce, strengthening state and national innovation for years to come.

[Hua Wei](#): Smarter cities, better decisions

From traffic signals to power grids, urban systems rely on complex decision-making.

[Hua Wei](#), an assistant professor in the School of Computing and Augmented Intelligence, is making those decisions smarter and more transparent with AI tools designed to bridge the "simulation-to-reality" gap, ensuring that models work not just in theory, but in the unpredictable real world.

His CAREER project uses reinforcement learning to optimize systems like traffic control, adapting in real time to changing conditions while keeping human decision-makers in the loop. Wei's test beds, including collaborations with the city of Chandler, Arizona, have already shown the potential to shave minutes off commutes.

Wei's emphasis on explainable AI ensures trust and accountability in high-stakes decisions, whether in city planning, public health or energy management. His student-focused lab blends technical rigor with playful engagement, even using rubber ducks to represent pedestrians in traffic simulations.

This story originally appeared on [ASU News](#).

Main image



Top row from left: assistant professors Tiffany Bao, Heejin Jeong and Dina Verdín. Bottom row from left: assistant professors Zhichao Cao, Hannah Kerner, Hua Wei and Mohamed Housseem Kasbaoui. The seven early-career faculty members in the Ira A. Fulton Schools of Engineering at Arizona State University have earned 2025 National Science Foundation CAREER Awards in recognition of their promising research. Graphic by Andrea Heser/ASU

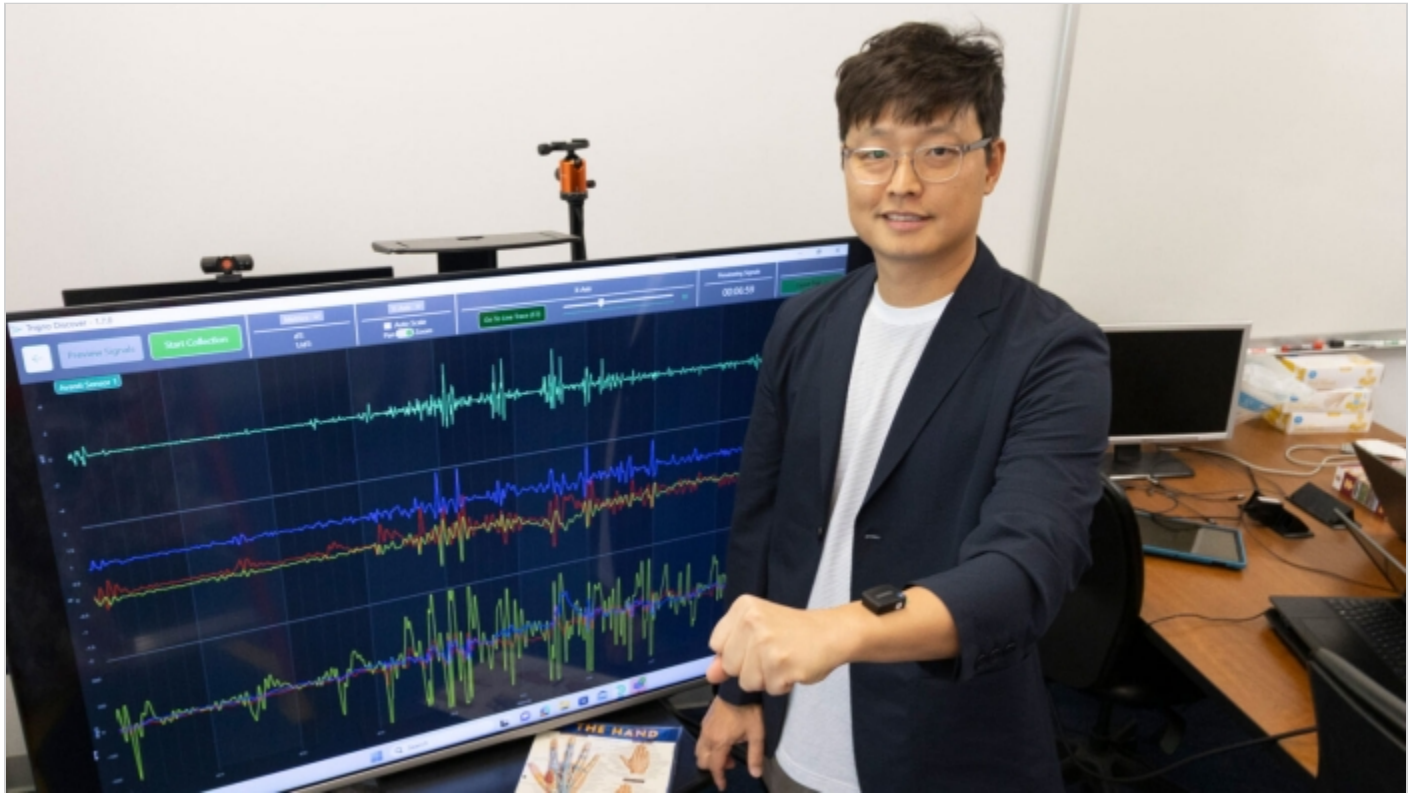
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Tiffany Bao, an assistant professor of computer science and engineering in the School of Computing and Augmented Intelligence. Photo by Erika Gronek/ASU



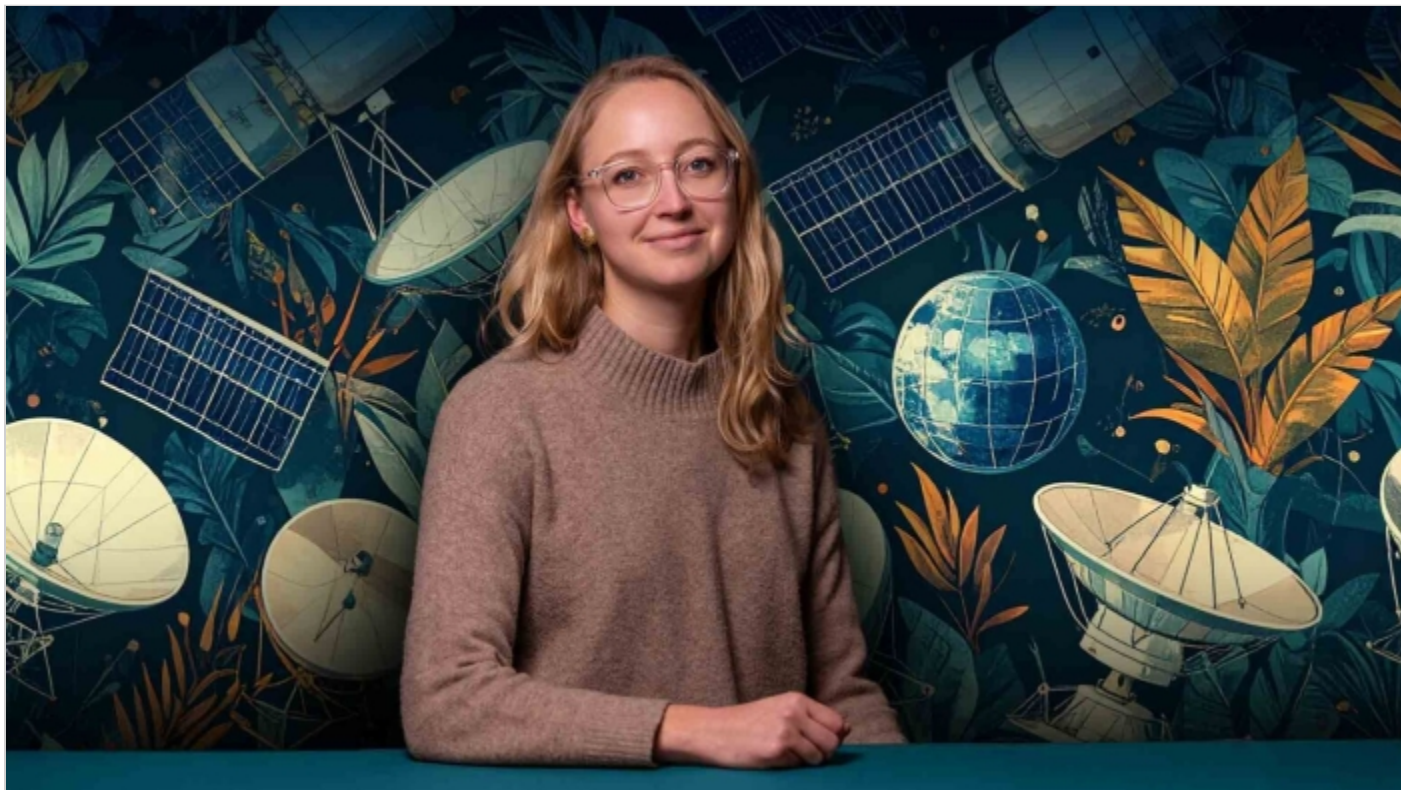
Zhichao Cao, an assistant professor of computer science and engineering in the School of Computing and Augmented Intelligence. Photo by Erika Gronek/ASU



Heejin Jeong, an assistant professor of human systems engineering in The Polytechnic School. Photo by Erika Gronek/ASU



Mohamed Housseem Kasbaoui, an assistant professor of mechanical and aerospace engineering in the School for Engineering of Matter, Transport and Energy. Photo by Erika Gronek/ASU



Hannah Kerner, an assistant professor of computer science and engineering in the School of Computing and Augmented Intelligence. Photo by Samantha Chow/ASU



Dina Verdín, an assistant professor of engineering in The Polytechnic School. Photo by Erika Gronek/ASU



Hua Wei, an assistant professor of computer science and engineering in the School of Computing and Augmented Intelligence, part of the Fulton Schools. Photo by Erika Gronek/ASU