

4 ASU researchers named senior members of the National Academy of Inventors

By Pete Zrioka, ASU News

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The [National Academy of Inventors](#) recently named four Arizona State University researchers as [senior members](#) to the prestigious organization.

Professor [Qiang Chen](#) and associate professors [Matthew Green](#), [Hamidreza Marvi](#) and [Chao Wang](#) were recognized for their successful commercialization of technologies that have a potential or demonstrated positive impact on the welfare of society.

"We are incredibly proud of our researchers for being recognized by the National Academy of Inventors," said [Sally C. Morton](#), executive vice president of ASU [Knowledge Enterprise](#), who leads ASU's [NAI chapter](#). "Their groundbreaking work embodies ASU's commitment to innovation and societal impact."

Founded in 2010, NAI is an international organization that encourages inventors to share their creations, mentor and educate students, as well as celebrates academic inventions and technology and their role in advancing society. Its over 4,600 members are drawn from more than 260 institutions from all over the world, spanning universities, governmental and nonprofit research institutes.

[ASU founded its NAI chapter](#) in 2017 to promote invention and recognize innovative work across the university. ASU grew to become one of NAI's 16 sustaining member institutions, and its chapter membership has swelled to 15 fellows, 22 senior members and more than 100 members to date.

Chen, Green, Marvi and Wang are among 162 academic inventors welcomed to the 2025 class of senior members — the largest class to date.

“To see this program grow year over year is a testament to the dedication our member institutions have to fostering innovation on their campuses and supporting their inventive staff and faculty,” said Paul R. Sanberg, president of NAI. “This year’s class comes from a multitude of impressive fields and research backgrounds from across the world. We applaud their pursuit of commercialization to ensure their groundbreaking technologies can make a difference by tackling the world’s most pressing issues, improving quality of life across society and advancing the economy.”

Plant-made pharmaceuticals

Qiang “Shawn” Chen, a professor in the [School of Life Sciences](#), part of [The College of Liberal Arts and Sciences](#), was recognized for his work developing novel human therapeutics and vaccines. Specifically, Chen develops macromolecule drugs — a new category of drugs that can only be produced through a biological system. Typically, developers of macromolecule drugs use mammalian cells to create the drug. Chen takes a different approach.

“The good thing about using (mammalian cells) is that they produce a lot of high quality, large molecules to use in effective drugs. But they are extremely expensive,” Chen says. “They also have the risk of carrying human pathogens. ... If those cells are infected, there is no way for us to detect that.”

Instead, Chen is working to develop macromolecule drugs through the cells of tobacco plants, whose genomes are easy to manipulate. Using plant systems could make drug development quicker and cheaper and reduce the risk of infection via other human pathogens while producing the same quantity of drugs at the same level of efficacy.

Additionally, when producing macromolecules to use in vaccines or therapeutics, researchers have little control over the function of those molecules. Some may have the intended function, but others might have a harmful function or no function at all. Chen works to have better control over the function of macromolecules in his research, ensuring that the molecules like proteins and sugars that his tobacco plants produce have the intended function.

Chen’s research has been used to develop safer and more efficacious monoclonal antibody-based drugs against dengue virus, Zika virus and chikungunya virus.

Of being selected as a senior class member of the NAI, Chen says: “It is an honor. Not only for myself, but for all the members of my lab who contribute to this work. I’m excited that our work

contributes to basic science, and also translates new science into products that can benefit society.”

Chen is also a professor at the [Biodesign Center for Bioelectronics and Biosensors](#).

Capturing carbon

Matthew Green was elected for developing impactful technologies that revolutionize how to tackle the environmental impact of the planet’s rising temperatures.

Green is an associate professor of chemical engineering in the [School for Engineering of Matter, Transport and Energy](#), part of the [Ira A. Fulton Schools of Engineering](#), and the director of ASU's [Center for Negative Carbon Emissions](#) in the [Julie Ann Wrigley Global Futures Laboratory](#). His work advances technologies that can capture carbon dioxide directly from the air. The team is testing a prototype technology based on research from Klaus Lackner that removes CO₂ from the air through a type of direct air capture, or DAC, technology that requires no energy for CO₂ capture, modeled on how natural trees function

In 2024, Green collaborated with Mani Modayil Korah, a Science and Technology Center postdoctoral fellow in the Fulton Schools, to develop a novel technology that was named a semifinalist in the U.S. Department of Energy competition for the Direct Air Capture Pre-Commercial Technology Prize. Their product, which is deployed through their startup [NuAria](#), is designed to be cost-effective and scalable by using sorbents from inorganic salts similar to baking soda.

His lab, the Green Group, conducts research in various fields, including carbon capture, water filtration and polymer fundamentals, with an overarching goal of creating sustainable solutions for a healthy planet.

Green is excited to collaborate with other researchers to continue developing solutions that reverse the effects of climate change.

Bioinspired robotics

Hamidreza Marvi is breathing life into novel robotic technologies inspired by nature. An associate professor of mechanical and aerospace engineering in the School for Engineering of Matter, Transport and Energy, part of the Fulton Schools, he leads the [BIRTH Lab](#), which creates bioinspired robotics for health, space exploration and industrial inspection applications.

In addition to being published in several top-tier scientific journals, such as Science and the Proceedings of the National Academy of Sciences, Marvi's work has led to nine issued U.S. patents and six pending. The patents fall into two application categories: magnetic robotics to assist surgeons and bio-inspired mobility, and inspection systems, which are designed for robotic inspection and environmental monitoring and have applications in aerospace, industrial automation and defense.

Most recently, Marvi developed a [robotic arm](#) that uses artificial intelligence and a magnetic system to help colonoscopy surgeons treat early-stage cancer by performing a successful endoscopic operation. Funded by Arizona Biomedical Research Centre, this work will potentially make it easier to treat colorectal cancer, the second-leading cause of cancer-related deaths in the U.S.

"Being selected as an NAI senior member is a tremendous honor, recognizing not only my contributions to innovation and translational research but also the potential for these technologies to make a real-world impact," he says. "It validates years of work in bio-inspired robotics and medical technology and reinforces my commitment to bridging the gap between research and commercialization. This recognition fuels my motivation to continue developing technologies that improve health care, automation and exploration while also inspiring and mentoring the next generation of inventors."

Marvi says he looks forward to collaborating with other NAI inventors to advance robotics and explore new commercialization pathways.

"NAI's mission aligns closely with my commitment to transforming innovative ideas into practical solutions, and I am eager to contribute to its ongoing efforts to promote impactful innovation," he says. "I look forward to leveraging my NAI membership to advocate for research translation, mentor aspiring inventors and support the integration of robotics into health care and industrial applications."

Better biosensors

Chao Wang currently holds 32 granted and pending U.S. patents directly related to his multidisciplinary research in advanced manufacturing, nanophotonics and biomolecular sensing.

Wang is an associate professor of electrical engineering in the [School of Electrical, Computer and Energy Engineering](#), part of the Fulton Schools, and a faculty member in the [Center for Molecular Design and Biomimetics](#) at the [Biodesign Institute](#). His research aims to establish a multilevel integrative strategy to explore biomedical solutions that are faster, more accurate, less expensive and more broadly accessible.

Wang's team has developed a modular assay, nanoparticle-supported, rapid electronic detection, called NasRED, that has been successfully demonstrated to detect a wide variety of pathogens — including COVID-19 antigens and antibodies, African swine fever virus, cannabinoids, Shiga toxin-producing E. coli, cytokines, cancer biomarkers and neurodegenerative diseases.

"The sensor development is a good example that will endorse our minimalist philosophy in research," Wang says. "Our vision is that biosensors not only need to be precise but also simple to make a real impact. Easy-to-use sensors with minimized human intervention will help reduce errors and speed up technology translation."

Wang recently founded a startup company, REDX Diagnostics, to further transition the technology to commercialization. He believes this platform technology can have a significant impact on diagnosing numerous infectious diseases and early screening of chronic diseases such as cancer and Alzheimer's disease.

"It is a great honor to be elected by the NAI as a senior member," Wang says. "The election will provide me with more opportunities to learn from many outstanding inventors who have already made measurable impacts on our society in a very positive way. This recognition of my past engineering efforts will only motivate me to do more in the future to further convert scientific discoveries made in laboratories into useful products."

Wang's research has been published in prestigious journals, including Nature Nanotechnology, Nature Communications, Materials Today, ACS Nano, Advanced Functional Materials, Biosensors and Bioelectronics, and Nano Letters. Prior to joining ASU in 2015, Wang was a research scientist at the IBM Thomas J. Watson Research Center, where he worked on translational systems biology and nanobiotechnology.

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Main image



Photo of the Walton Center for Planetary Health on ASU's Tempe campus by Andy DeLisle.

Text image(s)



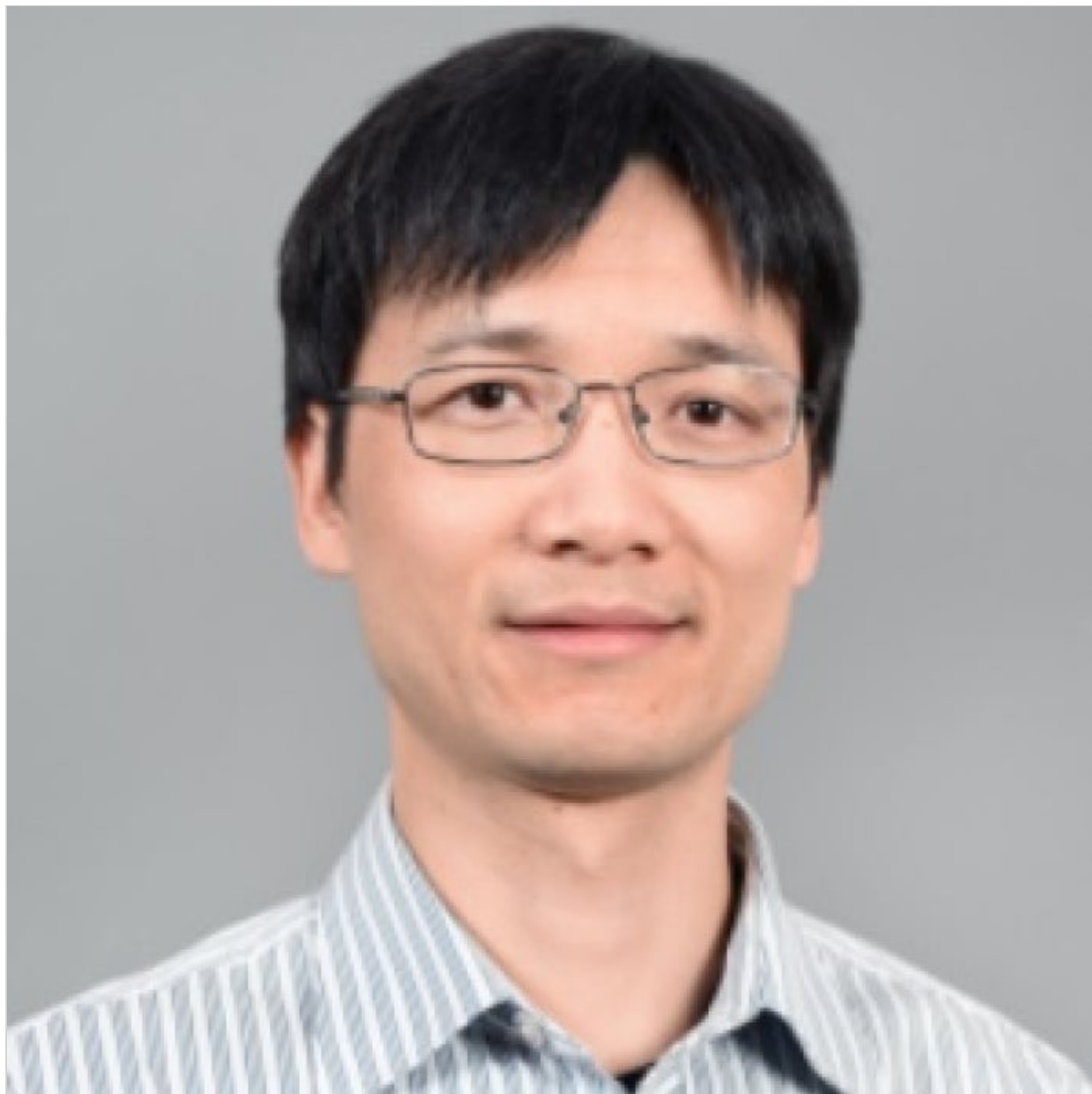
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