Engineering a biomedical career

After a decade teaching chemical engineering, a new Institute of Molecular Medicine recruit decided to dedicate 100 percent of his effort to a new professional challenge – biomedical research.

Alex Ge, PhD, associate professor with the Texas Therapeutics Institute, joined the IMM in July 2021, serving on the faculty at the University of California, Riverside, where he taught chemical engineering to undergraduate students, in addition to biochemical research.

"Chemical engineering is a well-established discipline," he admitted. "With biomedical research, there is more freedom, and it has more impact."

Ge earned his PhD in chemical engineering at McMaster University in Canada and completed postdoctoral training at The University of Texas at Austin.

"During my postdoc training, I worked with biomedical antibodies, and that is what sparked my vision to pursue this direction," he said, adding that the IMM was the perfect opportunity to develop antibodies in a supportive research environment.

An engineering background gives Ge a unique perspective for research.

"I like challenging targets," he said. "The engineer in me likes to take things apart to solve problems. Even when I was a boy I would take things apart, and I remember my mom reminding me to put things back together."

Ge's research is funded by the National Institutes of Health (NIH) and Department of Defense and focuses on creating antibodies for treatments in areas as various as cancer, pain, stroke, obesity, and snake venom.

His R21 grant from the NIH, considered a "try out" grant on an interesting topic with great need, concerns poisonous snake bites.

According to the NIH, between 7,000-8,000 people in the United States are bitten by a venomous snake each year, with up to 44 percent sustaining long-term injury and five dying. Current antivenom therapy, over a century old, is created by injecting poisonous snake venom into horses and harvesting the resulting antibodies, which are expensive, often ineffective, and may even cause major allergic reactions.

Ge and his lab are working on a new method to treat venomous snake bites with new antibodies.

"The action of venom among snakes is similar," Ge said, "but it contains a spectrum of toxins, so there is a level of complexity. We are starting with the most significant snake in North America, the rattlesnake."

One major toxic enzyme found in rattlesnake venom interferes with the bloodstream, kicking off a reaction cascade causing severe bleeding. Ge and his colleagues are aiming to specifically block this fatal snake toxin with antibodies developed in the lab.

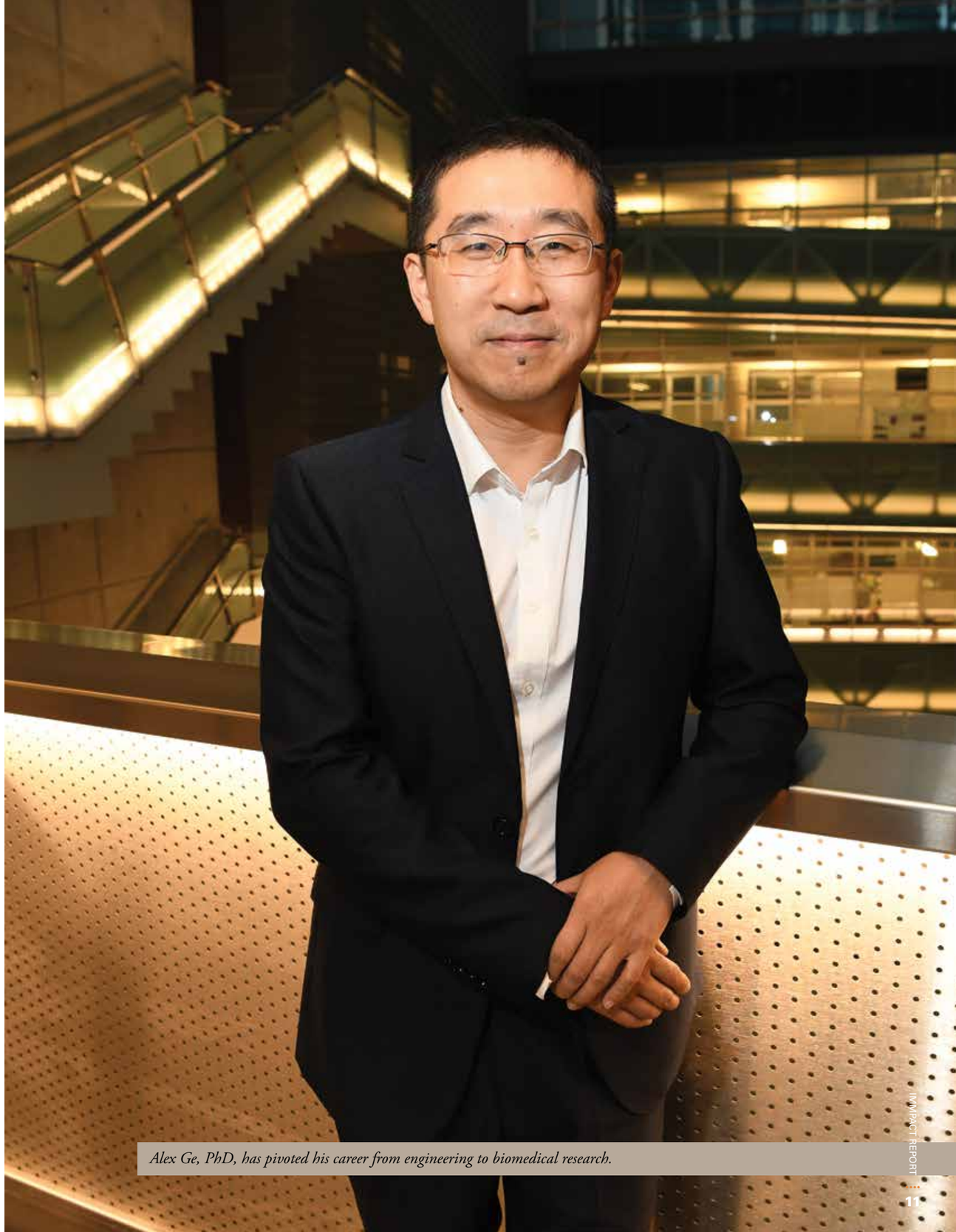
To get the venom for testing, Ge traveled to the only federally funded Viper Resource Center in the United States. Located in Kingsville, Texas, the National Natural Toxins Research Center is supported by the NIH and Office of Research Infrastructure Programs and houses many snakes.

"When we walked into the room, all of the rattles started making noise – that signals that the rattlesnake wants to strike," Ge recalled, adding that all of the snakes were in cages.

Although the current research is focused on the rattlesnake, if successful, it could be applied to other poisonous snakes.

"Sometimes you need an engineering mind to consider new ways and new technologies," he said.

> "Chemical engineering is a well-established discipline. With biomedical research, there is more freedom, and it has more impact." — Dr. Alex Ge



Alex Ge, PhD, has pivoted his career from engineering to biomedical research.