



Inspired by a Mentor

A Ph.D. candidate finds the perfect research niche.

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More than a year ago, [Martin Trapecar, Ph.D.](#), an assistant professor in the Division of Endocrinology, Diabetes and Metabolism at the Johns Hopkins University School of Medicine, was shuffling through the applications sent to the university's biomedical engineering Ph.D. program. He happened upon an application submitted by Shereen Chew, M.S.

"We have access to the applications sent to the Johns Hopkins University's Whiting School of Engineering Ph.D. program in biomedical engineering in Baltimore, which is one of the biggest graduate programs at Homewood campus and is also associated with the Johns Hopkins School of Medicine," says Trapecar, who is based at [Johns Hopkins All Children's Hospital](#) in St. Petersburg, Florida. "We want to promote our [Institute for Fundamental Biomedical Research](#) to graduate biomedical engineering students and provide them with a path to our lab."

Reading Chew's application, Trapecar saw that she had received her master's degree in engineering from the California Polytechnic State University several years before and subsequently worked as a research associate for several years at the University of California San Francisco and at the Buck Institute for Research on Aging in Novato, California. Her research experience was strong. She had recently carried out independent, unsupervised research and, along with her colleagues, she published a paper on the research project in a 2022 issue of the journal *Retinal Cell Biology*.

The paper, titled "[Timed Notch Inhibition Drives Photoreceptor Fate Specification in Human Retinal Organoids](#)," investigated accelerating and synchronizing stem cell differentiation into photoreceptors by using a small molecule with a goal of transplanting photoreceptors grown from stem cells to reverse vision loss.

"Ph.D. students come to us with a variety of backgrounds, but Shereen had an excellent background in research in both her undergraduate work and in her graduate work, and she was already productive in publishing the work she and her colleagues carried out. She stood out," recalls Trapecar.

Impressed, he telephoned her right away.

A Passion for Medicine's 'New Frontier'

"I was a biomedical engineering major at Cal Poly with a minor in biological sciences," recalls Chew. "After earning my bachelor's degree, I got my master's degree in engineering with specialization in biomedical engineering."

She subsequently held several positions as a research associate, including in the lab of Deepak Lamba, Ph.D., associate professor of ophthalmology in the School of Medicine at the University of California San Francisco.

"Dr. Lamba took me under his wing," she recalls. "I had never done real research before, and I fell in love with it."

Besides "falling in love with research," there was also a "Eureka!" moment that sparked her enthusiasm to go after the Ph.D. when she watched a "Ted Talk" on YouTube given by Anthony Atala, M.D., professor of urology at the Wake Forest Institute for Regenerative Medicine. Atala's research interests are in regenerative medicine, tissue engineering and stem cells, which fascinated Chew.

"In his Ted Talk, Dr. Atala spoke on a new frontier in medicine called tissue engineering and discussed the possibility of [printing human kidneys](#)," says Chew. "I knew at that moment what I wanted to do — I wanted to stay in medicine and develop devices to help people."

Still working with Lamba, she took part in many research projects, one of which culminated in the research paper published in 2022. Chew shouldered a lot of responsibility as the team investigated the time points at which retinal stem cells turned into an enriched population of early cones or rod photoreceptors in the eye.

“Transplanting photoreceptors from human stem cells derived from retinal organs has the potential to reverse vision loss,” explains Chew. “In this study, our goal was to accelerate and synchronize the photoreceptor cell differentiation of stem cells into organs. At specific points in time, we employed a pathway called the “Notch pathway” to measure and control the growth and differentiation of transplanted stem cells to align stem cell growth with the stages of stem cell differentiation.”

On the Road to Earning the Doctorate

“Working toward the Ph.D. has been a long and winding road,” says Chew with a smile.

After recently passing her qualifying exams, she is officially a Ph.D. candidate — rather than a Ph.D. student — and is also a valued researcher in Trapecar’s lab.

“From looking at Shereen’s research and understanding her interest in regenerative medicine, I knew she would be a good fit in our lab,” explains Trapecar, who is her academic adviser and mentor. “She is currently using new engineering tools to simulate human biology to better understand how tissues and the immune system interact in health and disease, and also see how cells and genes work — this work fits into her passion to utilize laboratory tools to better understand neural development from the perspective of neural communication.”

What are the Responsibilities of a Mentor?

“Mentorship” is a well-used term in academics. Merriam-Webster’s online dictionary defines a mentor as one who is “a trusted counselor or guide,” and defines mentorship as “the influence, guidance or direction given by a mentor.”

However, many a good mentor will describe mentoring as being a “two-way street” where the mentee learns from the mentor, but the mentor also learns from the mentee, says Trapecar.

He knows this from personal experience, having been mentored by many along his academic path. But he especially credits Linda Griffith, Ph.D., a professor at the Massachusetts Institute of Technology (MIT) School of Engineering who was

his adviser and mentor. While working with Griffith at MIT, Trapecar participated in the development of a physiomimetic model to study the human “gut-liver-brain axis” as it interacts with the immune system under both normal and disease conditions. Now running his own lab, The Laboratory of Human Biomimetics, Trapecar continues a similar line of research, assisted by Chew and other highly motivated researchers.

When asked about the responsibilities of a mentor, Trapecar says that good mentoring is always specific to two people, and that the mentor needs to “step into the learning” as much as the mentee.

“The mentor is not just a “boss” to tell the mentee what to do,” he says. “The mentor must find the balance between support and guidance and give the mentee the space to explore their interests, find a career path that is right for them, because finding a career path is difficult, especially if you don’t know what’s out there.”

Will Chew one day be managing her own lab at some high-level research institution and mentoring students?

“I’d like that,” says Chew.

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