

First ASPIRE to Innovate Postdoctoral Scholar Earns NSF I-Corps Award with Hydrogel Technology to Promote Blood Vessel Growth



Karrie Dudek, PhD
ASPIRE to Innovate Postdoctoral Scholar

By Jess Roetman, Graduate Student

From innovating to funding a novel biotechnology, Karrie Dudek, PhD, has had a terrific year as the inaugural Postdoctoral Fellow of the ASPIRE to Innovate program with the recent announcement of an award from the National Science Foundation Innovation Corps (NSF I-Corps).

The ASPIRE to Innovate program is an initiative sponsored by Vanderbilt's BRET Office in the School of Medicine and the Center for Technology Transfer and Commercialization (CTTC) that provides biomedical scientists with entrepreneurial skills needed to launch new technologies from the bench to the commercial market during a two-year postdoctoral fellowship. As the very first fellow of the program, Dudek has been able to mesh her scientific training with her enthusiasm for entrepreneurship. This unique program provides an opportunity for her to become a co-founder while drawing on mentoring support from the Vanderbilt entrepreneurial community.

Over the past year, Dudek has collaborated with Ethan Lippman, PhD, Associate Professor of Chemical and Biomolecular Engineering and the CTTC on an innovative new technology using hydrogels to promote the growth of large blood vessels. Previous biomaterials have the capabilities to grow capillaries, but this new method can also grow arterioles, which are larger and can withstand higher-pressure outflows. In the body, growing

large vessels can assist in the healing of tissues which can become ischemic, or deprived of blood flow, during aging, disease, and surgeries. Their team has been able to gain valuable data from in vivo mouse models, demonstrating restoration of blood flow in critical limb ischemia models. Reflecting on the work thus far, Dudek shared, "the data we've gathered so far has been remarkable. There is tremendous potential in the healthcare field, and I think we have an opportunity to truly impact patient lives. Nothing quite like this exists on the market today."

Dudek's success in the first year of the ASPIRE to Innovate program is evident from a string of recognitions and achievements, including participating in the Zero-to-510 pre-accelerator program, completing the Wond'ry's Ideator and Builder entrepreneurship programs, and placing first in the inaugural Renaissance Women's Summit pitch competition. Nevertheless, her greatest accomplishment thus far came this past spring when she was awarded the NSF I-Corps grant award. The I-Corps program supports the commercialization of "deep technologies" that revolve around fundamental discoveries in science and engineering by engaging program fellows in developing new scientific technologies through interviewing potential customers and partners to determine the commercial potential for their early-stage translational innovations. Thus, the NSF I-Corps program pairs nicely with the goal of the newly established ASPIRE to Innovate program to train and mentor bench scientists with the skills to launch a company.



With \$50,000 from the NSF I-Corps award, Dudek participated in an intense 6-month sprint as part of the program. She conducted 102 customer discovery interviews in 7 weeks over the course of July and August 2022 with surgeons, hospital administrators and contractors, insurance companies, and other stakeholders interested in the potential of this hydrogel technology. “It’s all about seeing if customers see the solution and the technology going into the right market,” Dudek said with an excited grin. Ideally, Dudek will find investors who see value in the hydrogel technology as a therapeutic biomaterial and want to support its commercialization. Since the hydrogel technology promotes the growth of large blood vessels, it would not only assist in healing of blood-deprived tissues, which the team has shown in mouse models, but it could also be used to assist in the treatment and healing of orthopedic injuries, organ transplants, diabetic foot ulcers, burns, and more.



After finishing the ASPIRE to Innovate postdoctoral position next summer, Dudek envisions using her new entrepreneurial skillset to continue developing the business and making progress towards getting the vessel-promoting hydrogel technology to market. As a co-founder along with Lippman, she would become the CEO of this company. With the support of both the ASPIRE to Innovate program, as well as the NSF I-Corps award, Dudek is well on her way. She is excited about what the future holds and said, “this program, along with the support of the Vanderbilt and greater Nashville community, has helped us establish a strong foundation that will serve us well as we take our next steps to raise capital, grow the company, and seek FDA approval.”

ASPIRE to Innovate Postdoctoral Scholar Karrie Dudek, top, at the AOSSN Conference. Above, Karrie meetins with E2I speaker. Right, Karrie Dudek joins other trainees at the Life Science Tennessee conference in Nashville in March.

