

Problem-solving to save warfighters: Research scientist focuses career on DOD needs

NSRI Fellow Alicia Schiller, Ph.D., assistant professor of anesthesiology & director of combat casualty medicine at UNMC

MAY 31, 2022



Dr. Alicia Schiller knew her work with the Department of Defense would be important to her from the day of her first interview — her first time on a military base.

Feeling a bit overwhelmed as she headed to her 7 a.m. meeting after lengthy security protocols, she saw a soldier walking into the military hospital with his pregnant wife.

"He was a double amputee, holding her hand with a prosthetic hook," she recalled. "At that moment, I realized what I could be doing there — truly saving lives; helping brave men and women come home to their families. I never got to see that tangible impact on the academic side."

This focus on the practical use of research for the military struck a chord with her and stuck.

"In academics, your research isn't necessarily in the hospital," she said. "There's a separation. In a military hospital, there isn't. Every day, you walk past the people who will be deployed with something you have been working on. You eat lunch with them and get to interact with everybody."

Following that first interview, Dr. Schiller stayed in San Antonio for several years, becoming well-versed in the military's way of doing things. She now serves as the director of combat casualty care at the University of Nebraska Medical Center, lending her expertise to the anesthesiology department and pursuing two key lines of research:

- Investigation of the dynamic relationship between arterial blood pressure and flow to quantify vascular control
- Assessment of the acquisition of procedural skills, such as intraosseous line and chest tube placement, especially in military populations

This wasn't a career path Dr. Schiller had always planned on. Early on as a physiologist she always had trouble explaining to people — her mother, for example — exactly what she did. She wasn't a medical doctor. She didn't see patients. The daily ins and outs of the job were complicated.

It wasn't until her post-doctoral studies that she found a perfect way to explain it, on a plaque given to her: "Alicia Schiller, Research Scientist."

"I thought, whoa, when did that happen? I became a scientist," she laughed.

Even her mother could understand that.

Part of what makes Dr. Schiller's work complicated to explain is that it combines several disciplines. So, she chooses explanations to fit the audience.

To other researchers, she's a cardiovascular and renal physiologist. To friends and family, she studies how the brain controls the heart and kidneys. Within the DOD for combat care, she is a problem solver who helps protect the nation's warfighters.

"What I love about working in the DOD system is that I can say I'm a scientist, and I'm good at solving problems and methodology," she said.

In academia, she explained, your area of expertise drives what you do. In defense, specific needs drive the work.

Recently, Dr. Schiller's work took on aspects of both academia and defense in a project shepherded by NSRI in conjunction with the respected Tripler Army Medical Center (Tripler) in Hawaii. The team is developing sophisticated, actionable training tools for low-frequency, high-value medical procedures such as intraosseous line and chest tube placement. These procedures are not often performed, but when they are, they are very important to get right.

The \$142,000 12-month project uses novel medical simulation techniques involving visual recording, evaluation software and 3D printing of training apparatus.

► **Dr. Schiller presented about her project in November 2021**

Previous medical training tools for these types of procedures didn't give medical professionals a realistic idea of real-life situations, Dr. Schiller explained.

"It can be a problem when a life is on the line, and you don't have firsthand experience," she said.

One reason previous tools were inadequate was that developing them is not financially lucrative. Private companies tend to focus on projects that turn a profit.

"The military doesn't care about making money," she said.

"Of course, they want things to be cost-effective, but before that, they want it to work well."

Dr. Schiller is thankful to NSRI for bridging the gap between academia and military organizations such as Tripler.

"Honestly, if the University of Nebraska hadn't had the UARC, we 100 percent could not have done this project," she said. "Because of NSRI's status as a DOD-designated University Affiliated Research Center, Tripler was able to transfer funds, equipment and personnel. Without NSRI, none of those things could have happened. As a trusted partner to the DOD, NSRI is a critical conduit for this type of work."

Complex projects require expertise from various fields, and resources from both academia and the military are essential. In addition to Dr. Schiller, the project team includes Dr. Nick Markin, an anesthesiologist and 3D printing expert who developed the medical trainers from an idea he had to help train residents, and Dr. Priscila Rodriguez Armijo. On the military side, the team works closely with Tripler researchers.

Maj. Gen., USAF (Ret.) Richard Evans, NSRI executive director, holds up Dr. Schiller as an exemplary research partner who is helping the institute support U.S. Strategic Command, its UARC sponsor, and other federal government agencies working for our warfighters' safety.

"Dr. Schiller is an academic leader putting her skills and passion to work on tough challenges faced by our warfighters," he said. "I liken her work with training medical personnel to aviators going through Navy TOPGUN or Air Force Weapons School. The goal is to give these medical professionals focused training in a peacetime setting that will ensure their success when they encounter it for real down the road. We're proud to have Dr. Schiller on our NSRI team doing great work for the Army."

Learn more about Dr. Schiller's project through a recent presentation available at nsri.nebraska.edu/TriplerProject.

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