

Researching to Better Support Astronauts in Space

MAKING AN IMPACT

The AIAA Foundation's Neil A. Armstrong Graduate Award 2018 winner **Emily Matula** is preparing for a career to support and study life in space. Closer to home, she's been training to become



an EMT after seeing the need for medical assistance with Hurricane Harvey.

"A passion of mine is helping people, especially in crisis situations and I have

always had an interest in medicine," said Matula, a Ph.D. candidate at the University of Colorado Boulder, and a NASA Space Technology Research Fellow.

The EMT training has helped her become a better engineer. "In crisis situations, seconds are at stake, and no



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time to read an instruction manual or remember 30 different steps," she said. "Making sure that an AED (automated external defibrillator) or ventilator is easy to use can be the difference between life and death.

"While long duration spaceflight missions are typically slower paced, they still require designs with streamlined



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usability to accommodate crews of all different disciplines. Exposure to these medical designs will help me to produce simpler aerospace solutions."

Currently, Matula is taking a break from EMT training to head to Antarctica and collect algae samples to use in extremophile research. Her research supports Environmental Control and Life Support Systems (ECLSS), "making sure that the basic human metabolic needs of clean cabin air, drinking water, food, thermal control, waste remediation, and radiation protection are being met."

She's focused on using bioregenerative technologies—that's where the algae come in—to provide simultaneous cabin air revitalization and thermal control.

"Algae typically grow in a water-based media, and water is currently being used by the International Space Station in its thermal loop to transport metabolic and experiment heat to the ammonia radiators. I hope to make a multi-functional system by using an algae photobioreactor to cool down the cabin, like the ISS thermal system, while also using algae's photosynthesis to sequester respired CO₂ and provide breathable oxygen."

Ultimately, Matula would like to become program director of NASA's Human Research Program (HRP).

She's dreamed of becoming a scientist since she was a child in rural Ohio, home of clear starry nights. "I distinctly remember my dad waking me up at 4 in the morning, throwing coats and boots over pajamas, and laying down a large piece of cardboard for everyone to sit on and watch the Geminid meteor shower."

1 When interning with Boeing out in Seattle, a few of the interns got to explore the Blue Angels when they came in for Seafair 2 Test subject for the g-profile of the Virgin Galactic Spaceship 2 3 First flight in a private aircraft, taken up by an undergrad professor to tour Ann Arbor 4 Drilling holes into the core section of the Space Launch System by Boeing

Applications for 2019 AIAA Foundation scholarships are being accepted until 31 January 2019. For more information on establishing a scholarship and making a difference in students' lives, please visit aiaafoundation.org.