

# DELVING WITHIN, REACHING OUT

EMILY STEPHENS' PASSION FOR NEUROSCIENCE EXTENDS FROM THE LAB TO THE COMMUNITY

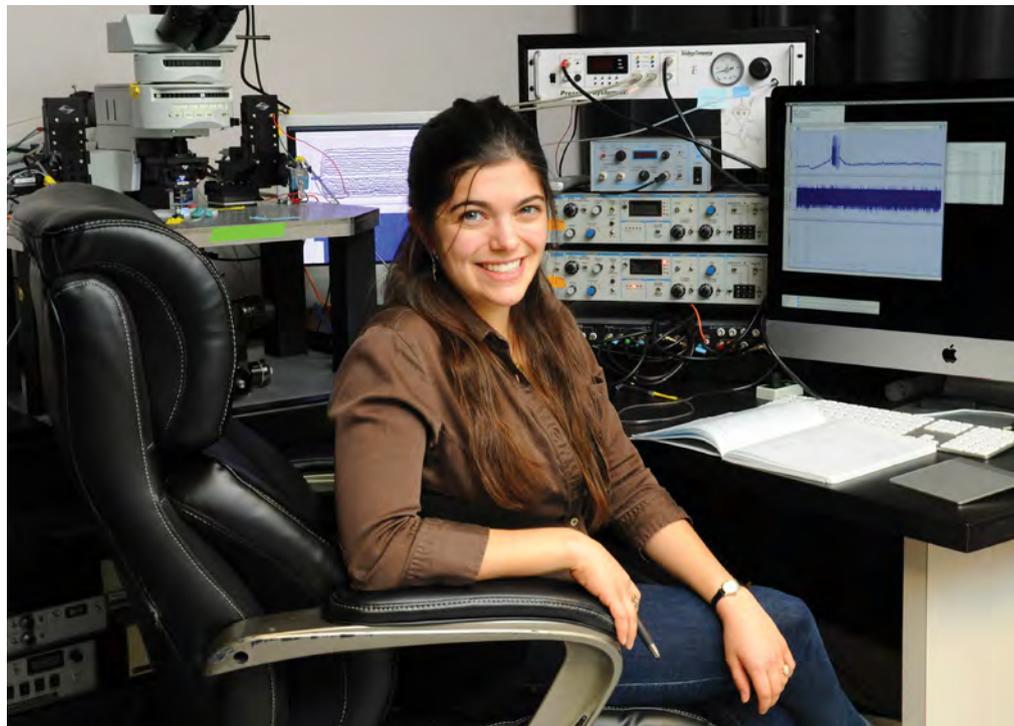
**W**HERE DOES CONSCIOUSNESS COME FROM? What factors determine an individual's personality? How does cognition work? These are the kinds of questions that Emily Stephens, a fourth-year graduate student in Geisel School of Medicine's Program in Experimental and Molecular Medicine, loves to think about, discuss, and try to find answers to.

Stephens has been interested in science, especially medical science, since childhood. "My grandfather was a physician and I went to daycare above his doctor's office, so I was around medicine a lot at a younger age," she recalls. "My dad worked in my grandfather's clinic, as well as in some different laboratories, and he and I have always shared a passion for science."

Learning first-hand about Multiple Sclerosis (MS) through her grandmother's struggle with the disorder, helped steer her toward neuroscience—MS is an often progressive and disabling disease of the central nervous system that disrupts the flow of information between the brain and rest of the body.

"I remember meeting with one of my advisers in college and being asked sort of that big question, 'What do you want to do?'" says Stephens, who attended Albion College, a small liberal arts school in Michigan, where she grew up. "By then, I knew that I wanted to learn more about how the brain works, and better understand complex behaviors related to things like decision-making and personality."

She applied to six graduate schools, including Geisel at the urging of her other grandfather, a Dartmouth alumnus. "He always talked about how going to school here as an undergraduate was one of the greatest experiences



of his life," she says.

When she arrived in Hanover, Stephens quickly fell in love with the physical beauty of the area and its close-knit community.

"Dartmouth has been a great fit," she says. "The people are so friendly and open here, and I really like the fact that it's a smaller school, which allows us to have close relationships with the faculty. For example, in our lab I see Allan every day, and having that guidance, assistance, and regular interaction with him makes a huge difference in our group's ability to learn and problem-solve."

Allan, is Allan Gullledge, PhD, an associate professor in the Department of Physiology and Neurobiology at Geisel and principal investigator on several research projects funded by the National Institute of Mental Health. His laboratory primarily studies the role of neuromodulators in information processing within cortical circuits of the brain.

"Emily is an outstanding graduate student," says Gullledge. "She's very enthusiastic about science, she's very smart, and she's very dedicated. She thinks about things the right way and she's critical when analyzing data. Because of that, she's doing very well as a scientist."

Stephens' research focuses on the frontal cortex, a part of the brain largely responsible for complex behaviors related to decision-making and emotional regulation. "I look at how serotonin affects particular subsets of cells in that area," she explains. "I use a technique

called patch clamping, which allows me to study individual brain cells under a microscope in living tissue that has been extracted from an animal. I can actually place electrodes in a cell and see what it's doing."

Her willingness to keep testing different hypotheses, when only about 10 percent of experiments typically succeed, says Gullledge, has allowed her to make a recent breakthrough. "It's still preliminary," he says. "We need to verify our data and publish our findings, but it's very exciting to us. I think it potentially provides some new insight into how antidepressant drugs like SSRIs (selective serotonin reuptake inhibitors)—that tens of millions of Americans are taking at any given time—are working in people."

"Being in academic research is really amazing," she says. "You have these days where you're doing something that maybe no one else has done before, and if it works you can be the first to share that knowledge."

Stephens' passion for neuroscience hasn't been confined to the laboratory. She is one of the organizers of the Upper Valley Brain Bee, a neuroscience competition for high school students. "I've been doing community outreach activities since college, and teaching neuroscience to younger students is one of the things I enjoy doing most," she says.

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