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# Eureka!

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# University of Dayton, Ohio (url: <http://www.udayton.edu/index.php>)



## Eureka!

**04.19.2011 | Research**

As a teenage teaching assistant in her hometown of Charleston, W.Va., Senia Smoot met a three-year-old autistic child. He could talk, but wouldn't converse.

Working with an applied behavioral analysis coordinator and a team of several therapists, Smoot spent up to 40 hours a week working with him one-on-one to improve his social interaction, cognitive ability and motor skills. Two years later, he was mainstreamed into a regular kindergarten class. Now in third grade, he just wrote a book about the size of the universe.

"I was thrilled to learn that," said Smoot, a University of Dayton research assistant who earned a mechanical engineering degree in December. "This work has become my passion."

This month, the National Science Foundation rewarded her passion with a prestigious, highly competitive NSF Graduate Research Fellowship. The three-year fellowship, valued at more than \$120,000, covers tuition and a monthly stipend for living expenses as well as international research and professional development opportunities. She will conduct research on the effectiveness of assistive devices for children with autism while pursuing a master's degree in mechanical engineering with an intent to earn a Ph.D. degree at the University of Dayton.

"Although more insurance companies are covering these devices, a lot don't because the research has been qualitative. I want to use my technical engineering background and apply it to the evaluation of therapy equipment for children with autism. It's hard to argue with insurance companies or local schools that these assistive devices should be funded. My research will provide quantitative data that's needed."

In 2009, the Centers for Disease Control and Prevention issued a report that chronicled the rise of autism to 1 in every 110 births in the United States and almost 1 in 70 boys. While autism is the nation's fastest-growing developmental disability, the cost of lifelong care can be dramatically reduced with early diagnosis and intervention, according to the Autism Society.

Smoot, 23, will be charting new ground with her research, according to Kimberly E. Bigelow, assistant professor of mechanical and aerospace engineering who recommended her for the NSF fellowship. Thousands of applicants competed for 2,000 awards or honorable mentions.

"Senia's career aspirations really resonate with me on a personal level because I, too, had a desire to take engineering and apply it to working with clinical populations to diagnosis disease and evaluate therapeutic intervention -- but I've found there is no clear path to pursue this. This award provides a path for Senia and allows her, in large part, to define her own research project," Bigelow said.

"She is really breaking ground to do what she wants to do, and it is so exciting to see her get to pursue her dream and combine interests that do not automatically go together in a traditional mechanical engineering degree program."

As a sophomore, Smoot worked with a psychology professor on an independent study project to better understand autism and various treatments. Later, she became a mentor in Bigelow's first-year engineering design course, where she challenged students to build a portable, adaptable activity table occupational therapists can use to help autistic children develop fine motor skills.

Smoot also has used her skills to serve others by tutoring engineering students; participating in Wheels for Kids, an annual program that collects bikes and refurbishes them for children; and serving as a clinical assistant on a medical mission trip to Mexico. As a project manager of a small group of mechanical and electrical engineering students, Smoot helped design an interactive museum display that simulates the Desch Bombe, the codebreaking machine credited with shortening World War II.

She served as a project manager at a Georgia Pacific paper mill as a co-op student and considered entering the workforce upon graduation, but found herself drawn back to her alma mater. Today, she's working full time as a research assistant in the biofuels lab in the University of Dayton Research Institute and developing experiments for her graduate research fellowship program, which begins in the fall.

The reality of winning the highly competitive NSF fellowship hasn't quite sunk in yet. Past fellows include Nobel Prize winners, the founder of Google, the co-author of Freakonomics and engineers and scientists who made breakthroughs in a number of STEM fields.

"I learned about the opportunity late and spent a feverish week and a half on my application," Smoot said. "I was so thrilled to get it."

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