

REUSE Mentors Students to Success

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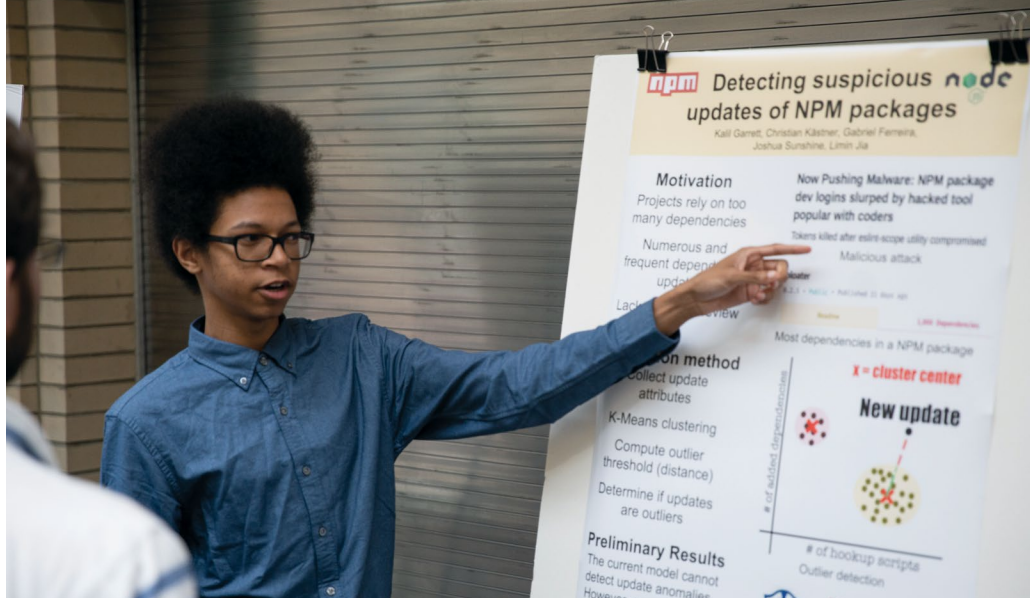
Stepping into Wean Hall for the first time, David Gray Widder saw the names on the office doors and knew he was in a different world. There was Mary Shaw, the computer scientist who received the National Medal of Technology and Innovation from President Obama. On the way to his first meeting, he passed the offices of other big names, like David Garlan and Claire Le Goues. For Widder, these computer scientists might as well have been rock stars.

A rising senior studying computer science at the University of Oregon, Widder spent the summer of 2016 doing research at Carnegie Mellon's top-ranked software engineering program through the university's Research Experiences for Undergraduates in Software Engineering (REUSE) program.

"I don't belong here," he thought to himself as he looked at the wall plaque on campus listing CMU's 12 Turing Award winners.

Nagging self-doubt persists among participants of the REUSE program. Joshua Sunshine (CS 2013), systems scientist in the Institute for Software Research (ISR) and director of the program, told a diverse group of some 20 undergraduate program participants that impostor syndrome is perfectly normal. "Everyone feels like they got in on a fluke," Sunshine said. "I still feel that way."

But Widder did belong. The 24-year-old is now a Ph.D. student at CMU, researching how people choose the right development tools in open-source communities, as well as inclusion and diversity in those communities. Like many of his fellow REUSE alumni, he says the program gave him crucial skills and much needed research experience to prepare for a top Ph.D. program in computer science.



Kalil Garrett, alumnus of the REUSE program



Joshua Sunshine (CS 2013),
alumnus of the REUSE program



David Widder,
alumnus of the REUSE program

"These are amazing people

"There may be people who come from a super-religious background and everyone in the family lives in the same town, or someone who goes to a regional public school close to home," said Sunshine, who also serves as the principal investigator of the program's NSF grant. "Despite the fact that an elite university might offer them generous financial aid, they don't necessarily apply. They might have to care for younger siblings, or being away from home might come at a big cost to the family."

Widder said he couldn't afford Carnegie Mellon as an undergraduate. Without REUSE, "getting into a top-tier graduate school would have been a long shot," he said.

Many of the people involved with high-level computer science graduate research attended elite high schools and competitive universities like CMU. "They have a different understanding of what classroom learning means than someone who came from a low-resource school," Sunshine said.

However, students from diverse backgrounds have unique experiences that become strong assets when tackling larger-scale societal problems such as food scarcity. "We want to build tools that everyone can use," Sunshine said. "That's why it is so important to have diversity." As it turns out, adding diversity not only provides important opportunities for the students and diversifies the field, it also makes for better science.

Widder is so enthusiastic about the program that he mentors REUSE participants, including Courtney Miller, a sophomore at the New College of Florida. Miller describes the small liberal arts college in Sarasota as having a "hippie vibe." When she arrived at CMU for REUSE last summer, the intense environment gave her culture shock.

"I thought, 'What am I doing here?'" Miller said. "David [Widder] would say, 'You are doing great. Keep on swimming.'" Regular meetings with her faculty mentor, Bogdan Vasilescu, an assistant professor in the ISR, boosted her confidence. She soon made connections and learned what it would take to get into a top graduate school.

Kalil Garrett, a second-year student at Georgia State University, spent his time in the program last summer creating a detection model for suspicious updates in the Node.js package manager, a tool for JavaScript that allows for the consumption and distribution of the hundreds of thousands of modules available on the main registry.

The experience made him realize that research was a viable career path.

"As an undergraduate, graduate research seemed abstract due to my lack of experience with the process," Garrett said. "But now I am more comfortable with it and I definitely want to go to graduate school in computer science."

doing amazing things."

— Joshua Sunshine (CS 2013)

Garrett's desire to go into research is common among REUSE participants. Eighty-six percent of the students who complete the REUSE program and graduate from college are doing research in graduate school or a major lab, Sunshine said.

During their 10 weeks on campus, students live in the dorms and go on group outings in the city. Widder was a social coordinator of his cohort, organizing trips to Kennywood and the museums, and planning family-style dinners. This social component strengthens the bonds of friendship and helps reduce the stress of working through the challenges that arise doing top-level research.

"You are navigating in a space where you don't know what you are doing," Widder said.

For additional support, Sunshine trains graduate students to mentor REUSE participants. Some students who take on these leadership roles incorporate mentorship into their plans for the future, as Sunshine did with his own career path.

In 2011, before CMU had a formal program like REUSE, he served as a graduate mentor to Sarah Chasins. The Swarthmore College undergrad had emailed Jonathan Aldrich, a professor in the ISR and director of CMU's software engineering doctoral program, to ask about summer research opportunities. Her work on efficient implementation of the Plaid programming language went on to win first place in the undergraduate division of the

SPLASH Conference, the Association of Computing Machinery Student Research Competition.

Chasins' success was part of the impetus for CMU to start REUSE. By then, Sunshine had such a passion for mentoring students, he no longer wanted a career in industrial research.

"There is a huge pool of students around the country who didn't necessarily know they wanted to be computer scientists when they were 15 and didn't have the preparation to get into a CMU or Berkeley," Sunshine said.

The semester after his REUSE experience, Garrett co-founded a student organization called STEMulate as a way to increase diversity and inclusivity in STEM fields. One of the goals of the group is to help members enroll in quality summer programs such as REUSE.

"These are amazing people doing amazing things," Sunshine said. ■

Interested in REUSE's mission to foster diversity in research? Learn more about the program and how your support can enrich the lives of brilliant young scholars like Courtney, Kalil and David by visiting cs.cmu.edu/funds/reuse.