

Connecting the Homeless

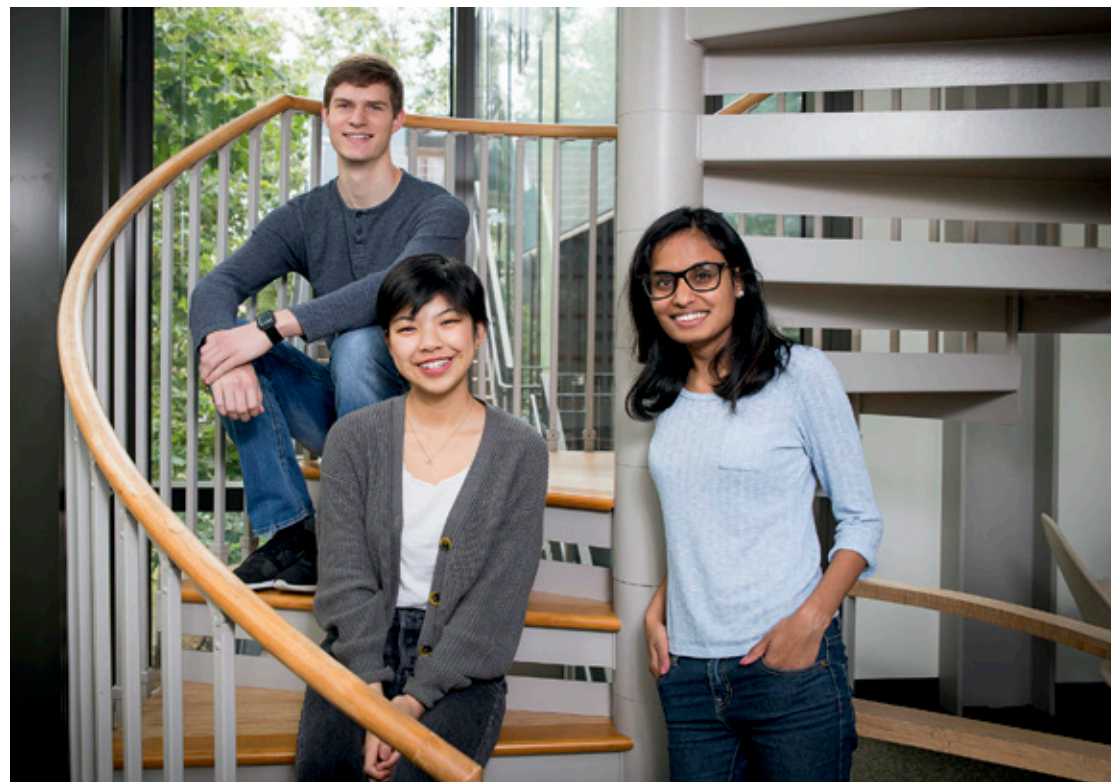
Among people who are homeless, lack of connection to family and friends poses an often-overlooked obstacle to stability and well-being.

"Homeless people haven't just lost a roof over their heads, they've often lost their ties to loved ones," says Nivetha Karthikeyan (BS '19), who graduated from Caltech last June with a degree in computer science and history. Over the course of the past academic year, Karthikeyan worked with junior Myra Cheng and senior Andrew Hess to help address the problem by developing new technological tools for Miracle Messages, a nonprofit that helps reunite homeless people with friends and relatives.

Founded in San Francisco, Miracle Messages helps homeless individuals record video or audio messages to loved ones they have lost all contact with. Then, using as much information as the individual is able to provide, volunteers scour social media and other digital platforms to find those loved ones and deliver the message. Over the past five years, Miracle Messages has facilitated reunions for more than 200 clients who had been disconnected from their families for around 20 years, on average.

Now, the organization's efforts will be enhanced by a database and web application developed by Karthikeyan, Cheng, and Hess, all students in Caltech's Division of Engineering and Applied Science.

The project grew out of an interest in the intersection of technology and activism, and the potential for computer science to serve as a vehicle for advancing social good. "It's something I really want to explore:



From left: Senior Andrew Hess, junior Myra Cheng, and Nivetha Karthikeyan (BS '19), who together launched TechReach, a new club that uses computer science to serve community needs.

how tech interacts with society and how we can use what we learn in the classroom to solve real societal problems," Karthikeyan says.

About a year ago, she and Cheng sent out an email to survey student interest in TechReach, a new club that would focus on using computer science to serve nonprofit and community needs. They received more than 60 interested responses.

On the advice of Claire Ralph, lecturer and director of outreach and partnerships for Caltech's computing and mathematical sciences department, Karthikeyan and Cheng elected to launch TechReach with a pilot project.

For Cheng, the club represents an opportunity to build on similar work she had done with the volunteer organization Code for San Jose. "There are issues I care about independently of computer science,"

she says. "It's exciting to use tech skills, to write code, in a way that is impacting people."

Hess, too, was drawn to the possibility of applying computer science to a concrete social problem: "I wanted to get real-world experience and to actually help people in a significant way."

As their work with Miracle Messages winds down, the students hope to expand TechReach to five or six new projects involving larger numbers of computer science volunteers and a broader range of issues. They'd also like to develop connections with nonprofits serving local communities.

"Understanding the needs of the client is just as important as the technology," Karthikeyan says. "We want to know more about the issues facing Pasadena to really figure out how our skills might help."

—Jennifer Torres-Siders

A Decade of Discovery and a Now-Limitless Future

In 2009, the Resnick Sustainability Institute (RSI) was established at Caltech with a \$30 million contribution from Stewart and Lynda Resnick and the Gordon and Betty Moore Foundation, and a vision to foster transformational advances in energy science and technology through research, education, and communication. An additional pledge by the Resnicks in 2014 created both the Resnick Institute Innovation Fund and the Lynda and Stewart Resnick Matching Program.

That vision has been realized through advances in the area of energy science and sustainable technology development, as well as in the recent announcement of an unprecedented \$750 million pledge to Caltech from the Resnicks to support, in perpetuity, cutting-edge research into environmental sustainability.

"Science and bold creativity must unite to address the most pressing challenges facing energy, water, and sustainability," says Stewart Resnick, chairman and president of The Wonderful Company and a senior member of the Caltech Board of Trustees.

Since its founding, the RSI has supported researchers who develop ways to convert sunlight to renewable hydrogen and carbon-based fuels, and new technologies for generating ammonia and other commodity chemicals. RSI support has led to the discovery of best-in-class catalysts using abundant, non-toxic materials, and enabled researchers to push the efficiency limits of solar photovoltaics and wind systems, advanced research into green chemistry, and helped to modernize the electricity grid.

RSI-supported research has also provided unprecedented insights into carbon-dioxide sequestration in the ocean, opening up a number of possible applications for removing carbon from the atmosphere, and created new techniques

for treating wastewater and desalinating saltwater through solar-driven heating, electrochemistry, and the use of nano-structured materials.

During its first decade, the RSI provided seed funds to researchers throughout Caltech's divisions and funded 96 Resnick fellows (graduate students and postdoctoral scholars). Resnick fellows or fellow alums have founded a number of sustainability-focused companies or had projects licensed by existing startups.

"The RSI has shown remarkable progress," says RSI director Jonas C. Peters, Bren Professor of Chemistry. "This commitment from Lynda and Stewart places hope in science and technology, and also in Caltech, to help chart a more sustainable future for all of us."



For more on the RSI and its work, visit <http://resnick.caltech.edu/>.