



REACHING OUT
OF THE
CLASSROOM
AROUND THE
WORLD

Lupita Montoya expresses
a social conscience that
literally builds a better world



Lupita Montoya became an engineer to change the world, and a teacher to change her students.

The problems that imperil people around the world drive her engineering classes. Last year, her sophomores designed a water purification system for a village in Nigeria that can carry water uphill.

“I feel touched by seeing poor people who don’t have their basic needs met finally get clean water,” Montoya said. “Bringing the power to read a book or prevent kids from getting diarrhea is beautiful.”

This assistant professor of civil and environmental engineering demonstrates that engineers and scientists can solve so many of the world’s problems. Her research in aerosol science, indoor air, the health effects of nanomaterials, allergies, and asthma is motivated by a desire to improve public health. This desire infuses her classes.

Montoya cares about issues of poverty, which often intersect with diseases of air quality. In one class, students develop sustainable projects that minimize footprints without limiting future generations’ access to resources such as water and energy. In the lab, she’s researching cleaner fuel for stoves because improving combustion and controlling emissions affordably is critical to people living in subsistence conditions.

Working Models

Montoya, 42, was born far from American affluence. Raised by her grandparents in Mexico, she dreamed of becoming a teacher and a scientist. Today, she’s thrilled to be an engineer, too. “Scientists use mathematical models to understand how things work. As an engineer, I’m in a position to gauge how well the models work, and give answers in specific situations and conditions,” she explained.

As a high school junior, she moved to Los Angeles to live with her mother, forced herself to learn English, and became class valedictorian. Her mother vetoed UCLA for Cal State Northridge, just a bus ride away. Initially a chemistry major, Montoya quickly discovered (through Northridge’s Minority Engineering Program) how engineers used science to promptly improve people’s lives, so she changed majors.

She’s always wanted to be a role model to female and minority students in engineering and science.

“Women and minority people have a different perspective and experiences, and they can be very important,” Montoya said in her rapid soprano. “I use my projects to excite students about making a difference for societies.”

(top) Two new books, designed to inspire future engineers, highlight Montoya’s story of growing up Chicana while passionately pursuing math and science. (bottom right) Montoya and her students designed ways for rural Nigerians, like these villagers, to remove sediments from their stream water—making it safe to drink.

Montoya works to quell the quiet crisis by encouraging young people, particularly women and minorities, to seriously consider science. This year, she was awarded one of the first 10 Sustainable Visions grants from the Lemelson Foundation to pursue her work. She’s also one of the first seven Rensselaer faculty to receive a RAMP-UP grant, which helps women advance to tenure and full professorships.

Why not change the world? Well, she is.

Montoya loves to remind her students what her instructors told her during grad school at Stanford: “You’re in a very special place, and you can choose to do important work anywhere with what this special place gives you.”

Because everyone is a potential amigo or compañero, Montoya carries a sense of community that fills her classroom. She believes we’re all part of a movement that can truly change the world. Our opportunities lie right here. Now is the time to make our lives significant.

“I want to be part of this revolution, and I want my students to feel the same way,” she said. “The world is getting smaller. If you stretch your arms, you can reach anywhere.”

◀ Montoya at home with her two sons: Isaac, 2, and Joshua, 5.

Students will travel to Peru with her this summer to prep for a class that will design appropriate housing for Andean communities. “The students need to be reined in a little—the houses have dirt floors, not tiles—but I don’t want students feeling sorry for the people they work with,” Montoya said. “This is not charity work. It’s an engineering challenge, and it shows them how privileged they are by giving them a chance to make a real difference in the world.”

