Already passionate in their commitment to physics, many of our 316 Course VIII undergraduates, who are drawn from a pool of talent circling the globe from North America to Europe, the Middle East and Asia, and Central to South America, share another key quality: a dedication to sharing their love of learning by teaching. For Rutuparna “Rutu” Das (SB ’12), however, teaching is not a new activity, but a deeply ingrained family tradition.

On August 15, 1997, the 50th anniversary of the date of Indian independence, Rutu’s parents, Bidyut and Bijaylaxmi Das, founded a school they named Rtapalli Vidyapitha, “the place of learning in the village of truth,” in the state of Odisha in southeastern India. It’s a uniquely all-expenses-paid, residential, co-educational high school, whose mission is to nurture both the intellectual development and social commitment of its students. These young people will in turn, it’s hoped, be the “builders and shapers” of India’s future. Philosophically based upon Rta and Shraddha—Sanskrit for truth/Dharma and faith/love—the school has a broad liberal arts curriculum with strong mathematics and science components. Also unique to the school is its fiscal situation: receiving neither government nor corporate funding, it continues to be primarily supported by Rutu’s parents. A growing base of alumni just entering the workforce have begun to give back to the school by contributing financially and with in-kind donations, such as teaching and administrative support.

During the summers after her junior and senior years of high school, Rutu taught beginning calculus and physics at Rtapalli Vidyapitha. In the summer of 2009, after her freshman year at MIT, Rutu was awarded an MIT Public Service Center fellowship for curriculum development of the school’s physics, calculus, and English classes. As a Course VIII major finishing her junior year, Rutu’s undergraduate research experience has already included work at MIT’s LIGO, Columbia’s GECO Lab, Princeton’s Atacama B-mode Search, and, not least, a full year of MIT’s renowned physics “Junior Lab.” She plans to continue following her passion for physics in graduate school, with, as of this writing, growing biases in favor of astrophysics and quantum information.
physics@mit: Rutu, you grew up with parents dedicated to the fields of education and physics (your father, Bidyut) and computer science (your mother, Bijaylaxmi). When you came to MIT in the fall of 2008, did you have any intention to eventually follow this family tradition to teach what you loved to learn? Did any aspect of your life and work here at MIT encourage you to do so?

Rutu: Before coming to MIT, I knew that I wanted to spend my life learning and teaching. Since I was little, my father would always point out interesting things in nature and explain the underlying science to me. This added a type of wonder to my surroundings that I always hoped to be able to pass on by teaching. At MIT, I got a chance to try sharing this wonder through the “Splash” weekend event run by the Educational Studies Program. This program allows MIT students to teach short classes on any topic of their choice to middle and high school students. I showed the students how to build physical models of quadric surfaces and discussed with them the meanings behind my favorite poems.

The feeling of inspiring students to get excited about something has always fascinated me, especially by showing them the beauty surrounding them, and then watching them explore on their own. This is what motivates me to teach and share.
between summer research and MIT UROP (Undergraduate Research Opportunities Program) experiences, and now with a full year of Junior Lab (J-Lab) under your belt, have you considered teaching an experimental high school physics class at Rtapalli Vidyapitha? Could the MIT method of project- or research-based physics teaching serve as a model in any way for such a class?

**Rutu:** We have definitely thought about adding an experimental science class at Rtapalli. In fact, in the summer of 2009, I spent a couple of days showing the students demos of some simple experiments. The teachers there are also trying to include more in-class experiments. Over the last year, I took several pictures and videos of some of the J-Lab experiments to show the students at Rtapalli to get them excited about experimental science. At the moment, we do not have much of a set-up for a formal experimental physics class, but we’re looking into getting some equipment for demos of interesting experiments. As time goes by, we hope to have more set-ups that the students will be able to operate by themselves.

Seeing the importance and effectiveness of learning through research at MIT, we are also planning to involve senior students at Rtapalli in summer research projects conducted in nearby institutes. MIT’s project- and research-based methods will definitely play an important role in whatever classes or demos are developed; after all, the best way to learn is by doing.

**physics@mit:** It’s not uncommon for those who love teaching to have themselves enjoyed the benefit of being the student of one or more talented teachers. As you approach your senior year, do any MIT classroom or lab learning experiences stand out for you?

**Rutu:** Of all the amazing classes I have been lucky enough to take at MIT, the one class that I’ll always remember as the most exciting and motivating is 8.04, Quantum Mechanics I, taught by Professor Allan Adams. Professor Adams came to each lecture bursting with energy and these insane metaphors (for example, throwing “goats,” *i.e.*, electrons, through a double-slit experiment), and invariably transferred his energy to the class. It was obvious he was truly excited about what he taught us, and that made us excited to learn it. At one point, Prof. Adams said to us that the best way to get a class to understand something is to make them want to learn it themselves; to get them so excited about something that they want to do the p-sets [problem sets]. His energy in class and creative p-set problems did just that.

As one of my classmates said to me, “Every time I do a problem in this class, I feel like I’m rediscovering the universe.” I will never forget how excited 8.04 made me to learn. I hope that when I teach, I can transfer the same sense of wonder and excitement to my students.

—I quote from Carol Breen, Communications & Pappalardo Fellowships Program Administrator