



## DIRTY WORK

On the grounds of San Marino’s Huntington Library, Art Collections, and Botanical Gardens—in the private, half-acre Huntington Ranch area—nearly two dozen middle and high school students spent this past summer measuring the levels of nitrogen in the soils around them to help the ranch determine whether its dirt is up to the challenge of growing an urban garden. This hands-on research experience was part of the Community Science Academy @ Caltech, which is affiliated with Caltech’s Center for Teaching, Learning, and Outreach. At left, James Maloney (MS ’06), one of the two codirectors of the CSA@Caltech program, helps high school student Kate Samaniego gather soil samples for testing. Other projects involved conducting experiments on ant behavior, and designing and building sensor-carrying remote-controlled powered kites, which the students flew over the library grounds. —JA

## \*FACULTY FOOTNOTES

There are approximately 100 billion neurons in the human brain—and the growth, development, and death of these neurons are controlled by thousands of genes. Sorting out how changes in these genes and neurons can lead to changes in behavior seems like a tall order, but that’s exactly the problem that biology research professor Carlos Lois is interested in.

► **His work uses songbirds as a model organism for the study of schizophrenia and autism:** “The advantage of working with birds is that they have this very natural behavior—singing—that in many ways is very similar to speech learning in humans. First, they have to listen to an adult tutor—the father bird—and after they listen, they practice until they can make a copy of the song that is very similar to what the father makes. There are not that many other animals that have this vocal learning. In humans there are a few communication-related genes that, when mutated, are associated with schizophrenia and autism. By studying mutations in those same genes in songbirds like zebra finches, we can learn how those mutations affect the bird’s ability to communicate with others—one characteristic used to diagnose these disorders.”



► **When he first came to Caltech to do a postdoctoral fellowship in David Baltimore’s lab, he didn’t have a driver’s license:** “When I was growing up in Spain, I lived in a big city and I didn’t need a car. Then I lived in New York and Boston. I came to Pasadena to do my postdoc and I was 28 years old and I didn’t know how to drive. I thought, ‘I’m sure I could do fine with a bicycle.’ I even went to Manhattan Beach, Santa Monica, and Zuma Beach on my bicycle, but then I decided that was enough, and I got my driver’s license.”

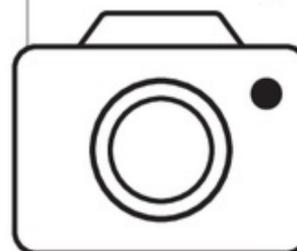
► **He loves the movies:** “I really like any sort of fiction—like novels, short stories, and especially movies. From 1986 to 2007 I’d say I watched an average of four movies every week. But when my son was born in 2007, it went from four movies per week to four movies per year. So now I mostly read fiction in novels and short stories.”

## Insider Info

Our graduate students smiled through two days of

# 97°

heat while we shot the photographs featured on the cover and throughout the magazine. Read their stories on page 10.

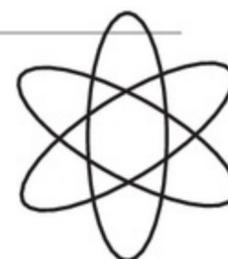


Southern India receives, on average, more than

# 2,000

hours of sunshine a year, making it an ideal test location for Caltech-built solar toilets. Go to page 22 for more info.

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graduate students are currently working toward dual MD/PhD degrees through joint programs with the medical schools at UCLA and the University of Southern California. Learn more on page 9.