



Stevan Nadj-Perge, Assistant Professor of Applied Physics and Materials Science, and his colleagues have generated an image of the atomic structure and electronic properties of “magic angle-twisted” graphene. What is the magic angle? Say you take two sheets of graphene—single-atom thick lattices of carbon atoms—and lay one atop the other to create a bilayer material, then twist one of the sheets of graphene to shift their orientation to one another. As the orientation shifts, the electronic properties of the bilayer material will change with it. In early 2018, researchers at MIT discovered that, at a certain orientation (about 1.1 degrees of relative twist), the bilayer material, surprisingly, becomes superconducting and moreover, the superconducting properties can be controlled with the electric fields. Their discovery launched a new field of research into magic angle-oriented graphene, known as “twistronics.” Nadj-Perge and his colleagues developed a new method of creating samples of magic angle-twisted graphene that can be used to align the two sheets of graphene very precisely while leaving it exposed for direct observation. Samples like this could help us to explain why the exotic electronic effects near the magic angle exist. Once we know that, we could help pave the way for useful applications, perhaps even leading to room-temperature superconductivity one day. (For more information, visit: [www.caltech.edu/about/news/finding-magic-magic-angle](http://www.caltech.edu/about/news/finding-magic-magic-angle))

Dear alumni and friends of the Division,

Entanglement, qubits, quantum computing: these concepts have moved decisively from the realm of theoretical physics into the lab, and specifically to our labs in the Division of Engineering and Applied Science. EAS is the home of a new effort to advance qubits from the lab to real world applications. To understand what this means, turn to page 12, where you can learn where we are placing our efforts, and what quantum computing holds in store for the advancement of computing. As we go to press with *ENGenious*, it was announced that the Amazon Web Services’ AWS Center for Quantum Computing is being established at Caltech, led by Oskar Painter (MS ’95, PhD ’01), John G Braun Professor of Applied Physics and Physics, and Fernando Brandao, Bren Professor of Theoretical Physics. This center brings together researchers and engineers from Amazon, Caltech, and other leading academic institutions to develop more powerful quantum computing hardware and identify novel quantum applications.

The recent, historic gift from Stewart and Lynda Resnick to Caltech is the largest ever for environmental sustainability research, the largest in Caltech’s history, and the second-largest gift to a U.S. academic institution. A multiplicity of fields—including solar science, climate science, energy, biofuels, water and environmental resources, and ecology and biosphere engineering—are supported by the Resnick’s \$750 million commitment to Caltech. The Resnicks have transformed Caltech, and their extraordinary gift will reach generations of students who will pursue new approaches to sustain-

ability, climate science, and engineering—creating new schools of thought and novel technologies with the goal of establishing paths to a sustainable existence.

Our students are deeply embedded in their studies and research—but they are also embedded in the community through the Caltech Y. This is an organization which has touched the lives of almost everyone at Caltech for more than 100 years and is increasingly touching the lives of local middle and high school students who come for tutoring in math and science. Over 150 Caltech students per year participate in the Caltech Y’s tutoring program—an astounding number given our combined graduate and undergraduate population of roughly 2,300. Learn about the evolution of the Y (see page 21)—and join them! There are myriad opportunities for alumni and friends of Caltech to participate in events and support the activities of the Y.

As always, I look forward to receiving your thoughts and comments. Please visit campus when you can—and stay in touch.

*G. Ravichandran*



Guruswami Ravichandran  
Otis Booth Leadership  
Chair, Division of  
Engineering and  
Applied Science  
[easchair@caltech.edu](mailto:easchair@caltech.edu)