Q&A

Rafael Jaramillo received the 2010 Rosalind Franklin Young Investigator Award on 4 May from the Advanced Photon Source Users Organization for his work on the fundamentals of magnetism at low temperatures.

Why did you decide to pursue applied physics as an undergraduate?

I want to understand how things work — especially in energy generation, because I have always considered myself an environmentalist. While working on my applied-physics degree at Cornell University in Ithaca, New York, I became interested in research that would directly help society to move beyond fossil-fuel use. I thought about following in the footsteps of a mentor, Bruce Kusse, and pursuing fusion-energy research related to plasma physics, but I found condensed-matter physics to be more intellectually stimulating.

What did you pursue for your PhD project?

My PhD was in theoretical condensed-matter physics, looking at the fundamentals of magnetism in low-temperature quantum systems. The motivation for my research was intellectual: I'm curious about things. I had this notion from college that, with a solid grounding in physics, I could go on to do anything. This work has no practical application, but there are connections to potentially useful materials. Now that I am trained, I can work more directly on the problem of making energy.

Describe the work recognized by the award.

One of the reasons for doing condensed-matter physics is to understand how order emerges from disorder. My project looked at how a particular form of magnetism arises out of disorder in a regime dominated by quantum dynamics rather than by thermal energy. It is a state of matter on the cusp of being magnetic — one side is ordered, the other side is disordered — and is the only known system in which the physics of the transition from order to disorder is not obscured by chemical and physical effects such as abrupt phase transitions.

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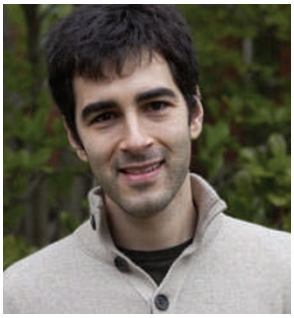

Does this award hold special significance?

It is a chance to recognize my mentors and co-workers, but the special significance is in the award's name. It honours Rosalind Franklin, the X-ray crystallographer who took the images of DNA that led to the discovery of its double-helix structure by James Watson and Francis Crick. I thought quite a bit about the dynamics behind that discovery: Watson and Crick clicked marvellously as collaborators, whereas Franklin worked alone. But she later conducted her most productive research, on viruses, once she found a strong collaborator in Aaron Klug. Cooperation was also a factor in our work: I don't think that either my collaborator, Yejun Feng, a physicist at Argonne National Laboratory, Illinois, or I would have accomplished half of what we did without each other.

Why did you change fields and move into solar energy, despite your success?

I could have spent a career following up on those findings. Our techniques were novel and have already led to results in different areas of condensed-matter physics. But I wanted to move on. People who are older and wiser than me say to do something unrelated for one's postdoc. Still, the physics of solar energy is very similar to what I was doing before, and involves concepts and measurement techniques that I used in my PhD. Many condensed-matter workers who are interested in energy move to solar, because it is basically semiconductor physics.

How would you describe your career prospects?

They are good enough in this economic environment, but anyone moving into the energy field is viewed cynically because everyone is now working on energy — often without changing their research focus — as it is flush with funding. I want to do relevant work that is intellectually motivated and has mental freedom. I'll be looking at well-known energy companies and will apply there in a year and a half, but not to the exclusion of academic research. In the longer term, building a company is challenging, but I would love to do it if I had an idea worth developing.

What are your future career goals?

I want to solve the world's energy problems. The research proposal that got me this postdoc is very ambitious. It is to design a widget to lower the cost of solar energy and make it competitive with fossil fuels. I'm working on an obstacle to efficient production of solar technology: how to integrate the charge made by photo cells at the nanoscale into real-world devices. As with most new technologies, it is unlikely to work, but I think we should be ambitious and aggressive because we need energy solutions. ■

Interview by Virginia Gewin.

IN BRIEF

Tokyo top for science

The University of Tokyo and the National University of Singapore came first and second in the top-200 QS Asian University Rankings for life sciences and biomedicine, released on 13 May. Kyoto University in Japan was third, Seoul National University fourth and Peking University fifth. The same schools were top in natural sciences, with Kyoto second, Peking third and Seoul fifth. Ranking was based on academic reviews, numbers of papers and citations, teaching, employability and the number of international staff and students. QS, a London-based education-services company, began the World University Rankings in 2004 with the *Times Higher Education Supplement*.

Stem-cell grants launched

On 14 May, the non-profit New York Stem Cell Foundation (NYSCF) announced an early-career investigator award programme. A US$27-million gift from philanthropic organization the Robertson Foundation, New York, will support at least 17 high-risk, high-reward grants of $1.5 million each over 5 years. NYSCF chief executive Susan Solomon says their mission is to support early-career stem-cell scientists, who often have difficulty getting funding to start a lab. The NYSCF will make a request for applications on 17 June, but expects support for more positions to become available later this year from other donors. International investigators may apply, but the research must be done in the United States.

Biotech bounces back

An attendance increase at this year's US Biotechnology Industry Organization international convention could signal a stronger outlook for the industry, conference officials speculate. Turnout at the 3–6 May event in Chicago, Illinois, rose by nearly 7% to 15,322. Last year's meeting in Atlanta, Georgia, drew 14,352 attendees, compared with 20,108 in 2008 in San Diego, California. Geographic locales also affect numbers. "[Attendance at] the convention often reflects the environment of the overall biotech industry," says spokeswoman Erin Reese. "There are signs that the industry is rebounding." This year's convention also had 2,125 companies participating in business partnership meetings, up from 1,770 in 2009 and 1,476 in 2006.