Q&A

Leo Gross, a surface chemist at IBM Research-Zurich in Switzerland, has received the first annual Gerhard Ertl Young Investigator Award for atomic-resolution images of molecules using non-contact atomic force microscopy.

What spurred your interest in microscopy?

After my undergraduate degree in physics at Free University of Berlin, I spent a year at Tulane University in New Orleans, Louisiana. We used scanning tunnelling microscopy to image surfaces with atomic resolution. I was fascinated with the method, in part because the experimenter gets an immediate response. This allows you to manipulate the experiment in real time, and change the parameters to get more information from your measurements. I knew I wanted to work with scanning probes.

How did your graduate experiences shape your evolving interest?

I finished my dissertation, on using scanning tunnelling microscopy to investigate organic molecules for molecular electronics, at Free University. There, I learned to use scanning tunnelling probes at low temperatures, near absolute zero, to manipulate atoms in experiments. For example, we were able to collect, trap and move single atoms in a single molecule. That work ended up being the cover page of *Nature Materials*' December 2005 issue.

What prompted your move to industry?

I wanted to join IBM Research-Zurich in part because its scanning tunnelling microscopy-related research efforts are led by Gerhard Meyer, who is an expert in physics as well as electronics, programming and hardware. To me, he is a role model in many ways. He uses his many areas of expertise to design the low-temperature microscopes we work with. He does not boast about his success, but pursues his science with patience and calmness.

Describe the impact of your two 2009 *Science* papers

We made astonishing images of molecules at atomic resolution (L. Gross *et al.* *Science* **324,** 1428–1431; 2009). Everyone knows the ball-and-stick structures in basic chemistry, but we were able to measure the atomic forces in a way that creates an image of every single atom in an individual molecule, which had never been done before. It is considered a major breakthrough.

The other paper measures the charge state of single atoms using atomic force microscopy (L. Gross *et al.* *Science* **325,** 1110–1114; 2009). This did not get such a great response immediately, but I think this work will lead to measurements of single-electron transport through molecular networks. This will be important once we begin to build devices out of single molecules, such as molecular switches that would control whether the molecule is in a conducting or non-conducting state.

Before these publications, I was not sure I would stay in science and find a permanent position that suited me. After, I was more confident about it and now have a permanent position here with IBM.

Have your plans changed because of this recognition?

Not really. I was happy here at IBM before the papers came out, and I still am. I like it that I don't have to teach and can do science full time. What has changed is that I get invited to do a lot more talks, so I travel more often, which takes away from time in the lab. The time away keeps me from working in the lab but I won't complain about it.

How does it feel to make breakthroughs so early?

Honestly, how I feel changes on a daily basis. Of course, I am happy. On the other hand, it has been hard to get back to normal lab work, with all the time spent on this award. I will probably not be able to do something like this every year, so that puts some pressure on my future research, because I want to continue working at a high level.

Do you feel pressure to make other high-profile advances quickly?

Luckily, I don't feel pressure to do work quickly from my superiors at IBM. I'm very focused on maintaining high quality as we explore surface chemistry in more detail using this approach.

Did you actively seek the Gerhard Ertl award?

Yes. Even though this was the first time the award was given, it was a well-publicized opportunity. It was very competitive with many very good applications. Once it was narrowed down to the five nominees, who were to present talks, I spent a lot of time trying to perfect my talk. It is really nice because this award honours the work of the whole team.

What is the secret to scientific success?

Patience is very important, but you must also have an open mind and think beyond one specific experiment. ■

Interview by Virginia Gewin

IN BRIEF

Cuts in Ireland

Hard times have forced Science Foundation Ireland (SFI), Ireland's main research agency, to cut the number of awards for this year's principal-investigator scheme. On 28 April, the SFI announced 27 awards totalling €25 million (US$32.2 million); the average grant also fell — from €1.4 million to €1 million. The awards are to fund 139 posts, including postdocs, PhDs and technical roles; 18 awards will help new investigators to build research teams, meaning more jobs. "It's tight and it's tough," says Graham Love, SFI director of policy and communications. "But we're in a holding pattern, maintaining the opportunities we've built to date as best we can until we return to proper funding levels."

Ranking effects

Academics' opinions of an institution can be swayed by its published ranking, according to a recent study. The report, 'Anchoring effects in world university rankings', presented on 3 May at the annual meeting of the American Educational Research Association in Denver, Colorado, examined whether world university rankings in the *Times Higher Education* affect peer judgements of reputation. The rankings take into account assessments by faculty members and administrators. The study, led by Michael Bastedo of the University of Michigan in Ann Arbor, found that universities that had high marks in 2004, the first year of the *Times* rankings, received higher reputation scores the following year. The authors conclude that staff are influenced by "external assessments of their institutions".

Graduate-school proposal

A report calls for two federal initiatives to boost the number of US students enrolling in graduate school. 'The path forward', by the Council of Graduate Schools (CGS) in Washington DC and the Educational Testing Service in Princeton, New Jersey, proposes doctoral traineeships and competitive master's grants. Traineeships would give students a stipend and fund their institutions to build programmes or develop strategies to help PhD students complete their courses. The hope is to reduce dropouts, says CGS president Debra Stewart. The plan aims, in particular, to encourage enrolment from under-represented minorities, Stewart notes.