

Strengthening women's role in nanoscience

The WomenInNano network is helping women working on nanoscience and technology to fulfil their potential, and is encouraging both men and women to contribute to a sea change in the physical and engineering sciences that will bring about gender equality, ultimately benefiting both the scientific community and society in general.

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In most ways, the British Carbon Group's NanoteC07, held at the University of Sussex last August, was a typical international materials science conference. Participants shared their recent results through 60 presentations packed into three days. Animated discussions about tensile creep properties and electrorheological behavior began at breakfast and stretched into the early hours.

But there was something unusual about this event. Out of the 102 research scientists working on nanotubes, diamond, and fullerene-related nanostructures that attended the conference, 38 were women. Moreover, most were not senior female scientists but women in their twenties doing postgraduate or postdoctoral research.

The relatively high proportion of young female scientists at this event was no accident. Many of them had been made aware of the conference, encouraged to attend, and, in 12 cases, given a bursary by the WomenInNano network¹, which was also one of the conference sponsors.*

The aim of WomenInNano is to strengthen the role of women scientists working in the physical and engineering sciences, in particular those specializing in nanotechnologies. It was set up with funding

*The other sponsors were: The British Carbon Group, The Royal Microscopical Society, and The GDR-E Nano-E.

from the European Commission's 6th Framework Programme and is a collaboration between 11 academic institutions in nine European countries – Germany, Romania, Sweden, Spain, Slovenia, the UK, Bulgaria, Italy, and France – under the co-ordination of the Leibniz Institute for Solid State and Materials Research (IFW) Dresden. Although its main focus is Europe, it also reaches beyond, to the wider international community.

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Establishing a network

The motivation for establishing the network in October 2005 was a recognition that the potential contribution of women to this area of cutting-edge science is not being fully realized – indeed, is being wasted – and that some kind of imaginative and practical intervention

is needed to change the status quo. The focus on nano means that the information and experience-sharing is specific and relevant to members' work, but WomenInNano also complements other networks of women scientists that have a different scientific or geographical scope, such as the UK-based Institute of Physics' Women in Physics Group. Women are still very under-represented in all the physical sciences, especially at senior levels.

By supporting the participation of women in events such as NanoteC07, WomenInNano is gradually drawing more women into the broader scientific community. It is encouraging them to become more aware of the opportunities offered by international conferences and to take a full and active role in them. This is helping women, especially those starting out in their careers, to develop their professional and personal networks, improve their self-confidence and presentation skills, and share experiences with other women.

Getting the most out of conferences

As any experienced scientist knows, getting the most out of a conference involves both formal participation in presentations and poster sessions, and the more informal business of networking: the exchange of information and tips, the forming of friendships and potential collaborations, and the fostering of a sense of scientific purpose through shared enthusiasm and mutual encouragement. If women do not attend conferences, they miss out in many ways.

The young female scientists at NanoteC07 appreciated the opportunity to interact with other members of the scientific community. It offered, they felt, something qualitatively different from just being up to date with the latest literature. Rachael Houchin, who is a first year PhD student at the University of Durham, UK, gave the first conference paper of her career at NanoteC07. "What is important is the whole interaction with people outside your little group and comfort



Nicole Grobert (second right), head of UK node of WomenInNano and others.

zone. It's no use just doing the research, you have to get out there and get it known," she says. Natalia Martsinovich, a postdoc at King's College London, UK, quotes a pertinent Russian saying: "The truth is born through argument." She adds, "It is a huge stimulus if people are interested in your work, so conferences are very important." Polina Pine, a Russian PhD student at Technion in Haifa, Israel, first heard about NanoteC07 through WomenInNano and found it invaluable to talk face to face with people whom she previously knew only as names from scientific papers and the Internet. "Israel is more US-oriented," she says. "As WomenInNano is a European organization, it has helped me connect with European researchers and get to know what happens in this part of the world." Siân Fogden, now in the third year of her PhD at Imperial College, London, UK, also welcomed the opportunities for networking. "I've met women from all over the world."

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Several female participants felt that the conference was a good opportunity to practice putting together and presenting a paper in an environment where many other women were speaking.

In addition to the chance to talk to other scientists about their research, the young women attending NanoteC07 welcomed the opportunity to speak to other women about more personal but related aspects of their careers, such as the difficult decisions they face if they want to combine having a family with continuing to work in their chosen field. By sharing experiences and establishing support networks, the hope is that women researchers will be less likely to become demoralized when they realize that they are not alone in facing these obstacles and dilemmas.

As well as meeting women of their own age, they are also likely to meet more senior women scientists who may act as role models and mentors. The more experienced women scientists may be able to offer practical solutions based on their own experiences; for example, how they manage to combine motherhood with their career in a fast-moving field, how they challenged discrimination, or how they broke through the glass ceiling to achieve a senior post. WomenInNano hopes that in time more and more women will attend such conferences and that their participation will become the norm.

Inspirational activities

As well as encouraging women to take part in 'mainstream' events, WomenInNano is organizing and participating in some more women-focused activities. One such event brought together young female scientists at a six-day summer school on career development and



Polina Pine (left) and Jie Peng (right) discussing Jie's poster at NanoteCO7. (Credit: Jenny Lunnon.)

research trends in Coma-Ruga, Spain, in June 2007. Nicole Grobert, a faculty member at the University of Oxford and head of the UK node of WomenInNano, found it inspirational. "I saw 100 young women, most of them pretty shy at first, gradually becoming more sure of themselves and ready to ask questions," she says. "New friendships were forming and I could feel that some would last for life. I saw how in a few days women developed and became more confident." For many participants, used to being in the minority throughout their scientific education, it was the first time they found themselves surrounded by other women scientists.

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WomenInNano also took an active part in the recent Women in Science 2007 Policy and Networking Conference organized by Oxford University's Oxford Women in Politics and Females in Engineering, Science, and Technology. This event aimed to address the wider issue of the under-representation of women in leadership and decision-making positions in science and engineering.

Putting aside the complex issues facing today's women scientists, there is another way in which women's potential contribution to

science is not being realized: many girls with ability and potential do not study scientific subjects at school, often because they lack knowledge of the career possibilities and have few or no female teachers, role models, or mentors. Consequently, WomenInNano is also undertaking outreach work with girls at schools.

The WomenInNano website serves as a networking tool to complement and continue the face-to-face networking that takes place at events. Women can use it to share information about forthcoming conferences, jobs, training opportunities, and grants; address problems; share good practice; and generally keep up relationships that will prove helpful to them in their careers.

The bigger picture

At present, a more comprehensive picture of women's involvement in nanoscience across Europe based on reliable statistics does not exist. So WomenInNano is also trying to obtain some quantitative figures. Its members in each country have been attempting to map where female nanoscientists are working, and what their research interests are, although a lack of response from some institutions has been a problem. And where figures do exist, they are a cause for concern. According to the UK Resource Centre for Women in Science, Engineering and Technology (which is funded by the UK government's Department for Innovation, Universities and Skills), an estimated 50 000 British women with science, engineering, and technology degrees are not currently working in science, engineering, or technology, either in industry or academia². PhD student Siân Fogden sums up the key issue very simply. "A lot of women start out at my level and then they tend to fall away."

Science is clearly losing out if women who have invested their time and talents in becoming scientists find they have to give up before they have made their potential contribution to their field, often simply because they want to have a family.

Through its activities, WomenInNano is enabling women to become more visible, more confident, more involved in the global scientific community, and more determined to have their achievements recognized and rewarded. The organization hopes that the male colleagues of women scientists will be open-minded and far-sighted enough to realize that a sea change in gender relations will ultimately benefit everyone, and scientific endeavor in general.

If, in the future, more women nanoscientists are achieving their full potential and making the contribution that they could make to this field instead of falling away, WomenInNano will have achieved its purpose. **mt**

FURTHER INFORMATION

1. WomenInNano: www.womeninnano.de
2. UK Resource Centre for Women in Science, Engineering and Technology: www.setwomenresource.org.uk