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AUSTRALIA IS A LARGE COUNTRY—greater in area than the United States—and with a population of only about 20 million people, so interactions over large distances are important. This has been recognized by the government through the Australian Research Council (ARC), which funds nearly all major research in Australia, apart from health and medical research, which has a separate funding organization. In 2004, the ARC established a set of research networks, one of which was the ARC Nanotechnology Network (ARCNN), the objective of which was to enhance collaboration and information exchange in a large variety of fields for the benefit of research productivity. The existence of ARCNN, which is administered from the Australian National University in Canberra, has made possible an overview of what is happening in the field today.

The ARCNN presently has over 1,000 members distributed across about 200 research groups, though these groups have broader interests in addition

Nanotechnology in Australia— A Network of Interactions

The ARC Nanotechnology Network looks to enhance collaboration and information exchange to benefit research productivity.

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Some of the 450 participants in ICONN2006 at the Brisbane Convention Centre.

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Some of the 850 participants in ICONN2008 at the Melbourne Convention Centre.

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The air-shower entry to a cleanroom at Australian National University.

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The peaceful beauty of Melbourne, where ICONN2008 was held in February 2008. The Melbourne Convention Centre is also on the banks of the Yarra River.

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to nanotechnology as one of their research themes. The activity is spread over many university campuses as well as government research organizations such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Nuclear Science and Technology Organisation (ANSTO), and the Defence Science and Technology Organisation (DSTO). Details can be found on the network Web site at www.ausnano.net. Research fields range from nanotubes and nanowires through functional nanomaterials, to medical

applications such as imaging and drug delivery and on to nanolasers and quantum computing. Due to public concern about safety issues, there is also an organization, NanoSafe Australia, with member groups across the country, that examines and reports on the possible health risks of nanotechnologies.

There are so many of these diverse groups that it would be impossible to describe their activities adequately here, so we will focus on the many ways in which the ARCNN is enhancing the interactions between them. A major factor is by simply enabling communication. Network members can then find out about others working close to their field of interest and make arrangements for access to specialized equipment as described in the facilities register on the network Web site. In the case of graduate students and early-career researchers, the ARCNN provides travel grants to facilitate access to this

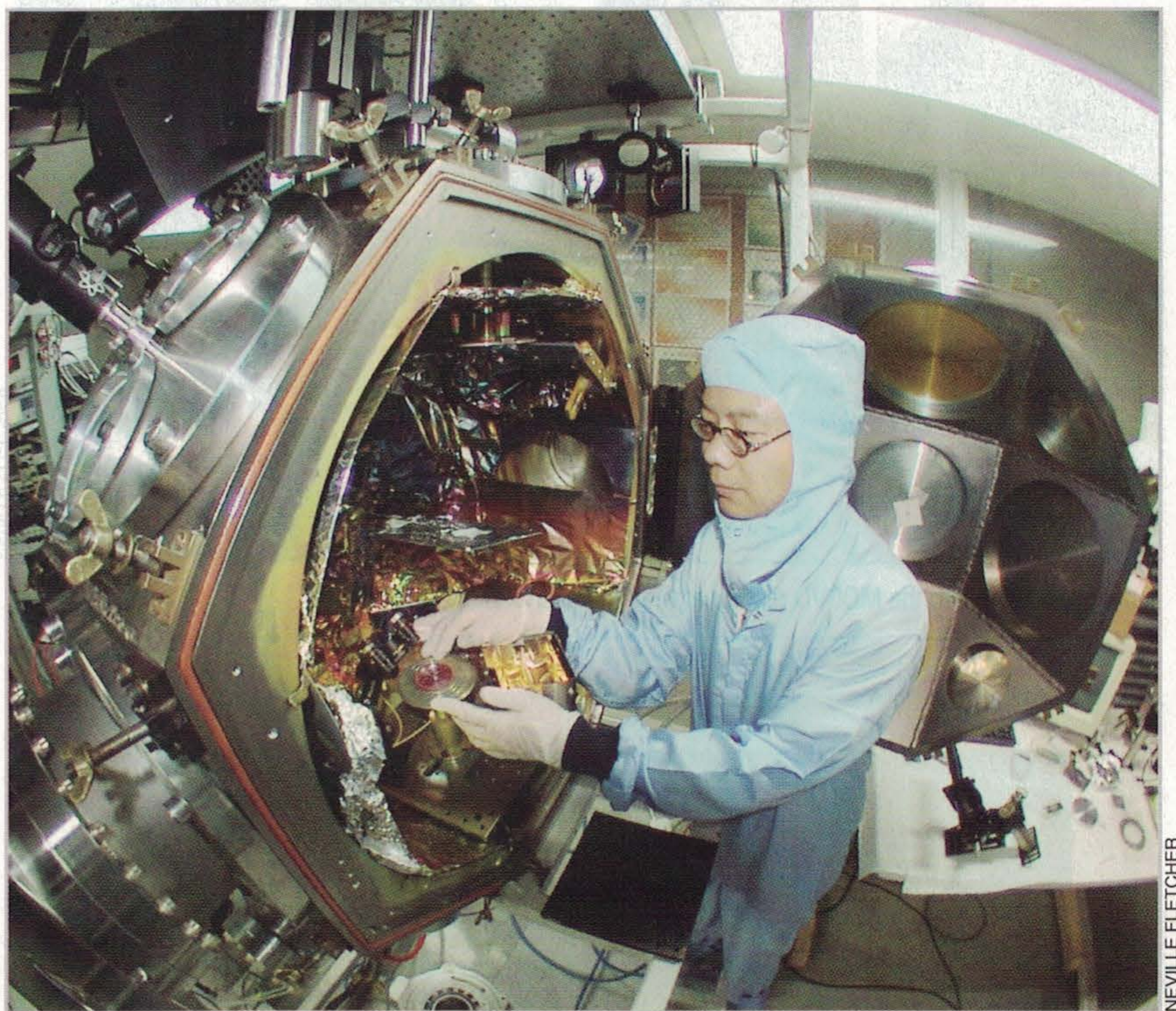
equipment. In addition to such travel within Australia, the network supplies around 12 short-term overseas travel fellowships to enable young researchers to visit special facilities or research groups in other countries. The countries visited have included the United States, England, Germany, France, Japan, Spain, and Ireland.

A more formal style of interaction takes place in the form of workshops and conferences. The ARCNN sponsors several workshops around the country each year that deal with such topics as nanoindentation, nanocomposites, and molecular modeling at the nano scale. It is also



The MOCVD reactor at the Australian National University.

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A pulsed-laser deposition system at the Australian National University.

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The Management Committee of the ARC Nanotechnology Network, meeting in 2007. Along with senior representatives of major participating organizations, the Committee includes representatives of students and early-career researchers.

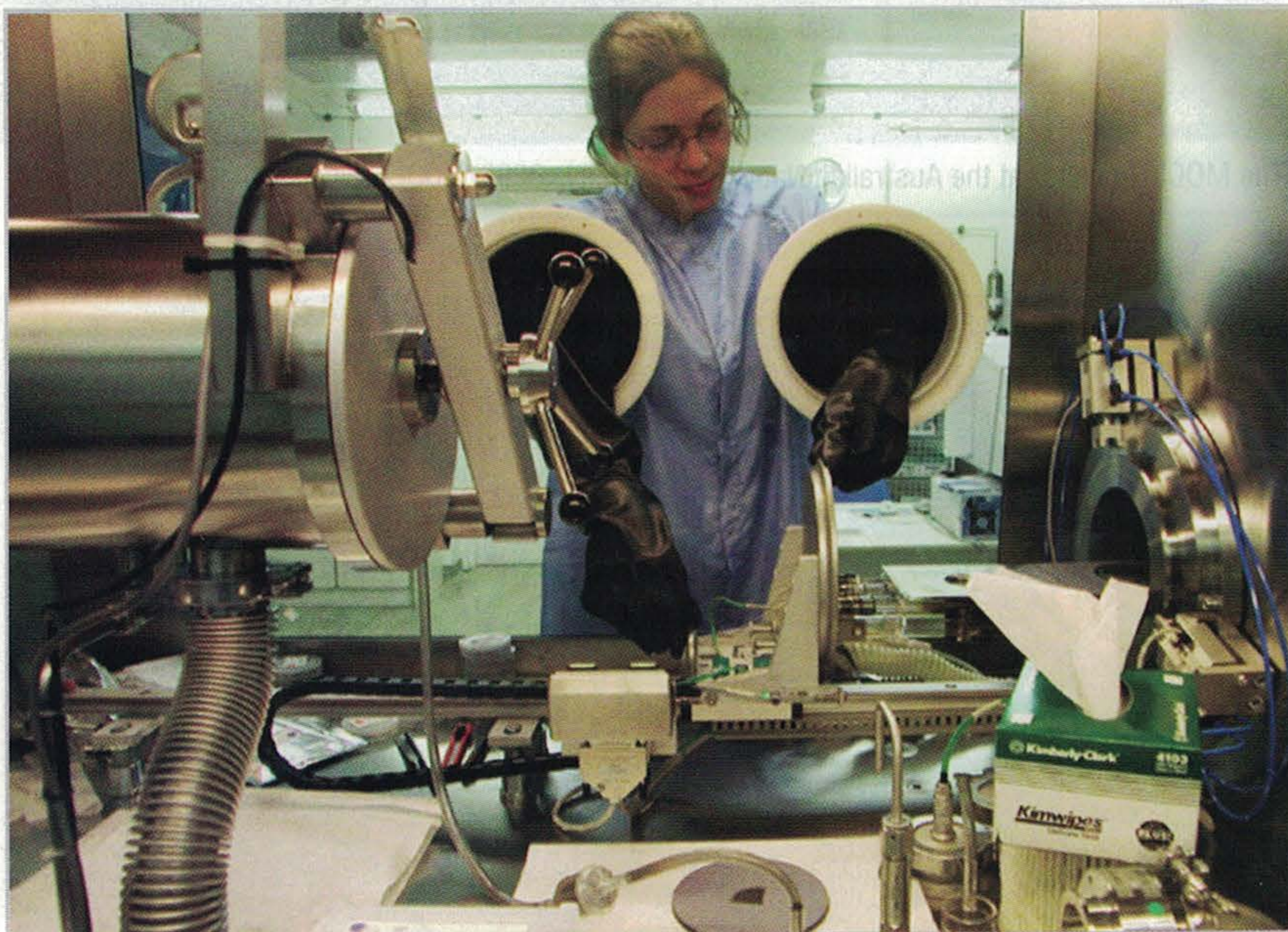
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ICONN2008, which was preceded by a two-day postgraduate symposium, drew more than 850 people.

involved in sponsorship of sessions at more general conferences on materials science, but the great events are the biennial International Conference on Nanoscience and Nanotechnology (ICONN), held in Brisbane in 2006 and Melbourne in 2008, with the next in the series to be featured in Sydney in 2010. These week-long conferences include lectures by highly distinguished international scientists and local researchers and have proved popular both with Australians and many overseas visitors. ICONN2006 attracted over 450 participants and ICONN2008, which was preceded by a two-day postgraduate symposium, drew more than 850 people. A further growth in attendance is expected for ICONN2010.

Since a major role of the ARCNN is the fostering of interactions, a number of the distinguished international speakers traveled to universities in Australia

The network has an annual series of “Young Nanotechnology Ambassador Awards” for graduate students working in the nanotechnology field.

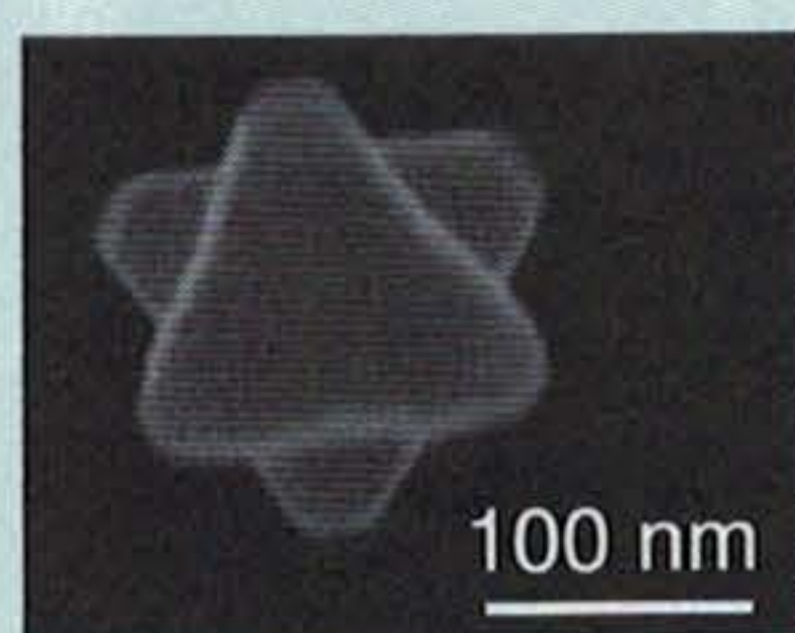


Loading a wafer into the MOCVD reactor at the Australian National University.

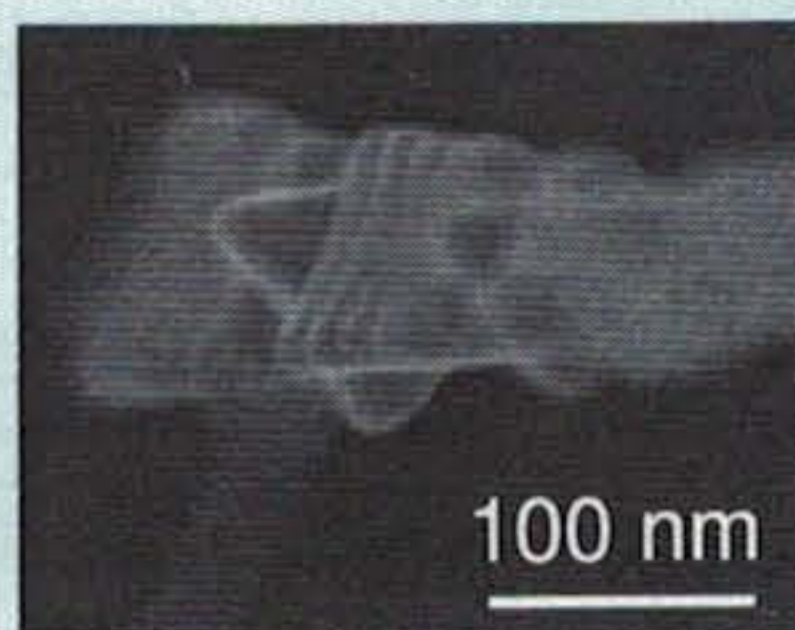
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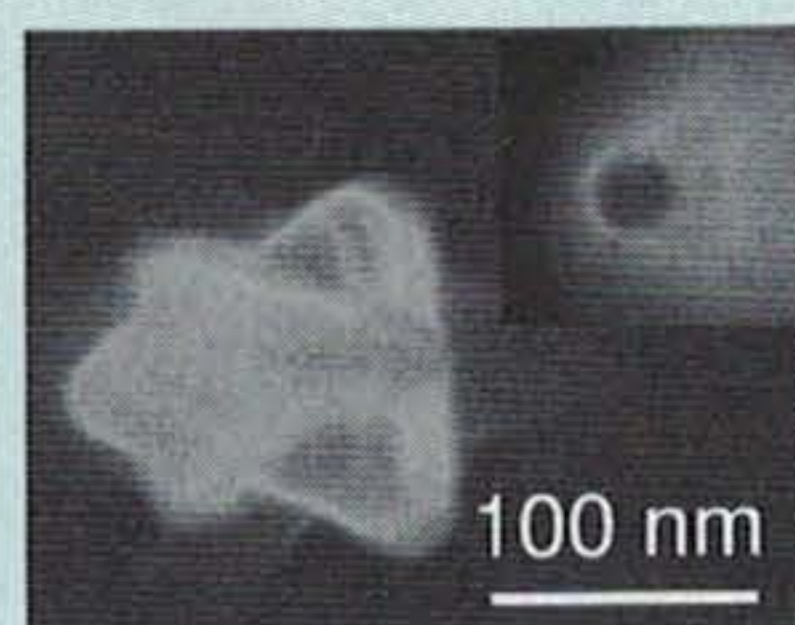
(a)



(b)



(c)



(d)

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A nanotechnology research project. (a) Gallium arsenide nanowires, each topped by a gold droplet and growing upon a gallium arsenide substrate; (b)–(d) show top views of the cross sections of the wires.

to discuss their work and to give further lectures following each of these conferences. The network also sponsors lecture tours by several other distinguished international scientists during the year, each visiting four or more centers that are particularly relevant to their research interests. International scientists interested in making contact with Australian researchers are encouraged to join the ARCNN, for which membership is free.

It is not only distinguished international scientists who are sponsored for lecture tours. In addition, the network has an annual series of “Young Nanotechnology Ambassador Awards” for graduate students working in the nanotechnology field. The aim is that each of these ambassadors will visit a number of schools, generally in their state but sometimes as far away as the remote Aboriginal communities of the Northern Territory, and give presentations about nanotechnology. These visits have been very successful and greatly welcomed by the schools visited. The network has also sponsored a nanotechnology topic, “Nanotechnology—taking it to the people,” on the immensely successful Web site “NOVA—Science in the News” (www.science.org.au/nova). It is organized by the Australian Academy of Science and aims to bring science and technology information to young people, teachers, and the general community.

While the present group of ARC networks has assured funding only to the end of 2009, there will be carryover funds to support ICONN2010, with the hope that some arrangement will be made for continuation of what has proved to be an extremely successful project. Whether that happens or not, the nanotechnology community in Australia has now been brought together to form a communicating whole and we expect great things to continue to emerge from it.

ABOUT THE AUTHOR

Neville Fletcher (neville.fletcher@anu.edu.au) is retired but still active in research. He previously served as foundation chairman of the ICONN Management Committee from 2005 to 2007. **N**