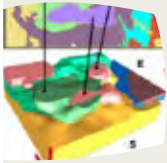




▶ HOW STRONG ARE THE RESEARCH & DEVELOPMENT LINKS BETWEEN LA FRANCE AND AUSTRALIA..... 3



▶ NANOTECHNOLOGY ILLUSTRATES A MAJOR AND GROWING COOPERATION FIELD WITH EUROPE 5



▶ A SERIES OF RESEARCHERS' PORTRAITS: ONE FOOT IN AUSTRALIA, ANOTHER IN EUROPE..... 10

FEAST focus

BUILDING THE EUROPEAN-AUSTRALIAN RESEARCH COMMUNITY. WWW.FEAST.ORG

FEAST recently organised a workshop sponsored by the British Council, the ANU Institute for the Environment, and the ARC Network of Excellence in Earth System Science, entitled "Abrupt Climate Change: Is it just a Northern Hemisphere

A small global, changing world

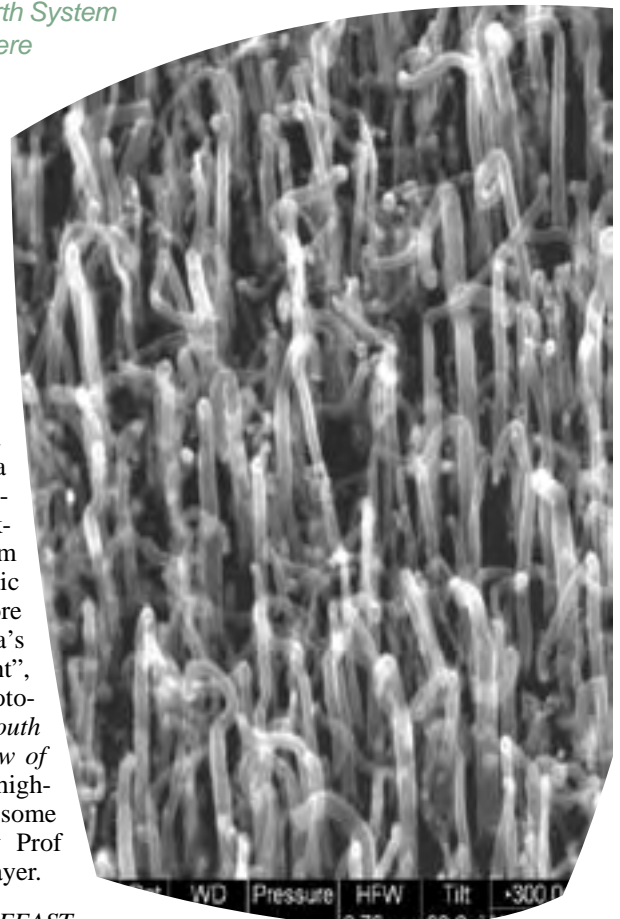
The ten day workshop provided the opportunity for researchers from the UK and Australia in the early stages of their careers to meet, develop a concerted outlook to their research, and plan future activities.

This workshop is only one illustration of the cooperation between Europe and Australia. Two weeks ago, the 10,000 t French research vessel, *Marion Dufresne* returned to Sydney from another French-Australian coring campaign, last week, FEAST's seminars about the Seventh Framework programme gathered more than 300 people in Sydney and Melbourne, a fair number of them having current collaborations with Europe. Despite FEAST's existence for almost five years, we still have a long road to build the Europe-Australia research community. The basic fact that Europe is the most important Australian partner in R&D is still very commonly ignored from labs to chancelleries, from public agencies to business.

It is also true that the need for information is here: while the FEAST website (www.feast.org) was browsed by 101 visitors last August when FEAST's new team was ramping up, last month you exceeded 14,000 visits to our site.

Meanwhile the Europe-Australia research community also has a social existence. The twenty participants of the British Council workshop joined about 80 people from the research, policy, and diplomatic communities of a dozen or more countries celebrating Australia's first "European Researchers Night", showcasing an outstanding photographic exhibition "*North - South - East - West: a 360 degree view of Climate Change*". The evening's highlight was a light hearted expose of some of the principles of science by Prof Mike Gore and Prof Sue Stocklmayer.

JF Desvignes-Hicks, FEAST



RESEARCH WATCH

Following in our series of Country focus, this issue of FEAST focus will have a particular watch on France, it's change in the research system and tools for successful cooperation. We illustrate a range of collaborations between Europe and Australia with examples of bilateral exchanges and projects and also a mature Framework project with outstanding Australian participation. The thriving world of the nanoscales provide us numerous examples in nano-engineering, nano-materials, or nano-biotechnologies.....7

SMARTER COMMUNITY: stepping stones to success



FEAST
is the only organization
having an official mandate
from the Australian gov-
ernment and the Euro-
pean Commission to foster
co-operation in Science
and Technology, including
Humanities and Social Sci-
ences
www.feast.org

FEAST Team Vol. 3

Jean-Francois Desvignes-Hicks was appointed as project manager of FEAST the 1st August 2005, but he has been involved with FEAST since 2001.

My interests in, and commitment to, transnational cooperation in research and Higher Education stem from early University experiences with groups in western and eastern Europe and in the USA.

I have a molecular biology background, having completed a Bachelor's degree in France. I have also one year at the University of Oklahoma (USA) where I undertook courses and research in fresh water ecology. Having fulfilled my motherland duties, dressed up with a red pompom on an high-tech metal scoop on the Atlantic Ocean, I started a Masters in modeling and analysis of biological systems at the University of Claude Bernard in Lyon.

My Masters thesis and research focused on a high potential, high value and culturally important

fish, common to most continental Europe ... *Cyprinus carpio* (the common Carp).

But I was not destined to be a researcher. Instead, I would investigate innovative support for researchers to achieve their objectives, in particular toward international goals.

I am certainly known by some of you from my previous role with FEAST-France as I was working with Alain Moulet at the French Embassy in Canberra.

The FEAST team is composed of a small secretariat with an important community. The over-



all job of this six handed secretariat is to catalyze excellence within this community.

More specifically, my role at FEAST is to liaise with the community. For example, by posting this newsletter every two months. But most importantly, by providing quality services to address issues of Australian European collaborations:

- Ongoing updates of successful research projects,
- One stop shop system for enquiries.
- Deliver effective activities with and for the FEAST networks.

My other interests include science-fiction, steam trains (I read too many Jules Verne novels in my earlier days), clarinet, discuss daily theories.

To contact me: I am behind the info@feast.org email

Jean-Francois Desvignes-Hicks

Potential risks of engineered nanoparticles

The British Department for Environment Food and Rural Affairs (DEFRA) recent response to the Royal Society and Royal Academy of Engineering report "Nanoscience and nanotechnologies: opportunities and uncertainties", illustrates the growing recognition by European policy makers of the gaps in our knowledge associated with the risks posed by nanoparticles to human health and the environment.

Many applications of nanotechnologies introduce no new health, environmental or safety risks, for example where the nanotechnology is on the scale of a node on a computer chip or of nanometer thin films on storage devices such as hard discs. The major concerns, which have been expressed strongly in the literature and in political debate, relate to nanomaterials, specifically engineered nanoparticles. The fact that such nanoparticles are of the same scale as cellular components and larger proteins has led to the suggestion that they might evade the natural defences of humans and other species and damage cells.

Nanoparticles can be character-

ized in terms of their size, shape and composition. In terms of size, the reduction in size to the nanometer level results in an enormous increase of surface area, so that relatively more atoms or molecules are present on the surface, thus enhancing the intrinsic reactivity. In terms of shape, nanomaterials can be characterized as: nanoscale in one dimension, e.g. thin films, layers and surfaces; nanoscale in two dimensions, e.g. nanowires and carbon nanotubes; nanoscale in three dimensions, e.g. fullerenes (spherical molecules about 1 nm in diameter comprising 60 carbon atoms arranged in a cage structure), dendrimers (complex organic molecules) and quantum dots (semiconductor nanopar-

ticles). In terms of chemical composition, because of the high surface/volume ratio,

it is possible that nanoparticles with a dimension under 100 nm can have different properties from the bulk material. Thus, a relatively benign chemical compound can become highly active at the nanoscale. All of these parameters define how nanoparticles behave when inhaled, ingested or placed on the skin of humans.

The health and safety issues of nanoparticles are at an early phase but there is a rapidly growing field of nanotoxicology in the biological and medical literature. Extensive research is underway, particularly in the USA and Europe, with several projects in the EU Fifth and Sixth Framework Programmes such as: Nanosafe, Nanoderm, Nanopathology, Nanotox, Impart and Nanosafe2. Data banks are being developed so that toxicity of existing and new nanomaterials can be readily accessed.

continues page 9 ...

The French Connection

France is a major partner of Australia in many fields: Economy, Defence, Culture, Education... Science and Technology is another major area in which France and Australia maintain strong links.

In 2005, the ARC (Australian Research Council), in its Linkage-International Selection Report, stated that “*The highest number of reported international collaborations was with France (...)*”. French researchers also had the highest success rate (36%) in the ARC International Fellowships, followed by the USA.

With these figures in mind, France still intends to further scientific and technological relations with Australia. With the help of the Associations for French-Australian Science (AFAS), the French Embassy works to maintain a high level of financial and technical support, not only to researchers for travelling and working jointly, but also to seed programs such as Cotutelle (double-badged doctoral degree), or to create networks such as FEAST-France. The French Embassy’s scientific section has been operating for over 15 years; its role is to develop French-Australian cooperation in science and technology by:

- maintaining and facilitating contacts between scientists and researchers from both countries,
- providing scientists with a broad range of funding opportunities to enhance exchanges,
- running a technological and scientific watch, then making this research available to both countries (through our 2 publications: French Science and Technology Fortnightly and BestOZ),
- assisting prospective or established cooperation projects,
- actively promoting our programs in universities, research organisations, governmental agencies,...
- animating FEAST-France. The network gathers French and Australian researchers and highlights S&T bilateral cooperation by identifying, supporting and strengthening linkages and cooperative ventures between France and Australia. FEAST-France also intends to assist “*Targeted*

Research Networks” to catalyse R&D skills, knowledge, technology and opportunities in joint research priorities. Events are also organised to raise awareness of opportunities for S&T cooperation between France and Australia.

■ Other actions

Besides FEAST-France, the French Embassy manages several programs, including funding schemes to help collaborative research projects:

■ FAST (French-Australian Science & Technology Program) is managed in conjunction with the Australian Department of Education Science and Training (DEST). It supports travel and short stays for scientists involved in collaborative research projects in Science for up to 2 years. (see [FEAST focus #18](#))

■ The Social Sciences program, organised in conjunction with the Academy of Social Sciences in Australia (ASSA), supports travel and short stays in the framework of collaborative research projects over 2 years. The goal of the programme is to support specifically targeted research and seed money for projects with a clear collaborative research focus.

■ The Cotutelle

Developing the PhD. Cotutelle or Joint/Double-Badged Doctoral Degree is another priority for the French Embassy’s scientific section. It is an opportunity for a French or an Australian graduate student to obtain a double-badged doctoral degree delivered jointly by a French and an Australian university. Since 1997, when the first PhD student was enrolled in a Cotutelle between France and Australia, the program’s success has soared in a fantastic way. To the date, 109 students have been, or are enrolled, in a Cotutelle between the two countries. More than just a financial support, the French Embassy works to promote the full scope of opportunities offered by the Cotutelle program.

■ New Networks under way

Besides the International Associated Laboratory on “grasslands from climatically stressful regions” to be officially created very soon between CNRS, the universities of Grenoble 1, Montpellier 2, and Paris 6 on the French side, and ANU and CSIRO, another project on “experimental approaches on water governance” could emerge from a bilateral workshop to be held in Montpellier this coming April.

In the huge field of nanotechnologies, an Australian delegation visited France in April 2005, opening a more integrated approach aiming at the possible creation of a bilateral network, a part of which could benefit from OzNano2Life (see page 7). A French delegation is expected to visit various Australian potential partners next July.

France has a leading research system in transport (road, railway, etc.) leaning on a dense network and industry. A delegation of the INRETS (National Institute of Research on Transports and Security) visited Australia last November. The first outcome of the visit is the organisation of a bilateral workshop later in 2006.

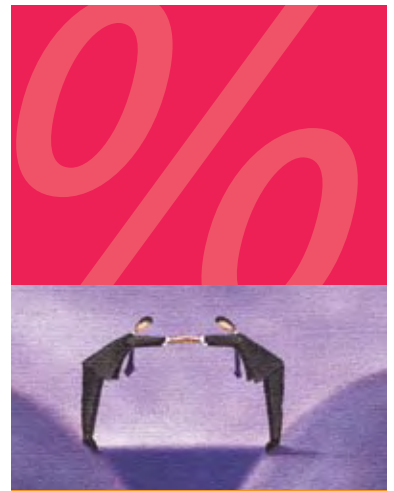
The Embassy strongly supports all of these initiatives, as they could lead to virtual labs, or at least strong networks under the “FEAST-France” label.

■ The Scientific Section

Don’t forget to visit regularly our “one-stop-shop” website (www.ambafrance-au.org/science). In addition to regular and documented news, you will find specific information on FEAST-France, French and Australian R&D structures, funding opportunities, Cotutelle, and other practical matters. The website is updated each week. Do not hesitate to contact us for further information. We would be pleased to answer your query(ies) as precisely as possible.

Contact: Tel: 02 6216 0131, mail: science@ambafrance-au.org

*Prof. Robert Farhi and
Frédéric Vanhove*



More information about countries in Europe at: www.feast.org/?countries

For more information and regular news, please make sure to bookmark: www.ambafrance-au.org/science

MILESTONE: commencing collaboration



A team from the European Space Agency (ESA) and the Australian National University (ANU) have developed a new 'ion engine' for use in space travel.

More at:

www.feast.org/?article&iD=87

Portrait of a researcher

Dr. Andrew Minett received one of the 18 Queen Elizabeth II fellowships (QEII) in 2005 for his project on Novel Carbon Nanotube Composite Materials at the Intelligent Polymer Research Institute (University of Wollongong, NSW).

He is also Project Leader for the ARC Centre of Excellence for Electromaterials Science, based at the University of Wollongong. The Centre, headed by Professor Gordon Wallace, has just been officially opened (as of 16 February 2006) for the next 5 years.

Andrew's career as a young researcher leaned from the start toward the international scene. Just after his PhD he was offered a 2 year Research Fellowship at the von Klitzing Department, Max-Planck-Institute fuer Festkoerperforschung (Max Planck Institute for Solid State Research), Stuttgart, Germany.

Andrew then moved to Ireland as a consultant for Media Lab Europe, the European branch of MIT's Media Lab (Boston). Staying another 3 years in

Dublin, Andrew became Senior Research Fellow in the Molecular Electronics and Nanotechnology Group, at Trinity College along with a Lecturing position in the Department of Physics.

"My research centres on developing methods to understand the interactions and/or functionalisation of entities - such as molecules, polymers or biological moieties - with nanoscale materials including nanotubes and nanowires; and to make use of this understanding to provide new directions in device development. My most significant contribution to this knowledge base in my early career has been the development of two separate novel purification and functionalisation methods, which are each protected by patents. Most recently, purification using com-

posite formation, and prior to that, a new hydrothermal technique for single-step purification and functionalisation of carbon nanostructures.

The primary aim of my current project as an ARC QEII Fellow is:

1. to investigate the interactions of molecular and polymeric (including biopolymeric) materials with carbon nanostructures in order to tailor the physical and chemical properties of the resultant composites.

This will be achieved by two secondary aims:

2. to develop novel methods to probe these interactions and fill the gaps in current knowledge.

3. to apply these methods to develop protocols to incorporate biomolecules and other nanoscale materials into functional bioelectronic devices that can find ultimate application in environmental, biomedical and bioelectronic technologies.

continues page 6 ...

One of them is Davide Crepaldi, a PhD student at the University of Milan - Bicocca (Italy). This university is one of the newest in Italy (created in 1993). One particularity of its postgraduate education is that most of the PhD students are enrolled for 4 years as they are strongly encouraged to stay one year in a foreign laboratory.

The Milanese team conducts research on how a grammatical class is represented in the mental lexical system of the human brain. In particular, Davide had results indicating that verb impairment may be caused by damage to the argument structure.

The first benefit of coming to the Macquarie Centre for Cognitive Science (MACCS), is the possibility of working in one of the most advanced laboratory of Cognitive Neuroscience in the world. In particular, Max Coltheart and his team at MACCS have a special competence and great experience on two types of studies that have a great relevance in the cognitive neurosciences: behavioural studies on normal sub-



A new researcher in Australia

The DEST Endeavour Europe Awards provided financial support for 15 postgraduate students from designated European countries to undertake research in Australia.

jects and computational studies. The Department of Psychology of the University of Milano-Bicocca, where Davide works, is predominantly focused on neuropsychological studies on aphasic patients and thus this research period at MACCS can noticeably widen his method-

ological background. From this cooperative research, topics have evolved and Davide is currently working on computer models for experimental simulations before heading back to Milan.

Acknowledgement Davide Crepaldi

Nanotech networks

We discussed an approach of European-Australian collaborations in nanotechnology with Chennupati Jagadish, Federation Fellow, Convenor of the ARC Nanotechnology Network (ARCNN) and Professor at the Research School of Physical Sciences and Engineering at the ANU

Jagadish's view is that the main driver for collaboration is the need to match complementary expertise. Therefore expanding from his personal collaboration to more diverse cooperations like the following examples:

■ in Oxford

Dr. Michael Johnston is the leader of the Terahertz Photonics Group in the Department of Physics, at the University of Oxford. He has visited the ANU numerous times, including this January. Their personal collaboration includes the regular publication of articles on optical spectroscopy of semiconductors.

The collaboration was successfully funded in 2005 on both sides by the ARC in Australia and the EPSRC in the UK. The ARC discovery project was granted to Dr Lan Fu from the Semiconductor Optoelectronics and Nanotechnology at the ANU and to Michael Johnston with both of them as Chief and Principal investigators. The \$AU 480,000 will permit the team to work in Australia on the development of high performance III-V semiconductor photoconductive antennas for terahertz applications. In the UK, Michael Johnston secured a £ 517,705 (\$AU 1.2 million) funding over 5 years through the EPSRC programme in Engineering for a project, not only linking Oxford and Jagadish's team but also the Italian National Agency for New Technologies (ENEA). The Oxford's group will specifically develop terahertz spectroscopic sensors that would be particularly well suited for research in extreme environments.

■ in Stockholm

Bengt Gunnar Svensson spent a few months in Jagadish's Department in 1991 during a sabbatical. Bengt, now Professor at the University of Oslo, was then researcher in the Solid State Electronics laboratory at the Royal Institute of Technology in

Stockholm. His team participates in ENDEASD, the European Network on Defect Engineering of Advanced Semiconductor Devices, bringing together groups in Europe to improve the radiation tolerance of silicon devices used in high energy particle physics and space applications.

They first worked on defects generated in megaelectronvolt germanium ion implanted silicon. Since then they have published nearly 20 papers together. In 1999, the Swedish Foundation for International Cooperation in Research and Higher Education (STINT) awarded Professor Svensson a SEK 500,000 (\$AU 87,000) grant over 3 years for his collaboration with Prof. Jagadish. While they have funding from their home institutions for research, the grant enabled them to strengthen their collaboration. The STINT fellowship programme, now called the Institutional Grants Programme, supports exchange of postdoctoral and senior researchers between Sweden and international collaborators. Using this tool, the collaboration has gone beyond personal contacts toward new projects with other groups at the Swedish Institute. Their recent collaboration is the study by spectroscopy and ion-beam techniques of defect formation in Silicon carbide involving Jagadish's colleague Dr. Jenny Wong-Leung, QEII Fellow, who has obtained ARC funding for a joint project with her and Bengt Svensson as Chief and Principal Investigators.

Quoting Prof. Jagadish, starting collaboration only works when the partnerships are based on the sharing of a common philosophy and probably by enjoying the same pleasure and fun in research. Keeping excellence in mind, it will be better to join forces to make a bigger impact, even by sharing the results, than keeping the benefits to one group with little progress and impact.

We could have detailed the training of students with the Departments of Applied Physics and Electrical Engineering at the Eindhoven University of Technology for Device processing, or constant exchanges, since 1992, with Warsaw University for research on semi conductors including with the support from DITR; or many other partnerships with the Semiconductor Physics Institute in Lithuania, the University of Karlsruhe in Germany, and also in France (Grenoble, Lyon and Toulouse). But we have seen examples of successful collaborations triggered by tools accessible to young researchers: home funding through ARC Discovery, use of opportunities offered by European countries, for research, for international collaborations.

■ ARCNN

In the same spirit of joining forces, to achieve maximum impact, the ARCNN, offers support to the members of the network for the often missing link: Short and Long Term Visits (from 2 weeks and up to 3 months), Overseas Travel Fellowships (up to 3 months) for postgraduate students or early career researchers. In the later scheme, 2 rounds per years will grant up to 50% of travel costs to a maximum of \$AU 5,000. Meanwhile the Distinguish Lecturer programme enables specialists like Professor Klaus Ploog from the Paul Drude Institute in Germany in 2005, to tour Australia.

The Australian Nanotechnology Network (ARCNN) was granted a \$AU 1,900,000 for 5 years in 2004 by the ARC Research Networks' scheme. The 24 selected Networks build on excellence of individual researchers and small teams to enhance the scale and focus of their research; and to encourage interdisciplinary, innovative and collaborative research. The ARCNN will host the ICONN 2006 conference (see Diary).

The challenges facing the Nanotech/nanomaterials sector to address control of shape, size and position of nanostructures/wires will definitively be tackled with greater impact by linking Nanotech networks in Australia and in Europe

MILESTONE:
build on
partnership



European consortia are studying how to build a land-based telescope bigger – in a field where size matters - and more powerful than any Earth-bound star-gazing tool built to date...

more details at:
www.feast.org/?article&ID=31

MILESTONE: global events



The WomenInNano Specific Support Action aims to encourage women to take a more active interest in science, and especially nanotechnology
www.ifw-dresden.de/women-in-nano/

... from page 4

The research outlined in this proposal intends to produce and understand the physical properties of novel composite materials with nanoscale characteristics that maintains their conductivity, stability and good interaction with biomolecules. This is essential for device functionality, however there are additional obstacles in device development, which this project aims to address:

1. interfacing the nanostructured materials to the mac-

rosopic world (the contact problem)

2. controlling the integration of nanoscale materials into micro- or macro-scale composite materials."

On 8 February 2006 a video-conference took place between COST (Brussels) and FEAST (Canberra). Initialised by the COST-Office Director Dr.-Ing. Martin Grabert and FEAST Executive Director Dr. Neil Hamilton it brought young outstanding Australian researchers together with representatives of the COST-Office. Very promising opportunities have been

identified and will be followed.

Andrew was part of this group. Rich with his European experience, Andrew holds a key position for later European-Australian projects as he knows the strengths and weakness of both sides and therefore where collaboration is most needed to remove some of the obstacles cited above.

We will have a focus on the conference, its outcomes and COST in a later issue.

Acknowledgement
Andrew Minett

Restructuring of Research in France

France is undergoing a major reshuffle of its research structures.

Along with about 90 universities, the scientific research network is split into a number of institutions, the most important of which, as far as the staff is concerned, being CNRS (multidisciplinary like the CSIRO) and CEA (equivalent to ANSTO). The investment of industry in R&D is only 52% of total expenditure (2.2% of the GDP), to be compared with about 67% in United States and 74% in Japan.

■ Funding structures

The main changes have thus been focused on higher levels of commitment from the industry, through the creation of two new funding agencies:

- the ANR (National Agency for Research),
- the AII (Industrial Agency for Innovation).

Both agencies will be funding projects through competitive calls. While the ANR is more focused on academic R&D and can be compared to other European research councils, the AII has been created to give rise to innovative projects with industrial partners. The budget of the ANR and the AII for 2005 respectively amounts to 700 million and 1 billion euros respectively (\$AU1.1 and 1.6 billion). To some extent, the ANR's objectives are similar to the ARC. However the agency was created just one year ago and has not yet

opened its funding policies to international partnership.

■ Networks of competence

In addition to the ANR and the AII, the French Government have also created 66 competitiveness clusters (*Pôles de compétitivité*). They are similar to the Australian CRCs in that they include academic and industrial partnerships. Each cluster is geographically localised in a French region, and its funding may involve local governments and industries, universities, all the range of public and private research institutions, including the ANR.

This new set of initiatives aims at increasing the part of the GDP devoted to R&D up to 3%, in agreement with the Lisbon strategy for

research in Europe.

■ Higher Ed Networks

Finally, in order to achieve critical sizes able to compete at the international level with multidisciplinary high level institutions, research and higher education structures are given the possibility to merge, together with companies when needed, into "Research and Higher Education Clusters" (*Pôles de Recherche et d'Enseignement Supérieur*). In addition, "Thematic Advanced Research Networks" (*Réseaux Thématiques de Recherche Avancée*) can be created by various partners to develop a research project of excellence in one or several topics.

This set of new institutions is part of the so-called "Pacte pour la Recherche" (Pact for Research), which has just been adopted by the Parliament and the Senate as a Research Act.

Prof. Robert Farhi and
Frédéric Vanhove

TOOLBOX

The ANR (National Agency for Research - Agence Nationale de la Recherche)

www.agence-nationale-recherche.fr

The AII (Agency for Industrial Innovation - Agence de l'innovation industrielle)

www.aii.fr

Networks of competence (*Pôles de compétitivité*)

www.competitivite.gouv.fr

OzNano2life

In 2002 the French-Australian Industrial Research (FAIR) programme supported a mission to France of an Australian delegation led by the University of Technology, Sydney (UTS) to find synergy in Nanobiotechnology with the CEA (French Atomic Energy Agency) in the French Alps near Grenoble.

From this kick-off mission, things snowballed in 2003. In December 2003 the Network of Excellence (see FEAST focus #19), *A network for bringing NANotechnologies TO LIFE* or Nano2Life received the green light from Brussels to start in February 2004. While the Australian participation was not formalized in the EU contract, the down-under partners established and organised an Australian network associated with Nano2Life. In June 2004, the Australian NanoBiotechnology Cluster, now called OzNano2Life, received about \$AU 975,00 funding from the fourth round of Australian government Backing Australia's Ability International Science Linkages programme (ISL).

■ Partnership

The Convenor for OzNano2Life is A/Prof Donald Martin from UTS who has developed the personal connections with the principal international partners in the EU Network of Excellence (NoE). The Executive Committee of 12 Core participants manages the cluster.

OzNano2Life provides the portal for structured exchange of scientists and information with European nanotechnology institutes participating in the EU NoE in Nanobiotechnology (Nano2Life). The NoE received 8.8 millions euros for 4 years and gathers 24 members from across Europe, including Nano clusters like Oeresund (Sweden), Bio-Analytik in Muenster, NanoBioNet in Saarbruecken, NanoBio in Grenoble and PCB Barcelona.



OzNano2Life is primarily a cluster conducting cutting-edge and international collaborative research in nanobiotechnology (including Frontier Technologies, and Advanced Materials). Its activities include international workshops, generating an excellent platform for innovation, participation in national and international events, exchange of young and senior researchers (for training and fellowships).

OzNano2Life's research road map is divided in 6 multidisciplinary packages, each of which is lead by a Australian-European binomial team:

1. the "artificial cell",
2. G-protein coupled receptor biosensor technology
3. immobilisation of proteins and novel biochip array platforms,
4. biomimetic nanosprings and novel nanostructured elastomeric materials,
5. nanomechanics of lipid membranes using holographic interferometry,
6. nanoscaled biological screening devices in microfluidic applications.

■ Outcomes

The cluster has so far facilitated 6 postdoctoral positions at the University of Queensland, CSIRO, UTS, University of Sydney, University of Münster (Germany) and University of Lyon 1 (France).

The first OzNano2life workshop was officially open by the French Ambassador in Canberra in 2004, followed by two other workshops in Victor Harbour (SA) and in Sydney (NSW). The 4th workshop will be held in autumn 2006.

Today and future outcomes definitively go toward closer links and more impacts on innovation in Europe and in Australia.

MILESTONE: planning success



2005 International Patent applications
USA 33.6%
Japan 18.8%
Germany 11.8%
followed by France and the UK
Australia is 13th with a rate of growth of 10.1%!

Source: World Intellectual Property Organization,
03/02/2006

The official page of Nano2Life is available at: www.nano2life.org

More information about OzNano2Life is available at: www.ambafrance-au.org/oznano2life/

Tips of the day

- 1 When you Register with FEAST quickly update your profile with your fields of interest or expertise
- 2 If you have question to the FEAST secretariat, jump to the helpdesk to access FAQs or post an enquiry

Nanoscale transistors: where is the limit?

An example of cooperation between Australian and French research teams.

With the development of shorter and thinner transistors, the needs for improved technologies and devices have dramatically increased over the last few years. One of the solutions under consideration is the "Silicon on Insulator" (SOI). A SOI is a layered structure consisting of a thin layer of silicon, from 50 to 10 nm (or 10 billionth of a meter), which is created on an insulating substrate, which is usually sapphire or silicon with an insulating layer of silicon dioxide 80 nm thick on its surface. This process reduces the amount of electrical charge that the transistor has to move during a switching operation, increasing speed (up to 30 to 40%) and reducing switching energy (up to 50%) over CMOS-based chips. SOI chips cost more to produce and are generally used for high-end applications.

The properties of these systems, where the thickness is reduced down to critical values, are not quite well known nor fully understood yet. More specifically, the measurement and the behaviour of what is called "carrier mobility", i.e., in the end, the velocity with which the information is transported, need to be investigated in more details before optimising such devices.

■ The partnership

The FAST (France Australia Science and Technology, see FEAST focus #18) Program has given the opportunity to two teams, one in Grenoble

and the other in Perth, to exchange their knowledge in this area. Grenoble is rapidly becoming a leading centre in Europe for micro and nanotechnologies, with the Minatec innovation centre (www.minatec.com) to open this year in April (see picture). The Institute of Microelectronics, Electromagnetism and Photonics (IMEP), is the French partner, and a member of this centre. The Australian partner is the Microelectronics Research Group at University of Western Australia.

A first 4 week visit to Lorenzo Faraone, at the Department of Electrical and Electronic Engineering (University of Western Australia) of Dr Sorin Cristoloveanu, CNRS team leader, in February 2005 made the two teams realise that their experimental techniques to measure the "carrier mobility" (Quantitative Mobility Spectrum Analysis in Perth and pseudo-MOSFET in Grenoble) were complementary. Dr Cristoloveanu gave several lectures at University of Western Australia, and both heads of research teams (Lorenzo Faraone is also the director of the Western Australian Centre for Semiconductor Optoelectronics and Microsystems - WACSOM) decided to apply for a FAST program support (whose deadline was 25 February 2005!!). Thus,

after having met and discussed new ideas for a collaboration and written the FAST application, the two teams decided to exchange people, samples and techniques. In that regards the comparison of their experimental results was highly helpful. As a whole, two researchers on each side spent up to 4 weeks in the partner country in 2005. The two teams are preparing a joint manuscript for a scientific journal.

■ Outcomes

The next step is the exchange of students, highly encouraged by the FAST program, with a PhD cotutelle to start very likely in 2006.

The scientific results of the cooperation will be very useful to SOI wafers manufacturers such as SOITEC, SEH (Shin-Etsu Handotai, Japan), ST Microelectronics (Switzerland HQ), etc... SOITEC was established in 1992 in Grenoble by two researchers from the CEA-Léti, one of Europe's largest microelectronics research institutes, and maintained strong links with IMEP. Full understanding and modelling of the behaviour of electronic carriers in such thin films is indeed needed by industrial partners to improve the performances of miniaturised electronic devices. Such feedback between basic researchers and industrial partners is one of the key trends of the success in micro and nanoelectronics.

*Prof. Robert Farhi and
Frédéric Vanhove*



For more information, please visit the websites of both teams:

The Microelectronics Research Group (MRG) at UWA www.mrg.ee.uwa.edu.au

The Institute of Microelectronics, Electromagnetism and Photonics (IMEP) www.imep.enserg.fr

INRIA, the French Institute for ICT announced the death of their Chairman and CEO, Gilles Kahn, on February 9 2006
Source: www.inria.fr

BRGM+IG

An example of French-Australian Industrial Partnership in Geology: 3D GeoModeller, the Geologist's Geological Editor and ENGINE, a Geothermal Energy Initiative

Since 2004, BRGM (French Geological Survey and formerly *Bureau de Recherches Géologiques et Minières*) and IG (Intrepid Geophysics) have entered into a collaborative research agreement to integrate IG's geophysical processing with BRGM's geological modeling software. The overall goal of this collaboration is to improve geological modeling – particularly in areas of cover – by incorporating geophysical outcomes directly into the geologist's 3D model building environment.

3D GeoModeller is a geological editor – a 3D geological modeling software package – developed by BRGM. Unlike CAD-based packages which use shapes and surfaces to describe geological objects within a model, 3D GeoModeller describes a geological model in terms of:

- a stratigraphic pile, each series being either onlapping or erosional
- geological contact points (e.g. the points ascribed to the 'top of Formation X')

■ geological orientation data (e.g. a vector v describes the 'facing of Formation X')

The software then builds a 3D model, based on the observations. It includes features the tools that a geologist would traditionally require ... such as the ability to readily input, and visualize, geology - in plan view (geological maps) and sections. New section views are easily created, and all sections rendered from the model are automatically consistent with all other sections and maps.

Subsequently, the GeoModeller Consortium was established in late 2004 to support the further development of the 3D GeoModeller software. The founding participants of the Consortium are all the Australian Geological Surveys, the Geological Survey of Namibia, Placer Dome & CSIRO.

The R&D activities are retained, although the priorities have been revised. The development plan now has a strong client-focus, with the priority to facilitate fast 3D geological model development within organi-

sations that have a range of digital geological data currently managed within relational databases and GIS data structures.

Subsequently to the Geomodeller success, Intrepid Geophysics & BRGM have extended their R&D co-operation to include Geothermal Energy. The new initiative involves developing links between Australian Institutions & European researchers in the geothermal area. The FP6 Co-ordination Action (CA), ENGINE (ENhanced Geothermal Innovative Network for Europe) is actually managed by BRGM. Bearing in mind that the European Commission targeted in 2003 of doubling the contribution of renewable energy from 6% to 12% by 2010. Geothermal Energy would contribute much to this objective.

In Australia, Intrepid is a member of the Australian branch of the International Energy Agency (IEA), Geothermal Implementing Agreement Network, which has the support of Exploration & Testing companies, State & Commonwealth agencies & service providers. The Intrepid/BRGM link provides a conduit for direct and efficient two way transfer of experience or knowledge between France and Australia in this area.

*Desmond FitzGerald
Head of IG*

For more information, please visit:

www.geomodeller.com or www.intrepid-geophysics.com

Potential risks of engineered nanoparticles

... from page 2

Given that the toxicology of a nanomaterial can be assessed, the critical safety issue is the extent of exposure. This can occur in various ways, e.g. during manufacture (accidental release), during use (from consumer products like cosmetics or sunscreens, or from drug delivery products) and during disposal (contamination of air or groundwater). There is clearly a need for careful regulation and monitoring at all these stages. Existing regulations cover many aspects of handling ultrafine particles such as welding fume,

carbon black, silica fume and exhaust particulates, but engineered nanoparticles may need additional regulation. From the existing data it is reasonable to conclude that: products employing tiny volumes of embodied nanoparticles pose little concern at any stage; exposure in manufacturing is directly related to the volumes concerned; exposure in use is likely to be highest for products with embodied, not free, nanoparticles and, exposure at end-of-life is more likely when no procedures exist.

While there are sufficient proxies with ultrafine particles to

enable adequate precautions to be taken and allow production of nanoparticles and their use in selected applications to go ahead, there is a clear need for more information on aspects of nanoparticle production, application and disposal, and on toxicity of nanoparticles to humans when inhaled, ingested and applied to the skin, and to toxicity in soils and water supplies. The EU Framework projects can provide such data.

Professor Greg Tegart

*Distinguished Visiting Fellow,
National Europe Centre, ANU*

SNAPSHOT: bookmarks



Careers Beyond frontiers

Dr Michael Krause received a 3 year Marie Curie Outgoing Fellowship to spend 2 years in the Sustainable Energy Centre at the University of South Australia followed by a return phase of 1 year in the Solar- and Systems Engineering Group at Kassel University (Germany)

■ The partnership

The present link has been established since Michael and his team in Kassel wanted to extend their research field to Solar Air Conditioning. So far they have developed an expertise in solar domestic hot water applications. A quick paper review shows that solar air conditioning has gained a lot of interest around the world during the past few years. In Adelaide, Prof. Wasim Saman was already working on a solar assisted dehumidification and cooling system and was keen to continue the research on this topic. Especially since Adelaide the only institute in Australia working solar air conditioning was two years ago, Michael contacted Prof. Saman and they jointly developed the project ideas and submitted the application to the Commission in May 2003.

The “Dehumidification and cooling driven by solar/waste heat using liquid desiccants” project started in mid 2004. Unfortunately, the centre in Adelaide was not successful until last January in receiving further major funding for the project, leaving Michael mainly working only with undergraduate students.

“Even if there were many interactions with other researchers from the centre and especially Prof. Saman, this situation was not always perfect. However, a possible reason for this might be that even if Australia has huge wind and solar resources, some funding bodies show a relatively low interest in renewable energy. Additionally, I sometimes get the impression that the acceptance of qualified fundamental research within the Australian society is not as high as it seems to be in Europe. One result of this is that it is difficult to motivate students to continue research within the University after their Degree and do a PhD or even a Master. Thus, by far more than 50% of the researchers in engineering sciences at the University of South Australia are from overseas, which makes it sometimes difficult to find researchers to carry out the research, even if you would have funding for projects.” says Michael.

The European research institution manages the whole contract including the financial aspects, the research activities and employment of the fellows (tax, health insurance,...). It is

nevertheless necessary to have an agreement between research institutes, preferably in advance to address issues like money transfer, intellectual property and support of the fellow.

■ Outcomes

In general the Marie Curie Scheme covers personal expenses for the researcher and institutions’ overheads. In Michael’s case the fellowship also supported participation in two conferences, and experimental equipment.

Through the fellowship both Universities in Kassel, and Adelaide, maintained their level of international cooperation. From the German point of view Michael introduced a new research topic within the existing research group. On the other hand the Adelaide centre successfully continued a previous research topic. Technical outcome for the solar air conditioning systems are numerous: gathering a lot of new experience in the field, both practical and theoretical leading to the publication of several papers, and hopefully the basis for a commercial product.

Through Michael’s work an option for regenerating salt solutions has been demonstrated. To achieve a higher variation of operating conditions, the testing will be continued. Using the developed model, simulations of a single-family house with solar domestic hot water, heating and cooling/dehumidification will be carried out.

*Acknowledgement
Michael
Krause*

The Challenge

The energy demand for commercial and residential buildings air-conditioning has increased continuously throughout the last decades and is still rising. This increase is caused amongst other reasons by increased thermal loads, higher comfort demands, and architectural trends. Most of the current air-conditioning units are vapor compression machines systems, that are heavy electrical consumers. The substitution of these compression machines by thermally driven cooling systems using renewable energy or waste heat is considered a promising alternative. In particular due to a high correlation between solar irradiation and cooling demand of most buildings, the application of solar energy is extremely attractive.

In humid climates or buildings with high latent loads, the use of liquid desiccants in an open cycle system is an important option for solar assisted air-conditioning. The proposed system is

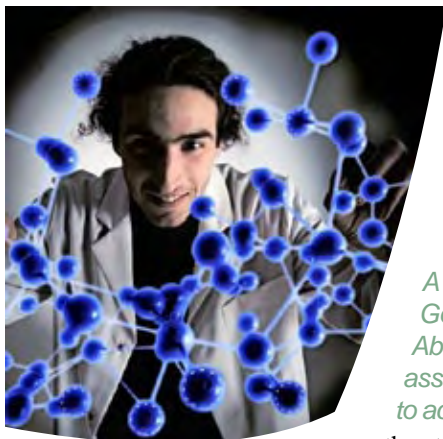
composed of the absorber, regenerator, indirect and/or direct evaporative cooling units for the dehumidified fresh air and heat recovery stages for both, the desiccant solution and the regeneration air. The absorber dehumidifies a flow of fresh air by direct contact of a hygroscopic solution (e.g. LiCl or CaCl₂). The cooling effect in such systems is provided using indirect and/or direct evaporative cooling.

While absorbing the moisture, the concentration of the hygroscopic solution and thus, its capability to absorb water, decreases. This requires drying of the solution, which can be done in a regenerator, driven by solar thermal energy. Solution tanks for strong and weak solution offer the option to operate the system even at times, when no solar energy is available, heat recoveries of air and desiccant especially for the regeneration process are necessary for a high coefficient of performance (COP).

Research & development expenditure by business sector in 2002-2003 (as % of total R%D expenditure)

Japan:	73.9
Sweden:	71.9
USA:	67.3
EU (25):	55.4
Australia:	48.8
UK:	46.7

Source: Eurostat and ABS



What is? The International Science Linkages Programme (ISL)

A programme established under the Australian Government's Innovation Statement - Backing Australia's Ability which will provide \$92.7 million over nine years to assist Australian researchers and firms to build networks to access international science and technology.

The ISL programme aims to assist Australian researchers to increase their participation in international leading edge scientific research, to leverage access to international research funds, to raise the profile of Australian research, and to support the development of strategic alliances between Australian and international researchers and industry.

The Competitive Grants component of the ISL provides support on a competitive basis for Australian researchers to participate in strategically focussed, leading edge, international scientific research and technology collaborations, including participation in European Union Framework Programme (EU FP) activities,

the staging of major international scientific conferences in Australia; and showcasing Australia's scientific research and technology capabilities. A call for Competitive Grants applications is made twice a year, in March and August, with 1 month allowed for the submitting of applications. The current application round opened on March 1, 2006 and will close on Friday, March 31, 2006 at 17:00 AEST. Competitive Grants is heavily subscribed with strong competition for the available funds.

Australian researchers seeking funding for participation in EU FP collaboration projects are invited to apply to Competitive

Grants. It is important to note that any application received is merit assessed by DEST on a competitive basis and no application is automatically funded even if it has already secured matching funding.

Two bilateral funds have also been established under the competitive element of the ISL programme specifically with China and France. The Australia-China Special Fund for S&T Cooperation (Australia-China fund) and the French Australian S&T programme (FAST, see [FEAST focus # 18](#)) are administered bilaterally with the respective country government. One call for applications is made annually.

Further information on the ISL programme is available on the website: www.dest.gov.au/science/isl or by contacting (02) 6240 5465.

Glossary

■ ANSTO

Australian Nuclear Science and Technology Organisation (AU)
www.ansto.gov.au

■ CNRS

French National Research Centre (EU)
www.cnr.fr

■ Consortium

A group of participants in the same FP project (EU)

■ Cordis

COmmunity Research & Development Information Service (EU)
www.cordis.europa.eu

■ COST

European Co-operation in the field of Scientific and Technical Research (EU)
www.cost.esf.org

■ CRC

Cooperative Research Centre (AU)
www.crca.asn.au

■ CSIRO

Commonwealth Scientific and Industrial Research Organisation (AU)
www.csiro.au

■ DEST

Australian Department of Education Science and Training (AU)
www.dest.gov.au

■ EMBL

European Molecular Biology Laboratory (EU)
www.embl.org

■ ERA

European Research Area (EU)

■ FP6/7

6th/7th Framework Programme for Research and Technological Development (EU)
europa.eu.int/comm/research/fp6

■ GRDC

Grains Research and Development Corporation (AU)
www.grdc.com.au

■ STREP

Integrated Projects in FP6 (EU)

■ IATICE

Italian-Australian Technological Innovations Conference & Exhibition (AU)

■ INRA

French National Institute for Agricultural Research (EU)
www.inra.fr

■ ISL

International Science Linkages grants of the DEST (AU)
www.dest.gov.au/science/isl/

■ JRC

Joint Research Center (EU)
www.jrc.cec.eu.int

■ Marie Curie actions

Mobility fellowships and grants (EU)
www.europa.eu.int/mariecurie-actions

■ NHMRC

National Health and Medical Research Council (AU)
www.nhmrc.gov.au



The FP6 Glossary can be found at:
fp6.cordis.lu/fp6/glossary.cfm

Diary

To add your event to this snapshot of Australia and Europe activity, please notify us at info@feast.org

March

- **ISL round nine**
The International Science Linkages Application round closes: 31 March
www.dest.gov.au/science/isl

APRIL

- **Med-e-Tel**
The International Trade Event and Conference for eHealth, Telemedicine and Health ICT. 5-7 April - Luxembourg
www.medetel.lu

TRANSFORUM 3

- **TRANSFORUM 3**
New needs for Europe: the renewed Lisbon Strategy & transport policy
6-7 April - Amsterdam, Netherlands
www.transforum-eu.net

MAY

- **Nanoparticles for European Industry**
Manufacture, Scale-Up, Stabilization, Characterization and Toxicology. Organised by the Institute of Nanotechnology.
2-3 May - London, UK
www.nano.org.uk/events

JUNE

- **Commercialisation Expo 2006**
Australia's research and technology exhibition, conference and networking event. Includes the Expo Marketplace and Peter Doherty Prize for Innovation.
18-20 June - Melbourne
www.expo2006.com.au

JULY

- **ICONN 2006**
2006 International Conference On Nanoscience and Nanotechnology
3-7 July - Brisbane, Qld, Australia
www.ausnano.net/iconn2006/

- **ESOF 2006**
The Euroscience Open Forum, the 2nd pan-European interdisciplinary science meeting high-

lighting research and innovation
15-19 July - MÜNCHEN, Germany
www.esof2006.org

WCEAM

The First World Congress for Engineering Management.
11-14 July - Gold Coast, Queensland
www.wceam.com

AUGUST

- **ISPMB 2006**
The 8th International Congress on Plant Molecular Biology.
20-25 August - Adelaide, SA
www.sallyjayconferences.com.au/ispmb2006/

- **INORMS 2006**
The International Network of Research Management Societies (INORMS) inaugural Congress on the Internationalisation of Research.
22-25 August 2006 - Brisbane, Queensland
<http://www.inorms2006.com/>

SEPTEMBER

- **TNT2006**
The "Trends in Nanotechnology" 2006 conference will be held at MINATEC.
04-08 September - Grenoble, France
www.tnt2006.org

- **European Healthcare Futures Conference**
The Choice Group (UK) targets to bring together key players in European healthcare.
29 - 30 September - Brussels (Belgium)
www.euhealthcarefutures.org

NOVEMBER

- **IST 2006**
The European Commission's annual IST conference.
22-24 November - Helsinki, Finland
www.europa.eu/information_society



FEBRUARY 2007

- **Launch of the 7th Framework programme**
15-17 February

ARIA

www.scientificambitalia.org/aria/arias.htm

- **March 20-22, Sydney**
Industrial and Technological clusters: Role and importance of innovation for Italian and Australian economy. Case study: Torino wireless Technological cluster and Galileo.
- **August 17-21, Couran cove, Queensland**
Italo-Australian Breast and Ovarian cancer symposium proposal
- **November, Canberra**
Workshop on Earth Observation for adaptive management of inland and coastal waters

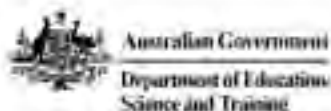


Forum for European-Australian Science and Technology Cooperation

www.feast.org
info@feast.org
building 67a

Australian National University
Canberra ACT 0200
Australia

Tips to be up-to-date with the Euro lingo: **CORDIS Express** You can receive CORDIS Express in your Email every Friday morning.
www.cordis.lu/express



This project is proudly supported by the International Science Linkages established under the Australian Government's innovation statement, Backing Australia's Ability and by the European Community's Sixth Framework Programme

The FEAST secretariat is hosted by the Australian National University on behalf of Australia's research Community