



External Grants & Commercialisation Activities

In 2004, the School derived more than 50% of its income (around \$16.5 million) from external sources that included competitive research grants from various ARC schemes, involvement with Co-operative Research Centres, other Government and non-government grants and direct industry contracts. There were around 100 active ARC grants in 2004 and the total number of individual external grants/contracts exceeded 275. The School's engagement with industry ranged from involvement in the Australian Photonics and the Functional Communication Surfaces Cooperative Research Centres, through successful joint grant applications with industry (ARC Linkage, ACT Knowledge Fund, AusIndustry), direct industry contracts/joint ventures and involvement with spin-off companies. External funding from industry engagement brought around \$5.5 million to the School in 2004.

Interactions with industry have assisted the School to build long-term relationships with the commercial sector that not only stimulate commercialisation of the School's research but provide flow-on benefits to the School's more fundamental research. This approach supports the School's strategy of pursuing research that covers both fundamental and applied (pre-commercialisation) activities. Such a broad research profile and overlap between the fundamental and applied programs can often provide some surprising results in which fundamental research achievement can lead to important commercial opportunities. For example, three spin-off companies have arisen from quite fundamental research in the School. Such spin-off companies include: RPO P/L, which is commercialising innovative polymer/glass composites with a range of applications in optical communications and as smart optical films; Vimed P/L, soon to be renamed as Radiosol Research P/L, which is commercialising novel nanoparticles that have applications in medical diagnosis; and WRiota P/L that is developing nanoindentation in silicon as a means of realising an entirely new memory technology.

The following applied research projects in the School are being explored for potential commercialisation. Patents have been granted or provisional patents lodged in all of these areas.

High Brightness Helicon Plasma

A contract has been negotiated with the FEI Corporation and leveraged with an ARC Linkage grant. The project is progressing well with the achievement of high brightness in devices designed by the Helicon Plasma Group. These are currently being engineered by FEI into commercial prototypes.

Modulated Solid State Spectrometer (Moss)

MOSS instruments, that provide a temperature image and other properties of high density plasma streams, have been developed in the School for commercial sale. A single channel instrument was recently delivered to Associazione Euratom-Eneasulla

Fusione in Italy. A further contract for the development of an instrument was negotiated with a Korean client in late 2004 and it is expected that this instrument will be delivered in 2005.

Optical Temperature Measurement

A Knowledge Fund grant was obtained in late 2003 in conjunction with BHP Steel (now Bluesteel) to develop an industrial radiation thermometer for the assessment of temperature of streams of molten steel and slag exiting a blast furnace. The instrument was demonstrated to provide information on the flow rates of slag and steel and was so successful that Bluesteel is negotiating for further contract research to develop it to industrial strength capable of operating in the rugged conditions around a blast furnace. A new patent application for multispectral analysis which is a development of the earlier frequency and space domain techniques that can be used to derive temperature, emissivity and change of emissivity with temperature from a single set of measurements.

Visualisation and Modelling of Porous Media

Contracts for the evaluation and modeling of oil bearing rock and for the evaluation of porous materials continue to come in. The Department of Petroleum Engineering at the University of NSW has contracted to supply an X-Ray CT Scanner and software to Oil and Natural Gas Company of India. ANU and UNSW will share in the supply of the instrument, software and training in its operation. A contract between ANU and UNSW is under negotiation and will result in the duplication of the ANU CT Scanner and provide significant funds for research.

BushLAN

A Knowledge Fund grant was obtained to assist with the development of this innovative technology that is being applied to cost-effective internet access for remote subscribers. Two ARC Linkage grants commenced in 2004 in this area. These are investigating aspects of the market for BushLAN and in the development of demonstrations of the technology. Several complete BushLAN boxes have been built, a wireless link to test the technology has been established across campus to the Engineering building and a demonstrator is in place in an area of regional NSW adjoining the ACT. Plans are afoot to extend the technology to higher frequencies.

Carbon & Boron Nitride Nanotubes

Sales of Boron Nitride nanotubes continue to be made in small amounts although we are able to manufacture large amounts of these materials compared to other methods, we still are limited in our capacity to make them. The Linkage

grant application to assist with the scale-up of the laboratory equipment was unsuccessful and the industrial partner withdrew so we are attempting to find other partners.

Ion Thruster Rocket

Interactions with both NASA and the European Space Agency (ESA) continued in 2004 because of the potential of this technology. The progress has been good and an agreement has been reached with NASA.

Mechanically Imposed Phase Changes in Silicon for Storing Digital Information

This silicon phase change technology and its protection through lodgment of a patent application has led to the setting up of a spin off company with external investors. This company, WRiota, was the industrial partner in a successful ARC Linkage application in late 2004. This Linkage grant and funds from WRiota (of the order of \$0.5 million per annum) will enable the pre-commercial aspects of this application to be developed within the School.

Laser Guide Star

An ARC Linkage grant was awarded late in 2003 in conjunction with Electro Optic Systems to develop an active optic system for adjustment of optical telescopes to remove the "twinkle" from stars when observed from Earth. Progress has been strong during 2004.

Radioactive Nanoparticles for Medical Diagnostics

This project has been in operation for two years through a spin off company VIMED that has been developing technology for detection of Deep Vein Thrombosis. Progress was strong during 2004 but VIMED investors experienced funding problems and the project has been taken over by the School pending the revamping of a new spin off entity. A new company should be up and running in 2005 with new investment in place.

Implant Isolation of III-V Compound Semiconductor Devices

This technology developed in the School has led to the successful application for an ARC Linkage grant with Epitax P/L as industry partner. The project will begin in 2005.

Advanced Siloxane Waveguide Devices for Telecommunications

This area of technology was developed in the School and has attracted the attention of one of the School's spin off companies, RPO P/L who successfully applied with us for an ARC Linkage project. This will begin in 2005.