Review of activities

Queensland Brain Institute researchers Dr Tara Walker and Tom Keeble work on finding molecules that regulate production of nerve cells in the brain. The Institute, established this year, fosters world-class research in four major fields of neuroscience – stem cells plus degeneration, migration and plasticity.

AUQA congratulated us on exceptional research outcomes and commended our strong support for higher degree students and early-career researchers.

Australian Universities Quality Agency report

Research and research training

Objectives

- to promote the value of research to the community, boost our leadership role and critically assess our performance against international peers
- to achieve international distinction in areas of strategic priority
- to collaborate with government, industry and global communities, increase funding from all sources and enhance our role as a major provider of research training

Key outcomes

- first in Australia for ARC Linkage Projects funding
- generated research income of $136.7 million (10 percent of national total)
- awarded $10 million as lead site for Centre for Excellence for Integrative Legume Research Centre
- opening of $105 million Queensland Bioscience Precinct
- commercialisation model named close to world-best practice
- conferred 456 PhDs (21 percent increase on 2002)

Outlook for higher education sector

- more non-government funded research
- more commercialisation of research
- growing globalisation

Our year ahead

- focus on assessing and rewarding research excellence
- more research higher degree students

We supported a broad research profile and invested strategically in key projects to win matching funds from government and other sources. We encouraged and rewarded outstanding achievement, maximised industry collaborations and commercialised research outcomes whenever possible. This provided a fertile environment for generating positive outcomes – and for training the next generation of researchers.

Assessing performance

Benchmarking and review

We operate within and measure ourselves against a competitive and increasingly-focused international research environment. This year an Australian Universities Quality Agency (AUQA) audit and report (page 12) also reviewed our performance.

Annual benchmarking measures include reviewing progress against research targets, monitoring performance (our own and main competitors') in peak national funding rounds, and benchmarking our activities through membership of *Universitas 21* and the Group of Eight (pages 4, 5).

We conduct regular school and centre reviews, chaired by national or international experts, with follow-up of recommendations at 12 and 18 months post-review. This year we reviewed the Schools of

- Animal Studies,
- Biomedical Sciences,
- Engineering,
- Journalism and Communication,
- Languages and Comparative Cultural Studies, and
- Medicine.

Competitive funding

Maintaining our lead

We continued to improve performance across a range of funding indicators. Our total reported research income in 2002 (latest data available, charts page 39) was $136.7 million, representing a four percent rise on 2001 and a 52 percent improvement over five years (from $90 million in 1998).

We earned 39 percent of our research income from industry and other private sector sources, and 13 percent from outside Australia.

Our income from Australian competitive grants schemes has increased by 21 percent over the past five years, from $40 million in 1998 to $48.3 million in 2002. In the 2003 Commonwealth Block Grants we ranked:

- second in Institutional Grant Scheme earnings with $28.3 million, representing 10.2 percent of the national total;
- third in Research Infrastructure Block Grant earnings with $13.6 million, 9.9 percent of the national total; and
- fourth in Research Training Scheme earnings with $51.2 million, 9.7 percent of the national total.

Research strengths...

- Australian and postcolonial studies
- cognition, performance and human interaction
- cultural, historical and media studies
- governance and citizenship
- institutional and organisational change
- social and economical disadvantage
- aetiology and management of disease
- population health and health promotion
- biotechnology
- cellular and molecular bioscience
- complex and intelligent systems
- environment, biodiversity and sustainability
- food and health
- hypersonics
- imaging science and technology
- marine studies
- materials and nanotechnology
- neuroscience
- quantum and Photon Science and Technology
- sustainable agricultural production systems

"Big Four" status

We ranked third in the nation for total Australian Research Council (ARC) funding announced in 2003 for starts in 2004, performing strongly within the "Big Four" (with the Universities of Melbourne, Sydney and New South Wales).

We topped Australia with $19 million in the first round of ARC Linkage Projects funding announced, with 33 projects worth $8.7 million and a further $10.3 million from industry. This was two-and-a-half times the amount earned by any other university from that round.

Major grants (over the next four years) include:

- $708,168, plus $630,000 from Gold Coast Water and Sydney Water Corporation, to study biotransformation processes in sewer systems and optimise wastewater management (Advanced Wastewater Management Centre);
- $888,000, plus $1.3 million from QRxPharma Pty Ltd, to study the venoms of about 20 Australian snakes and develop improved human pharmaceuticals (School of Medicine); and
- $660,456, plus $646,073 from Airservices Australia, to develop a computational model to predict workloads of air traffic controllers (School of Psychology).

We attracted another $22.5 million for 74 projects via the ARC Discovery Projects scheme. This represented nearly 10 percent of the national total. Two of our projects received almost $2 million each:

- $1.805 million to the Centre for Hypersonics HyShot program to research scramjet engines; and
- $1.75 million to a joint IMB and La Trobe University project to develop the next generation of drug design and insecticides.

Our researchers performed strongly in the three fellowship categories integrated into the Discovery grants. They received two Australian Research Fellowships, three Australian Professorial Fellowships and 11 Australian Postdoctoral Fellowships.

We ranked second nationally for the number of ARC Linkage Infrastructure, Equipment and Facilities (LIEF) grants totalling $2.3 million.

We received five LIEF grants totalling more than $1.8 million (commencing in **2004**) as lead institute for projects involving our IMB, Queensland Brain Institute, Centre for Microscopy and Microanalysis, and Faculties of EPSA and SBS. We also succeeded in five support-partner applications.

We attracted six of 24 prestigious ARC Federation Fellowships awarded in 2003 (page 39) and 39 Australian Postgraduate Awards Industry (APAI) PhD Scholarships.

Centres of Excellence

We shared in more than $55 million funding as partner in five of only eight ARC Centres of Excellence (CoEs) to commence in 2003. We won $10 million as lead partner in a new national Centre for Integrative Legume Research and will share, as core partners, in other CoEs:

- Quantum Computer Technology ($14 million, led by UNSW);
- Biotechnology and Development ($9.5 million, led by University of Newcastle);
- Mathematics and Statistics of Complex Systems ($11 million, led by University of Melbourne); and
- Quantum-Atom Optics ($11 million, led by ANU).

In addition to the CoEs, ours was the only Queensland university to win funding for ARC lead Centres announced in 2003. We received more than $15 million for:

- ARC Centre for Functional Nanomaterials ($6.4 million, School of Engineering);
- ARC Centre for Genome-Phenome Bioinformatics ($3.4 million, IMB); and
- ARC Centre for Complex Systems ($3.9 million, School of Information Technology and Electrical Engineering).

Health research funding

We received the third-highest number of new National Health and Medical Research Council (NHMRC) Project Grants announced this year (behind the Universities of Sydney and Melbourne), winning 37 grants totalling almost $14 million.

Our share of the funding was the largest in Queensland and represented nearly 10 percent of total grants announced this year for **2004**. The grants included:

- nearly $700,000 to investigate Indigenous men's health (School of Population Health); and
- more than $500,000 to study the benefits of exercise for diastolic heart-failure patients (Schools of Population Health and of Human Movement Studies).

We will be core participant in two of 11 new NHMRC Program Grants, totalling nearly $11 million, awarded this year for programs commencing in 2004:

- $6.4 million over five years to study the control of nerve cell production in adult brains (School of Biomedical Sciences); and
- $4.38 million over five years to find ways of increasing people's activity levels to

combat weight gain and diseases (School of Population Health).

We are also support partner in two NHMRC program grants projects for 2004, to develop:

– vaccines for malaria, scabies and streptococcal disease (School of Pharmacy, Queensland Institute of Medical Research); and
– more effective vaccines and drugs (School of Molecular and Microbial Sciences, Monash University).

We also lead a $4 million Program Grant commenced in 2003 on plasma membrane structure and function (IMB).

Our researchers won 21 scholarships and fellowships totalling $3.5 million in the NHMRC Researcher Support Awards. We topped the country with three Industry Fellowships, and also received 11 Training Scholarships and seven Training Fellowships.

We received $4.8 million from a unique International Collaborative Grants Scheme (ICGS), jointly funded by the NHMRC, the UK-based Wellcome Trust and the New Zealand Health Research Council.

Three grants will fund:

– interventions for diseases in Thailand resulting from risk factors such as tobacco and unsafe sex ($3.2 million, School of Population Health);
– evaluation of a vaccine to prevent tumors associated with papillomavirus ($1.3 million, Centre for Immunology and Cancer Research); and
– studies into controlling and preventing schistosomiasis, a debilitating disease affecting 40 million Chinese ($2.4 million, Queensland Institute of Medical Research).

Industry links via CRCs

The Federal Government reviewed the CRC program during 2003 and the next round of funding will be announced at the end of **2004**.

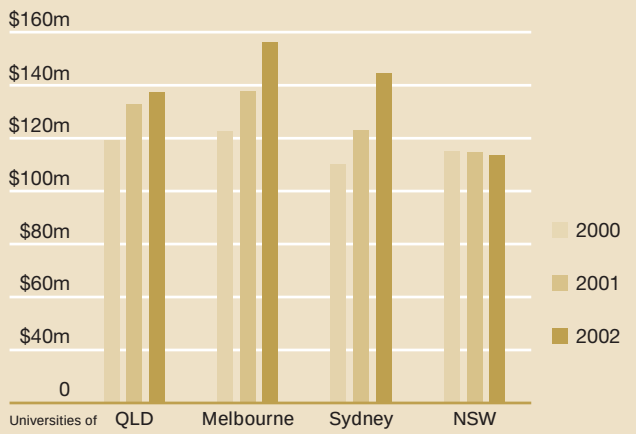
We have one of the highest levels of participation of any institution in Australia in the Cooperative Research Centre (CRC) program. This includes core partnership in 22 CRCs and supporting partnership in seven.

In the funding round announced in 2002 for 2003, we were core partner in four of 12 new CRCs and supporting partner in four more. We were also core partner in four, and supporting partner in one, of these CRCs awarded renewed funding.

ARC Federation Fellowships

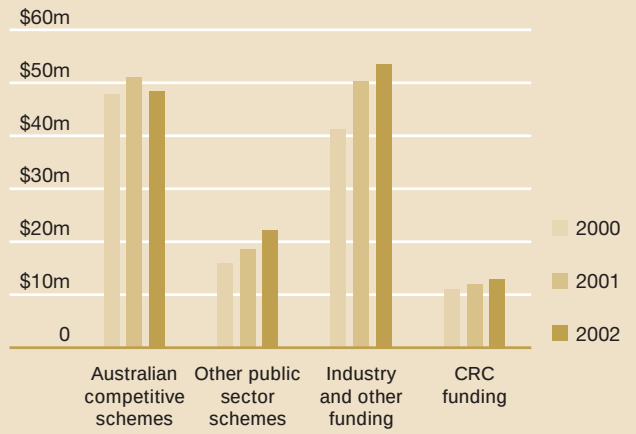
We attracted more 2003 Federation Fellowships than any other institution – six of 24 awarded nationally. These are part of the Government's

TOTAL RESEARCH INCOME 2000-2002



CRC INCOME 2000-2002

UQ RESEARCH INCOME 2000-2002



INSTITUTIONAL GRANTS SCHEME (IGS) 2002-2004

$3 billion Backing Australia's Ability innovation action plan to keep Australia's leading researchers in the country. The Federation Fellows are regarded as among the best in the world in their fields.

Research strengths

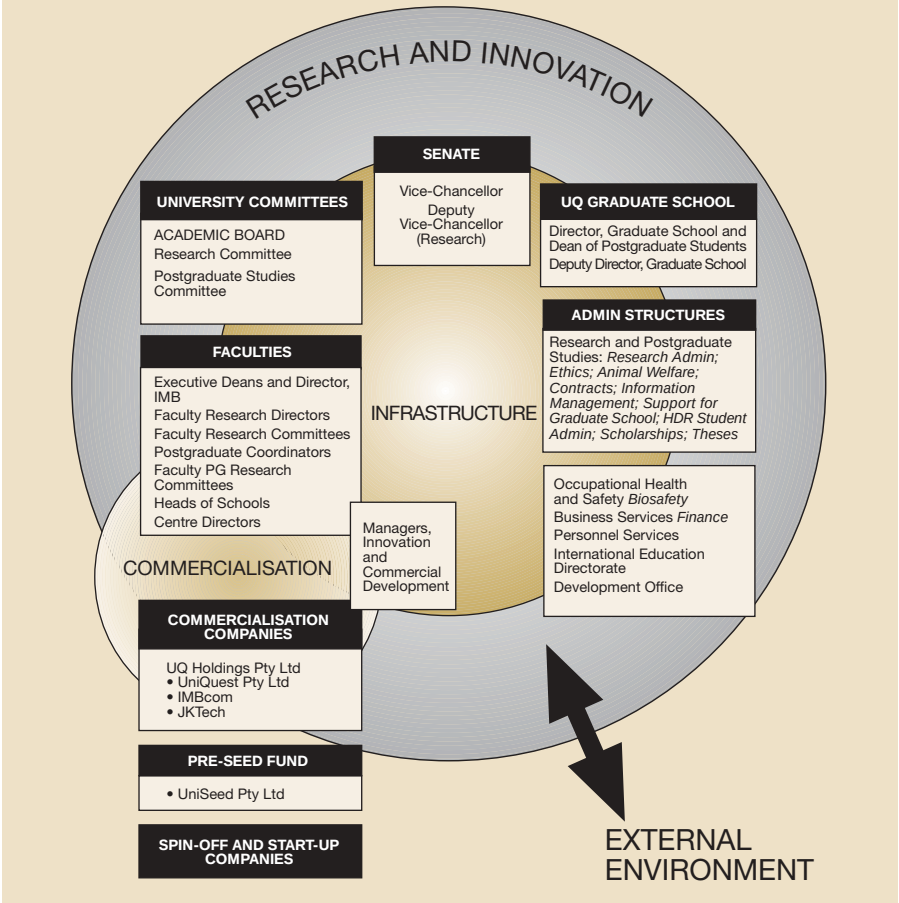
Existing and emerging strengths

Our 20 areas of Existing Research Strengths (page 38) are known internationally, generate significant external income, and have first-rate records for graduate supervision.

Our Emerging Strengths reflect areas of strategic importance within faculties and include:

- drama, diversity, peace and conflict resolution (arts, humanities and social sciences);
- on-line health and education, clinical neuropsychology, tissue inflammation and repair (health and medical sciences); and
- e-commerce and cyber-law, Isotope analysis, trace element chemistry and geochronology (science and technology).

OUR RESEARCH AND INNOVATION CYCLE



Publications

Our researchers communicated their non-commercial work to the wider international community by publishing research outcomes in learned journals, books and conference papers. Our research output consistently ranks as one of the highest in the country; and our annual Commonwealth Department of Education, Science and Training (DEST) publications point score increased by seven percent in 2002 (latest available data).

Star projects

World firsts

Outcomes of international significance included the following:

- identifying a gene, PPARd, which may lead to treatment for obesity (IMB);
- finding that regulating blood-sulfate levels could help treat diseases such as Alzheimer's, schizophrenia, autism and motor neurone disease (School of Biomedical Sciences);
- finding a previously-unknown species of leaf-tailed gecko in remote north Queensland (School of Life Sciences);
- an Australian Hypersonics Initiative (to coordinate the nation's research effort) as key partner with the Australian National University, the University of New South Wales and two state governments (Queensland and South Australia); and
- building and testing a C-NOT gate, an essential component in quantum computers (our School of Physical Sciences and the University of Illinois). Results were presented at the invitation-only annual quantum computing review by the US Army Research Office, which awarded funds of US$750,000.

Leading the field

All faculties and schools conducted groundbreaking research. Outcomes included:

- finding links between mangrove dieback and a common canegrowing herbicide likely to damage the Great Barrier Reef (Centre for Marine Studies);
- documenting the Australian life and work of Sir Robert Helpmann (School of English, Media Studies and Art History);
- studies of how people can learn to manipulate their emotions to achieve switches between decision-making styles (Faculty of BEL);
- *A cultural history of the Internet*, one of only 12 proposals chosen nationally for presentation at the National Arts Research Showcase

(Centre for Critical and Cultural Studies);
- a vaccine which may immunise against the deadly West Nile disease (School of Molecular and Microbial Sciences);
- fossil evidence of a second sauropod at Winton, Queensland near the remains of the largest dinosaur discovered to date in Australia (School of Life Sciences with Queensland Museum);
- identification of the visual skills of elite cricket batsmen (School of Human Movement Studies and Australian Institute of Sport); and
- fresh knowledge about the 1941 attack on Pearl Harbour (Faculty of Arts).

International partnerships

Leadership of international projects confirmed the global reputations of many of our academics, including those whose teams:
- discovered a type of very small galaxy, the "ultra-compact dwarf galaxy" (School of Physical Sciences);
- investigated SARS in China (page 52); and
- studied the use of hand-held personal computers to help treat panic disorder and agoraphobia (School of Psychology).

Other collaborative projects included:
- work on tourism industry security, quality and control (Faculty of BEL, United Nations World Tourism Organisation);
- producing high-resolution maps showing tissue loss in the brains of Alzheimer's sufferers (Centre for Magnetic Resonance, University of California);
- researching human drug development (IMB, New Zealand biotechnology company EndocrinZ);
- studying drought-resistant rice varieties for cultivation in Cambodia, Laos and Thailand (School of Land and Food Sciences, with more than $1 million from the Rockefeller Foundation); and
- funding for a computer-based collaborative research project to fast-track crop improvement and combat drought (School of Land and Food Sciences, US-based company Pioneer Hi-Bred International, Inc).

National priorities

Many of our research projects are in line with National Research Priorities **www.dest.gov.au/priorities**. Examples, by Priority, are as follows.

Work aimed at **Promoting and maintaining good health** included:
- studying cellular plasticity in the brain (Queensland Brain Institute);

School of Life Sciences PhD student Conrad Hoskin shows off the Gulbaru gecko – a previously unknown creature (now on the endangered species listing) found north-west of Townsville.

- finding that pap smears from pregnant women could reveal genetic defects in foetuses (IMB);
- developing an award-winning e-technology, Ex-Ray, to monitor psychiatric and physical conditions (School of Information Technology and Electrical Engineering, Centre for Online Health);
- testing treatment programs to prevent kidney failure in Aborigines (School of Population Health);
- developing landmark interventions for parents of children with disabilities (Parenting and Family Support Centre with Western Australia's Disability Services Commission);
- help for problem gamblers from non-English-speaking backgrounds (UQ Ipswich CSRC – page 52);
- testing a computer program for diagnosing early dementia (School of Psychology, Key Centre for Human Factors); and
- a new Centre for Rural and Remote Area Health to train health professionals (our Faculty of Health Sciences with University of Southern Queensland).

Projects helping to build **An environmentally-sustainable Australia** included:
- pioneering sustainable reform of the Murray Darling system (Economics);
- establishing a Centre for Native Floriculture to develop Queensland's native flower industry (UQ Gatton);
- developing molecular engineered nanomaterials for advanced fuel cells (Nanomaterials Centre);
- social and environmental concerns in the mining industry, and water-related issues in the minerals industry (Sustainable Minerals Institute);
- satellite-tracking estuarine crocodiles in north Queensland to minimise negative human interactions (School of Life Sciences, Queensland Parks and Wildlife Service);
- investigating tropical weed control (UQ Gatton);
- developing Design and Construct Standards (adopted by international certification company Green Globe) to foster environmentally-sensitive tourism infrastructure (Centre for Sustainable Design); and
- developing ecologically-friendly technologies to prevent barnacles and other organisms on boat hulls and pylons (School of Molecular and Microbial Sciences).

Initiatives focused on **Frontier technologies for building and transforming Australian industries** included:
- stochastic modelling of genetic regulatory networks (Advanced Computational Modelling Centre);
- developing principles of quantum nanotechnology (Centre of Excellence Quantum Computer Technology);
- investigating the causal phenotypic links required for the regulation of legume

growth (Centre of Excellence for Integrative Legume Research);
– developing limiting technologies to expedite the identification, characterisation and utilisation of genomic information (ARC Special Research Centre for Functional and Applied Genomics);
– developing mathematical models and computer simulations to show creativity (School of Biomedical Sciences); and
– building a unique generator to optimise power system operation and security (Engineering).

Safeguarding Australia research included projects aimed at:
– building a national capacity for prevention, preparedness and response to infectious disease and biosecurity threats (Australian Biosecurity CRC in Emerging Infectious Disease, launched on our St Lucia campus this year); and
– developing techniques for evaluating large-scale defence systems proposals and modelling decision making constraints in battle-field situations (Centre for Human Factors and Applied Cognitive Psychology with DSTO).

Commercial returns

Best-practice model

We use a hands-on commercialisation model. It involves early identification and protection of potentially-valuable intellectual property using a network of support professionals (such as marketing, financial and legal) and faculty science-based professionals.

This commercialisation model was recognised as close to world-best practice in two reports released by DEST in March 2003: *Best practice processes for university research commercialisation* and *Analysis of the legal framework for patent ownership in publicly-funded research institutions.*

We also performed strongly in the *National survey of research commercialisation* published in 2003. We ranked first on invention disclosure, patents issued worldwide, licences executed and operational start-up companies (where the institution holds equity); and second or third on most other measures in the survey.

Seeding promising projects

UniSeed is an early-stage seed venture capital investment fund commercialising intellectual property at the Universities of Queensland and Melbourne. It was established in late 2000 by UQ Holdings Pty Ltd and Melbourne University Private.

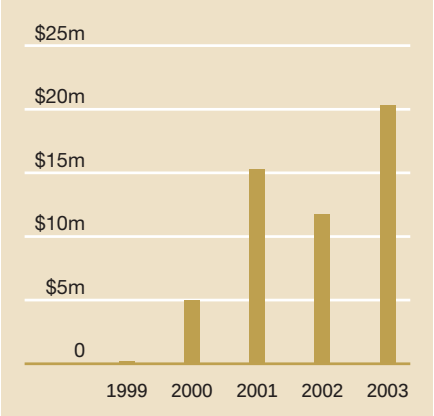
Over the past three years UniSeed has committed $9.1 million to 18 companies, with $7 million paid to date. About half of this investment is in companies originating from our University and its related organisations.

In 2003, private venture capital funds, government grants and co-investors provided more than $5 million. This included second-round private-venture funding for three of UniSeed's earliest investments.

UniSeed successfully leverages its own capital with that of others. Its companies have secured 13 Biotechnology Innovation Fund grants, one in 12 of all awarded nationally; and since inception, it has attracted $12 million of external capital via leveraging. This equates to an extra $1.30 investment in ventures for every $1 UniSeed has committed. Much of this total investment will flow back to the universities through targeted research contracts.

UniSeed has six active investments in Queensland: Adipogen; Thrombostat; QRxPharma; Wedgetail; Fultex; and Combinomics.

UNIQUEST: INVESTMENT RAISED FOR START-UP COMPANIES



UNIQUEST: INTERNATIONAL PROJECTS BILLINGS

UniQuest

www.uniquest.com.au

UniQuest Pty Ltd, our main technology and consulting company (page 10), adds value to the early stages of research outcomes and fosters links between university researchers and industry. Its activities this year included operations in 13 countries (page 52).

UniQuest generated revenues of $31.6 million, of which $13.3 million represented payments or provisions for payments to the University.

Several awards recognised high performance:
– the *Premier of Queensland's 2003 Export Award* (services category);
– a DOCITA Australian IT Innovation "E Health" award; and
– three of seven Commercialisation Excellence Awards at the Commercialisation Forum and Fair of Ideas.

The latter were for the Most Outstanding Australian Research Commercialisation Opportunity in the ICT/Mathematics Field (Fultec); the Most Outstanding Queensland Research Commercialisation Opportunity (Promics); and Most Outstanding Australian Research Commercialisation Opportunity from a Postgraduate Research Project (Fultec).

The Fultec project (commercialisation of a blocking device to protect telecommunication interfaces) also placed second in the Most Outstanding Australian Research Commercialisation Opportunity across all fields.

Other highlights for 2003 included the following.
– We launched Thrombostat, a company developing new compounds to inhibit blood clotting, with a $428,000 investment from UniSeed (page 42), $250,000 from AusIndustry's Biotechnology Innovation Fund, and $125,000 under the Queensland Government's BioStart program.
– We patented and packaged technologies to develop new plant and turf cultivars into a $3.26 million deal, for licensing to an international start-up company.
– We developed and launched a comprehensive database management system, the Faculty Business System, to help researchers and

academics track their consulting and research projects with industry and communities.

This year's UniQuest Trailblazer Challenge (identifying ideas, inventions or research outcomes with commercial potential) resulted in five awards of $8000 each to staff and students. These will advance:

- a cancer immunotherapy suitability diagnostic test (also awarded $5000 for best overall project);
- a topical cream to remove and inhibit hair growth;
- new alloy materials for storing hydrogen in fuel-cell powered vehicles;
- pain-relieving drugs using the brain's natural hormones; and
- therapeutics to alleviate sciatica.

IMBcom

www.imbcom.com.au

IMBcom Pty Ltd (page 10) is the University's newest commercialisation company, dedicated to delivering high-value commercial outcomes from the Institute for Molecular Bioscience (IMB). In 2003 IMBcom helped secure more than $1.7 million in Federal- and State-sponsored commercial grants for IMB researchers. IMB research projects receiving ARC Linkage Project Grants are also expected to benefit from industry partner in-kind contributions valued at more than $1 million. IMBcom has incorporated or owns equity in nine startup companies arising from IMB discoveries.

Grants for start-ups

Five of eight Queensland Government Innovation Start-up Scheme Grants (to help commercialise innovation) went to our start-up companies and projects. The grants, worth $85,000 each, went to:

- Nanomics BioSystems Pty Ltd (IMBcom/University) to commercialise technology for genomics, proteomics, drug discovery and human diagnostics;
- ImmunoTherapies Pty Ltd (private company/QIMR/IMB) to develop a targeted cancer therapy;
- Wave Instruments Pty Ltd to commercialise a remote, internet-based, physiological monitoring system;
- Adipogen Pty Ltd (QIMR/UniQuest/UniSeed) to develop an anti-obesity therapeutic;
- Nephrogenix Pty Ltd (IMBcom/UQ/Monash/Renal Regeneration Consortium) to develop and commercialise treatments for chronic kidney disease; and
- Associate Professor Ranjeny Thomas (UniQuest/UQ/PA Hospital) to develop a vaccine for autoimmune diseases and allergy using the body's own immune system.

IMB researcher Associate Professor Jenny Martin uses an X-Ray Crystallography Machine (the most powerful, and the only one of its kind in Australia) to determine the structure of small crystals and large unit cells.

JKMRC and JKTech

The Julius Kruttschnitt Mineral Research Centre (JKMRC) international caving project, supported by a consortium of mining companies, developed a system (adopted by two South African diamond mines) for controlling the draw of ore from block caving mines.

Researchers also produced a technology to boost capacities in open-cut gold mines by identifying boundaries between ore and waste after blasting. This improves revenues, sometimes by millions of dollars per year.

Theoretical and experimental research produced (and production-tested) a patented design for cyclone separators for the sizing and beneficiation of coal and other minerals. Numerical modelling of rock fractures demonstrated the roles different mineral components play in the breakage process, and how this can be used to streamline mineral extraction.

The Centre's commercial division, JKTech **www.jktech.com.au**, sold a record five of its sophisticated electron microscope systems for mineral analysis, the MLA, to customers in Canada and South Africa.

It also completed the first phase of a unique software package for simulating froth flotation circuits, with funding from international mining companies and the Queensland Government, and rolled the package out to customers in Australia, South Africa, and the USA.

Leading in new fields…

Infrastructure highlights included

- opening of the $105 million Queensland Bioscience Precinct (page 61),
- establishment of the Queensland Brain Institute, and
- plans for the $60 million Australian Institute for Bioengineering and Nanotechnology, to begin construction in 2004.

Encouraging excellence

Supporting our own

We provide solid support for our researchers and their efforts. Latest Australian Bureau of Statistics data (published 2000) show our research-related expenditure represented eight percent of the combined total of the entire Australian higher education sector.

In 2002 we introduced new ways of distributing Commonwealth Block Grants funding to faculties via our Institutional Grants Scheme (IGS) and Research Training Scheme (RTS). In 2003 this performance-based component equalled $51.5 million and represented more than a third of the total operational funds allocated to faculties. Remaining IGS funding of $2.5 million went to competitive grants schemes to support early-career researchers and provide seed funding for promising projects.

This year the internal Research Only budget used $9.1 million to:

- promote research excellence;
- seed fund research initiatives;
- maintain research infrastructure; and
- promote research outcomes/facilitation.

We recognised, rewarded and supported individual excellence with training and mentoring programs, $12,000 start-up packages for new research staff and help with competitive grant applications.

Other incentives included:

- 70 internal grants, totalling $663,000, to help researchers develop applications for external funding;
- 17 UQ Postdoctoral Research Fellowships, including three for women; and
- seven UQ Foundation Research Excellence Awards totalling $465,000, presented to early-career researchers during Research Week (page 48).

The latter will seed-fund promising work on:

POSTGRADUATE ENROLMENTS

at March 31, 2003	2002	2003
Doctorate by research	2705	2775
Doctorate by coursework	33	60
Masters by research	640	582
Masters by coursework	2706	3159
Postgraduate/ graduate diploma	529	695
Graduate certificate	666	665
Total	**7279**	**7936**

contemporary bioethics; the damage rumours cause to organisations; broadband Internet technology; computation-quantum computers; the function of mineral sulphate in the body; research combining database mining and traditional cell biology; and study of the cortex via brain imaging and advanced computer graphics.

Research training

Our commitment

Annual awards for good supervision (page 26) and various incentives for postgraduate study (page 29) confirmed our commitment to excellent postgraduate training.

We also backed graduate student education services via our annual evaluation of schools and distribution of funds to good performers; and we introduced the Research Student Portfolio (page 26), to encourage development of job market skills.

Current benchmarking/evaluation procedures for PhD students include exit surveys for completing and withdrawing students. Cohort studies indicate that our completion rate for PhD studies is around 75 percent and show a very high level of satisfaction with the PhD program.

The Graduate School plans to survey PhD students three, five, and 10 years after graduation to ascertain the skills and training they have used in their careers and additional skills they might need after ending formal study.

Our postgraduates

We enrolled 7936 postgraduates representing 23 percent of the student body, and conferred 2684 postgraduate degrees. These included 456 PhDs, 21 percent more than in 2002 and the most in any one year for this University.

While our research objectives and priorities remained similar to those of the previous year, we increased our efforts to attract, retain, educate and graduate more higher degree students. This category numbered 3357 this year, with 2775 PhD students (423 international) and 582 research masters (69 international).

The Postgraduate Education Loans Scheme (PELS) again led to increased postgraduate coursework enrolments, which this year accounted for 13.5 percent of all students.

National profile

National research scholarship performance benchmarks our strengths in research and research training.

In 2003 Commonwealth Government-funded scholarships, we ranked third for Australian Postgraduate Awards (APA – 142 awards, nine percent of the total). We also cooperated with

industry partners on awards such as PhD research scholarships worth:
- $25,000 p.a. (Department of Primary Industries, Agency for Food and Fibre Sciences); and
- $25,000 (Queensland Department of Natural Resources and Mines).

Graduate School

Our quality research training includes opportunities for travel, exchanges, internships and industry collaboration. UQ Graduate School initiatives for 2003 included:
- 27 workshops on research higher degree supervisory practices;
- concurrent graduate certificates;
- a stronger advisory team for research students;
- more support for students and projects at confirmation stage;
- streamlined examination procedures;
- three Short PhD Scholarships for staff to complete theses; and
- 80 PhD Completion Scholarships awarded in 2003.

Supporting our own

Graduate School Research Scholarships at APA rates support our best candidates. This year we gave:
- 32 Postgraduate Research Scholarships (UQPRS);
- 40 Graduate School Scholarships (UQGSS);
- 30 UQGSS (I), a living allowance for international students to complement IPRS; and
- 15 Mid-Year Scholarships (UQMYS).

Other postgraduate support included:
- Research Training Scheme places for all domestic research higher degree students;
- 79 Graduate School Research Travel Awards (see below);
- four dedicated Graduate School Study Centres in our libraries;
- *Graduate Student Week*, organised by the School with help from the Library, Student Support Services and the Student Union; and
- funding assistance for three postgraduate research student conferences including a Human Movement Studies Conference and a Life Sciences Conference.

Travel scholarships

We have given more than 400 Graduate School Research Travel Scholarships since the scheme's introduction in 1998. This year 79 grants helped students access research facilities in Australia and overseas to advance projects such as:
- psychology: isolating factors critical to sustainable entrepreneurship (USA, Denmark);
- social science: collecting samples of prehistoric pottery and studying unpublished data (New Zealand, USA); and
- law: researching the proposed European constitution (Germany, UK).

Graduate attributes

Our Postgraduate Studies Committee and Graduate School Board endorsed a set of attributes expected of its higher degree research graduates. These attributes will be mapped onto a set of training opportunities that can be accessed by HRD students at appropriate stages of their candidature. The Integrated Skills Program, developed in 1999, provides a structural model and cooperation with other University units will enhance and expand this program. The attributes will include areas such as:
- interpersonal understanding;
- interpersonal and team-based communication;
- critical thinking;
- problem solving; and
- project management.

Infrastructure

Funding

We are committed to developing world-class infrastructure to attract high-quality staff and maintain our momentum with leading-edge research.

Our $13.6 million 2003 Research Infrastructure Block Grant ($11.1 million in 2002) maintained major infrastructure while supporting faculty research priorities and external equipment grant applications. Nine percent of this budget was distributed to faculties based on research performance.

Notable additions to our research infrastructure (page 61) included:
- $4.5 million from the Smart State Research Facilities Fund for a powerful supercomputer, the Australian Computational Earth Systems Simulator (ACcESS);
- $1.45 million from the Smart State Research Facilities Fund towards establishing a $5.2 million cryo-electron microscopy facility to help design and develop new drugs;
- a $3 million Boeing Systems Engineering Teaching Laboratory for aviation and aerospace teaching and research (page 30);
- a $2 million, five-year NHMRC grant to establish the Centre of Clinical Research Excellence in Cardiovascular Disease and Metabolic Disorders at Princess Alexandra Hospital, Brisbane;
- a $200,000 upgrade to our Pinjarra Aquatic Research Station;
- a Centre for Native Floriculture (page 41);
- our Centre for Magnetic Resonance's installation of the southern hemisphere's most powerful Magnetic Resonance Imaging scanner at Wesley Hospital, Brisbane; and
- a $250,000 state-of-the-art laser imaging system in a wind tunnel facility at UQ Gatton, to study pesticide spray application.

Equity and diversity

Equity Office (pages 32, 57) initiatives supported research and research training.

Three staff won Short PhD Fellowships, effective in **2004**, to complete their theses. These assist people whose progress is affected by demanding carer responsibilities, unusual personal circumstances or sustained insecure employment, with particular consideration given to Indigenous Australian applicants.

Other activities included:
- three *Postdoctoral Research Fellowships for Women*;
- two *Re-entry Scholarships*;
- six *Promoting Women Fellowships* (20 past recipients have taken higher-level jobs since the scheme began in 1997);
- three seminars for women and one on internationalising curriculum studies as part of Research Week (page 48); and
- participation in a Mid-career Mentoring Program for Women.

The year 2004

- We will extend our practice of conducting exit surveys with PhD students by developing surveys to run three, five, and 10 years after graduation. This will inform us about the usefulness of skills gained at University, and suggest educational requirements following completion of formal studies.
- We will be core participant in two new NHMRC-funded programs, including a $6.4 million study into nerve cell production in the adult brain.
- Major research infrastructure improvements will include new buildings to house the Sustainable Minerals Institute, Queensland Brain Institute and Australian Institute for Bioengineering and Nanotechnology.