

Biomed Benchmark

News from the School of Biomedical Sciences

December 2012, Issue 17

From the (new) Head of School

Nearly three months have passed since I stepped into my new role as Head of the School of Biomedical Sciences. I am pleased to have this opportunity to set out my first impressions and invite you to communicate your thoughts and views to me.

Originally from Melbourne, I have spent the last 22 years living in London, where my most recent role was Director of the Division of Biosciences at University College London. I also ran an MRC-funded research program on the cell biology of egg and embryo development. Moving family and laboratories across the world is not a trivial matter, but all the indications are that joining Monash has been an excellent decision.

The School of Biomedical Sciences is one of the biggest and best research organisations in Australia, with a critical mass of research excellence across the disciplines. The previous Head, Professor Christina Mitchell and Acting Head for the last year, Professor Phil Bird, have left some impressive shoes to fill and I am looking forward to working with everyone to build on this strong legacy.

Highlights so far include meeting many of you and hearing first-hand about the

groundbreaking research being undertaken here. I have also been impressed with the plans being developed for an innovative new teaching precinct, which will transform student learning for our undergraduates.

Also, our researchers have excelled in the latest NHMRC and ARC grant rounds, securing \$26.1 million of funding commencing in 2013. Monash University too has set a high bar, leading the country in NHMRC project grants and second for ARC income. This establishes Monash as a fertile environment for research, with opportunities to collaborate across Faculty boundaries. This level of excellence across the scientific disciplines, together with outstanding research facilities, sets the scene for an exciting future.

To build on this success in a rapidly changing environment, we will need to be adaptable and flexible. The advent of Massively Open Online Courses marks the coming of age of on-line teaching and will drive new methodologies into all of our programs.

The recent round of Federal cuts to research budgets present a major challenge for all universities. Effective communication with the public and government is important if we are to reverse this trend. Also, new income streams



Professor John Carroll, Head of the School of Biomedical Sciences.

and careful planning are required so we can continue to develop essential research infrastructure. Certainly, the single best thing we can do is to publish the best science possible and for this we need the best scientists.

I want to build on the strong foundation we have by attracting new research leaders to Monash as well support and develop the careers of our best

young researchers. To help guide us into the future, I have initiated the development of a new strategic plan and will be seeking input over the coming months.

I look forward to working with you to undertake these challenges and to support you in your endeavours. I welcome your input and views, so please contact me at j.carroll@monash.edu.



Grants Success

In the latest two rounds of funding announcements, School of Biomedical Sciences researchers have secured \$22.1 million of funding from NHMRC commencing in 2013. This includes support for 36 Project Grants and five Fellowships.

The NHMRC funds will support diverse areas of research, including: structural biology studies of cancer, thyroid disease and immune system proteins; sperm development; roles of signalling molecules in cancer, autoimmunity, stroke, cardiovascular and Alzheimer's diseases; fat metabolism,

tissue function, sex, stress and obesity; bacterial disease and antibiotic resistance; and drug development.

In addition, our researchers have secured \$4.0 million of funding from ARC commencing in 2013. This includes support for eight Discovery Project Grants and three Early Career Research Fellowships, the latter which went to Drs Leo Lui, Julian Vivian and Connie Wong.

Overall, nine scientists achieved outstanding results. Professor Tony Tiganis scored four grants worth \$2.3 million while eight researchers were awarded two grants each. A summary of the top five grant recipients is listed.

Researchers with Highest Combined Funding*

	Name	Grants received	Amount (\$ million)
1	Professor Tony Tiganis	4	2.3
2	Professor James Whisstock	2	1.3
3	Associate Professor Kate Denton	2	1.3
4	Professor Christina Mitchell	2	1.2
5	Dr Siew Yeen Chai	2	1.2

*Funding sources: NHMRC and ARC, announced in October/November 2012.

On eggs, death and fertility

Chemotherapy and radiation therapy can damage the DNA of immature eggs, leading to their death. Consequently, cancer survivors are often unable to have children and may experience premature menopause.

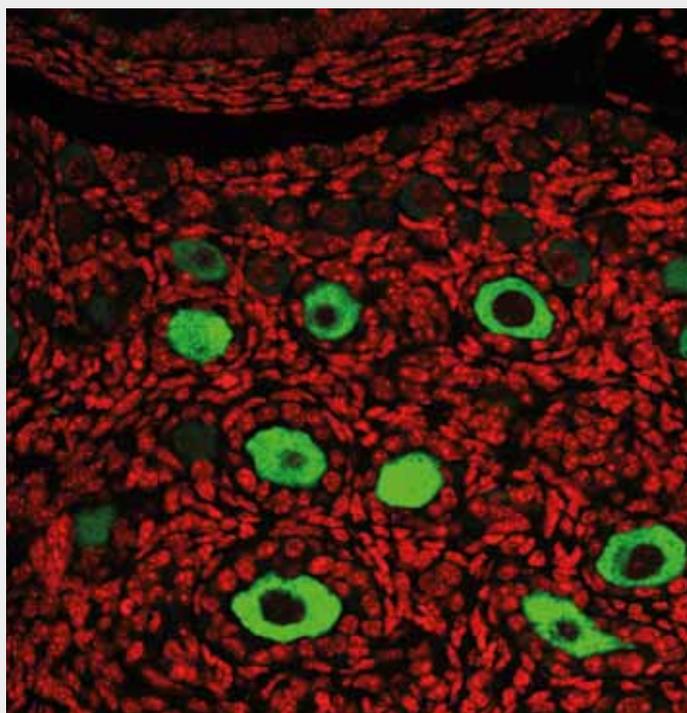
Two recent papers reveal how eggs respond to these harmful insults and surprisingly, the take-home message is that eggs aren't all the same.

Associate Professor Jeffrey Kerr (School of Biomedical Sciences), together with Dr Karla Hutt and Professor Jock Findlay (Prince Henry's Institute), and Professor Andreas Strasser and Associate Professor Clare Scott (Walter and Eliza Hall Institute), have discovered that two proteins called PUMA and NOXA are primed to kill eggs that have damaged DNA. Remarkably, their *Molecular Cell* paper shows that eggs of mice lacking either PUMA or both PUMA and NOXA not only survived irradiation but also produced healthy offspring.

"We were surprised and excited to find that the surviving eggs were able to repair their DNA so that offspring health was not adversely affected," Dr Hutt said.

"Our team is now studying how to inhibit PUMA and NOXA in women, so we can protect their eggs during cancer treatment."

One feature of cells with damaged DNA is that they go into 'suspended animation' and wait until the damage is repaired before progressing to another round of cell division. In a second study published in the journal *Current Biology*, Head of School Professor John Carroll and Dr Petros Marangos (University College London) have shown that eggs that have grown to full size and are ready to mature cannot launch the pathway that causes eggs to arrest when their DNA is damaged. This raises the possibility that affected eggs may be released during ovulation and fertilised, resulting in genetically compromised embryos.



Mouse ovarian tissue section, showing eggs stained for PUMA (green).

The next step for Professor Carroll is to see if the egg DNA can be repaired after conception or whether offspring harbour damaged DNA in their chromosomes. "These studies point to the need to avoid damaging the egg's DNA when performing assisted reproductive technologies such as egg

maturation and egg freezing," Professor Carroll said.

"If we can understand why immature eggs respond differently to those at the end of their growth and development, we can potentially control egg survival and quality, and protect female fertility."

A global view on male reproductive health and PhD training

Monash University and Justus-Liebig University in Giessen, Germany will build on their shared strengths in male reproductive health to establish a landmark International Research Training Group.

The German Research Foundation has supported the establishment of a PhD program with an A\$3.8 million grant, the first to be awarded jointly with an Australian university.

This International Research Training Group program will allow 18 students to be

co-supervised by researchers at Justus-Liebig University Giessen and at one of three Monash University sites: School of Biomedical Sciences, Monash Institute of Medical Research and Prince Henry's Institute.

The funded research projects will investigate the determinants of normal fertility and prostate function; the causes of male infertility, testis and prostate cancer; and the role of the immune system in male reproductive health.

The coordinator of the Monash program, Professor Kate Loveland, from the School of Biomedical Sciences, said the complementary research

strength of the two universities will benefit both postgraduate students and the broader field.

"This program will offer a unique opportunity for students to participate in an international training scheme designed to develop the research talent needed to make improvements in men's reproductive health," Professor Loveland said.

"They will spend a minimum of 12 months studying at each site, receive specialised training in biomedical platform technologies at Monash and in translational andrology at Justus-Liebig University Giessen, plus be eligible to obtain a planned joint Doctorate, which is exciting."



Professor Kate Loveland

The German Research Foundation, or DFG, is Germany's largest research funding organisation. It currently funds 226 research training groups and 48 international colleges.

When *Candida* becomes life threatening

When we think of *Candida*, we often link it to thrush, a common fungal infection. But this organism can also invade the body, killing at-risk people receiving surgical prostheses or catheters in intensive care units and cancer patients receiving transplanted bone marrow-derived stem cells.

Dr Ana Traven hopes to raise awareness of this problem, which is increasing worldwide.

In work published in the journal *PLoS Genetics*, the scientist and her team from the Department of Biochemistry and Molecular Biology; colleagues at the Department of Microbiology, Monash Micro Imaging and Alfred Hospital, in Melbourne; and Biotechnology Research Institute in Montreal, Canada, showed that a protein complex called Mediator allows *Candida* to change into a disease-causing shape and also grow drug resistant biofilms on silicone surfaces.

If *Candida* can switch from round to elongated, tubular cells called filaments, they can invade human cells and become deadly. But when Dr Traven's team deleted genes that code for Mediator subunits, the mutant *Candida* strains could neither grow well on silicone discs nor switch to the filamentous form in the lab or in a worm model of *Candida* infection.

"We don't know yet how Mediator feeds into the signalling pathways that control the switch from round to long cells and the formation of biofilms, but if we can stop *Candida* from making these transitions, we could stop disease," she says.

In a second paper published recently in the journal *Genetics*, Dr Traven's team showed that another protein called Ccr4 is also involved in biofilm formation. Previous work from the lab showed that Ccr4 is necessary for *Candida* cell switching and virulence in a mouse infection model.

"We knew that many genes in *Candida* controlled these



Dr Ana Traven

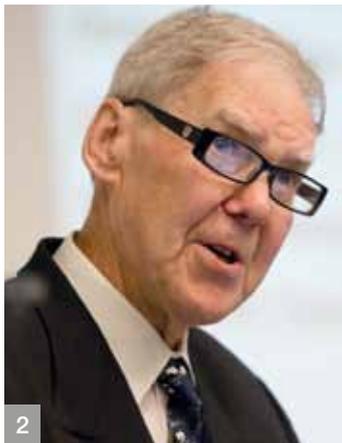
transitions, but no one has shown that these gene regulators are involved. In both cases, we have identified new players that are key for virulence," she says.

"By understanding how *Candida* deploys these molecular switches with deadly consequences, we can use this information to design better antifungal treatments."

Celebrating Physiology's golden anniversary



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1) Dominic Man-Kit Lam beside his paintings. 2) Associate Professor Rod Westerman 3) From left to right: Colin Gibbs, Professor Warwick Anderson, Marie Gibbs, Anne Knights and Geoff Knights. 4) Professor Robert Porter

On 26 October, 150 past and present staff and their families gathered at the Monash Clayton campus to celebrate the Department of Physiology's 50th Anniversary. They came to hear several Heads of Physiology reminisce about the Department's evolution from its early days to today, and the successes and challenges they faced.

When Associate Professor Rod Westerman arrived in 1965, research and student numbers

were rapidly increasing and lecturers taught both physiology and pharmacology to undergraduates studying medicine and science.

While the state-of-the-art then was an IBM electric golf ball typewriter and documents were duplicated by roneo, the audiovisual aids department was sought after for its high-quality physiology teaching videotapes, which were used here and at the University of Melbourne for 20 years.

"My striking memory at the end of Physiology's first decade was that of a happy and passionate group of staff and academics students busily engaged in achieving their best both in

exciting research and innovative teaching," Associate Professor Westerman said.

Professor Robert Porter, who chaired Physiology from 1967 to 1980, also highlighted the importance of the foundation years when Physiology collaborated with several Monash departments, including: Biochemistry, Electrical Engineering and Psychology.

"It forged relationships with institutes like the Baker Institute and presented opportunities for students to do honours and postgraduate work, gaining degrees from this University and Department," he said.

"These collaborations were central to the attitudes and approaches the Department was able to engender."

During his time at Physiology, Professor Porter oversaw his group's move from the top of the Biochemistry Department to a new home in Building 13F. While the new building couldn't accommodate everyone's aspirations, he said it had a common room for staff and was designed with flexibility in mind for both teaching and research activities. Professor Porter also emphasised that the common room was an important place for staff, students and colleagues from other departments to meet and



5) Guests mingling. 6) Front row: John Veale and wife. 7) From left to right: Graham Taylor, UweProske, Igor Wendt and Dennis Loisel. 8) Dr Alan Finkel, Chancellor of Monash University.

have collegial interactions - an achievement of which he was most proud.

“We were a group of people who related to one another and enjoyed each other’s company,” he said.

“Even though we had differences in opinion, it didn’t make a difference - and we didn’t need Facebook to have such interactions!”

Professor Warwick Anderson, Head of Physiology from 1996-2006, paid tribute to the dedicated lecturers and general staff who supported the Department during his tenure

when there were government cuts to university funding.

“I would like to thank the research staff who stood up to fill the gap when we couldn’t have full-time academic staff,” said the NHMRC CEO.

“We asked a lot of them.”

Moving to the future, the current Head of Physiology Professor Iain Clarke highlighted how he has actively maintained research excellence by recruiting early and mid-career staff in the areas of obesity and diabetes, neuroscience and cardiovascular disease research.

“We have also reached out to the world by sponsoring a successful symposium with the Weizmann Institute in Melbourne and next year we will visit our colleagues in Tel Aviv,” he said.

“In 2013, we will sponsor a meeting with a European Union consortium on reproductive biology and neuroendocrinology in Prato, Italy, which will impact enormously on our department.”

Also speaking at the Jubilee event was Chancellor Dr Alan Finkel, who remembered his PhD years at Monash Electrical Engineering. He developed instruments to measure nerve

function, but needed colleagues in the Department of Physiology to test them.

Professor Iain Clarke also officially launched *Heaven on Earth*, a set of two paintings donated by Hong Kong scientist, philanthropist and artist Dominic Man-Kit Lam, who attended the function.

The celebrations ended with an informal dinner at the Notting Hill Hotel and a good time was had by all.

PhD research rewarded

Congratulations go to School of Biomedical Sciences PhD student Andrew Clarke, who has received the MBio Merck Millipore Best Student Paper Award for his significant research contribution to the immunology field. He won \$2,000 for his efforts.

Andrew, who was a joint first author of a 2011 *Nature Immunology* paper with Daniel Pellici from the University of Melbourne, used a structural biology approach to show that immune cells called Natural Killer T-cells recognise small molecules called antigens from the host in the same way as antigens from invading microbes. He was supported by PhD supervisor Professor Jamie Rossjohn, who co-led the project with University of Melbourne Professor Dale Godfrey.

“Our research finding was surprising as previous studies in other types of cells have revealed drastic differences when studying immune

interactions between foreign and ‘self’ molecules,” Andrew says.

Andrew, who is writing up his PhD thesis, is thankful for the recognition that he has received.

“When conducting PhD research, there is so little in the way of reward,” he says.

“Therefore, it’s a good feeling to be congratulated on a lot of hard work in the lab and at the Australian Synchrotron - often into the small hours of the morning.”

Award sponsor Vito Trifilo couldn’t agree more.

“Merck Millipore is proud to sponsor and be associated with this award as this helps recognise the high calibre of science conducted by Monash University students,” says the National Sales Manager.

“Congratulations to Andrew and we wish him all the best in his research endeavours and scientific career.”

The MBio Merck Millipore Best Student Paper Award is administered by MBio Graduate School.

www.med.monash.edu.au/mbio-gradschool/

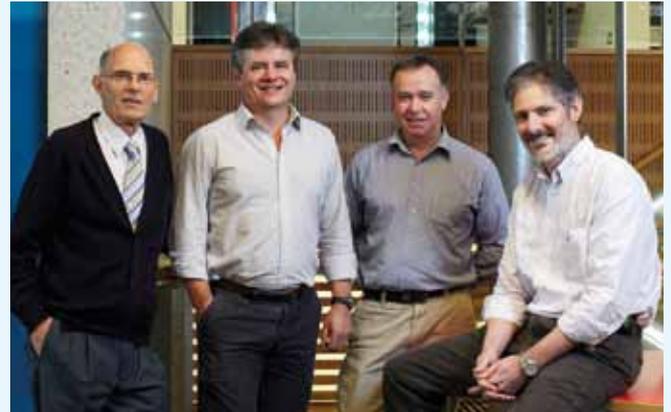


Andrew Clarke

Awards and prizes

Professor Richard Harding (Department of Anatomy and Developmental Biology) collaborated with **Professor Stuart Hooper** (MIMR), **Associate Professor Tim Cole** (Department of Biochemistry and Molecular Biology) and **Professors Peter Davis** and **Colin Morley** (Royal Women’s Hospital) on a study that was named one of the ten

best research projects by NHMRC. The team studied how the health of premature babies could be improved after birth and during intensive care in hospital. They showed that careful monitoring of oxygen levels and lung inflation in premature babies could protect their immature lungs and also minimised the risk of brain damage.



From left to right: Professor Richard Harding, Professor Stuart Hooper, Associate Professor Tim Cole and Professor Peter Davis. Image: NHMRC.

Professor James Whisstock

(Department of Biochemistry and Molecular Biology) was awarded the Merck Millipore Research Medal by the Australian Society for Biochemistry and Molecular Biology. This award is given to an outstanding Australian biochemist or molecular biologist with less than 15 years postdoctoral experience. Professor Whisstock received a medal and presented the Merck

Millipore Medal Lecture at the ComBio meeting in Adelaide in September.



Professor James Whisstock



Genevieve Kerr

Genevieve Kerr

(Department of Anatomy and Developmental Biology) won the Oozoa Award at the Annual meeting of the Society for Reproductive Biology in the Gold Coast in August. The PhD student was recognised for her outstanding presentation in the session of selected abstracts relating to gamete biology. Genevieve is co-supervised by Professor Kate Loveland and Dr Helen Abud.

Frocktober: a vintage affair



Roxanne Toivanen in her vintage finery.

What's a girl to do when she can't grow a Movember moustache for prostate cancer research?

Roxanne Toivanen, a PhD student from the Department of Anatomy and Developmental Biology, frocked up in 80's gowns during Frocktober, a fundraising initiative of the Ovarian Cancer Research Foundation.

The 70's fashion fan set herself a challenge, rotating six flamboyant frocks except when sleeping, showering or swimming, so when Roxanne walked or pumped iron, she remained in vintage.

"I wanted to show everybody that I was committed to this cause," Roxanne said.

"I also thought if I stood out and embarrassed myself for other people's benefit, I would be able to raise money."

Her approach was spot on. Roxanne raised \$1855 and hopes to reach \$2000 after selling her frocks and donating proceeds to Frocktober.

Throughout this time, Roxanne continued writing



and working in the laboratory of Professor Gail Risbridger, where she conducts prostate cancer research. With the support of the Australian Prostate Cancer Bioresource, Roxanne has obtained tissue samples from patients with sporadic and hereditary prostate cancer, and studies how prostate cancer progresses and responds to existing and new treatments.

"At the moment we're looking at cancer pathology and basic drug responses," Roxanne said.

"This research will ultimately help with better treatment planning for patients with prostate cancer."

After an eventful year, Roxanne, whose PhD thesis has been accepted, will travel to New York in February 2013, where she will continue her prostate cancer work as a postdoc at the Harbert Irving Comprehensive Cancer Center at Columbia University.

In Australia, 1200 women are diagnosed with ovarian cancer every year and one Australian woman dies every ten hours from the disease, which is often diagnosed at a late stage when prognosis is poor.

It's Movember bro (and sista)



Richard Rebello

Richard Rebello has no qualms about growing a moustache for Movember, when men and women raise funds during November to support prostate cancer and male mental health programs.

When he isn't promoting the cause, Richard can be found in a Department of Anatomy and Developmental Biology laboratory with Dr Luc Furic, where he is hoping to identify new drugs or compounds to treat prostate cancer.

As Richard's research is funded by the Prostate Cancer Foundation of Australia and Movember Australia, he's happy to discuss men's health and promote his favourite charity.

Why are you fundraising for Movember?

I think we all know someone who has suffered or is suffering with physical or mental health issues. As men can find it difficult to communicate about their problems to family and friends, I'm growing a moustache to show that it's more manly to be aware of your health than to ignore it.

How much money do you hope to raise?

I've set a target of \$1000- double last year's effort. As my Dad has joined me in my Movember campaign as 'Rebello and son', I expect to exceed this amount.

How are you raising awareness around men's health?

I'm using Facebook and the Movember site <http://mobro.co/richardrebello> to talk about prostate cancer and update everyone on my progress. I also remind my Dad to get regular health checks now that he is over 50.

What look are you aspiring to?

I like the 1970's/80's rock star handlebar look. My hero is Bill Kelliher, who plays guitar for the American heavy metal band Mastodon. He has a great big bushy handlebar moustache, which I'm trying to emulate.

What reaction have you received?

When you enter a room with a big handlebar, people notice you. I mostly receive compliments but have been told that I look 'creepy' and am obviously single. I have a girlfriend.

www.ocrf.com.au/

<http://au.movember.com/>

Reflections on a memorable academic career

It's often said that when one door closes another opens.

It couldn't be truer for Professor Phillip Nagley, from the Department of Biochemistry and Molecular Biology, who will be retiring on 21 December after 44 years here as a PhD student, staff researcher, lecturer and education leader.

Rather than pulling up stumps and taking an indefinite break, this Monash academic has his next chapter mapped out, maintaining professional connections and engaging with the science community, but in different ways than now.

Here are selected snapshots of the journey he has taken in research and education, and what the future holds for him.

Research

Back in the late 60's, when Monash was a fledging tertiary institution out in the 'styx', scientists came here as research was well funded by government and the University. While grants were easier to secure then, science was just as competitive internationally as it is today.

Professor Nagley began his research career studying the mitochondria to understand how these cellular structures form and provide fuel to cells in the form of a molecule called ATP, which is essential for life.

After 40 years working in the same field, he has since researched various aspects of mitochondrial biology. It turns out that mitochondria play key roles in cell regulation and cell death, and more recently have been implicated in neurodegenerative disorders including: Parkinson's disease, motor neuron disease and stroke - discoveries made possible through collaborations with neuroscientists at the University of Melbourne and the Florey Institute of Neuroscience and Mental Health.

"My research has led me along a winding track, but it's all connected and been fulfilling all the way," Professor Nagley says.



Professor Phillip Nagley

He is proud too to have had continuous grant funding from 1973-2011. Highlights include being part of a NHMRC Program Grant (2003-2007) and the ARC Centre of Excellence in Structural and Functional Microbial Genomics (2005-2010); publishing over 200 publications in peer-reviewed journals and books; and having an h-index of 35, a measure of both productivity and academic impact of a scientist's published work.

During his career at Monash University, Professor Nagley has also mentored more than 50 honours students and 40 PhD and master's students, which he has found rewarding.

"It's been a pleasure to watch these research students grow, become self-directed individuals, who can go on and build their own careers," he says.

Education

From the early outset, biochemistry as well as anatomy and physiology have been taught to Monash students studying medicine and science, with each Department celebrating their 50th anniversaries this year (**Physiology, Pages 4-5**) or in 2011 (**Biochemistry and Molecular Biology, Anatomy and Developmental Biology;**

Biomed Benchmark, December 2011, Issue 15).

The main activity of the Department of Biochemistry and Molecular Biology was for many years teaching Bachelor of Science students. But in 1999, a new course was developed by the Faculty of Medicine, Nursing and Health Sciences, the Bachelor of Biomedical Science. Like the BSc degree, it comprises popular science subjects, but also includes a set of core units in biomedical science. This relatively new offering has attracted high-achieving students who are interested in both medicine and science.

"The biomedical science course has been successful because it has been well integrated between all the Departments in the School," Professor Nagley explains.

"The students still have to take electives from the Science program which the School is still responsible for, and this has helped support our honours and graduate research programs."

Biomedical science education at Monash has also changed enormously to incorporate more active learning, with students benefiting in the process.

"What we've been doing here in the past 30-40 years is develop students' senses of selves, supporting them to find

information by having them participate in research literature projects and give talks in small groups," Professor Nagley says.

"By incorporating different activities and contexts in which students learn and communicate that information, they become more mature and self-directed."

Education leadership

Since 2006, Professor Nagley has chaired the School of Biomedical Sciences Education Committee, where education-focused staff (lecturers who also conduct discipline-based education research), and teaching and research academics meet monthly to discuss education quality, strategy and policy.

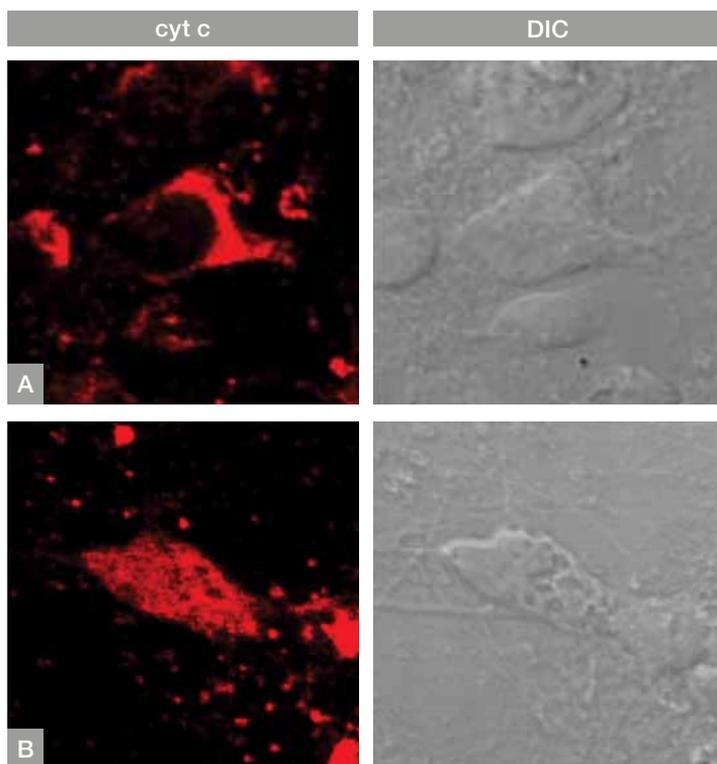
Since its formation, the group has been instrumental in restructuring selected units and refurbishing teaching labs with new equipment and improved facilities.

In 2009, Professor Nagley established the Biomedical Advancement Unit (BEAU), which interacts closely with the School Education Committee. On behalf of the School of Biomedical Sciences, BEAU has liaised with Monash College and worked closely with John Monash Science School to develop educational programs. BEAU also provides development opportunities for educators. This has enabled educational staff to attend conferences and training courses and engage with the wider education community, both nationally and internationally.

While Professor Nagley has enjoyed juggling his education and research roles here, he concedes that it can be difficult to perform at a high standard in both areas.

"Teaching and research staff are under pressure as the primary achievement indicator of their success is research, yet they have to spend a lot of time on teaching," he says.

"We're moving to get the University, Faculty and School to recognise that education contributions should be



Some early results of Professor Nagley's neuroscience research collaboration with Professor Phil Beart from the Florey Institute of Neuroscience and Mental Health. (A): A healthy neurone, indicating the location of cytochrome c in mitochondria (red). (B): A dying neurone, where cytochrome c has been released from mitochondria and distributed throughout the cell as part of the cell death pathway. (DIC): Differential interference contrast image of the same cells, showing their full outline. Image: Maria Lima, former PhD student.

regarded as highly as research contributions for teaching and research staff because that is part of their contracts.

"The education work is just as time-demanding but it hasn't been given the status that it should in terms of overall profiles, which affects many teaching and research staff."

Professor Nagley has been equally passionate about teaching infrastructure. Together with Associate Professor Yvonne Hodgson, Professor Paul McMenamin and Professor Phillip Bird, they have advocated for improvements in this area in the form of a redeveloped teaching precinct for the School.

"While it hasn't been realised in bricks and mortar quite yet, we have presented a unified plan (developed through the Education Committee) to get the project on the map," he says.

The future

When Professor Nagley officially retires in December, some

things will change and others will remain the same. While there will be more time for family and friends, as Emeritus Professor he will maintain an office at Monash, where he plans to continue mentoring students, reviewing grants and manuscripts, and collaborating with neuroscientists at the Florey Institute of Neuroscience and Mental Health.

Professor Nagley will also continue his role as Secretary General of the Federation of Asian and Oceanian Biochemists and Molecular Biologists and links to the International Union of Biochemistry and Molecular Biology. This will involve travelling to conferences and meeting with colleagues in Japan, Bangladesh and Taiwan in the next two years, an academic activity that he relishes.

"I don't think I will be sitting on a deck chair next to a swimming pool," he says.

"I like being busy."

Three minute thesis competition

On 17 August, the MBio Graduate School hosted the Three minute thesis competition, where PhD students summed up their research in three minutes, using one slide only.

On the big day, 11 finalists from School of Biomedical Sciences departments gave their presentations to a large audience, including judges: Professor David de Kretser, Dr David Haylock (CSIRO) and Paula Stoddart (Miltenyi Biotec). The PhD students competed for \$1500 worth of prizes sponsored by Miltenyi Biotec.

The two winners were Jessica Van Gent (Department of Anatomy and Developmental Biology) for her talk *Deal or No Deal: Cell fate choices in the developing testis* and Michael Kraakman (Department of Biochemistry and Molecular Biology, Baker IDI Heart and Diabetes Institute) for his talk *Russel Crowe and Lego*

man: An unbeatable recipe for conveying complex biological phenomena to lay audiences. They received \$600 each. Adam Shahine (Department of Biochemistry and Molecular Biology) was runner up and won \$300.

Michael Kraakman and Jessica Van Gent then represented the School of Biomedical Sciences in the Faculty finals on 23 August, where eight finalists from six Monash Schools vied for prizes. Michael Kraakman won the Faculty competition, receiving \$300 for his efforts and a spot in the University finals on 4 September. His colleague Jessica Van Gent was equal second placed with Nigel Rogasch (Central and Eastern Clinical School), each winning \$150.

At the University finals, Michael Kraakman came second. The winner was Caroline Le (Monash Institute of Pharmaceutical Sciences). Caroline received \$1000, and competed against 30 other PhD students from universities across Australia, New Zealand and the South Pacific at the University of Queensland in October.



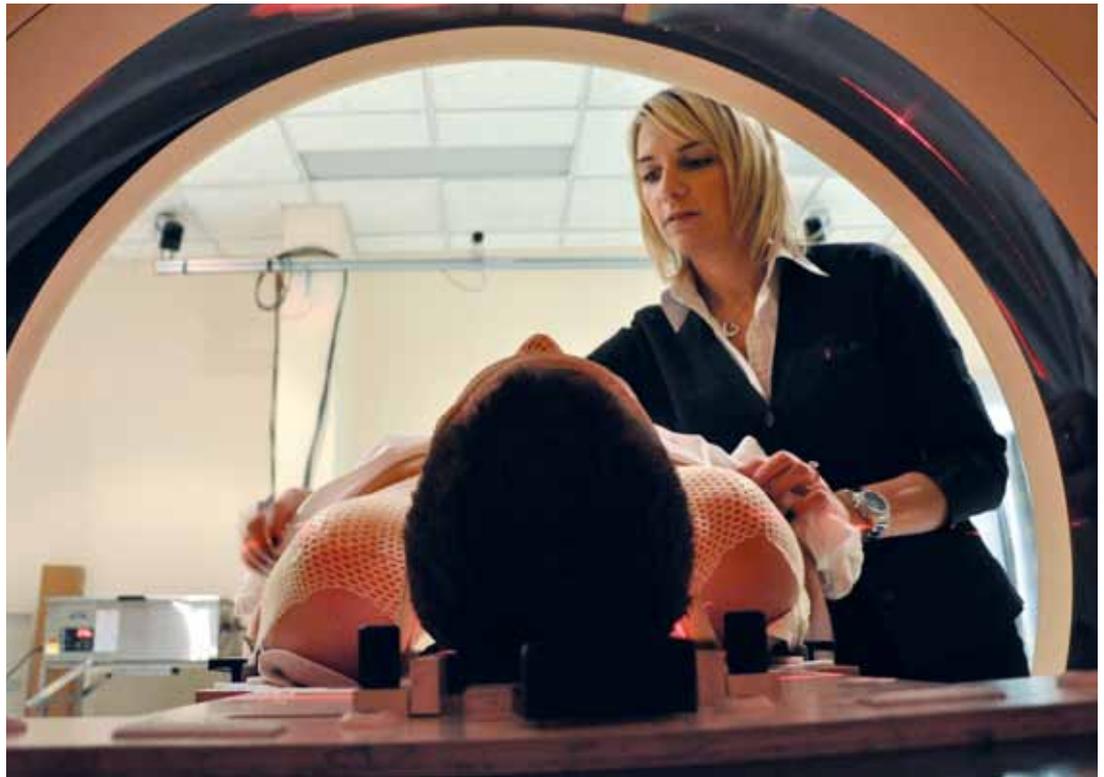
From left to right: Adam Shahine, Paula Stoddart (Miltenyi Biotec), Jessica Van Gent and Michael Kraakman at the MBio Graduate School's Three minute thesis competition.

Australian funding for radiation therapy course development

The Department of Medical Imaging and Radiation Sciences has recently secured \$777,239 of funding from the Australian Government Department of Health and Ageing as part of its *Better Access to Radiation Oncology* strategy. The funding will support the development of a national education program for postgraduate radiation therapists to become Advanced Practitioners.

Improving access to radiation therapy for cancer patients is a Commonwealth Government priority as it is anticipated that demand will increase over the next ten years as baby boomers age. With the increased need for healthcare services, there will in turn be greater demands placed on radiation oncologists, the doctors who prescribe radiation therapy. It is predicted there could be lengthy delays for patients trying to access radiation therapy treatments if this is not addressed now.

One solution that has been used successfully in the UK, which has faced similar challenges, is to create a new professional role, the Advanced Practitioner Radiation Therapist. With additional training provided to radiation therapists, it is anticipated they could use their new advanced clinical skills to perform traditional medical tasks on behalf of the radiation oncologist. This is hoped to generate a more efficient



A radiation therapist positions a patient for radiation therapy planning.

radiation therapy service while still optimising patient care.

This view has prompted the radiation therapy academic leader at the Monash School of Biomedical Sciences Caroline Wright and a specially appointed project leader Kristie Matthews to team with colleagues at the University of Sydney, RMIT University, University of Newcastle, Queensland University of Technology, and University of South Australia to develop a new national curriculum for radiation therapists to gain expert clinical skills to become Advanced Practitioners.

The 20-month project titled *Development and Implementation of a National*

Educational Curriculum Framework for Advancing Radiation Therapy Practice has two components:

Initially, the project team will consult with clinical, medical and academic professionals from radiation oncology practices in Australia as part of a structured research study. They will explore how advanced practitioner roles can be integrated into a clinical environment to enhance patient care, and what academic and clinical training is needed.

From the research information obtained, the project team will then design and develop a course in *Advanced Practice for Radiation Therapy*, which could be potentially rolled out

in Australian universities by mid-2014.

“We believe that this exciting initiative will support the development of advanced practitioner radiation therapists in Australia,” Kristie Matthews said.

“The demand on radiation oncologists’ time is already enormous, and as radiation therapists we can see the impact even minor treatment delays can have on the patients’ emotional well-being.

“If we can create a new professional role to enhance service delivery and make it more efficient for the patient, this will be a positive result on multiple levels.”

Education news

Congratulations to the following staff on their successful academic promotions, which are effective from 1 January 2013. **Drs Julia Choate** (Department of Physiology) and **Priscilla Johanesen** (Department of Microbiology) were promoted to senior lecturers. Also, **Doctors Janet Macaulay** (Department of Biochemistry and Molecular Biology) and **Michal Schneider-Kolsky** (Department of Medical Imaging and Radiation Sciences) were promoted to Associate Professors.

Dr Tom Jeavons retired on 30 November after 23 years of teaching Human Bioscience to Allied Health students at Monash. He is passionate about teaching and since 1990 has been involved in curriculum initiatives and e-learning research. Despite a full teaching load, Dr Jeavons completed a PhD, investigating the link between indoor mould exposure and asthma exacerbations. More recently, he has been the Coordinator of Allied Health at the School of Biomedical Sciences at the Peninsula campus. In his retirement Dr Jeavons plans to devote more time to his grandchildren, travel and make wine.

The new Monash PhD: What's best for our students?

From January 2013, Monash University will begin rolling out a new PhD program for graduate students, comprising of at least three months of professional coursework and/or training, plus research work and a thesis.

The program will enhance the skills and training experience of the PhD candidate, and better prepare them for their future careers. Initially, six faculties will introduce the Monash PhD in 2013, while the Faculty of Medicine, Nursing and Health Sciences' program will begin in 2014.

To assist with program development, the MBio Graduate School hosted a seminar in September by Professor Emeritus Michael Mulvany titled *The European vision in PhD education and ORPHEUS standards*.

Professor Mulvany, from Aarhus University Graduate School of Health Sciences, in Denmark, outlined how European Union universities, government and education bodies have worked together to develop PhD standards which ensure that European students receive high-quality training and have diverse career options. In the last ten years, PhD student numbers have increased exponentially, yet only a small percentage end up in permanent academic positions. In the UK, the figure is thought to be 4%.

"Clearly, this situation is not sustainable," Professor Mulvany said.

"There are two possibilities: we reduce the number of PhD students – and this is being done in some places. However, the amount of an institution's research in biomedicine that is done by PhD students is enormous - it's probably 30% - 40% at Aarhus University.

"Cutting numbers might not be a good idea.

"The alternative is to ensure that PhD training prepares them for non-academic jobs. We can't expect to get good students to come into PhD programs if the training is based on an academic job, yet only a 5% end up in academia."

After six years of discussions, workshops and meetings with European delegates, the Organisation of PhD Education in Biomedicine and Health Sciences in the European System (ORPHEUS), Association of Medical Sciences in Europe and World Federation for Medical Education have published a document this year that states their position on PhD training. It is intended that the *Standards for PhD Education in Biomedicine and Health Sciences in Europe* document is used for internal and external evaluation of PhD programs and students would also refer to this information.

ORPHEUS standards

The authors recommend that a European PhD program of three to four years follows a three-year Bachelor and two-year Master's degree studies, supervisors are qualified and students conduct original research. In addition to research-based training, candidates are recommended to receive six months of formal training in transferable skills including: research presentation skills, project management, grant application, evaluation of scientific literature, supervising technicians and research students, and career development and networking. The time spent on coursework is not to compromise the quality of research training, but enhance it.

The thesis is expected to be based on the equivalent of three articles, or at least manuscripts ready for submission.

In Australia, PhD students bypass a Master's degree altogether, moving directly from an honours year to PhD. Professor Mulvany believes this pathway is compatible with the European model, providing that the honours year is based on research.

Careers

Who should provide career advice to PhD students so that expectations are in line with opportunities available in research, industry and other sectors?

"It's important that PhD supervisors realise this is important, but often they do not have much experience other than helping students find jobs through their own contacts," Professor Mulvany said.

"This is something that has to be taken up at the faculty level. The institution can run career days where students and potential employers can meet."

Resources

Implementing new programs and training takes extra resources. Who should pay for these PhD training improvements?

"A transparent method is to require an annual tuition fee from PhD students to cover the cost of courses, support for conference participation, assessment of the PhD thesis and PhD administration," Professor Mulvany said.

"Aarhus University Graduate School of Health Sciences has a tuition fee of approximately €5000 per year, excluding laboratory costs and supervision."

Professor John Carroll agrees with this view. "The Monash PhD is an important new development here. Many staff will be involved in developing the training components and resources will need to found



Professor Emeritus Michael Mulvany

from existing budgets," the Head of School said.

"In the UK, Research Councils provided institutions with additional funding, called Robert's Funding, to support the development and implementation of a skills and training portfolio for their PhD students."

The future

The Monash Institute of Graduate Research has recently introduced a new Monash PhD that requires discipline specific training and professional development that builds on a range of transferable skills desired by employers in industry, academia, government and the community. Professor Sharon Ricardo will take up the Associate Dean (Research Degrees) role in the Faculty of Medicine, Nursing and Health Sciences in January 2013 to oversee the new program that also encompasses MBio Graduate School.

"Together with Faculty Project Officer Dr Priscilla Johanesen, we are communicating with Heads of Schools and Higher Degree Research coordinators of the nine Schools and Institutes here," Professor Ricardo said.

"Next year, we will hold a series of focussed Faculty workshops to assist with the development of PhD programs tailored to research disciplines at different sites, with implementation scheduled for 2014.

Vic market science

Sunday shoppers at Vic Market got more than they bargained for when scientists brought their microscopes and other gizmos to the masses during National Science Week in August.

At the *Living Science at the Market* event, there were hands-on activities to excite young and old, with lab-coated supervisors by their sides.

Dr Sharon Flecknoe and Michael Spiegel represented the School of Biomedical Sciences and Australian Regenerative Medicine Institute, respectively with their BioEYES marquee, where microscopes were set up to show embryo development in live zebrafish. The public could see hearts beating and blood flowing in real time, and zebrafish hatch. For the children, there were also colouring-in-sheets and zebrafish word puzzles to amuse them while mums and

dads stopped to see what the fuss was about.

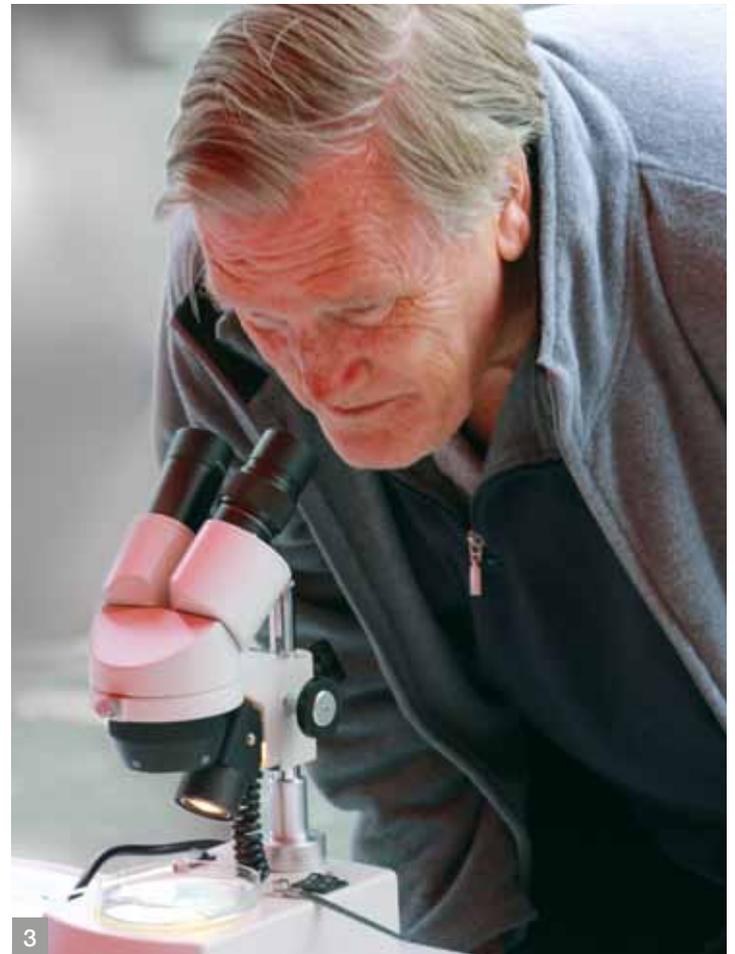
Dr Flecknoe said that for some people this was the first time that they had ever looked down a microscope and they were delighted.

“A couple of tweens said: ‘If science was this cool at school I might have actually enjoyed it’ while toddlers squealed with excitement and adults expressed their amazement at the process of fish development,” said the Early

Year Bioscience Coordinator and lecturer.

“This event gave us a unique opportunity to connect with the general public and highlight some of the excellent research that is currently being conducted at Monash.”

So next year, check out the National Science Week activities on offer at an unconventional site near home. You might be inspired by what you see.



1) Child's play. 2) Family activities. 3) Engrossing science.

Biomed Benchmark

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