In two eventful months, Professor James Whisstock received an ARC Federation Fellowship together with the Commonwealth Health Minister’s Award for Excellence in Health and Medical Research.

Professor Whisstock’s accolades build on a distinguished 11-year research career at Monash University, with highlights including the 2007 NHMRC Principal Research Fellowship and 2006 Science Minister’s Prize for Life Scientist of the Year. With the Federation Fellowship, the Department of Biochemistry and Molecular Biology researcher will receive a $3 million ARC grant over five years. Only 14 scientists received the coveted award this year.

“I am incredibly honoured to receive this fellowship,” says Professor Whisstock. “It allows me to go in a direction that I previously didn’t have the capacity to take on.”

In Professor Whisstock’s case, this means working on the family of perforin-like proteins, which kill bacteria, virally infected cells and cancer cells. These molecules also play important roles in developmental and neural biology. Professor Whisstock and his team will investigate how perforin-like proteins insert into membranes and form pores, and assess the diversity of function of these molecules in nerve growth and embryonic development. His team will use the Australian Synchrotron and collaborate with Professor Joe Trapani from Peter MacCallum Cancer Centre; Dr Michelle Dunstone, Dr Coral Warr and Associate Professors Phil Bird and Wayne Hodgson from Monash University School of Biomedical Sciences.

Professor Whisstock also received the Commonwealth Health Minister’s Award for Excellence in Health and Medical Research at the Australian Society for Medical Research dinner, one of the highlights of Medical Research Week in June. This prize is granted to an internationally renowned scientist who has completed their PhD within the last 12 years, has an outstanding record of accomplishment in medical research, is an inspiring role model and mentor, and skilled health communicator.

“I’m delighted to receive this award,” says Professor Whisstock. “I have a great team, who work hard and make amazing contributions. So it’s an honour for me and my team to be recognised in this way.”

Sarah Everitt, a PhD student from the Department of Medical Imaging and Radiation Sciences, is running a landmark study that has the potential to change radiation therapy practice for lung cancer patients.

Last December, the radiation therapist secured a Victorian Cancer Agency Tumour Grant to conduct a study on 20 patients at Peter MacCallum Cancer Centre. Ms Everitt will use a hybrid positron emission tomography and computed tomography scanner, or PET/CT, to detect cancer cells in people before and during radiation therapy. This machine finds the lung tumour and a radioactive marker monitors its metabolic activity.

“This will be the first study globally to investigate a novel tracer called FLT during radiation therapy, and will place Victoria at the forefront of cutting-edge and world-leading research,” says Ms Everitt.

“Predicting tumour behaviour may allow us to deliver highly-targeted treatment that is tailored for each patient.”

Lung cancer patients usually receive 30 courses of radiation therapy over six weeks – based on one pre-treatment PET/CT scan with a glucose marker. In this study, patients will receive multiple hybrid scans with both the conventional radiolabel, FDG, and an experimental FLT marker – a first for this cancer.

Ms Everitt hopes that this novel approach will make a difference. “We aim to achieve longer survival and fewer side effects for patients with lung cancer,” she says.

Ms Everitt will be collaborating with colleagues at Peter MacCallum Cancer Centre including: Associate Professor David Ball, Associate Professor Michael MacManus, Professor Rod Hicks and Professor Tomas Kron. She is supervised at Monash University by Dr Michal Schneider-Kolsky.
These Great Barrier Reef stonefish aren't your typical aquatic specimen. They're venomous: one sting from their spines can cause intense pain, temporary paralysis, and sometimes death – if untreated. These fish live in Associate Professor Wayne Hodgson's laboratory in the Department of Pharmacology. His team work with dangerous creatures, which most people avoid: mouse spiders, taipans, death adders, tiger snakes and the Australian box jellyfish. They are venom collectors.

Associate Professor Hodgson is unfazed about his stonefish. "They are not aggressive fish," he says. "As the spines are found along their backs, they are safe as long as you don't stand on them or push down on their spines. We handle them with protective mesh gloves."

Associate Professor Hodgson has shown in earlier work that 'milked' stonefish venom causes cardiovascular collapse – where blood pressure plummets and the heart slows down. While the currently available stonefish anti-venom appears to work well, this isn't the case with box jellyfish anti-venom, with experimental and clinical evidence suggesting it is ineffective. Therefore, this treatment is no longer used in Darwin where stings are common. Box jellyfish are the world's most venomous animal.

That's where Cairns-based Rocky and Spike come to the rescue. Each stonefish has 13 spines along its gnarly back and a venom gland underneath each spine. Associate Professor Hodgson places a stonefish into a tub of water, pushes down on a spine, venom squirts up and is collected into a vacuum tube. And no-one is hurt.

Rocky and Spike make a splash

They might look scary and prehistoric. But to those in the know, they're called Rocky and Spike. And they're cool.

As anti-venoms are expensive to produce and the local market is small, the development of new products isn't considered to be a high priority. Associate Professor Hodgson disagrees. "We're trying to find other drugs or strategies to treat box jellyfish stings," he says. "We hope the stonefish venom will give us an insight into the mechanism of action of the jellyfish toxin as we believe they may work in a similar way."

Reconnecting damaged neurons

Dr Yona Goldshmit, our recent recruit to the Department of Anatomy and Developmental Biology, is full of surprises.

A science graduate turned physiotherapist, she embarked on a Master's degree in neurobiochemistry after her daughter's birth, and then moved her family from Israel to Melbourne – where she combined her passion for physiotherapy with spinal cord injury research.

At the University of Melbourne, Dr Goldshmit worked with genetically modified mice that lack EphA4, a protein that is important in brain development. "It is part of a family of molecules called Ephs and ephrins," she says, "which together with other molecules, guide neurons to grow in the right direction and create the structure of the brain."

These EphA4-knockout mice are special. When their spinal cords are severed, the mice can regrow new nerve connections at the injury site and beyond, there is reduced scarring – which can inhibit this process – and the animals walk again within one to three months. However, normal mice did not improve and lost their ability to walk again.

After her PhD and during her first postdoc, Dr Goldshmit showed that when EphA4 function is blocked in normal mice their spinal cord neurons also regenerate after spinal cord injury.

Now at Monash University, Dr Goldshmit has set herself another challenge. "I like to learn new things," she says. "We have nice results in mice so why not check in primates as their brain structure more closely resembles humans? This is what I'll be doing for the next three years in Dr James Bourne's laboratory."

With a fellowship from the Victorian Neurotrauma Initiative, Dr Goldshmit will examine the role of Ephs and ephrins in the visual system of primates following brain injury. "Working with the visual system, I can check for functional recovery using electrophysiology, which is difficult to assess in mice," she says.

"We have nice results in mice so why not check in primates as their brain structure more closely resembles humans?"
First paper

For a young scientist, the first paper is a defining moment and provides a sense of achievement as they establish their credentials in the research community. We spoke to PhD student Zoe Ireland.

In April this year, Zoe Ireland published her first paper in the American Journal of Obstetrics and Gynecology.

The article focusses on fetal hypoxia, a condition where the developing fetus is deprived of oxygen and nutrients before or during birth. This can cause brain injury, seizures, developmental delay, behavioural abnormalities and physical disability.

Currently, there is no effective treatment to combat the effects of hypoxia on the fetal brain, which is difficult to diagnose. Therefore, Zoe, from the Department of Physiology, is looking to find preventative treatments for this debilitating disorder.

In this paper, Zoe tested the therapeutic potential of creatine, a molecule that curbs the loss of nerve cells when the adult brain is starved of oxygen.

Zoe explains: “We developed a model of birth hypoxia in the spiny mouse where we administered creatine to the pregnant mother in order to increase placental and fetal stores of creatine, in utero.” Then, a period of hypoxia was introduced just before birth.

When pregnant mice received a diet containing 5% creatine, almost all (95%) their oxygen-depleted pups survived birth. But only two-thirds of hypoxic pups survived when their mothers were fed regular diets only. Creatine also restores growth patterns in the offspring of supplemented mice.

How this molecule protects the brain is unclear. Creatine is converted by the body to form phosphocreatine, an important energy store. It is found in red meat and fish, and is used by athletes to increase muscle strength and performance.

Following the success of her first paper, Zoe is continuing her work on creatine and assessing its potential to prevent brain injury in pre-term babies, who may be unable to synthesise or absorb creatine properly.

Zoe presented her work at two international conferences in Europe in June, and visited a major research group in Zurich.

Ms Zoe Ireland

Alcohol in pregnancy: is any too much?

The Monash Healthy Start to Life research initiative and the ARC/NHMRC Network in Genes and Environment in Development will host the first national conference on alcohol in pregnancy in November.

This area is topical as it is now known that when a fetus is exposed to alcohol there are harmful life-long consequences and multiple organ systems can be affected. This conference will review current knowledge on the effects of prenatal alcohol exposure and address the question: is there any safe level of exposure?

The meeting will feature leading Australian researchers and representatives from the public health sector. Confirmed speakers include:

- Professor Robert Burton, Epidemiology and Preventive Medicine, Monash University
- Ms Lyn Colvin, Epidemiology, Telethon Institute for Child Health Research
- Professor Peter Coyle, Hanson Institute, Institute of Medical and Veterinary Science
- Professor Jon Currie, Addiction Medicine and Translational Neurobiology, St Vincent’s Hospital
- Professor Richard Harding, Anatomy and Developmental Biology, Monash University
- Professor Andrew Lawrence, Addiction Neuroscience Laboratory, Howard Florey Institute
- Dr Karen Moritz, School of Biomedical Sciences, University of Queensland
- Dr Ruth Morley, Paediatrics, Royal Children’s Hospital
- Associate Professor Helena Parkington, Physiology, Monash University
- Professor Sandra Rees, Anatomy and Cell Biology, University of Melbourne
- Dr Gurmeet Singh, Menzies School of Health Research, Northern Territory

Conference details
Date: Friday, 14 November 2008
Venue: Monash University Clayton campus, Lecture theatre C1

Registration details available at: www.healthystarttolife.monash.org/events

Email enquiries: enquiries@healthystarttolife.monash.org
Sometimes it's difficult to destroy a pathogen.

That's the case with *Mycobacterium tuberculosis*, the bacterium that causes TB and kills about 1.6 million people each year in Africa, south-east Asia and the Eastern Mediterranean. What's more, the available treatments are becoming ineffective with the emergence of strains that are either multi-drug resistant or extremely drug resistant.

Many international groups are trying to develop new drugs or vaccines against this disease. Dr Tim Stinear, from the Department of Microbiology, is taking a complementary approach. He has sequenced the entire genome of *Mycobacterium marinum*, a relatively harmless mycobacterium, which infects frogs, fish and fish handlers.

Sounds fishy? Not really. *M. marinum* is actually a close relative of *M. tuberculosis*. By comparing entire bacterial genomes of a pathogen with a similar but non-pathogenic relative, we can reveal how bacteria have evolved and how they cause disease.

Dr Stinear explains: “The genome of *M. tuberculosis* was sequenced in 1998. But we still don't know what genes are important for it to grow inside human macrophages (specialised white blood cells that destroy bacteria and viruses) to set up destructive lesions in your lung.”

Therefore, Dr Stinear sequenced *M. marinum* together with colleagues from around the world including: the Wellcome Trust Sanger Institute in the UK, the University of Washington in Seattle, Institut Pasteur in Paris and Monash University – work that was recently published in Genome Research.

What did he find? “If we look at the genomes of *M. marinum* and *M. tuberculosis*, *M. marinum* has a larger genome and it’s versatile,” says Dr Stinear. “It’s adapted to living in diverse environments and switches things on and off to respond to changes in temperature and shifts in oxygen.”

But more significantly, *M. tuberculosis* contains 600 genes that *M. marinum* doesn’t have – genes that might cause TB virulence – and a starting point for novel drug design.

Genomics allows us to analyse organisms in ways previously unimagined. Dr Stinear agrees. “With the imminent opening of the new high-throughput DNA sequencing facility at Monash Micromon,” he says, “studies like this will become more common and our biological insights more profound.”

MISCL MS fundraiser honoured

Jill Wells, who has fundraised for MS research at Monash Immunology and Stem Cell Laboratories, received the Tattersall’s Award for Enterprise and Achievement last December.

She was honoured for establishing Cure MS, a charity that has donated over one million dollars to support research into this debilitating disease.

One beneficiary is MISCL scientist, Professor Claude Bernard, who has received 1.4 million dollars over 12 years. He is indebted to Ms Well’s support. “The money has made a huge difference,” says Professor Bernard. “We purchased equipment that allows us to do the work we need to do to find the cause of MS and develop a therapeutic approach to help patients.”

For Ms Wells, who has lived with multiple sclerosis for 30 years, this is a subject close to her heart.

“Winning the award acknowledges my contribution to finding a cure for MS, which wouldn’t be possible without the support of our committee,” says Ms Wells.

“It proves that despite my inability to do so much, I can still contribute to society.”

At the event at The Boulevard restaurant in Kew, Ms Wells received a trophy and $15,000, which she hopes to build on so more substantial projects can be funded.

Cure MS is an independent, volunteer-run organisation that donates all funds raised to MS medical research.
Ms Kleiner, from the Department of Anatomy and Developmental Biology, was awarded the Dean’s award for Innovation and Excellence in Teaching. Ms Kleiner developed the anatomy teaching programs for the new physiotherapy degree and created a postgraduate program for physiotherapists wishing to further their knowledge of anatomy.

Dr Macaulay, from the Department of Biochemistry and Molecular Biology, received the Dean’s award for Excellence in Education. Dr Macaulay implemented the Student Project Cases, a student-centred learning activity where second year medical students work together to research a topic, write a document and give an oral presentation. She also developed nutrition and biochemistry multimedia teaching packages and co-organised the National Forum on Education in Biomedical Sciences last year.

A lecturer for 10 years, Dr Macaulay was honoured by her colleagues. “This is a very important award because there are limited occasions when our achievements in education are judged and acknowledged by our peers,” she says.

Prizes and awards ceremony.

On 16 April, the Faculty of Medicine, Nursing and Health Sciences acknowledged its high achieving students for 2007. Professor Steve Wesselingh, Faculty Dean, presented awards to the following students from the Bachelor of Biomedical Sciences and Bachelor of Radiography and Medical Imaging courses:

Bachelor of Biomedical Sciences
Year 1: Faculty Prize – Andrew Bisset and Stacey Hokke
Year 2: Faculty Prize – Miriel Shu Hui Ho and Benjamin Watson, Solly Faine Prize – Lori Turner
Year 3: Faculty Prize – Toni McGee and Firuz Salih
Year 4: Eric Glasgow Anatomy Bequest Scholarship – Robert Galinsky and Firuz Salih
Honours: Faculty Prize – Emily Louise Wilson

Bachelor of Radiography and Medical Imaging
Year 1: MIA Year One Highest Aggregate Prize – Eugene Greco
Shimadzu Radiographic Imaging and Methods Prize – Jemima Dowell
Year 2: Covidien Year Two Prize – Alice Gibson
Faculty Prize – Anastasia Castles
Year 3: ATL Ultrasound Prize – Claire Patton

Toshiba CT Prize – Dhaksha Tharmaraj
Year 4: Siemens Prize for MRI – Caroline Aird and Kristina Galang
The Symbion Health Prize – Claire Gore
The Australian Institute of Radiography Victorian Branch Prize – Kristina Galang

Lecturers honoured

In March this year, SOBS lecturers Dr Janet Macaulay and Ms Adina Kleiner each received the 2007 Dean’s Award for Excellence from Vice-Chancellor Professor Richard Larkins.
What does it mean to win the third year Faculty Prize?
Receiving the Faculty Prize was a real honour. I worked hard during my third year so it was great to have that work recognised by the School and Faculty. It motivates me to perform at my best during my honours year. Awards such as this build students’ confidence and help us strive to achieve bigger goals than we originally imagined.

Why did you choose to study biomedical science?
I have always been interested in the way the human body functions, and the science behind medicine. I did not want to lock myself into a specialist field or an occupational degree, because I did not know what I wanted to pursue as a career.

The course offered me the chance to experience different disciplines in the field. I was also attracted by the range of opportunities beyond the degree, with clinical, research and commercialisation programs being offered to biomedical science graduates.

What did you like about the course?
I enjoyed being introduced to most fields of biomedical science, and areas such as research, clinical ethics and health policy. I benefited from the way the core units built on common themes across the three years and approached them from different angles, for example looking at the anatomy, physiology, biochemistry and pharmacology of the endocrine system. I enjoyed learning about how different pathways and systems in the body function, and impact each other when things go wrong, or when we intervene with therapies.

What is your honours year project?
I am completing my honours year in the Department of Physiology. I am looking at the relationship between obesity and inflammation, and the potential for probiotics (dietary supplements that contain potentially beneficial bacteria) to alter this inflammatory state.

What are your career plans?
I am going to wait and see how this year pans out. I’d like to continue working towards understanding metabolic disorders, and finding new therapeutic approaches to tackle these problems in society.
Paul Eleftheriou, a 2002 graduate of the Monash course, is a testament to this view. After finishing Year 12, Paul narrowly missed out on an undergraduate place in medicine at Monash. Still keen to maintain a medical focus to his study, Paul enrolled in the biomedical science course. However, Paul yearned to be a doctor. In his final year of the degree course, he sat the Graduate Australian Medical School Admission Test and was accepted into medicine at the University of Melbourne. Now an intern at Western Hospital in Footscray, Paul cites his biomedical studies as a guiding influence over his medical aspirations. “My major interest from my biomedical science course was neuroscience, so this is the area I would like to specialise in,” he says.

“Medication, surgery and other interventions mean nothing if the human element is lacking”

Besides his enthusiasm for the theoretical side of medicine, Paul finds the routine interaction with patients particularly rewarding. “What I enjoy most is being able to talk to people and let them share their sorrow,” he says. “Medication, surgery and other interventions mean nothing if the human element is lacking.”

The flip-side of this personal investment in the job, are the sacrifices that follow. “The hours are generally long and you are constantly changing hospitals and specialties, which can make it hard to keep up with family, friends and personal relationships,” says Paul.

While uncertain of his future, Paul hasn’t forgotten his biomedical science past. “The course opened my eyes to the massive biomedical world that exists and one day I would like to undertake a research degree such as an MD or PhD in my area of specialty,” he says.

Destination revelation

The career destination of Bachelor of Biomedical Science graduates is anything but predetermined as students explore work opportunities before pursuing their chosen path.

One student, who has chosen this path, is Jaslyn Lee. A Singaporean resident, she has had to adapt to life and study in a new country. Jaslyn chose the Monash RP program because it was an accelerated course, which provided a direct platform to a career in medical research.

“I chose biomedical science because I have an interest in biology, and in particular female reproductive biology,” says Jaslyn. “I aspire to go as far as I can in this field, and the established biomedical infrastructure at Monash provides an encouraging and supportive environment for students to reach their potential.”

Currently, Jaslyn is completing a biomedical science honours year in the Department of Biochemistry and Molecular Biology.

After 18 months of living in Australia, Jaslyn says she has enjoyed both the educational and social opportunities available to her. “Living and studying abroad has broadened my horizons and widened my thinking,” she says. “I have found the culture and the people endearing. I’ve also enjoyed exploring the country and have picked up hockey again.”

From Singapore with love

For several years, Monash University has allowed students from the Republic Polytechnic in Singapore to enrol in the third year of the Monash biomedical science course.

One student, who has chosen this path, is Jaslyn Lee. A Singaporean resident, she has had to adapt to life and study in a new country.

Jaslyn chose the Monash RP program because it was an accelerated course, which provided a direct platform to a career in medical research.

“Living and studying abroad has broadened my horizons and widened my thinking”

Jaslyn Lee

“Living and studying abroad has broadened my horizons and widened my thinking.”

Jaslyn Lee

Dr Paul Eleftheriou

“The course opened my eyes to the massive biomedical world that exists and one day I would like to undertake a research degree such as an MD or PhD in my area of specialty,” he says.
Biomed Banter

Love is in the air

It appears that Paris’ reputation as the city of love is well founded, as Vicki Stacy from the Department of Anatomy and Developmental Biology discovered. Having spent two months travelling alone in Europe and the Middle East, Vicki landed in Paris on Valentine’s Day to meet up with a friend, who convinced her to visit the Eiffel Tower. There, she received a pleasant surprise.

“My friend told me to turn around and look at the view,” says Vicki. “There was Pete, my boyfriend, standing with a single rose and a ring in his hand. He went down on one knee and proposed. Apparently I said yes! I can’t remember.”

Despite her hazy recollection of the moment, this is undoubtedly an engagement that we will remember.

And baby makes three

Dr Helen Abud, senior lecturer from the Department of Anatomy and Developmental Biology, gave birth to daughter Lana on 25 January. She is pictured here with mum at three months. Lana is a baby sister to Aaron, 14 and Hayley, three.

Trivia treat

In May, six teams of students and staff from the Department of Physiology competed for the 2008 trivia night prize.

It was a nail-biting finish as the honours team lead by Professor Iain Clarke crossed the line, one point ahead of their nearest rival.

The winning team received a $100 meal voucher at Monash University Club.