



THE UNIVERSITY  
OF QUEENSLAND  
AUSTRALIA

**IMB**

Institute for Molecular Bioscience

# Annual Report 2015







**Cover artwork**  
*Cellular Intelligence*  
by Joannah Underhill

This work refers to the innate intelligence of all cellular organisms to arrange and organise themselves in the service of the whole. In their non-verbal understanding of the world, cells have the power and intelligence to rearrange themselves to allow more cells in, or push others out as required, and to automatically find and know their functions and place in the body.

Multi-layered in its approach, this painting has a depth that speaks to the constant osmotic exchange between cellular forms. It visualises the artist's exploration of groupings within and between cells to facilitate exchange and communication.

*Cellular Intelligence* forms part of Brisbane artist Joannah Underhill's (1978-2014) IMB artist-in-residency collection, *Envisaging the Invisible*.

Read more at [jounderhill.com](http://jounderhill.com)

You can buy official prints from the collection, which are signed by the artist, at [www.imb.uq.edu.au/prints](http://www.imb.uq.edu.au/prints), with all proceeds supporting IMB's vital research.

**Acknowledgements**

This report was published by IMB Communications in April 2016 and records the institute's achievements between 1 January and 31 December 2015. To enquire about this report please email [communications@imb.uq.edu.au](mailto:communications@imb.uq.edu.au)

CRICOS Provider No. 00025B

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# ABOUT

The University of Queensland's Institute for Molecular Bioscience (IMB) is a multidisciplinary scientific research institute committed to improving quality of life through research and translation.

Our researchers discover the fundamental mechanisms of biology and human disease and translate these findings into new drugs and diagnostics for global health, and improved products and processes for industry and the environment.

## Mission

Our mission is to advance scientific knowledge and deliver new health and industry applications from the best in life sciences research.

## Vision

Our vision is to be a global leader in the discovery and application of molecular life sciences research.

## Research divisions

- Chemistry and Structural Biology
- Genomics of Development and Disease
- Cell Biology and Molecular Medicine

## Research centres and breakthrough programs

- Centre for Inflammation and Disease Research
- Centre for Pain Research
- Centre for Rare Diseases Research
- Centre for Superbug Solutions
- Breakthrough Science Program in Biomembrane Design
- Breakthrough Science Program in Algal Biomedicine
- Breakthrough Science Program in Mechanobiology

## Strategic priorities

- Discovery excellence
- Translation impacts
- Learning
- Leadership and engagement
- Equity and sustainability

## Share in our discoveries

Subscribe to our IMB news and event updates  
[imb.uq.edu.au/subscribe](http://imb.uq.edu.au/subscribe)

## Join our social communities

 [Twitter.com/IMBatUQ](https://twitter.com/IMBatUQ)

 [Facebook.com/InstituteforMolecularBioscience](https://Facebook.com/InstituteforMolecularBioscience)

 [Youtube.com/IMBatUQ](https://Youtube.com/IMBatUQ)

Our research impact spans the areas of



Rare diseases



Pain



Inflammation



Superbugs



Heart and cardiovascular diseases



Cancer



Clean energy



Diabetes and obesity

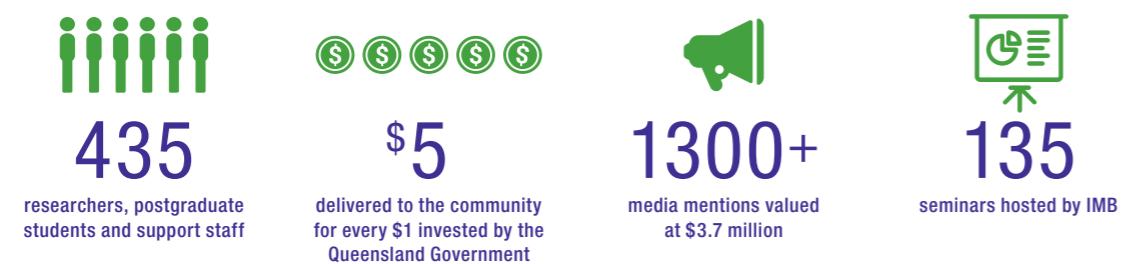
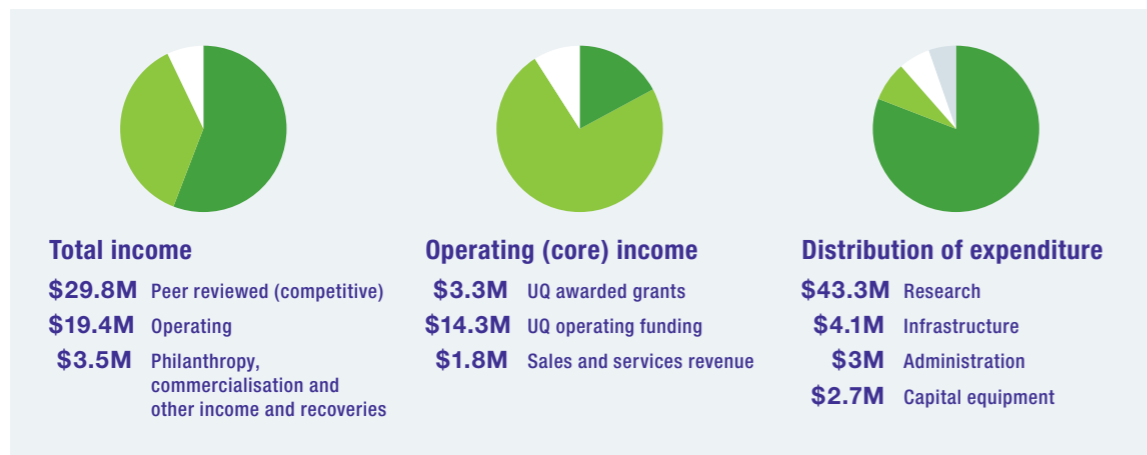


Agriculture

## DISCOVERY



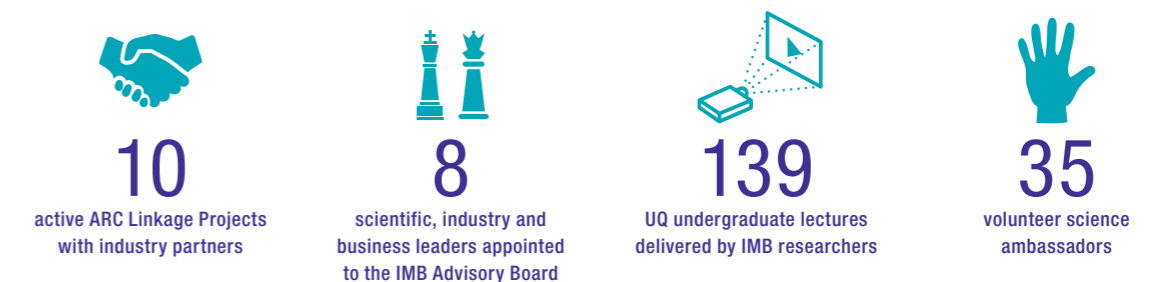
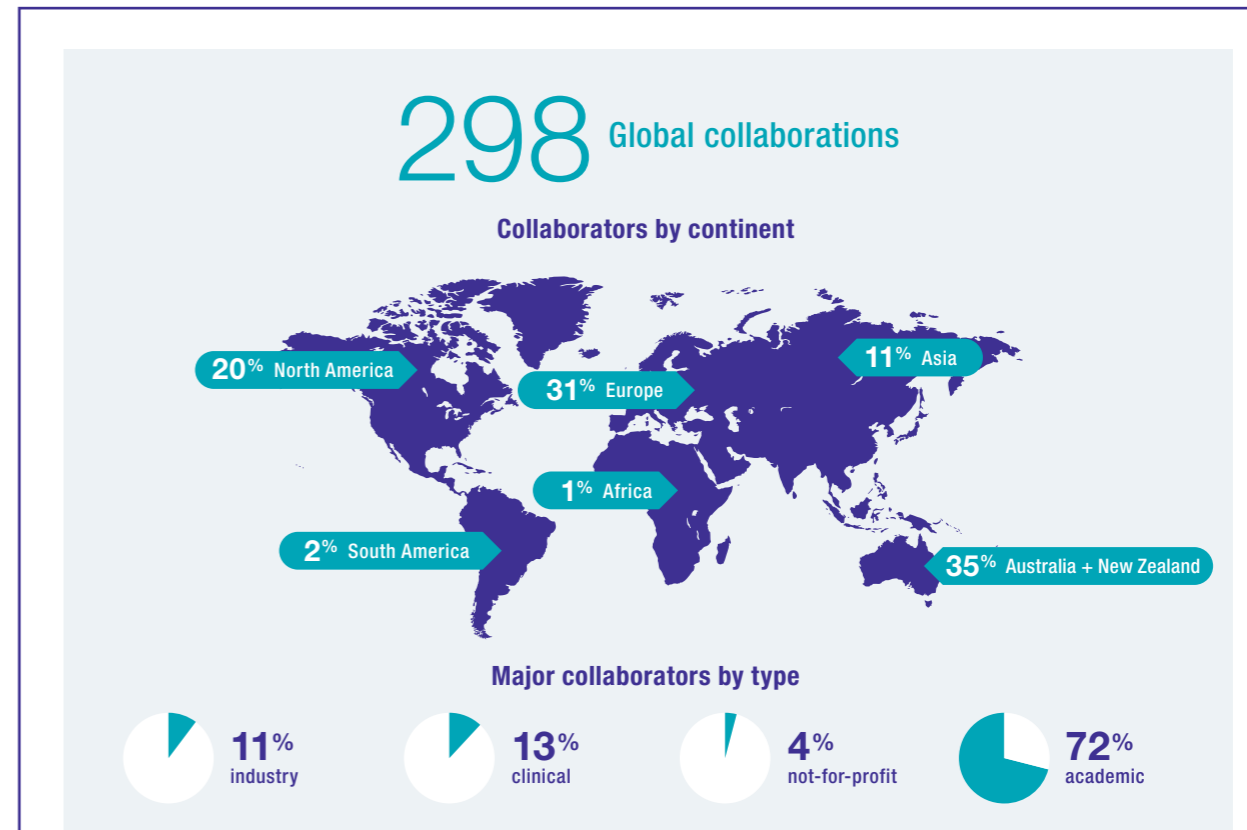
## INSTITUTE PERFORMANCE



## LEARNING



## ENGAGEMENT





# UQ VICE-CHANCELLOR AND PRESIDENT'S MESSAGE

As an institute dedicated to excellent science and improving quality of life, the Institute for Molecular Bioscience is creating change for individuals and society.

## Partners in success

The culture of collaboration and innovation at IMB attracts the support of an impressive list of national and international industry, clinical and not-for-profit partners. IMB consistently delivers fundamental life sciences breakthroughs and advances in disease detection and treatments, industrial processes, and environmental sustainability.

During 2015, IMB researchers forged strong collaborations with leading companies in the pharmaceutical, agricultural and biofuels sectors. These partnerships, some of which are highlighted below, provide a clear pathway for translating the institute's great research into tremendous products and services for society turning excellence into 'excellence plus':

- Professors David Craik and David Fairlie teamed with Pfizer Australia to produce a new class of drugs by engineering peptide drugs to be taken as a tablet rather than via injection;

- Professor Ben Hankamer was awarded a \$340,000 Australian Research Council (ARC) Linkage Project grant to work with global engineering and construction firm KBR and renewable energy company Muradel to produce renewable algal biofuels and animal feeds;
- Professor Kirill Alexandrov and drug discovery company Phylogica Ltd received a \$670,242 ARC Linkage Project grant to develop technology for producing peptide-based pharmaceuticals.

## Global impact

IMB makes a significant contribution to UQ's consistent placement well inside the top 100 in research-focused global university rankings, and in the top 50 in several of these. The institute also boosts our standing in the prestigious *Nature Publishing Index Asia Pacific*, where UQ leads Australian institutions and is among the Asia Pacific's top 10. Impressively, IMB researchers contributed 33 per cent of UQ's ranking in the *Nature Publishing Index Asia Pacific* as at the last quarter of 2015.

UQ continues to lead Australia for research income in the prestigious ARC Discovery scheme and Discovery Early Career Researcher awards.

IMB researchers achieved around three times the national average success rate for both ARC and National Health and Medical Research Council (NHMRC) funding in 2015. These pleasing figures are a testament to IMB's culture of research excellence and innovation.

## Inspired leaders

From its inspired research leaders to its rising scientific stars, IMB exemplifies UQ's vision to create a better world through knowledge leadership. Some of the IMB researchers recognised in 2015 for their drive to create positive change included:

- Professor Mike Waters, who was elected a Fellow of the Australian Academy of Science in recognition of his outstanding contributions to science during a career spanning more than 45 years;
- Professor David Craik, who received \$1 million from the Clive and Vera Ramaciotti Foundations and trustee Perpetual to revolutionise pharmacy by growing drugs in plants;
- Dr Sónia Henriques, who received one of only 50 ARC Future Fellowships awarded nationally, to develop transporters to allow drug delivery into cells and new strategies for biofuel production;
- Professor Jenny Martin, who championed the Science in Australia Gender Equity (SAGE) initiative as a member of the SAGE Forum Steering Committee, signing up 32 institutions around Australia—including UQ—to improve gender equity in Science, Technology, Engineering, Mathematics and Medicine (STEMM); and
- PhD student Angie Jarrad, who won the Queensland Women in Technology (WiT) PhD Career Start Award for her research to develop antibiotics to fight gut pathogens.

I congratulate and thank Director Professor Brandon Wainwright and all IMB staff, students and supporters who have been instrumental in the positive outcomes achieved throughout 2015. I look forward to following your future discoveries, and the benefits they will yield for many generations, well into the future.

**Professor Peter Høj**  
Vice-Chancellor and President  
The University of Queensland

# DIRECTOR'S MESSAGE

The broad IMB community of students, staff, alumni, donors and partners drives us to discover, inspires us to innovate, and compels us to create change in the world by developing new drugs and diagnostics for global health, and improved products and processes for industry and the environment.

## Encouraging innovation

Our staff and students received numerous awards and grants throughout the year to pursue innovative research projects from investigating the role of inflammation in Parkinson's disease and multiple sclerosis, to converting plants into biofactories for insecticides and drugs.

IMB researchers received more than \$7.8 million in ARC funding, and more than \$16 million in NHMRC funding to pursue discoveries in a range of health and environment areas. This funding was complemented by investment from philanthropic organisations such as the Clive and Vera Ramaciotti Foundations and trustee Perpetual, the Bill and Melinda Gates Foundation and the Heart Foundation.

Our research centres have been hard at work, making discoveries in the areas of pain, superbugs, inflammation and rare diseases. The IMB Centre for Pain Research found new potential painkillers in unlikely places, exploring cone snail, spider and centipede venoms in the search for new, more effective drugs. The IMB Centre for Superbug Solutions was officially launched along with a worldwide search for the next antibiotic to combat superbugs. The IMB Centre for Inflammation and Disease Research worked with an international team to develop an oral experimental drug to better treat inflammatory diseases such as arthritis, liver disease and dementia. The IMB Centre for Rare Diseases Research forged stronger clinical and community relationships with the appointment of centre director Associate Professor Carol Wicking to the Rare Voices Australia Scientific Medical Advisory Committee. IMB group leaders will be part of the new UQ Centre for Cardiac & Vascular Biology, announced in late 2015, with Dr Ben Hogan being named Co-Director.

## Celebrating our people

We welcomed two new group leaders to IMB in 2015. Dr Joseph Powell joins us from UQ's Queensland Brain Institute, and brings his skill in using large-scale, high-throughput genomic data to investigate how DNA sequence variants contribute to human disease. Dr Nathan Palpant joins us from the University of Washington, and brings significant expertise within the areas of stem cells and cardiovascular development and regeneration. Both Joseph and Nathan are valuable additions to our community who will strengthen and extend our genomic and cardiovascular research.

We were pleased to welcome to our Advisory Board Associate Professor Bev Rowbotham, Director of Haematology at Sullivan Nicolaides Pathology and Associate Professor of Cellular and Molecular Pathology at The University of Queensland, and Dr Anand Gautam, Director of Innovation Sourcing, Biopharmaceutical Research Unit, Novo Nordisk, Denmark. Bev and Anand are both delighted to contribute their depth of expertise and knowledge in advising and supporting IMB on its future development and success, and we are equally delighted to have them join us.

We farewelled two long-serving group leaders during 2015: Professor Melissa Little and Associate Professor Tim Bailey. We thank Melissa and Tim for their valued contributions to kidney research and bioscience software development respectively, and we look forward to maintaining research links with both.

## Engaging our community

During the year we had 500+ visitors tour IMB, 35 volunteer science ambassadors running tours and helping with events, and more than 135 seminars hosted at IMB.

We invited our community to explore brain cancer, pain and superbugs at our very successful public events, featuring speakers including renowned neurosurgeon Professor Charlie Teo AM, 'spray-on skin' pioneer and 2005 Australian of the Year Professor Fiona Wood AM, quadruple amputee Matthew Ames and video messages from burns survivor Turia Pitt, England's Chief Medical Officer Professor Dame Sally Davies DBE, FRS and former Bond girl and superbug survivor Daphne Deckers. We also hosted the third forum in our Life Sciences@UQ series, designed to allow researchers, industry and government representatives to network and strengthen Queensland's life sciences sector.

This report records our collective achievements and I thank and commend our staff and students for their contributions. I also thank our donors and partners for their ongoing support; it is through these partnerships that we can conduct world-class life sciences research to improve quality of life for all.

**Professor Brandon Wainwright**  
Director, Institute for  
Molecular Bioscience





# DISCOVERY

Research highlights

Research centres

Grants, fellowships and awards



# MEDICINE TO GROW ON TREES



Taking medicine in the future could be as simple as eating a sunflower seed or drinking a cup of tea made from herbs grown in your own garden.

IMB's Professor David Craik and collaborator Professor Marilyn Anderson AO from La Trobe University received \$1 million from the Clive and Vera Ramaciotti Foundations, administered by trustee Perpetual, to turn plants into pharmaceutical factories.

Thanks to the award, a world with cheaper, more accessible medicines—particularly for the world's poor—is not so far away.

"The aim of our research is to create a new generation of drugs to treat everything from HIV to chronic pain," David said.

"We really think these drugs could have major advantages for the developing world.

"The life expectancy of a male in Tanzania today is only 47 years, largely because of HIV/AIDS—and it's not that we don't have good medicines for HIV, the problem is that the medicines are unaffordable for many people there.

**"We are working to create drugs that can be grown in fields rather than factories, allowing large-scale, low-cost production in the backyards of the very people who need access to them."**



## Starting the cycle

The plant-grown drugs will be based on molecules called cyclic peptides, or cyclotides, that plants naturally produce.

Peptides are mini-proteins made up of a string of amino acids, the body's building blocks. Unlike most peptides, the ends of a cyclotide are joined together to form a circle, with chemical links across the structure to keep it stable.

"Cyclotides bridge the gap between traditional oral drugs, which are inexpensive but non-specific in their function, such as common painkillers, and protein-based drugs, such as insulin, which are specific but expensive and need to be injected," David said.

"The cyclotide drugs we are developing are very specific, and can be taken orally, thus simultaneously having the advantages of both traditional and protein-based drugs.

"Ordinary peptides are usually broken down quickly by the body's digestive enzymes, so we use the chemical trick of joining the ends together to stabilise them.

"The cyclic structure makes these peptide drugs harder for digestive enzymes to get at, giving the drug more time in the body to do its work.

"These drugs may also be safer, as when they eventually get digested they break into individual amino acids, the same as those found in our food."

## Growing success

The research team has already made progress with a pain relief drug made by combining venom peptides from a cone snail with *Arabidopsis*, a useful plant for genetic studies. The drug has shown positive results in animal trials.

The team is now working with petunia and canola plants for leaf- and seed-based expression of drugs, and potato and soybean as edible bio-pills.

**"In ongoing projects with collaborators we are designing peptides for treating cancer, pain, diabetes, obesity, and autoimmune, cardiovascular and infectious diseases," David said.**

"We will be able to combine these peptides with a cyclotide scaffold, then use plant biofactories to inexpensively produce large quantities of the drugs.

"Our focus in the next few years is to optimise the pain relief drug already under development, produce anti-obesity peptides in potatoes, and produce anti-cancer peptides in sunflower and soybean."

## Fruitful partnership

The \$1 million funding from the Clive and Vera Ramaciotti Foundations, administered by trustee Perpetual, will be used to establish the Clive and Vera Ramaciotti Facility (CVRF) for Producing Pharmaceuticals in Plants, to be based at IMB.

The facility has the potential to accelerate the development of plant-derived and plant-based pharmaceuticals, revolutionising translation of early-stage discoveries to tangible therapies, and potentially impacting the lives of millions of people.

"This type of blue sky research falls outside the realm typically funded by government or industry so we are particularly grateful to the Ramaciotti Foundations for their support," David said.

The Ramaciotti Biomedical Research Award is presented every two years, and this is the first time it has been awarded to Queensland.



# TAKING THE STING OUT OF PAIN



Lurking inside the world's most toxic creatures are hidden keys to curing pain. IMB researchers are exploring the venoms of spiders, scorpions, centipedes and cone snails in the search for potential painkillers.

"Looking to venomous creatures to cure pain may not seem very intuitive," Deputy Director of the IMB Centre for Pain Research Dr Irina Vetter said.

"However, venoms have evolved over time to have very specific effects on the nervous system of prey, with some of the venom components causing pain, and others blocking pain pathways.

"Components that cause pain help us to understand pain pathways, and components that block pain have direct potential as painkillers."



## Spider venom has legs as future painkiller

IMB's Professor Glenn King and colleagues recently discovered a new class of potential painkillers in tarantula venoms.

Many of the venoms contained peptides (mini-proteins) that blocked the Nav1.7 pain channel, which has a key role in pain transmission.

"Nav1.7 is a sodium channel located on sensory neurons, which are specialised nerve cells involved in sensing pain," Glenn said.

"Previous research shows that people who lack Nav1.7 channels due to a naturally-occurring genetic mutation are unable to experience pain, so blocking this channel could potentially help us to switch off pain in people with normal pain pathways.

"We have nine sodium channels in our bodies and our challenge is to find peptides that can distinguish between these channels and target only Nav1.7—something current pain relief drugs can't do but spider venom peptides most likely can."

The team studied venoms from 205 tarantula species, finding at least one peptide that blocked pain channels in 40 per cent of the species, and seven peptides overall that showed promise for developing a new painkiller.

"We found one peptide with the right three-dimensional structure, stability and potency to form the basis of a future painkiller," Glenn said.

"Our next step is to continue exploring the clinical potential of these peptides—and the ones we are yet to find in the 45,000 known species of spider in the world—in the hope of developing better treatments for the one in five Australians living with persistent pain."

## A new approach to pain

Peptides from venoms are of particular interest because unlike current painkillers, they should not be addictive, lose effectiveness over time or cause debilitating side-effects.

"The peptides we've found are very selective, targeting and turning off only one type of sodium channel," Glenn said.

"This is important as other sodium channels control important physiological functions such as beating of the heart and muscle contraction, and inhibiting these channels could have serious side-effects."

The researchers are not looking for a replacement for aspirin; their focus is helping people that suffer from long-term chronic pain.

"Around the world, 15-20 per cent of the population suffer chronic pain, and the proportion is generally higher than 50 per cent for seniors," Glenn said.

"Diabetic neuropathy, cancer pain and osteoarthritis pain could all potentially be alleviated by this new class of painkillers."

**Source:** Klint, JK, Smith, JJ, Vetter, I, Rupasinghe, DB, Er, SY, Senff, S, Herzig, V, Mobli, M, Lewis, RJ, Bosmans, F and King, GF (2015), *Seven novel modulators of the analgesic target Nav1.7 uncovered using a high-throughput venom-based discovery approach. British Journal of Pharmacology, 172: 2445-2458.*

# FUELLING THE FUTURE

One day, the fuel for your car, the medicine you take and even the food you eat could be produced by tiny green algae powered by sunlight.

IMB's Professor Ben Hankamer and his team are working to fast-track development of renewable solar fuels and other products that are CO<sub>2</sub>-neutral and reduce competition for arable land and fresh water.

"By 2050, the human population is forecast to expand to 9 billion people, requiring 50 per cent more fuel, 70 per cent more food, and 50 per cent more fresh water," Ben said.

"At the same time, Intergovernmental Panel on Climate Change data show that we must reduce CO<sub>2</sub> emissions by ~80 per cent to limit the rise in average global temperature to two degrees Celsius, the limit agreed to at the 2015 UN Conference on Climate Change.

"Achieving this reduction necessitates the rapid development of clean fuel technologies, as about 80 per cent of our global energy demand is for fuels, but almost all renewable energy technologies—solar, wind, wave—generate electricity to supply the other 20 per cent."

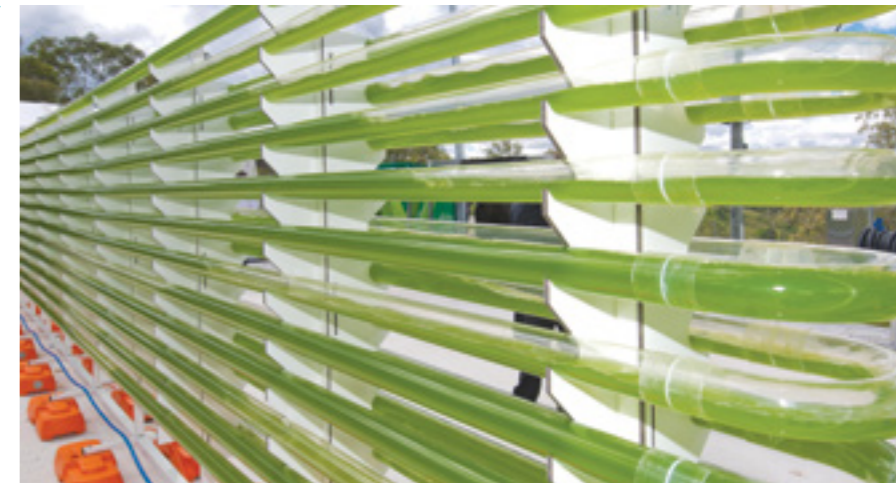
Ben's team is focused on producing solar fuels from microalgae, which have evolved over 3 billion years to harness the huge energy resource of the Sun.

"Microalgae could help us transition from a finite fossil fuel resource to a sustainable solar energy supply," Ben said.

## Harnessing the Sun

The solar energy resource is so large that the sunlight striking the Earth's surface in just two hours delivers enough energy to power the entire world economy for one year.

Plants and algae have mastered the art of harnessing this energy resource through evolving intricate systems that convert sunlight, CO<sub>2</sub> and water into the food, fuel and atmospheric oxygen that support life on Earth.



Algal bioreactors at IMB's Solar Biofuels Research Centre

"Compared to other crops, microalgae are highly efficient at converting sunlight and carbon dioxide into energy for their own growth—or for producing fuels, foods and other high-value products," Ben said.

"My team is working to increase this efficiency further by improving production processes and genetically modifying algae cells."

Microalgae can be grown in saline or waste water and agricultural run-off, and production systems can be located on non-arable land, reducing competition with food production and water resources.

## Optimising algae

The big challenge Ben and his team are now addressing is to optimise these production systems to make solar fuels cost-competitive with fossil fuels.

"We are using advanced modelling to analyse technology and market needs to guide system design," Ben said.

"We're also studying microalgae cell lines to understand the photosynthetic machinery and increase the efficiency of sunlight conversion to biomass.

"Other researchers have demonstrated that the crude oil yield from microalgae can be increased, and there is plenty of potential for further optimisation.

"Our economies and our responses to climate change depend on stable fuel supplies, so it is economically and environmentally important to invest in and develop efficient renewable fuel systems now."

## Adding value

Microalgae have the potential to deliver much more than renewable fuels.

Microalgae biotechnologies can also power the production of high-value products such as vaccines, and animal and aquaculture feeds.

Ben and colleagues from across UQ are investigating the use of algae to produce components for dengue virus vaccines and new antibiotics.

"Having multiple markets for a range of algae products supports the refinement and cost reduction of microalgae systems, and ultimately helps to bring solar fuels closer to price parity with crude oil," Ben said.

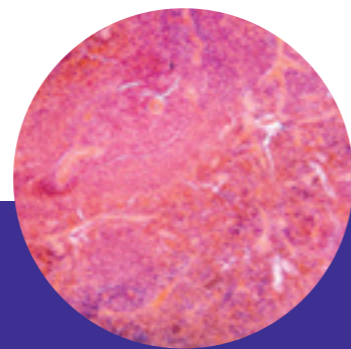
"Queensland is in an ideal position to take advantage of this technology, with its vast lands, abundant sunshine and saline water resources, a skilled workforce, excellent infrastructure and proximity to growing Asian markets.

"With the national focus on innovation for a strong economy, now is the time to invest in developments to secure our future fuel supply."



1

IMB researchers worked with an international team to develop an experimental drug that blocks a key driver of inflammatory diseases – a finding that could lead to new treatments for arthritis, liver disease and dementia.



IMB researchers were part of an international team that completed the most comprehensive analysis yet of pancreatic cancer, in a study that could improve future treatments. The study revealed four subtypes of the disease, providing new hope for personalised treatments.

2

# RESEARCH HIGHLIGHTS

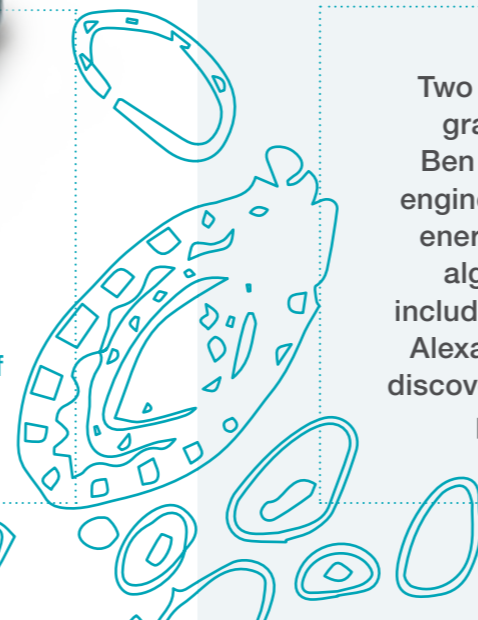
3

Associate Professor Lachlan Coin was part of an international team tackling hunger and poverty in Sub-Saharan Africa by improving sweet potato crops.



Associate Professor Mark Smythe and his team developed a new asthma treatment that targets the underlying cause of asthma rather than just the symptoms, and could reduce the unwanted side-effects of current treatments.

5



4

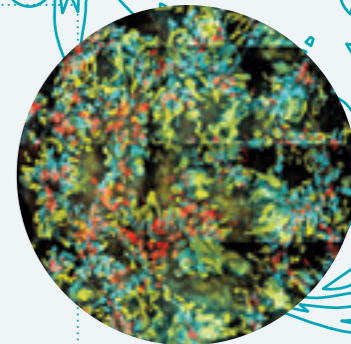
Professor Mike Waters was elected a Fellow of the Australian Academy of Science in recognition of his outstanding contributions to science during his career spanning more than 45 years. He is IMB's fourth fellow.

Photo: Mark Graham



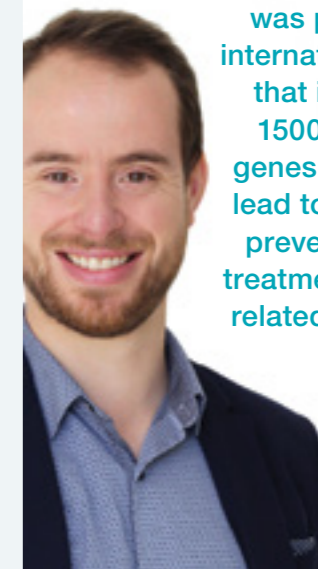
6

IMB researchers perfected a method of growing mini-kidneys from stem cells for use in drug screening, disease modelling and cell therapy. The mini-kidneys form all the cell types normally present in the human kidney and could allow the use of mini-organs to screen drugs to treat kidney disease or find out if a new drug is likely to injure the kidney.



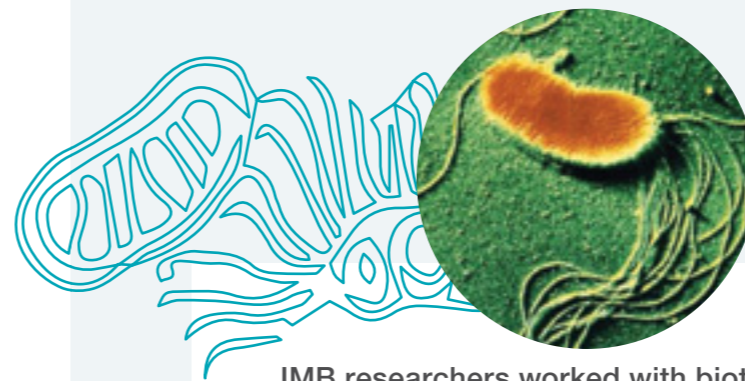
8

Dr Joseph Powell was part of an international study that identified 1500 'ageing' genes that could lead to improved prevention and treatment for age-related diseases.



7

IMB researchers worked with biotechnology company Alchemia to discover a potential new class of antibiotics inspired by sugar molecules produced by bacteria. Bacteria are less likely to become resistant to an antibiotic based on a modified version of their own sugar, so the discovery could help to combat the rise of superbugs.



9

Professor Rob Parton was part of an international team awarded \$US1.3 million in 2015 Human Frontier Science Program funding to help identify how our own fat cells can be used to attack bacteria.



10

Two IMB researchers received ARC Linkage Project grants to team with industry partners. Professor Ben Hankamer was awarded \$340,000 to work with engineering and construction firm KBR and renewable energy company Muradel to develop products from algae, such as foods, fuels, high-value products including vaccines, and bioremediation. Professor Kirill Alexandrov was awarded \$670,242 to work with drug discovery company Phylogica to develop technology for producing peptide-based pharmaceuticals.





# RESEARCH CENTRES



Dr Kate Schroder is looking for new approaches to controlling inflammation as part of the CIDR



Claudio Cortes Rodriguez, Associate Professor Carol Wicking and Maria Rondon Galeano hope their work in the CRDR will help improve quality of life for people living with rare diseases

## IMB Centre for Rare Diseases Research

**Rare diseases are more common than the name suggests.**

Centre Director Associate Professor Carol Wicking said there are more than 7000 known rare diseases, with many more described each year.

“While each may be rare, together rare diseases are common, affecting around 1 in 12 Australians—including a large number of children,” she said.

“Many rare diseases are genetic and often, but not always, begin in childhood.

“Around one-third of children with a rare disease will not survive to the age of five.

“Rare diseases can affect virtually any organ in the body and frequently affect more than one in a life-threatening or chronically debilitating way.”

The IMB Centre for Rare Diseases Research aims to identify the genetic mutations causing rare diseases, model mutations in cell and animal models to confirm the link between mutations and disease, and to better understand what has gone wrong in affected cells and tissues. This information will have implications for diagnosis, and may aid in future development of therapies for patients living with a rare disease.

Researchers in the centre are working with clinical and research colleagues around the world to investigate a range of rare diseases, including diseases of the brain, heart, reproductive system, skeleton, muscles and vasculature.

**“The Centre for Rare Diseases Research supports the international goal of identifying the molecular cause of most rare diseases by 2020.”**

**Associate Professor Carol Wicking**

**Director:** Associate Professor Carol Wicking  
🌐 [rarediseases.imb.uq.edu.au](http://rarediseases.imb.uq.edu.au)  
✉ [rarediseases@imb.uq.edu.au](mailto:rarediseases@imb.uq.edu.au)

## IMB Centre for Pain Research

**One in five Australians lives with chronic pain.**

Centre Director Professor Richard Lewis said that for more than half of these people, pain has a significant impact on their day-to-day lives.

“Chronic pain impacts mood, memory and relationships, as well as physical capabilities,” he said.

“It also has a big impact on the economy, costing Australia \$34 billion per year, which is more than the cost of treating cancer, stroke, and diabetes.

“Many types of chronic pain are poorly treated by current painkillers, so we are working to understand the origins and mechanisms of pain to develop new treatments.”

The IMB Centre for Pain Research is working with experts across the world to discover and develop new molecules for treating pain in humans. Our researchers particularly focus on pain that is difficult to manage, such as burns, neuropathic, diabetic, chemotherapy and cancer pain.

“Our vision is to discover and characterise pain targets and pathways associated with chronic pain and identify molecules that will improve the treatment of chronic pain,” Richard said.

“We know that many current painkillers are not effective and come with a number of unpleasant side effects.

“Through the centre’s multidisciplinary approach to pain research, we are working to change this by developing new treatment options to improve quality of life for people living with chronic pain.”

**“Through research, we can gain a better understanding of how the body feels pain and, in partnership with pain specialists, source solutions to major problems faced by people living with pain.”**

**Professor Richard Lewis**

**Director:** Professor Richard Lewis  
**Deputy Director:** Dr Irina Vetter  
🌐 [pain.imb.uq.edu.au](http://pain.imb.uq.edu.au)  
✉ [pain@imb.uq.edu.au](mailto:pain@imb.uq.edu.au)

## IMB Centre for Inflammation and Disease Research

**Inflammation plays an essential role in our health and survival, but can also harm us.**

Centre Director Associate Professor Matt Sweet said that dysregulated inflammation lies at the heart of many human diseases, including diabetes, asthma, arthritis, sepsis, stroke, Alzheimer’s disease, cancer, and liver disease. He said the total burden of liver disease alone in Australia is estimated to be more than \$50 billion.

“Inflammation protects us from infection and helps to heal our body after tissue damage, but it needs to be very tightly regulated and switched off once the job is done,” he said.

“Our modern lifestyle—including stress, diet, pollution, and physical inactivity—keeps the immune system on high alert and can lead to it being activated inappropriately.

“Uncontrolled inflammation can turn against our own bodies, causing damage to otherwise healthy cells, thus resulting in development and/or aggravation of disease.”

The IMB Centre for Inflammation and Disease Research is discovering the molecular and cellular processes of inflammation, understanding how inflammation progresses to disease, and transferring this knowledge into new drugs—as well as repurposing existing drugs—to prevent and treat inflammatory diseases.

Centre researchers are focused on identifying biomarkers and druggable inflammatory pathways for specific inflammatory diseases, such as chronic liver disease and inflammatory bowel disease. They are also developing new technologies, such as biosensors, to track the migration and status of inflammatory cells and mediators, which can help identify new drug targets and guide the development of new diagnostics.

**“Understanding how inflammation becomes dysregulated is essential if we are to develop more effective anti-inflammatory drugs.”**

**Associate Professor Matt Sweet**

**Director:** Associate Professor Matt Sweet  
**Deputy Director:** Dr Kate Schroder  
🌐 [inflammation.imb.uq.edu.au](http://inflammation.imb.uq.edu.au)  
✉ [inflammation@imb.uq.edu.au](mailto:inflammation@imb.uq.edu.au)

## IMB Centre for Superbug Solutions

**The World Health Organization has declared antimicrobial resistance, or superbugs, to be one of the greatest threats to human health.**

Centre Director Professor Matt Cooper said resistance to antibiotics is a growing global problem in treating infections, resulting in illnesses lasting longer and increasing costs to the healthcare system.

“Superbugs cost the Australian economy in excess of \$1 billion each year, while bacterial infections kill more than 140 Australians each week,” he said.

“Now is the time to come together and help our community stop superbugs in their tracks before it’s too late.”

The IMB Centre for Superbug Solutions is working to understand the chemistry and biology of infections. With this knowledge, our researchers can discover new drugs and redesign existing drugs to improve effectiveness and help save lives.

Through the Community for Open Antimicrobial Drug Discovery (CO-ADD), the centre is also fast-tracking the discovery and development of new antibiotics to treat multidrug-resistant bacteria, including those that cause skin infections, sepsis, pneumonia, tuberculosis and urinary tract infections. Ultimately, the centre aims to help doctors give patients the most effective drug, the first time, in time.

**“New treatments are urgently needed to prevent a return to the pre-antibiotic era, when even simple infections caused death.”**

**Professor Matt Cooper**

**Director:** Professor Matt Cooper  
**Deputy Director:** Associate Professor Lachlan Coin  
🌐 [superbugs.imb.uq.edu.au](http://superbugs.imb.uq.edu.au)  
✉ [superbugs@imb.uq.edu.au](mailto:superbugs@imb.uq.edu.au)



# GRANTS, FELLOWSHIPS AND AWARDS

## Grants

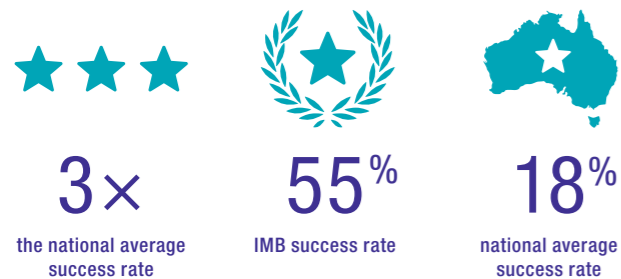
The institute performed very well in the major competitive grant rounds offered by the Australian Research Council (ARC) and National Health and Medical Research Council (NHMRC) for funding commencing in 2015.

Competitive grant funding represented 56 per cent (\$29.8 million) of IMB's total income in 2015 (\$52.6 million), reflecting the high quality and scientific importance of our research.

### In 2015, funding commenced for the following IMB-led grants

- 10 NHMRC Project grants totalling **\$7,903,575**
- 1 NHMRC Development grant totalling **\$556,795**
- 11 ARC Discovery Project grants totalling **\$5,222,900**
- 2 ARC Linkage Project grants totalling **\$1,010,242**

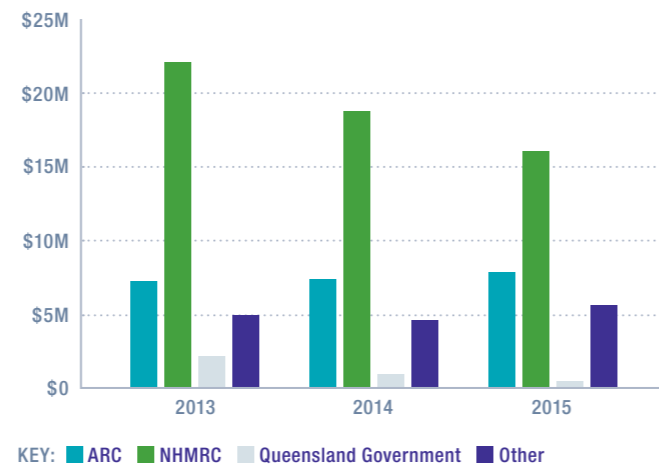
### ARC Discovery Project grants



### NHMRC Project grants



## Competitive grant income



## Fellowships

IMB fellows are supported by a range of competitive fellowship schemes. Thanks to the support of these funding organisations, IMB fellows have the opportunity to conduct valuable research with the potential to advance global scientific progress and improve the health and wellbeing of people around the world.

### Total competitive fellowships continuing in 2015

- 1 ARC Discovery Outstanding Researcher Award (DORA)
- 5 ARC Future Fellows
- 4 ARC Discovery Early Career Researcher Awards (DECRA)
- 14 NHMRC Research Fellows
- 1 NHMRC Career Development Fellow
- 4 NHMRC Early Career Fellows
- 1 Queensland Smart Futures Fellowship
- 1 Lymphatic Education & Research Network (LERN) Postdoctoral Fellowship

### Fellowships commenced in 2015

- 1 ARC Australian Laureate Fellow totalling **\$2,977,310**
- 1 ARC Future Fellow totalling **\$677,352**
- 1 ARC Discovery Early Career Researcher Award (DECRA) totalling **\$373,254**
- 1 NHMRC Research Fellow totalling **\$739,980**
- 1 NHMRC/Heart Foundation Career Development Fellow totalling **\$455,452**
- 1 National Heart Foundation Future Leader Fellowship totalling **\$200,000**

## Awards

### 2015 award highlights included

**Professor David Craik** received a \$1 million Ramaciotti Biomedical Research Award for his work to use plants as 'biofactories' to produce next-generation pharmaceuticals. He was also named an ARC Laureate Fellow and received the American Peptide Society's 2015 Vincent du Vigneaud Award for outstanding achievements in peptide research and scientific excellence at mid-career.



Professor David Craik (right) with ARC Chief Executive Officer Professor Aidan Byrne

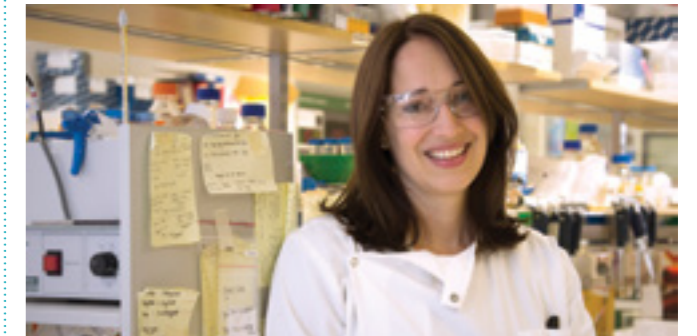
**Professor Mike Waters** was elected a Fellow of the Australian Academy of Science in recognition of his outstanding contributions to science during his career spanning more than 45 years. His discoveries are contributing to the development of new cancer and diabetes therapies.



Professor Mike Waters (Photo: Mark Graham)

**Dr Ben Hogan** received the Heart Foundation Researcher of the Year Award for his outstanding work in 2014 on identifying the genes and cells that control formation of the vascular and lymphatic system, and how they can be targeted to help repair the body after a heart attack or during cancer.

**Dr Irina Vetter** was awarded the Alexander von Humboldt Fellowship for Experienced Researchers to carry out research in Germany, and the Leichhardt Memorial Award for an Australian researcher to visit Germany.



Dr Irina Vetter

**Professor Paul Alewood** was awarded a competitive NHMRC Principal Research Fellowship to continue his research into developing new pain therapies from venoms.

**Professor Kirill Alexandrov** received the National Breast Cancer Foundation Innovation and Vision in Research Award for novel and important breast cancer research.

**Dr Brett Collins** received the Australia and New Zealand Society for Cell and Developmental Biology (ANZSCDB) Emerging Leader Award for his research into the mechanisms of cellular membrane trafficking in health and disease.

**Professor Glenn King** was awarded the Australia and New Zealand Society for Magnetic Resonance medal for outstanding contributions to magnetic resonance research.

**Professors David Craik and David Fairlie** received a UQ Partnership in Research Excellence Award for their work with Pfizer Australia to produce a new class of drugs by engineering peptide drugs to be taken as a tablet rather than via injection.

**Dr Joseph Powell** received a UQ Foundation Research Excellence Award to support his research that aims to develop a computational method for examining how genetic variants contribute to common diseases.

## 2015 Sources of Competitive Funding

- ANZ Trustees
- Australia-India Strategic Research Fund
- Australian Cancer Research Foundation
- Australian Research Council
- Bill and Melinda Gates Foundation (US)
- Bioplatforms Australia Limited
- Brainchild Foundation
- Cancer Council Queensland
- Cariplo Foundation (Italy)
- Clive and Vera Ramaciotti Foundations
- CURE (Citizens United for Research in Epilepsy) (US)
- G08 Australia
- Great Barrier Reef Foundation
- Heart Foundation
- Human Frontier Science Program (France)
- Ian Potter Foundation
- James S McDonnell Foundation (US)
- Lymphatic Education & Research Network (US)
- National Breast Cancer Foundation
- National Health and Medical Research Council
- National Institutes of Health (US)
- Queensland Government
- The Cass Foundation
- The Kids' Cancer Project
- The MAWA (Medical Advances Without Animals) Trust
- Wellcome Trust (UK)
- Wound Management Innovation CRC
- WWTF – Vienna Science and Technology Fund (Austria)





# LEARNING

Research training

Research higher degree students

Research higher degree conferrals





PainPal team – Prashanth, Kathleen and Alan



SIMBA executive committee

# RESEARCH TRAINING

When it comes to an enriching student experience, it takes more than top researchers and world-class facilities to set the foundation for a meaningful career. While these are important factors—and definitely attributes students can expect to find at IMB—a supportive environment and career mentorship also play a vital role.

## Development through mentorship

In 2015, IMB supported 129 active research higher degree (RHD) students. We also hosted 23 undergraduate students, 6 coursework masters students, 21 summer students, 12 winter students and 39 occupational trainees during the year. Collectively, our IMB student cohort had members from over 30 countries.

Students at IMB are encouraged to expand their skill sets and reach their scientific potential in a culture of research excellence. In a drive to enhance their research experience, a series of workshops were offered to students in 2015 on topics including biostatistics, communication and data integrity.

RHD students were also invited and encouraged to participate in events organised by IMB's student association, SIMBA, and the IMB Early Career Researchers Committee. These events included a range of career and mentoring seminars, as well as events for social and professional networking and peer support.

## Singing their praises

There were many opportunities to celebrate student successes at IMB during 2015.

**Kathleen Yin** (Vetter group) won the Hacking Health hackathon at the Health Informatics Conference in June 2015. She was also part of an IMB team, with **Prashanth Jutty Rajan** (Lewis group) and **Alan Robertson** (Coin group), that received first place at Brisbane HealthHack in October 2015 for developing an app to help chronic pain patients. The prototype app, PainPal, will help patients manage the impact of the disease on their quality of life, and provide de-identified data to researchers to help guide the development of new treatments for chronic pain.

**Kuastav Das Gupta** (Sweet group) was awarded the Young Science Ambassador Award for Brisbane by Wonder of Science and visited schools to promote science, technology, engineering and mathematics (STEM) education, along with judging regional science conferences at Dalby and Roma.

**Clarissa Rios Rojas** (Koopman group) was selected as a global champion for women's economic empowerment by the UN's Empower Women platform. Clarissa started a non-profit, Ekpapalek, to empower Latin students and promote the social and economic development of Latin American countries.

"IMB has amazing research facilities and numerous groups specialising in medicinal chemistry, the area of research that I wanted to pursue for my doctoral studies. Within these groups, biologists and chemists work side by side to develop new medicines. IMB also has many links with industry and I was keen to learn about the translation of basic research into consumer products. The opportunity to be part of this unique interplay ultimately saw me choose IMB."

**Angie Jarrad**  
IMB PhD student  
(Cooper group)



Angie Jarrad receiving her Women In Technology PhD Career Start Award

## Travel grant highlights

**Nicholas Condon** (Stow group) received a UQ Graduate School International Travel award to visit Howard Hughes Medical Institute's Janelia Research Campus, US, to use the Lattice Light Sheet microscope, and then attend the American Society for Cell Biology Annual Meeting in San Diego.

**Tae Gyu Oh** (Muscat group) received an award to attend the 2015 Nuclear Receptor EMBO Conference, France, where he presented a talk.

**Sing Yan Jessie Er** (King group) received a UQ Graduate School International Travel award to visit Professor Jennifer Cochran's lab at Stanford University, US, to learn state-of-the-art imaging techniques. As part of the trip, she presented a poster at the Peptide Therapeutic Symposium, US, and a poster at the International Peptide Symposium, Singapore, for which she won a prize.

**Marija Kojic** (Wainwright group) presented a poster at the Gordon Research Conference: Cerebellum, US, and then won first prize for her oral presentation on the same work at the 6th International Postgraduate Symposium in Biomedical Sciences, UQ.

## Where are they now?

We celebrated with 28 of our RHD students who graduated during 2015. Many graduates secured research positions at leading organisations around the world, or accepted exciting roles within the corporate sector, including:

**Dr Kathryn McClelland** (formerly Koopman group) is now working for the National Institute for Environmental Health Sciences in the US.

**Dr Keerthana Krishnan** (formerly Grimmond group) is now an applications and product development scientist at NEBNext New England Biolabs in the US.

**Dr Sheila Barbero** (formerly Fairlie group) is now a trainee patent attorney at Griffith Hack, Melbourne.

**Dr Natasha Chaudhary** (formerly Parton group) is now working at the Weill Cornell Medical College, Cornell University.



# RESEARCH HIGHER DEGREE STUDENTS

Hafiza Abdul Ghani  
Nikita Abraham  
Joanna Akello Agwa  
Eduardo Albornoz  
Balmaceda  
Rubbiya Ali  
Sungmin Baek  
Guillaume Bernard  
Damien Bierschenk  
Brandon Binnie  
Chaseleigh Bradley  
Lou Brillault  
Samuel Capon  
Irene Chassagnon  
Smrita Chaudhury  
Wenhan Chen  
Gamma Chi  
Ivy Chiang  
Chun Yuen (Jonathan)  
Chow  
Signe Christensen  
Nicholas Condon  
Yingnan Cong  
Claudio Cortes  
Rodrigues  
Ben  
Cristofori-Armstrong  
Yi Cui  
Zhenling Cui  
Jason Da Silva  
Kaustav Das Gupta  
Jessica De Angelis  
Darren Do  
Tram Ahn Do

Kinga Duszyc  
Mriga Dutt  
Ingrid Edwards  
Sing Yan Er  
Chun-Wei Feng  
Jordan Follett  
Emily Furlong  
Dejan Gagoski  
Joel Goode  
Daniela Grassini  
Lin Grimm  
Shafali Gupta  
Marwa Hussain Ali  
Mathilde Israel  
Kapil Jain  
Gisela Jakob  
Angie Jarrad  
Prerna Jha  
Pengxiang Ji  
Husen Jia  
Yan Jiang  
Yuhong Jiang  
Wooram Jung  
Prashanth Jutty Rajan  
Pabasara Kalansuriya  
Johan Kamal Hamidon  
Sanjaya KC  
Marija Kojic  
Lalith Kummari  
Soohyun Kwon  
Christian Larney  
Hyun Jae Lee  
Geraldine Ler  
Xuan Liang

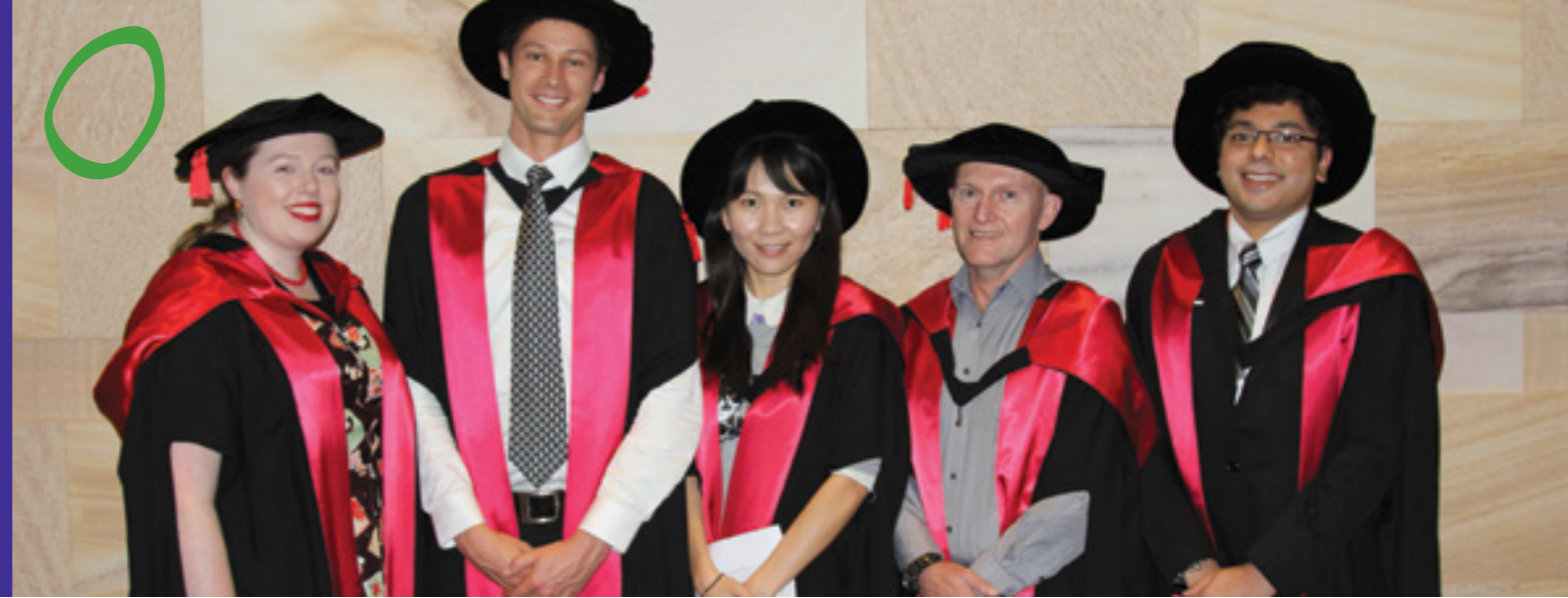
Ye-Wheen Lim  
Chao Liu  
Emma Livingstone  
Bruno Madio  
Barbara Maier  
Justin Mitchell  
Osama Mohamed  
Ambika Mosale  
Venkatesh Murthy  
Masuda Nabi  
Laizuman Nahar  
Pratik Neupane  
Hoang Son Nguyen  
Daniel Neilsen  
Georgianna Oguis  
Tae Gyu Oh  
Jeroen Overman  
Blessy Paul  
Samuel Perry  
Wanida Phetsang  
Sarah Piper  
Miranda Pitt  
Kwan Yuen Poon  
Rosa Prahll  
Pritesh Prasad  
Anggia Prasetyoputri  
Haiou Qu  
Michelle Quezada  
Iniguez  
Sassan Rahnama  
Anjaneya Ravipati  
Clarissa Rios Rojas  
John Roles  
Jessica Rowley

Manohar Salla  
Zoe Schofield  
Zhuo Shang  
Haojing Shao  
Janina Steinbeck  
Jamie Stevens  
Claudia Stocks  
Jasmin Straube  
Megan Surawski  
Atefeh Taherian Fard  
Jessica Teo  
Wei Xuan Teo  
Vikas Tillu  
Zewen Tuong  
Peter van der Heide  
Darya Vanichkina  
Felicitas Vernen  
Dan Wang  
Hongyang Wang  
Krishantha Pradeep  
Wardamune Gedara  
Kenneth Wee  
Xiaosa Wu  
Yeping Wu  
Dake Xiong  
WeiJun Xu  
Jennifer Yarnold  
Jeremy Yeo  
Kathleen Yin  
Alina Zamoshnikova  
Eugene Zhang  
Chenxi Zhou  
Rebekah Ziegman  
Kerstin Zoidl





# 2015 RHD CONFERRALS



Kathryn McClelland, David Wood, Jingjing Wan, Timothy Reeks and Yash Chhabra at the July graduation

Name	Supervisor	Degree	Thesis title	Alumni destination
Shaffinaz Abd Rahman	Associate Professor Gary Leong	PhD	A Systems Biology Approach towards Child Obesity and Obesity-Related Diseases: Integration of Clinical, Genetic, Hormonal and NMR Metabonomic Factors	Ng Teng Fong General Hospital Sleep Laboratory, Singapore
Md. Shohidul Alam	Professor Glenn King	PhD	Engineering Insect-Resistant Plants by Transgenic Expression of an Insecticidal Spider-Venom Peptide	Bangladesh
Juliana Ariffin	Associate Professor Matt Sweet	PhD	Characterisation of human macrophage functions in innate immunity	Harvard Medical School, Boston, US
Megha Bajaj	Professor Matt Cooper	PhD	Development of novel anti-infective drugs targeting microbial proteins	bioMérieux Australia Pty Ltd, Sydney
Sheila Barbero	Professor David Fairlie	PhD	Towards inhibitors of hydrolytic enzymes involved in inflammation	Trainee Patent Attorney, Griffith Hack, Melbourne
Niraj Bende	Professor Glenn King	PhD	Bioinsecticides for the control of human disease vectors	Bioline, UQ
Sisi Bi	Professor Matt Cooper	MPhil	Mode of action studies on Glycopeptide antibiotics targeting Biomimetic Gram-positive bacterial membranes	General Manager, Make Trips Pty Ltd
Natasha Chaudhary	Professor Rob Parton	PhD	Molecular and Functional Characterization of a Clathrin Independent Endocytic pathway, the CLIC/GEEC pathway	Weill Cornell Medical College, Cornell University, US
Kaiwen Chen	Dr Kate Schroder	PhD	Inflammasome function in neutrophils	Schroder lab IMB, UQ
Mu Cheng	Professor Matt Cooper	PhD	Mode of action studies on antibiotics targeting Gram-positive bacterial cell wall and cell membranes	New parent
Anupma Choudhary	Dr Ryan Taft	PhD	The hidden microRNA biology of mammals	Not disclosed
Thomas Clairfeuille	Dr Brett Collins	PhD	Structural basis of protein cargo transport by sorting nexins	Genentech
Charlotte Dsouza	Professor David Craik	PhD	Structure-activity relationships and development of disulfide-rich cyclic peptides as pharmaceutical templates	Not disclosed
Keerthana Krishnan	Professor Sean Grimmond	PhD	Functional characterization of miRNAs in tumour biology	Applications and Product Development Scientist – NEBNext, New England Biolabs, US
Carus Lau	Professor Glenn King	PhD	Understanding the molecular basis of the interaction between spider toxins and the voltage sensor domain of voltage-gated ion channels	Victor Chang Cardiac Research Institute, Sydney

Name	Supervisor	Degree	Thesis title	Alumni destination
Tunjung Mahatmanto	Professor David Craik	PhD	Discovery and applications of seed-derived cyclic peptides	InPhyto Organic Products & Functional Foods Specialist, Brawijaya University, Department of Agricultural Product Technology, Indonesia
Uru Malik	Professor David Craik	PhD	The science and business of novel therapeutics: the need for a complete picture	Consultant, PricewaterhouseCoopers, Australia
Kathryn McClelland	Professor Peter Koopman	PhD	Uncovering new candidate genes for involvement in disorders of sex development using RNA-seq and Morpholinos	National Institute for Environmental Health Sciences, US
Paola Ojeda Ojeda	Professor David Craik	PhD	Chlorotoxin as a natural scaffold for the development of drugs	Center for Bioinformatics and Molecular Simulation, University of Talca, Chile
Rashmi Priya	Professor Alpha Yap	PhD	Junctional Rho GTPase signalling: molecules and mechanisms	Yap Lab IMB, UQ
Xiaying Qi	Associate Professor Rohan Teasdale	PhD	The role of sorting nexins in macropinocytosis and Salmonella invasion	Studying a Graduate Certificate in Research Commercialisation
Yu Ling Kelly Quek	Professor Sean Grimmond	PhD	Structural variation in cancer genomes & the identification of personalized DNA-based cancer biomarkers	South Australian Health and Medical Research Institute, Adelaide
Timothy Reeks	Professor Paul Alewood	PhD	Discovery and characterisation of novel low molecular weight bioactive peptides from Australian elapid venom	Queensland Brain Institute, UQ
Darshani Rupasinghe	Professor Glenn King	PhD	Developing novel analgesics to treat chronic pain: inhibiting voltage gated sodium channel 1.7 with spider-venom peptides	King lab IMB, UQ
Jingjing Wan	Professor Paul Alewood	PhD	Synthesis of peptide dendrimers and their applications in biomedicine	Alewood lab IMB, UQ
Juliane Wolf	Professor Ben Hankamer	PhD	Effective scale up of microalgal systems for the production of biomass and biofuels	Hankamer lab IMB, UQ
David Wood	Professor Sean Grimmond	PhD	Investigation of human transcriptional complexity by massively parallel sequencing	Australian Centre for Ecogenomics, UQ
Yun Kit Yeoh	Professor Phil Hugenholtz	PhD	Investigation of root and associated soil microbiomes of sugarcane and other plants	Australian Centre for Ecogenomics, UQ





# ENGAGEMENT

Research commercialisation

Global collaborations

Community engagement

Scientific engagement



# RESEARCH COMMERCIALISATION

IMB works closely with The University of Queensland's commercialisation company UniQuest to translate important life sciences discoveries into benefits for industry and our community.

UniQuest is one of Australia's leading research commercialisation companies and specialises in global technology transfer.

In 2015, IMB continued its successful track record in the Australian Research Council's (ARC) Linkage Project grants scheme, which supports research and development projects between higher education and industry.

In addition to managing eight existing ARC Linkage Project grants partnerships, the institute secured funding for two new ARC Linkage Projects. Professor Kirill Alexandrov partnered with drug discovery company Phylogica to develop technology for producing peptide-based pharmaceuticals; and Professor Ben Hankamer partnered with engineering and construction firm KBR, and renewable energy company Muradel, to develop renewable fuels and high-value products from algae.

With UniQuest's support, the institute also secured 10 new funded research agreements with key industry partners including major pharmaceutical and agrochemical companies. This included partnering with Australian global agrochemical company Nufarm to produce next-generation crop protection agents. Researchers are investigating spider venom toxins in the hope of identifying new insecticides with improved effectiveness and safety.

Throughout the year, IMB managed an intellectual property (IP) portfolio of 35 patent families, including patents related to diagnostics, therapeutics and drug discovery tools. One of IMB's patent applications was granted in 2015, and nine new provisional patents were filed, including drug candidates for inflammatory diseases, epilepsy and stroke, and new technologies for harvesting algae, creating peptide variants for drug screening, and using electrochemical biosensors to improve point-of-care testing.

During the past decade, IMB has proudly produced several spin-out companies and continues to maintain close relationships with many of these, including Protagonist Therapeutics, which has discovery operations in both the US and at IMB, maintaining the biotech's access to IMB expertise and capabilities. The biotech is developing oral drugs for diseases that currently require injected treatments, providing a safer, more effective, convenient and affordable choice for patients and the healthcare system. In 2015, Protagonist raised \$40 million from Series C financing to begin clinical trials of their drug candidate for inflammatory bowel disease (IBD).

IMB further strengthened its commercial networks in 2015, attending major industry events including BIO2015 in Philadelphia and AusBiotech, showcasing IMB technologies and commercialisation opportunities to potential industry partners. We also hosted visitors from major multinational companies, including CSL, AstraZeneca, Pfizer, Johnson & Johnson, Nufarm and GE Healthcare.

IMB is committed to training its postgraduate students and early career researchers in working with industry to take their discoveries out of the lab and into the community. This is facilitated by UniQuest's annual two-day commercialisation workshop. In 2015, 34 IMB researchers attended the workshop, where they received advice on identifying and protecting IP, and on the different funding options and routes available to commercialise IP and knowledge.

UniQuest will continue to work alongside IMB's research teams in 2016 to pursue commercial opportunities in the areas of human therapeutics, including new treatments for inflammation, pain, metabolic disorders, infection and cancer; agriculture, including insecticides and pesticides; and biotechnology, including microalgae-based biofuels and production of high-value materials.



#### Patent families managed by research area

- 5 agricultural/industrial biotechnology
- 6 diagnostics/devices
- 4 drug discovery tools
- 1 therapeutic target
- 19 therapeutics



10

ARC Linkage Projects with industry partners



10

new funded industry collaborations signed in 2015

"Over the past five years, our collaboration with The University of Queensland has been particularly fruitful.

We've had a great opportunity to engage with some very passionate scientists, we've worked on some very challenging targets, and we've helped grow the knowledge and understanding of peptide therapeutics within our organisation.

We've been very fortunate to collaborate with Professor Fairlie, Professor Craik and the teams that work in their labs.

The work we're doing with IMB and The University of Queensland is a true example of collaboration built on strong trust, communication and passion."

**Dr Daniel Grant, Senior Director and Head, External Research & Development Innovation, Pfizer Australia**

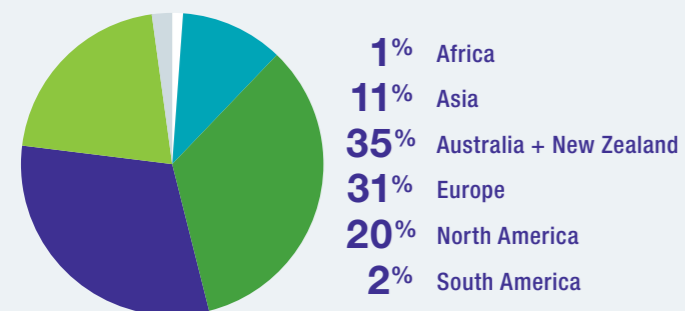
Professor David Craik from IMB with Dr Daniel Grant from Pfizer Australia receiving the 2015 UQ Partnership in Research Excellence Award





# GLOBAL COLLABORATIONS

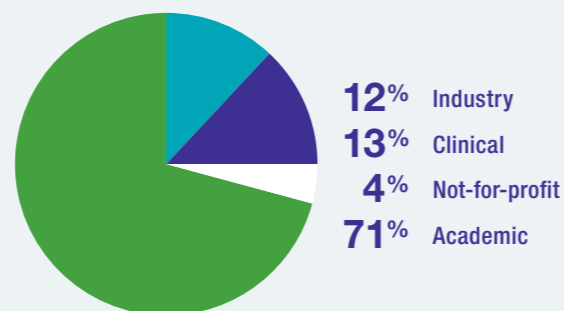
## Collaborations by region



### Academic

- African Network for Drugs and Diagnostics Innovation (ANDI) (Ethiopia)
- German University in Cairo (Egypt)
- University of Nairobi (Kenya)

## Major collaborations by type



### Academic

- Academia Sinica (Taiwan)
- Bangalore University (India)
- Chulalongkorn University (Thailand)
- CSIR-Indian Institute of Chemical Technology (India)
- Fudan University (China)
- Guangzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences (China)
- Hainan University (China)
- Institute of Microbiology, Chinese Academy of Sciences (China)
- Institute of Molecular and Cell Biology (Singapore)
- KAIST, University in Daejeon (South Korea)
- Kasetsart University (Thailand)
- Khon Kaen University (Thailand)
- King Abdullah University of Science and Technology (Saudi Arabia)
- Kunming Institute of Zoology, Chinese Academy of Sciences (China)
- Mechanobiology Institute of Singapore
- Mukogawa Women's University (Japan)
- National University of Singapore
- RKDF University (India)
- Saurashtra University (India)
- Shanghai Institute of Materia Medica, Chinese Academy of Sciences (China)
- Tel Aviv University (Israel)
- Tianjin Institute for Industrial Biotechnology (China)
- Tianjin University (China)
- Tokyo Medical and Dental University (Japan)
- Tsinghua University (China)
- Universiti Putra Malaysia
- University of Kyoto (Japan)
- University of Peking (China)
- Wuhan University (China)
- Zhejiang A & F University (China)

### Clinical

- National Centre for Biological Sciences (India)
- Nippon Medical School (Japan)

### Industry

- Mongolia New Veyong Bio-chemical Corporation (Mongolia)



# 105

Collaborations in Australia + New Zealand

### Academic

- Australian National University (Canberra)
- Baker IDI Heart & Diabetes Institute (Melbourne)
- Bio21, University of Melbourne
- Burnet Institute (Melbourne)
- Deakin University (Melbourne)
- European Molecular Biology Laboratory (EMBL) Australia (Melbourne)
- Florey Institute of Neuroscience & Mental Health (Melbourne)
- Garvan Institute of Medical Research (Sydney)
- Griffith University, Eskitis Institute (Brisbane)
- Griffith University, School of Medical Sciences, Menzies Health Institute Queensland (Gold Coast)
- James Cook University (Townsville)
- La Trobe University (Melbourne)
- Liggins Institute (New Zealand)
- Macquarie University (Sydney)
- Monash Institute of Pharmaceutical Sciences (Melbourne)
- Monash University (Melbourne)
- Peter Doherty Institute for Infection and Immunity (Melbourne)
- Prince Henry's Institute (Melbourne)
- QFAB Bioinformatics (Brisbane)
- Queensland University of Technology (Brisbane)
- RMIT University (Melbourne)
- South Australian Health & Medical Research Institute (Adelaide)
- Telethon Institute for Child Health Research (Perth)
- The University of Adelaide
- The University of Auckland (New Zealand)
- The University of Melbourne
- The University of Sydney
- The University of Waikato (New Zealand)
- The University of Western Australia (Perth)
- University of Newcastle
- University of New South Wales (Sydney)
- University of Otago (New Zealand)
- University of South Australia (Adelaide)
- University of Southern Queensland (Toowoomba)
- University of Technology Sydney
- University of Wollongong
- UQ Australian Centre for Ecogenomics (Brisbane)

- UQ Australian Infectious Diseases Centre (Brisbane)
- UQ Australian Institute for Bioengineering and Nanotechnology (Brisbane)
- UQ Centre for Advanced Imaging (Brisbane)
- UQ Centre for Integrated Preclinical Drug Development (Brisbane)
- UQ Centre for Integrative Legume Research (Brisbane)
- UQ Centre for Microscopy and Microanalysis (Brisbane)
- UQ Centre for Neurogenetic and Statistical Genomics (Brisbane)
- UQ Global Change Institute (Brisbane)
- UQ Protein Expression Facility (Brisbane)
- UQ Queensland Brain Institute (Brisbane)
- UQ School of Agriculture and Food Science (Brisbane)
- UQ School of Biological Sciences (Brisbane)
- UQ School of Biomedical Sciences (Brisbane)
- UQ School of Chemistry and Molecular Biosciences (Brisbane)
- UQ School of Mathematics and Physics (Brisbane)
- UQ School of Medicine (Brisbane)
- UQ School of Pharmacy (Brisbane)
- Victor Chang Cardiac Research Institute (Sydney)
- Walter and Eliza Hall Institute (Melbourne)

### Clinical

- Centenary Institute Medical Research Foundation (Sydney)
- Genetic Health Queensland (Brisbane)
- Mater Hospital (Brisbane)
- Mater Medical Research Institute (Brisbane)
- Mater Pathology (Brisbane)
- Menzies School of Health Research (Darwin)
- Murdoch Childrens Research Institute (Melbourne)
- Pathology Queensland (Brisbane)
- Peter MacCallum Cancer Centre (Melbourne)
- Princess Alexandra Hospital (Brisbane)
- QIMR Berghofer Medical Research Institute (Brisbane)
- Queensland Mycobacterium Reference Laboratory, Queensland Health (Brisbane)

- Royal Brisbane and Women's Hospital (Brisbane)
- Royal Children's Hospital (Melbourne)
- SA Pathology (Adelaide)
- St Vincent's Institute of Medical Research (Melbourne)
- Sullivan Nicolaides Pathology (Brisbane)
- The Children's Hospital at Westmead (Sydney)
- Translational Research Institute (Brisbane)
- UQ Centre for Clinical Research (Brisbane)
- UQ Diamantina Institute (Brisbane)
- UQ Mater Medical Research Institute (Brisbane)
- Westmead Hospital (Sydney)

### Industry

- Alchemia (Brisbane)
- Australian Nuclear Science and Technology Organisation (Sydney)
- Australian Superintendence Company (Brisbane)
- BioAustralis (Sydney)
- Bioplatforms Australia (Sydney)
- Bioproton (Brisbane)
- CSIRO Agriculture (Brisbane)
- Eli Lilly Australia (Sydney)
- Innovate Ag (Wee Waa)
- Janssen (Sydney)
- KBR (Brisbane)
- Microbial Screening Technologies (Sydney)
- Muradel (Adelaide)
- Nufarm (Melbourne)
- Phylogica (Perth)
- Protagonist (Brisbane)
- Sun Rice (Leeton)

### Not-for-profit

- Australian Institute of Sport (Canberra)
- Australian Synchrotron (Melbourne)
- Cancer Council Queensland (Brisbane)
- Great Barrier Reef Foundation (Brisbane)
- Great Barrier Reef Marine Park Authority (Townsville)
- Mission Massimo Foundation (Melbourne)
- National Breast Cancer Foundation (Sydney)
- National Computational Infrastructure (Canberra)
- The Kids' Cancer Project (Sydney)





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## Collaborations in Europe

### Academic

- Albert Ludwigs University of Freiburg (Germany)
- Basel Biozentrum (Switzerland)
- Bielefeld University (Germany)
- Bioscientia Center for Human Genetics (Germany)
- Cancer Research UK Cambridge Institute (UK)
- Cardiff University (UK)
- Centre Européen de Recherche en Biologie et Médecine (France)
- Centro Nacional de Biotecnología (CNB), CSIC (Spain)
- Curie Institute (France)
- DamStem, University of Copenhagen (Denmark)
- ETH Zurich (Switzerland)
- European Molecular Biology Laboratory (EMBL) (Germany)
- European Bioinformatics Institute (EMBL-EBI) (UK)
- Friedrich-Alexander-University Erlangen-Nuremberg (Germany)
- Heidelberg University (Germany)
- Hubrecht Institute for Developmental Biology and Stem Cell Research (Netherlands)
- IFOM (Italy)
- Imperial College London (UK)
- INSERM UMR 1152 (France)
- Institut Pasteur (France)
- Instituto de Química Orgánica General (Spain)
- John Innes Centre (UK)
- Karlsruhe Institute of Technology (Germany)
- Karolinska Institutet (Sweden)
- Kings College London (UK)
- Leibniz Centre for Medicine and Biosciences (Germany)
- Loughborough University (UK)
- Martin Luther University of Halle-Wittenberg (Germany)

- Max Planck Institute for Molecular Biomedicine (Germany)
- Max Planck Institute of Molecular Cell Biology and Genetics (Germany)
- National University of Pharmacy (Ukraine)
- N.D. Zelinsky Institute of Organic Chemistry (Russia)
- Newcastle University (UK)
- Paris Descartes University (France)
- Sahlgrenska Center for Cardiovascular and Metabolic Research, University of Gothenburg (Sweden)
- Sapienza – Università di Roma (Italy)
- Technische Universität Dresden (Germany)
- The National Center for Scientific Research (CNRS) (France)
- Trinity College (Republic of Ireland)
- Université Claude Bernard Lyon 1 (France)
- University College Cork (UK)
- University College London (UK)
- University Medical Center Freiburg (Germany)
- University of Barcelona (Spain)
- University of Bath (UK)
- University of Birmingham (UK)
- University of Bristol (UK)
- University of Cambridge (UK)
- University of Copenhagen (Denmark)
- University of East Anglia (UK)
- University of Edinburgh (UK)
- University of Essex (UK)
- University of Geneva (Switzerland)
- University of Graz (Austria)
- University of Groningen (Netherlands)
- University of Hamburg (Germany)
- University of Helsinki (Finland)
- University of Lausanne (Switzerland)
- University of Liverpool (UK)
- University of Ljubljana (Slovenia)
- University of Lyon (France)
- University of Manchester (UK)

- University of Milan (Italy)
- University of Montpellier (France)
- University of Montpellier 2 (France)
- University of Nice Sophia Antipolis (France)
- University of Nottingham (UK)
- University of Oslo (Norway)
- University of Oxford (UK)
- University of Parma (Italy)
- University of Rennes 1 (France)
- University of Sheffield (UK)
- University of Stockholm (Sweden)
- University of Strathclyde (UK)
- University of Ulm (Germany)
- University of Warwick (UK)
- University of Wrocław (Poland)
- University of Zurich (Switzerland)
- Uppsala University (Sweden)
- VU University Amsterdam (Netherlands)

### Clinical

- Erasmus MC (Netherlands)
- St George's University Hospital (UK)

### Industry

- Adlego Biomedical AB (Sweden)
- AstraZeneca (Sweden)
- Avicenna Oncology (Switzerland)
- Benchmark Holdings (UK)
- Boehringer Ingelheim (Germany)
- Defence Science & Technology Laboratory (UK)
- iNovacia AB (Sweden)
- Pfizer (UK)
- Zealand Pharma (Denmark)

### Not-for-profit

- Cariplo Foundation (Italy)
- Wellcome Trust (UK)



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## Collaborations in North America

### Academic

- Boston University (US)
- Cardiovascular Research Institute, University of California (US)
- Dalhousie University (Canada)
- Emory University (US)
- Georgia Institute of Technology (US)
- Harvard University (US)
- Howard Hughes Medical Institute Advanced Imaging Center, Janelia Research Campus (US)
- Johns Hopkins University (US)
- Laval University (Canada)
- Marshall B. Ketchum University (US)
- Memorial University of Newfoundland (Canada)
- National Cancer Institute (US)
- Oregon Health & Science University (US)
- Rutgers University (US)
- Saint Louis University School of Medicine (US)
- Stanford University (US)
- St. Francis Xavier University (Canada)
- Texas Tech University (US)
- University of Arizona (US)
- University of British Columbia (Canada)
- University of Calgary (Canada)
- University of California, Irvine (US)

- University of California, San Diego (US)
- University of California, San Francisco (US)
- University of Chicago (US)
- University of Miami (US)
- University of Montana (US)
- University of New Mexico (US)
- University of North Carolina at Chapel Hill (US)
- University of Pennsylvania (US)
- University of Prince Edward Island (Canada)
- University of Southern California (US)
- University of Tennessee (US)
- University of Texas Health Science Centre at San Antonio (US)
- University of Texas Medical School at Houston (US)
- University of Virginia (US)
- University of Washington (US)
- University of Wisconsin (US)
- Yale University (US)

### Clinical

- Albert Einstein College of Medicine (US)
- Children's National Medical Centre (US)
- Fred Hutchinson Cancer Research Center (US)
- Massachusetts General Hospital (US)

- Mayo Clinic Children's Center (US)
- Medical University of South Carolina (US)
- Montreal Children's Hospital, McGill University Health Centre (Canada)
- Montreal Neurological Institute and Hospital, McGill University (Canada)
- Mount Sinai Hospital (US)
- National Institutes of Health (US)
- St. Joseph's Hospital and Medical Center (US)
- The Hospital for Sick Children (Canada)

### Industry

- Alere (US)
- Elanco (US)
- Illumina (US)
- Johnson & Johnson Pharmaceutical Research and Development (US)
- Pfizer (US)
- Progenra (US)

### Not-for-profit

- James S. McDonnell Foundation (US)
- Lymphatic Education & Research Network (US)



# 6

## Collaborations in South America

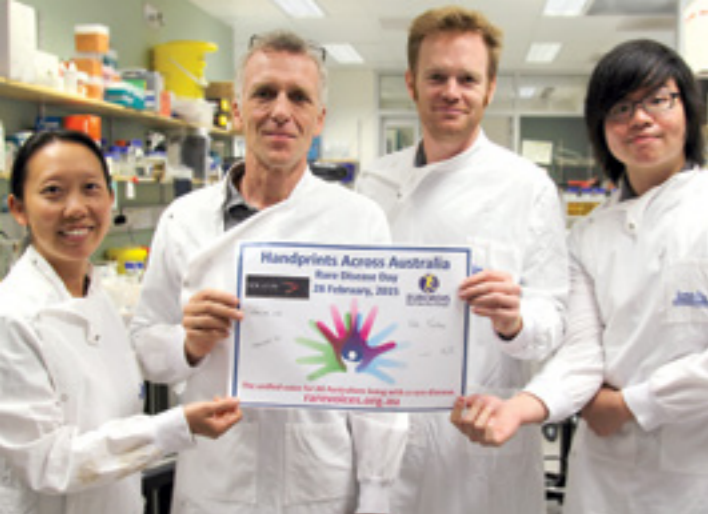
### Academic

- Federal University of Rio de Janeiro (Brazil)
- State University of Northern Rio de Janeiro (Brazil)
- University of Campinas (Brazil)
- University of La Frontera (Chile)
- University of São Paulo (Brazil)

### Clinical

- Centro de Pesquisas René Rachou (Brazil)





The Parton group shows their support for Rare Diseases Day



Professor Brandon Wainwright welcomes attendees to Life Sciences@UQ Networking event



Donors tour IMB as part of UQ's Celebration of Giving



Heart Foundation supporter Joan O'Keefe takes a look down the microscope during her visit to IMB



The IMB Centre for Superbug Solutions, which will tackle the looming global health crisis of antibiotic-resistant bacteria, was launched in September

# COMMUNITY ENGAGEMENT

IMB scientists are inspired by the community to discover new ways to prevent, diagnose and cure disease, and accelerate solutions for significant social and environmental challenges.

We provided opportunities for the community to share in the excitement of our discoveries, and enabled them to understand the value of the incredible scientific research that is conducted in our institute.

During 2015 we welcomed more than 4700 external visitors to the institute, including students, donors, scientific collaborators, industry partners, media, politicians, and community supporters. Our visitors joined us for a range of events, including laboratory tours, public seminars, scientific conferences, and student information sessions.

Our students and early-career researchers honed their science communication and engagement skills through their involvement in our Science Ambassador program. Our 35 volunteer ambassadors played a vital role in showcasing our research to the public at a range of events, and inspired future students to choose a career in science.

## Beating the odds against brain cancer

During National Science Week, IMB hosted an event with renowned neurosurgeon Professor Charlie Teo AM in conversation with multi-award winning journalist, Madonna King. Mr Barrie Littlefield, Head of Engagement, Cure Brain Cancer Foundation, also shared his family's experiences with this devastating disease.

Brain cancer kills more people under 40 in Australia than any other cancer. Professor Teo shared his vision for treating brain cancer in the future and discussed the important role community support and world-class research play in helping to beat the odds against brain cancer.

The event was attended by over 230 community members and was a great chance to showcase IMB's cancer research, including Professor Brandon Wainwright's work to develop personalised treatments for children with brain tumours.

**"The event was terrific and inspiring because it covered different angles—the clinician (Professor Charlie Teo AM), the personally affected dad (Mr Barrie Littlefield) talking of his experience, and the scientist (Professor Brandon Wainwright)."**

**Attendee**

Watch the event video at [youtube.com/IMBatUQ](http://youtube.com/IMBatUQ)

## Living with pain

'Spray-on skin' pioneer and 2005 Australian of the Year Professor Fiona Wood AM delivered a moving address to more than 250 people who joined us for the IMB Centre for Pain Research 'Living with Pain' community event in July. Centre Deputy Director Dr Irina Vetter explained how pain is transmitted through the body, and how IMB's research will lead to more effective drugs for pain management in the future. The event opened with an inspirational video message from burns survivor Turia Pitt, who spoke about the excruciating pain she suffered while recovering from burns to 60 per cent of her body.

The panel, moderated by Dr Paul Gray, Deputy Director of Anaesthesia (Pain Management), Princess Alexandra Hospital, included representatives from the IMB Centre for Pain Research as well as patient advocacy group Chronic Pain Australia. The panel discussed the trauma of pain and how animal venom research at IMB may provide significantly better management of pain while eliminating the side effects of current medications.

**"Thank you! The work you do changes lives and gives hope for the future."**

**Attendee**

**"From the volunteer at the car park to the young researchers talking about the sea animals they were researching, to the truly magnificent Professor Fiona Wood AM, I was absolutely honoured and privileged to attend."**

**Attendee**

Watch the event video at [youtube.com/IMBatUQ](http://youtube.com/IMBatUQ)

## IMB Centre for Superbug Solutions launch

The IMB Centre for Superbug Solutions launched in spectacular fashion with 200 people joining us at UQ's Customs House in September.

The event featured a number of high-profile speakers in the field, including England's Chief Medical Officer Professor Dame Sally Davies DBE FRS (via video message), Queensland's Chief Health Officer Dr Jeannette Young, UQ alumnus and bacterial infection survivor and advocate Mr Matthew Ames, former Bond girl and bacterial infection survivor Daphne Deckers (via video message), and local clinicians and antibiotic awareness advocates.

The Centre is tackling the looming global health crisis of drug-resistant bacteria—superbugs—through a worldwide search for new antibiotics.

**"As a member of the general public, this helped me a lot to understand what I could do to help, and how to prompt my doctor for other tests if I really felt I was not getting the right answers, and to know that it's okay to ask."**

**Attendee**

Watch the event video at [youtube.com/IMBatUQ](http://youtube.com/IMBatUQ)

## Life Sciences@UQ Networking event

We were pleased to welcome more than 150 attendees to our Life Sciences@UQ Networking event in September at Customs House.

Our Life Sciences@UQ events demonstrate leadership in the life sciences sector by bringing together industry, government and researchers from across UQ and other research organisations, to build networks and collaborations that will lead to life science breakthroughs.

The Hon Leeanne Enoch MP, Minister for Science and Innovation, presented an address and took part in a panel alongside Professor Robyn Ward AM, Deputy Vice-Chancellor Research, UQ; Ms Winna Brown, Assurance Partner, Ernst & Young; Mr Mark Sowerby, Managing Director, Blue Sky Alternative Investments Limited; and Dr Peter Welburn, Managing Director, Eiger Health Consulting Group.





Dr Ben Hogan discusses his research with Heart Foundation supporters Anita and James Yonkers, Heather Craig and Violet Kuskie



Cancer Council Queensland's face-to-face fundraisers visiting IMB

# THANK YOU TO OUR 2015 SCIENCE AMBASSADORS

## We opened our institute to visitors

Professor Brandon Wainwright welcomed federal MP The Hon Jane Prentice to IMB in May to learn more about the innovative research carried out at our institute. Ms Prentice toured Professor David Fairlie's and Dr Kate Schroder's labs and discussed their inflammation and obesity research projects that may revolutionise patient care.

In conjunction with UQ's annual Celebration of Giving, IMB hosted tours for UQ donors in April. Our visitors enjoyed hearing about the research conducted at IMB, and seeing the spiders, zebrafish, hydrogen-powered model car, NMR facility and more.

In June, a group of Cancer Council Queensland's (CCQ) face-to-face fundraisers visited some of our CCQ-funded IMB researchers. The frontline fundraisers toured our research labs and gained important insights into the exciting cancer research projects made possible thanks to CCQ's generous support.

In November, we welcomed staff and supporters of the Heart Foundation to tour IMB's cardiac and vascular biology and genomics labs and meet Dr Ben Hogan, who was awarded the Heart Foundation's Researcher of the Year. Ms Deborah Fraser from the Heart Foundation said: "Our supporters were captivated and inspired with the research that is taking place in vascular biology development, genetics and cardiac development. You have an extraordinary research facility at IMB and we are very grateful to have experienced it today."

## We inspired the next generation of scientists

Kaustav Das Gupta (Sweet group) was selected to participate in the Queensland Young Science Ambassador (YSA) program and inspired high school students to engage with science. He gave students science challenges, attended the Clunies Ross Awards and chaperoned a Science, Technology, Engineering and Mathematics (STEM) workshop.

Marija Kojic (Wainwright group) shared her passion for neuroscience with a group of year 10 students at Stuartholme School in March.

Dr Guillermo Gomez (Yap group) ran a full-day Cell Biology Workshop for students from Indooroopilly State High School and North Lakes State College. The students attended a presentation by Professor Jenny Stow, a poster session with researchers, and a building tour, and participated in cell biology conducted in the lab.

During the July school holidays, Martin group welcomed a family of keen young scientists who were looking to learn more about X-ray crystallography and the contributions of women to science. The family visited the lab, spoke to researchers, and made a film to share with their classmates.

## We made an impact in the media

Science communication remained a priority for the institute, with many of our researchers regularly engaging with media to share their stories. We secured more than 1300 media mentions valued at \$3.7 million across print, broadcast and online media.

Some of the major outlets to publish our research in detail included ABC TV's Catalyst; Channel 10's Scope; commercial radio; ABC radio, both metropolitan and regional/rural; Radio National's AM and The World Today programs; Triple J; news programs of channels 7, 9, 10 and ABC; and an impressive list of daily and weekly newspapers, including major metropolitan News Ltd and Fairfax papers, and online publications—including The Conversation and The Wall Street Journal—from across the country and the world.



Nikita Abraham (Lewis group)  
Megha Bajaj (Cooper group)  
Guillaume Bernard (Ragan group)  
Nilesh Bokil (Sweet group)  
Lou Brillault (Hankamer group)  
Michelle Christie (Martin group)  
Thomas Clairfeuille (Collins group)  
Claudio Cortes Rodriguez (Wicking)  
Ben Cristofori-Armstrong (King group)  
Mark Crowe (QFAB)  
Jessica De Angelis (Smith group)  
Evelyn Deplazes (King group)  
Mathilde Desselle (Cooper group)

Anh Do (Fairlie group)  
Mriga Dutt (Lewis group)  
Emily Furlong (Martin group)  
Dejan Gagoski (Alexandrov group)  
Guillermo Gomez (Yap group)  
Daniela Grassini (Smith group)  
Abishek Iyer (Fairlie group)  
Angie Jarrad (Cooper group)  
Prashanth Jutty Rajan (Lewis group)  
Marija Kojic (Wainwright group)  
Kathryn McClelland (Koopman group)  
Melanie Oey (Hankamer group)  
Jeroen Overman (Francois group)

Sarah Piper (King group)  
Rashmi Priya (Yap group)  
Alan Robertson (Coin group)  
Natalie Saez (King group)  
Christina Schroeder (Craik group)  
Melanie Shakespear (Sweet group)  
Atefeh Taharian Fard (Ragan group)  
Darya Vanichkina (Taft group)  
Juliane Wolf (Hankamer group)



# SCIENTIFIC ENGAGEMENT

IMB researchers play an active role within the scientific and medical research communities in Australia and abroad. Their contributions keep the institute at the forefront of scientific advancement, sharing our progress on the global stage and welcoming new opportunities to collaborate with expert colleagues around the world. The following highlights represent a small sample of the many valuable contributions made by our research staff during 2015.



Associate Professor Carol Wicking

## Appointment highlights

IMB researchers were appointed and re-appointed to the editorial boards of a number of leading journals including *Acta Crystallography Section D*, *Advances in Bioinformatics and Computational Biology*, *Biochemical Journal*, *BMC Evolutionary Biology*, *Chemical Biology and Drug Design*, *Developmental Biology*, *F1000 Research*, *Journal of Immunology*, *PLOS Genetics*, *Toxicon*, *Toxin Reviews and Toxins*.

**Professor Rob Capon** was elected to the UQ Academic Board and Academic Board Standing Committee.

**Professor Matt Cooper** served on the National Health and Medical Research Council's Health Innovation Advisory Committee.

**Professor David Craik** was elected to the council of the American Peptide Society.

**Professor Glenn King** chaired the Australian & New Zealand Society for Magnetic Resonance Board of Directors.

**Professor Peter Koopman** was editor-in-chief of the journal *Sexual Development*, and a Faculty of 1000 Developmental Biology Prime Faculty Member.

**Professor Jenny Martin** served on the Australian Academy of Science 'Science in Australia Gender Equity' (SAGE) Steering Committee, and chaired an NHMRC grant review panel.

**Professor George Muscat** chaired an NHMRC research fellowship peer review panel.

**Dr Kate Schroder** served as associate editor of the *Journal of Immunology* and *Cell Death Discovery*.

**Professor Jenny Stow** served on the Australian Cancer Research Foundation International Anniversary grant panel.

**Professor Brandon Wainwright** chaired the Queensland Institutes of Health and served on the boards of the European Molecular Biology Laboratory (EMBL) Australia, the Australian Genome Research Facility, and Life Sciences Queensland.

**Associate Professor Carol Wicking** served on the Rare Voices Australia Scientific Medical Advisory Board.



Professor Richard Lewis



Professor Ben Hankamer



Professor Jenny Martin

## Presentation and event highlights

IMB researchers organised and presented at numerous national and international conferences in 2015. IMB senior researchers delivered 139 lectures to UQ undergraduate students, and IMB hosted 135 seminars and events.

**Professor Paul Alewood** co-chaired the 11th Australian Peptide Symposium.

**Professor Rob Capon** was an invited speaker at the Marine Fungal Natural Products Conference, Nantes, France, presenting 'Polyketides from marine mollusc-associated fungi'.

**Professor Matt Cooper** was an invited speaker at the Gordon Research Conference Antimicrobial Peptides, Italy.

**Professor Ben Hankamer** was an invited speaker at the Algae Biomass Summit, US.

**Professor Richard Lewis** was a scientific advisory committee member, session organiser, session chair and invited speaker at the 18th World Congress of IST (International Society on Toxinology), University of Oxford, UK.

**Professor Jenny Martin** was an invited speaker at Science at the Shine Dome, presenting 'Minerals to Medicine – 100 years of crystallography'.

**Professor Rob Parton** was an invited plenary speaker at Cold Spring Harbor Asia meeting, presenting 'Lipid metabolism and human metabolic disorders'.

**Dr Kate Schroder** was an invited speaker at the Japan Australia Meeting on Cell Death, Melbourne.

**Dr Kelly Smith** presented and chaired a session at the Australian Network for Cardiac and Vascular Developmental Biology, Adelaide.

**Professor Jenny Stow** presented a masterclass on 'Visualising the immune system' at the Australasian Society of Immunology/Immunology Group of Victoria.

**Associate Professor Matt Sweet** was an invited speaker at the World Congress of Inflammation, Boston, US.

**Associate Professor Rohan Teasdale** was a conference convenor at the 15th Hunter Cell Biology Meeting.

**Associate Professor Carol Wicking** was an invited speaker at the Rare Diseases Summit 2015, Melbourne, presenting 'From gene discovery to therapies for rare disease – a research perspective'.



# STRUCTURE AND GOVERNANCE

Organisational structure

Advisory board

Strategic management committee

Our people

Joint appointments and affiliates



# ORGANISATIONAL STRUCTURE



## IMB ADVISORY BOARD CHAIR'S MESSAGE

In 2015, the IMB Advisory Board has been very pleased to see IMB maintain its impressive track record in securing competitive research funding, while initiating new strategic actions to translate more of its world-class research. The board believes that IMB's new five-year strategic plan will be integral to maintaining the institute's position as one of Australia's and Queensland's premier life sciences research organisations.

2015 was a very challenging year for research organisations with tightening competitive funding which is shifting to a stronger focus on applied science. The board therefore congratulates IMB and its Director Professor Brandon Wainwright on achieving impressive results such as its success rate in the ARC Discovery Projects and NHMRC Project grants announced in late 2015 for commencement in 2016.

IMB achieved a success rate of 54.5 per cent in the ARC Discovery Projects round, which is more than triple the national average of just 17.7 per cent, and more than double UQ's average of 23.6 per cent.

In the NHMRC funding round, IMB received almost 17 per cent of the \$57.8 million awarded to Queensland researchers. IMB's success rate was 2.5 times higher than the national average success rate of 14.9 per cent.

Results such as these can only be achieved with talented scientists engaged in globally leading research, collaborating across disciplines and working with end users in the health system, industry and the wider community.

One of IMB's most encompassing challenges going forward is diversifying its income base to maintain its world-class science, the primary source for innovation in the life sciences sector. This could be achieved in part in the longer term by returns from translation and commercialisation, an area to which the board has paid particular attention in 2015.

Consistent with this ambition, two new members have been appointed to the board—Associate Professor Beverley Rowbotham from Sullivan Nicolaides Pathology and Dr Anand Gautam from multinational pharmaceutical company Novo Nordisk. Both are experienced in embedding innovations in the health system.

In addition, a translation sub-committee of the board will be established in early 2016. It will specifically support the development of an expanding translation pipeline within IMB by supporting researchers in the early stages of translating their discoveries into products and applications that will have the potential to change lives and build industries. The sub-committee will work closely with IMB's new initiative, the 2016 Year of the Young Entrepreneur.

I speak on behalf of the board in saying that we have sincerely enjoyed working with the enthusiastic and world-class scientists that give IMB its global reputation for excellence, and we look forward to assisting the institute in being more widely recognised for its innovations.

**Dr Cherrell Hirst AO**  
Chair  
IMB Advisory Board





# ADVISORY BOARD



## Mr Bob Christiansen

*BEcon (Queensland),  
DipInfmProc (Queensland),  
DipFinServices (AFMA)*

Bob is the founding managing director of Southern Cross Venture Partners, one of Australia's largest technology venture capital firms. He is also a director of several early- and later-stage technology companies in Australia and the US. Bob has been a member of the former Queensland Government's Science and Innovation Advisory Council, and its predecessor, The Smart State Council. He is also an advisory board member of the UQ-owned technology incubator, iLab, and in 2015 was selected by the Knowledge Society and the Office of the Australian Chief Scientist as a member of the "Knowledge Nation 100".

Bob spent over 20 years in the US technology sector, where he founded two start-up companies. Prior to returning to Australia, he spent time as chief technology officer for the advisor services group of Fidelity Investments in Boston.

Previously, Bob was a general partner of venture capital firm Allen & Buckeridge. He brings over 40 years of experience in entrepreneurship and the international technology sector, with an emphasis on commercialisation and financing, business management and operations, and system design and development.



## Professor John W Funder AC

*MD (Melbourne), PhD (Melbourne), LLD (Hons) (Monash), DMedSci (Hons) (Melbourne), MD (Hons) (Sydney), FRACP, FRCP*

John is professor of medicine (Monash), honorary professor (UQ) and professorial associate (Melbourne). He is also a distinguished scholar at the Hudson Institute of Medical Research in Melbourne.

He has more than 40 years of experience working in medical research and has significant leadership experience in the sector, having served as director of the Baker Institute from 1990 to 2001, director of research strategy at Southern Health (now Monash Health) from 2008 to 2011, and president of the Australian Society for Medical Research and the Endocrine Society of Australia.

In 2014, he was awarded the International Society of Hypertension's Robert Tigerstedt Lifetime Achievement Award. He has also received the Endocrine Society's Robert H. Williams Award for Distinguished Leadership (2013), Research Australia's Leadership and Innovation Award (2010), and the American Heart Association's prestigious Novartis Award (2008). During his career, John has published more than 500 scientific papers, given over 200 international presentations and has been a member of many editorial boards.



## Dr Anand Gautam

*BSc (Meerut), MSc (Brunel), PhD (London)*

Anand is director of R&D innovation sourcing at Novo Nordisk with responsibility for setting directions to innovation sourcing strategy to fill the company's pipeline with novel therapeutics. Anand joins the board with a strong background in scientific and commercial management of research at various academic institutions and biotechnology companies around the world. In addition, he brings direct experience in drug discovery, drug development with late-stage clinical trials, and commercialisation of translatable science from academia.

Anand undertook postdoctoral training in immunology at Stanford University in California, US. He was then appointed as a research fellow, and later a leader, at John Curtin School of Medical Research, The Australian National University. He was also appointed as an associate professor at UQ's former Diamantina Centre for Immunology and Cancer Research.

Prior to joining Novo Nordisk, Anand formed OmGenix BioSolutions, a consultancy company, and worked as a vice-president of research and development at Progen in Brisbane, where he managed and initiated Phase I to III clinical trials. He has also worked as a senior vice-president at Pharmexa, Denmark, where he headed research and external collaborations.



## Dr Cherrell Hirst AO (Chair)

*MBBS (Queensland), BEdSt (Queensland), DUniv (Hons) (QUT, GU, SCU), FAICD, FTSE*

During the past decade, Cherrell has played a significant role in Queensland's growing biotechnology sector. From 2007 to 2014 she served as chief executive officer of QIC BioVentures, where she was a director of several investee companies. During this time she also served on several national and state government advisory boards. Cherrell was chancellor of the Queensland University of Technology from 1994 to 2004, and chair of the Brisbane Girls Grammar School Board of Trustees from 1996 to 2006.

Cherrell is a qualified medical practitioner, gaining a national reputation in the field of breast cancer screening and diagnosis as director of the Wesley Breast Clinic. Cherrell has been awarded three honorary doctorates, an Australian Government Centenary Medal (2003), and the title of Officer of the Order of Australia (AO) (1998). She is also a former Queenslandler of the Year (1995).

Cherrell is currently chair of ImpediMed and Factor Therapeutics (formerly Tissue Therapies) and a director of Medibank Private, Gold Coast Health and Hospital Service, and RSL Care. She has previously served on the boards of Peplin, Hatchtech, the Avant Group and Suncorp, as well as various not-for-profit entities.



## Professor Max Lu

*BE (Northeastern), ME (Northeastern), PhD (Queensland), FAA, FIChemE, FTSE*

Max commenced as provost and senior vice-president of The University of Queensland in March 2014, prior to which he was the university's deputy vice-chancellor (research). He was also the founding director of the ARC Centre of Excellence for Functional Nanomaterials from 2003 to 2009.

Max has served on numerous government committees and advisory groups including those under the Prime Minister's Science, Engineering and Innovation Council, and ARC College of Experts. He is the past chair of the Institution of Chemical Engineers (IChemE) Australia board, and former director of the Australian Academy of Technological Sciences and Engineering (ATSE) board. He is an elected fellow of the Australian Academy of Science, ICHEM, the Australian Academy of Technological Sciences and Engineering, and the Royal Society of Chemistry.

Max is a Thomson Reuters Highly Cited Researcher in both Materials Science and Chemistry (with over 30,000 citations and h-index of 89). He has received numerous prestigious awards including the China International Science and Technology Award, Chinese Academy of Sciences International Cooperation Award, Orica Award, RK Murphy Medal, Le Fevre Prize, ExxonMobil Award, and the Chemeca Medal.



## Associate Professor Beverley Rowbotham

*MBBS (Hons) (Queensland), MD (Queensland), FRACP, FRCPA, GAICD*

Bev is a past president of the Royal College of Pathologists of Australasia (RCPA) and is the current chairman of the Federal Council of the Australian Medical Association. She serves on National Pathology Accreditation Advisory Committee (NPAAC) and Federal Government committees on matters related to laboratory medicine. She is a director of RCPA Quality Assurance Programs Pty Ltd, the Avant Mutual Group, Avant Insurance Ltd and the Doctors' Health Fund.

Bev is director of haematology at Sullivan Nicolaides Pathology, part of the Sonic Healthcare group, and associate professor of cellular and molecular pathology at The University of Queensland.

Bev was a board member and chair of the Association for Childhood Language and Related Disorders and is now a director of AEIOU Foundation for children with autism.



## Professor Stephen Walker

*BSc (Hons) (Sydney), PhD (Tasmania)*

Stephen is executive dean of The University of Queensland's Faculty of Science, where he is responsible for the leadership and governance of one of the largest science groupings in Australia, with approximately 1100 (equivalent full-time) staff, and about 7500 (equivalent full-time) students.

Previously, Stephen was executive dean of the former UQ Faculty of Engineering, Physical Sciences and Architecture. Prior to UQ, he spent five years at the Australian Research Council (ARC) in Canberra, following a number of years as a senior scientist within CSIRO.

Stephen has a BSc (Hons) from The University of Sydney, and a PhD from The University of Tasmania. He has worked in a number of fields such as atmospheric pollution, remote sensing, coastal oceanography and water quality, and medical research (cardiology). He has extensive experience in conducting and overseeing collaborative research, funding schemes and policy, in conjunction with universities, government agencies, utilities, and private industry.



## Dr Jane Wilson

*MBBS (Queensland), MBA (Harvard), FAICD*

Jane is acting chancellor of The University of Queensland, a guardian of the Future Fund, director of Sonic Healthcare Ltd, finance director of The Winston Churchill Memorial Trust, and a director of the General Sir John Monash Foundation.

Jane has a background in finance, banking and medicine, with an MBA from Harvard Business School and a medical degree from UQ. Her previous directorships include inaugural chair of Horticulture Australia, chair of IMBcom, and director of BUPA Australia and NZ, Universal Biosensors, Energex, Sun Retail, WorkCover Qld, and other small biotechnology companies. She has also served on several Queensland Government advisory boards, and the Prime Minister's Business Advisory Board.

Jane was the Queensland president and director of the Australian Institute of Company Directors (AICD) from 2002 to 2004, and was named in the inaugural 2012 AFR/Westpac Top 100 Women Awards in the board/management category.



# STRATEGIC MANAGEMENT COMMITTEE



**Dr Mark Ashton**

**Executive Director, Intellectual Property Commercialisation, UniQuest**

*BSc (Hons) (Bath), PhD (Bath)*

Mark is UniQuest's executive director, intellectual property commercialisation. He leads a team responsible for commercialising UQ's intellectual property.

Mark completed his undergraduate studies in chemistry, postgraduate studies in medicinal chemistry sponsored by the pharma company Organon (now Merck), and postdoctoral studies in the discovery of novel calcium channel antagonists in the UK.

Mark was previously senior director, commercial engagement – health, and before that manager of innovation and commercial development for IMB. Before joining UniQuest, he held positions as executive vice-president (business development) of the European-based biotech company Evotec, and president of the drug discovery operations division of Evotec, responsible for some 200 scientists.

Mark currently serves as a director of the Australian biotech company, Vaxxas Pty Ltd and was previously a board director of Dimerix Bioscience Pty Ltd and a board observer of Spinifex Inc.



**Professor Matt Cooper**

**Director, Centre for Superbug Solutions**

*BSc (Hons) (Adelaide), PhD (Adelaide)*

Matt is director of IMB's Centre for Superbug Solutions, director of the Community for Open Antimicrobial Drug Discovery, and an IMB research group leader.

Matt trained in organic chemistry in Adelaide, before moving to the UK for the next decade where he continued his research at the University of Cambridge and in start-ups and biotechnology companies.

Matt is a scientific entrepreneur with a track record of innovation, industry engagement, intellectual property generation, and business development. His lab is working to design and develop new diagnostics and treatments for drug-resistant bacteria, tuberculosis and dengue fever.

Matt is a National Health and Medical Research Council (NHMRC) Principal Research Fellow, and a member of the NHMRC Health Innovation Advisory Committee and Fellow of the Queensland Academy of Arts and Sciences.



**Professor David Fairlie**

**Head, Chemistry and Structural Biology**

*BSc (Hons) (Adelaide), PhD (UNSW)*

David is head of IMB's Chemistry and Structural Biology division, and an IMB research group leader.

David conducted his undergraduate studies at the University of Adelaide, postgraduate studies at the Australian National University and the University of New South Wales, and postdoctoral studies at Stanford University and the University of Toronto.

David has held ARC Federation and ARC Professorial fellowships, chief scientific officer and scientific director company roles, and has collaborated with and consulted to some of the world's largest pharmaceutical and biotechnology companies. His research team works at the interface of chemistry and biology to better understand the detailed processes of life, ageing and disease.

David is a National Health and Medical Research Council (NHMRC) Senior Principal Research Fellow.



**Associate Professor Ben Hogan**

**Co-Head, Genomics of Development and Disease**

*BSc (Hons) (Melbourne), PhD (Melbourne)*

Ben is co-head of IMB's Genomics of Development and Disease division, and an IMB research group leader.

Ben completed his PhD and a Cancer Council postdoctoral fellowship at The Ludwig Institute for Cancer Research in Melbourne. He continued his postdoctoral training at the Hubrecht Institute in the Netherlands, where he applied large-scale zebrafish forward genetic screening to study lymphatic vascular development in the embryo.

In 2010, Ben established his group at IMB as a CJ Martin Fellow. Today, his lab is a global leader in forward genetics, genome editing, molecular imaging, in vivo cell biology and embryology, all with a focus on vascular biology and development.

Ben is a National Health and Medical Research Council (NHMRC) and Heart Foundation Career Development Fellow. He is also co-director of the UQ Centre for Cardiac and Vascular Biology and a member of IMB's Centre for Rare Diseases Research.



**Professor Richard Lewis**

**Director, Centre for Pain Research**

*BSc (James Cook), PhD (Queensland)*

Richard is director of the IMB Centre for Pain Research, and an IMB research group leader.

Richard completed his undergraduate studies in zoology and chemistry at James Cook University, and a PhD in zoology at UQ. Before joining IMB, he worked at the Queensland Department of Primary Industries, where he continued his PhD research on the toxins responsible for ciguatera fish poisoning.

During his 20 years back at UQ, Richard has pioneered the discovery of a new class of peptide-based painkillers inspired by the pharmacology of animal venoms.

Richard is a National Health and Medical Research Council (NHMRC) Principal Research Fellow and currently on the editorial boards of *Frontiers in Pharmacology*, *Toxicon*, *Toxins* and *Current Molecular Pharmacology*.



**Maureen O'Shea**

**Director of Advancement**

*BEd (UNE), PGC Social Impact (UNSW)*

As IMB's director of advancement, Maureen is responsible for the institute's philanthropy, communications and community engagement.

Maureen's postgraduate studies in social impact at the UNSW Business School were focused on social impact investing, philanthropy, social enterprises and demonstrating social impact, with a particular interest in global health. She is currently completing postgraduate study at Harvard University in management, organisational behavior, communications and philanthropy.

Prior to joining IMB, Maureen was development manager at UNSW's Faculty of Medicine, where she was responsible for securing significant philanthropic funding for medical research to deliver positive outcomes for patients. In this role Maureen focused on neurosciences, women's and children's health, and public health, particularly global responses to HIV.

Maureen has extensive experience in entrepreneurial, consulting and marketing roles in the IT and ecommerce sectors. She now combines her business experience and passion for social impact to drive philanthropic investment in life sciences that promise to deliver significant health, social and environmental benefits.



**Professor Mark Ragan**

**Co-Head, Genomics of Development and Disease**

*BA (Hons) (Chicago), PhD (Dalhousie)*

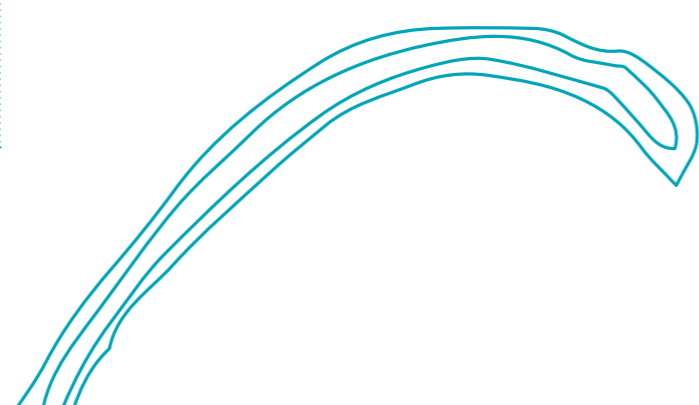
Mark is co-head of IMB's Genomics of Development and Disease division, and an IMB research group leader.

Mark completed his undergraduate studies in biochemistry at the University of Chicago, and postgraduate studies in biology at Dalhousie University in Canada. Before joining IMB, he worked for more than 20 years as a research scientist for National Research Council Canada, and for six years as a fellow of the Canadian Institute for Advanced Research's program in evolutionary biology.

Mark's current research applies genome-scale data to solve challenges in biotechnology, human disease and costal ecology.

Mark has published more than 200 peer-reviewed papers, is director of the Australian Research Council (ARC) Centre of Excellence in Bioinformatics, and a co-founder of QFAB Bioinformatics. He is also involved in national and international infrastructure initiatives in genomics, computing, data and bioinformatics services.

IMB's Strategic Management Committee advises on strategic actions and monitors the implementation of strategic goals.







**Professor Jennifer L Stow**  
**Deputy Director (Research)**

*BSc (Hons) (Monash),  
PhD (Monash)*

Jenny is IMB's deputy director (research). In this role she manages the scientific and competitive funding performance of the institute, as well as IMB's postgraduate program.

Jenny completed her undergraduate and postgraduate studies at Monash University in Melbourne, after which she undertook postdoctoral training at Yale University's School of Medicine as a Fogarty International Fellow. She was soon appointed as assistant professor in Massachusetts General Hospital's renal unit, where she established an independent research group in cell biology. She returned to Australia in 1994 as a Wellcome Trust Senior International Fellow to join UQ's Centre for Molecular and Cellular Biology (now IMB).

Jenny is a National Health and Medical Research Council (NHMRC) Principal Research Fellow. Her IMB research team studies inflammation and infection at the molecular and cellular levels, to determine the role they play in a range of diseases, and find new ways to combat and control them.



**Associate Professor Matt Sweet**  
**Director, Centre for Inflammation and Disease Research**

*BSc (Hons) (Queensland), PhD (Queensland)*

Matt is director of the IMB Centre for Inflammation and Disease Research, and an IMB research group leader.

Matt undertook his degrees in biochemistry at The University of Queensland. As a postdoctoral CJ Martin Fellow at The University of Glasgow (Scotland, UK), he studied the role of molecular pathways involved in innate immune cell activation and inflammation. These studies led to the identification of a new experimental approach to suppress pathological inflammation in sepsis and other inflammatory conditions.

Matt moved to IMB in 2001, and established his own group in 2007. His group works to understand the innate immune system, with a focus on revealing the roles of specific genes and molecular pathways in a range of infectious and inflammation-driven diseases.

Matt is a National Health and Medical Research Council (NHMRC) Senior Research Fellow, and the national coordinator and Queensland representative for the Australasian Society for Immunology Infection and Immunity Special Interest Group. He is also an editorial board member for the *Journal of Leukocyte Biology*.



**Dr Ian Taylor**  
**Deputy Director (Operations)**

*BSc (Hons) (Strathclyde), PhD (London), MBA (Queensland)*

Ian is IMB's founding deputy director (operations). In this role he is responsible for the administration and operations of the institute, including management of institute finances, infrastructure, safety, and support services and staff.

Ian completed his undergraduate studies in biochemistry and postgraduate studies in radiation biology in the UK, working as a research officer for several years. In the late 1970s, he relocated to Australia to take up positions as a research fellow at the Ludwig Institute for Cancer Research and a lecturer at the University of Sydney. In 1984, Ian moved to Brisbane to join the Queensland Institute of Medical Research (now QIMR Berghofer Medical Research Institute) as its first scientific manager.

Ian has more than a decade of experience in research, and 30 years of experience in scientific management and laboratory design and construction.



**Professor Brandon Wainwright**  
**Director**

*BSc (Hons) PhD (Adelaide)*

As director, Brandon is responsible for advancing the institute's research initiatives, strengthening the institute's global connections and leading IMB's scientists in their work to improve quality of life for all.

Brandon completed his undergraduate and postgraduate studies at the University of Adelaide, after which he secured a postdoctoral fellowship at St Mary's Hospital at Imperial College London (ICL). During his six years at ICL, he worked on the first human genome project, and made significant discoveries in the field of human molecular genetics as a Medical Research Council Senior Research Fellow. He returned to Australia in 1990 to join UQ's Centre for Molecular and Cellular Biology (now IMB).

Brandon leads his own IMB laboratory, which focuses on understanding the genetic pathways behind skin cancer and medulloblastoma, a type of brain tumour that occurs predominantly in children.

He serves on the board of Life Sciences Queensland, the Australian Genome Research Facility, the European Molecular Biology Laboratory (EMBL) Australia, and a number of national and international scientific review committees. In 2015, Brandon chaired the Queensland Institutes of Health.



**Associate Professor Carol Wicking**  
**Director, Centre for Rare Diseases Research**

*BSc (Melbourne), MSc (Melbourne), PhD (London)*

Carol is director of the IMB Centre for Rare Diseases Research, and an IMB research group leader.

Carol obtained her PhD from The University of London, working on one of the earliest disease gene mapping projects—the hunt for the cystic fibrosis gene. As a postdoctoral fellow at UQ, she was involved in the successful isolation of the gene for the inherited cancer predisposition syndrome, Gorlin's syndrome.

With more than 25 years of research experience in human genetics and cell and developmental biology, Carol's research is now focused on understanding a class of rare diseases known as ciliopathies.

Carol is a UQ Vice-Chancellor's Senior Research Fellow and a member of the Rare Voices Australia Scientific Medical Advisory Committee.



**Professor Alpha Yap**  
**Head, Cell Biology and Molecular Medicine**

*MBBS (Queensland), PhD (Queensland), FRACP*

Alpha is head of IMB's Cell Biology and Molecular Medicine division, and an IMB research group leader.

Alpha trained as a physician and endocrinologist at UQ and the Royal Brisbane Hospital, after which he completed a PhD in epithelial physiology at UQ. Before joining IMB, Alpha was a CJ Martin Fellow at Memorial Sloan-Kettering Cancer Center, New York, and a Wellcome Trust International Senior Medical Research Fellow, UQ.

Alpha is a National Health and Medical Research Council (NHMRC) Principal Research Fellow. He is an associate editor for *Molecular Biology of the Cell*, and a member of nine other editorial boards, including *Current Biology* and *Developmental Cell*.

With Professor Rob Parton, Alpha leads IMB's Breakthrough Science Program in Mechanobiology, which is an exciting new field that brings together biologists, mathematicians, physicists and engineers to investigate how mechanical forces generated and sensed by the body contribute to fundamental processes in health and disease, such as organ development, stress, and inflammation.





# OUR PEOPLE



Centre for Superbug Solutions group

## Cell Biology and Molecular Medicine

IMB's Cell Biology and Molecular Medicine division seeks to understand the molecular workings of the cell, the building blocks of our bodies. This is vital for a full understanding of how our bodies function, and serves as a foundation to investigate the cellular basis of disease.

Scientists are tackling key issues in cell biology, investigating the mechanisms responsible for how cells develop, function, move and interact with one another.



### Research staff

**Alexandrov group:** Kirill Alexandrov (Group leader), Fernanda Ely, Zhong Guo, Wayne Johnston, Shayli Moradi, Sergey Mureev, Marinna Nilsson, Viktor Stein

**Collins group:** Brett Collins (Group leader), Rajesh Ghai, Natalya Leneva, Suzanne Norwood, Saroja Weeratunga

**Muscat group:** Rebecca Fitzsimmons, George Muscat (Group leader), Mary Wang

**Parton group:** Nicholas Ariotti, Michele Bastiani, Akshay Bhumkar, Charles Ferguson, Yann Gambin, Nichole Giles, Tom Hall, Dominic Hunter, Harriet Lo, Nick Martel, Kerrie-Ann McMahon, Susan Nixon, Robert Parton (Group leader), James Rae, Emma Sierecki

**Schroder group:** Jelena Bezbradica Mirkovic, Dave Boucher, Rebecca Coll, Caroline Holley, Mercedes Maria Monteleone, Kate Schroder (Group leader), Amanda Stanley

**Stow group:** Darren Brown, Tatiana Khromykh, Lin Luo, Jennifer Stow (Group leader), Juliana Venturato, Adam Wall

**Sweet group:** Nilesh Bokil, Daniel Hohenhaus, Ronan Kapetanovic, Kolja Schaale, Melanie Shakespear, Matt Sweet (Group leader), Kathryn Tunny



Dr Rashmi Priya and Professor Alpha Yap

**Teasdale group:** Andrea Bugarcic, Markus Kerr, Genevieve Kinna, Jamie Stevens, Rohan Teasdale (Group leader), Zhe Yang

**Waters group:** Yash Chhabra, Michael Waters (Group leader)

**Yap group:** Bipul Acharya, Srikanth Budnar, Guillermo Gomez, Magdalene Michael, Rashmi Priya, Vanessa Tomatis, Suzie Verma, Alpha Yap (Division head and group leader)

## Chemistry and Structural Biology

IMB's Chemistry and Structural Biology division conducts pure, strategic and applied research in organic and medicinal chemistry, structural biology, biochemistry, pharmacology, virology, bacteriology, and biotechnology.

Researchers within the division have expertise throughout the drug discovery pipeline and work together with academic and industry partners around the world to make important contributions towards understanding and treating a range of human diseases and conditions.



Craik group

### Research staff

**Alewood group:** Paul Alewood (Group leader), Andreas Brust, Zoltan Dekan, Jean Jin, Vincent Lavergne, Markus Muttenthaler, Jingjing Wan

**Capon group:** Rob Capon (Group leader), Lea Indjein, Venkatanambi Kamalakkannan, Zeinab Khalil, Angela Salim, Sean Xiao

**Cooper group:** Maite Amado, Mark Blaskovich, Mark Butler, Matthew Cooper (Group leader), Daniel Croker, Mathilde Desselle, David Edwards, Alysha Elliott, Alejandra Gallardo-Godoy, Karl Hansford, Geraldine Kaeslin, Angela Kavanagh, Ruth Neale, Ruby Pelingon, Soumya Ramu, Janet Reid, Avril Robertson, Zoe Schofield, Danielle Sutherland, Daniel Wattersson, Nicole Wheatley, Zyta Ziora, Johannes Zuegg

**Craik group:** Hadi Ahmad Fuaad, Angeline Chan, Olivier Cheneval, David Craik (Group leader), Thomas Durek, Edward Gilding, Peta Harvey, Crystal Huang, Mark Jackson, Quentin Kaas, Annie Kan, Nicole Lawrence, Aaron Poth, Tina Schroeder, Joakim Swedberg, Sonia Troeira Henriques, Conan Wang, Joachim Weidmann

**Fairlie group:** Aline Dantas De Araujo, David Fairlie (Division head and group leader), Rebecca Fitzsimmons, Maria Greenup, Tim Hill, Huy Hoang, Abishek Iyer, Woan Mei Kok, James Lim, Ligong Liu, Ken Loh, Rink-Jan Lohman, Jeffrey Mak, Robert Reid, Nick Shepherd, Jacky Suen, Chongyang Wu, Kai-Chen Wu, Annika Yau

**Hankamer group:** Ben Hankamer (Group leader), Michael Landsberg, Melanie Oey, Ian Ross, Rosalba Rothnagel, Evan Stephens, Juliane Wolf

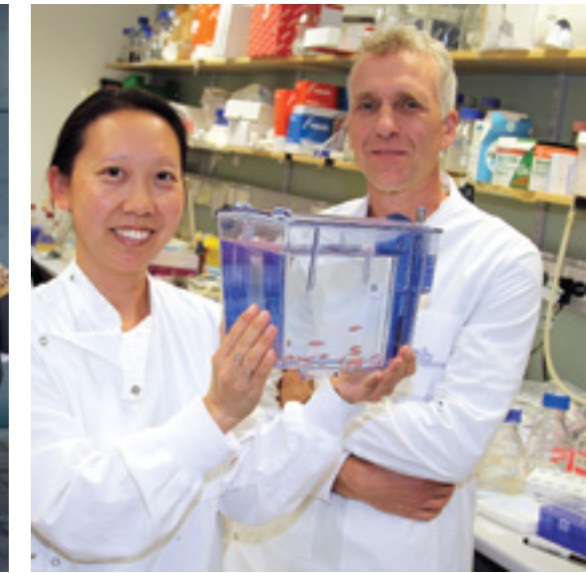
**King group:** Raveendra Anangi, Yanni Chin, Evelyne Deplazes, Maggie Hardy, Volker Herzig, Glenn King (Group leader), Linlin Ma, Sandy Pineda Gonzalez, Lachlan Rash, Natalie Saez, Sebastian Senff, Jennifer Smith, Eivind Undheim, Andrew Walker

**Lewis group:** Åsa Andersson, Fernanda Caldas Cardoso, Jean Giacomotto, Richard Lewis (Group leader), Hoshyar Mohialdeen, Thea Monks, Lotten Ragnarsson-McGrath, Silmara Rodrigues De Sousa, Himaya Siddhialu Wickrama Hewage, Josh Wingerd

**Martin group:** Karl Byriell, Hassanul Choudhury, Michelle Christie, Wilko Duprez, Shu-Hong Hu, David Jacques (CJ Martin Fellow, in Cambridge), Russell Jarrott, Gordon King, Fabian Kurth, Jenny Martin (Group leader), Roisin McMahon, Patricia Walden

**Smythe group:** Gregory Bourne, Christina Kulis, Jaimee McMahon, Mark Smythe (Group leader), Adam Stephenson, Jenny Zhang

**Vetter group:** Jennifer Deuis, Michael Morgan, Irina Vetter (Group leader)



Dr Harriet Lo and Professor Rob Parton

## Genomics of Development and Disease

IMB's Genomics of Development and Disease division generates important insights into gene structure, function, regulation and interaction; clues to the causes of genetic diseases, including cancer; and new molecular and genomic approaches to better understand and help diagnose these diseases.

Scientists within this division have the capacity to not only link a novel genetic mutation with a disease state, but also to begin to investigate how this disease state might be treated on an individual level and at a broader population level.

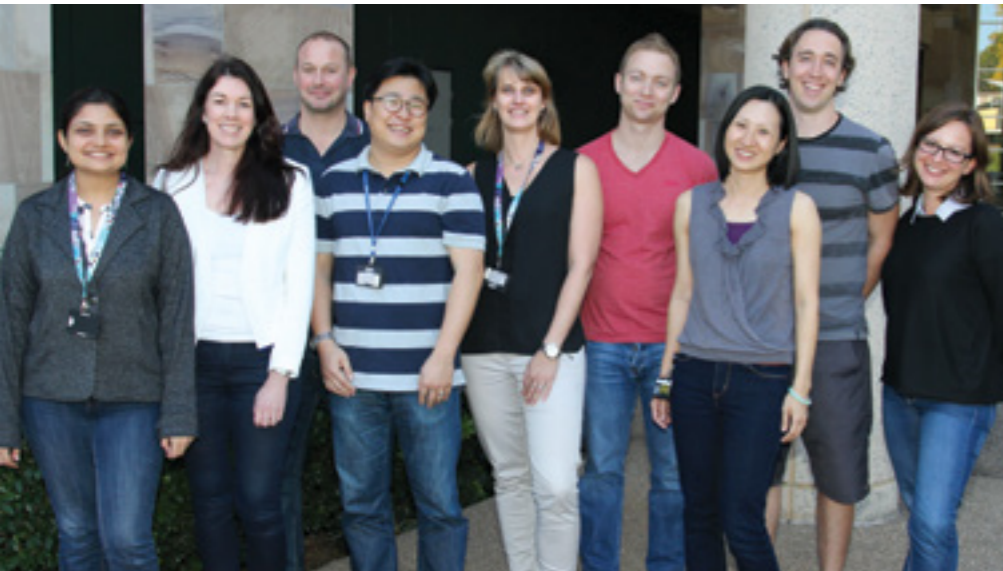
Drawing on their expertise in molecular genetics, developmental biology, stem cell biology, bioinformatics, computational biology, mathematics, statistics, and computer science, our researchers are able to apply common skill sets and approaches to a broad range of biological conditions.





# JOINT APPOINTMENTS AND AFFILIATES

Joint appointments and affiliates foster research collaborations between IMB and other institutes and schools at The University of Queensland and around the world. They are actively involved in sharing resources and facilities, supervising students and supporting IMB initiatives.



Hogan group

## Research staff

**Bailey group:** Tim Bailey (Group leader), James Johnson

**Coin group:** Derek Benson, Minh Cao, Lachlan Coin (Group leader), Devika Ganesamoorthy, Alan Robertson

**Francois group:** Frank Fontaine, Emmanuelle Frampton, Mathias Francois (Group leader), Cathy Pichol-Thievend, Renae Skoczylas

**Hogan group:** Neil Bower, Jun Chen, Kylie Georgas, Ben Hogan (Co-division head and group leader), Kaska Koltowska, Anne Lagendijk, Scott Paterson

**Koopman group:** Josephine Bowles, Tara Davidson, Jessica Ineson, Peter Koopman (Group leader), Ee Ting Ng, Alex Quinn, Cassy Spiller, Liang Zhao

**Little group:** Han Chiu, Pei Er, Joan Li, Melissa Little (Group leader), Norseha Mohamed Suhaimi, Jessica Vanslambrouck

**Palpant group:** Clayton Friedman, Nathan Palpant (Group leader)

**Powell group:** Jenny Fung, Alex Holloway, Luke Lloyd-Jones, Sam Lukowski, Joseph Powell (Group leader), Peter Smartt, Emily Wong (visiting), Chloe Yap

**Ragan group:** Alison Anderson, Cheong Xin Chan, Gavin Graham, Lien Le, Webber Liao, Edmund Ling, Huanle Liu, Michael Nuhn, Chanyarat Paungfoo-Lonhienne, Eric Powell, Mark Ragan (Co-division head and group leader), Danny Sheehan,

Striganesh Srihari, Alex Varlakov, Kerri Wait, Lanna Wong

**Simons group:** Stephen Bent, Joanna Crawford, Cas Simons (IMB Fellow), Douglas Stetner

**Smith group:** Kelly Smith (Group leader), Alisha Tromp

**Wainwright group:** Christelle Adolphe, Laura Genovesi, Alex Koon, Amanda Millar, Brandon Wainwright (Group leader)

**Wicking group:** Joelle Kartopawiro, Maria Rondon, Carol Wicking (Group leader)

## Support staff

**Administration support:** Sue Allen, Gail Howard, Patricia Howarth, Lucinda Essery, Barbara Synak

**Advancement:** Katrina Garner-Moore, Maureen O'Shea (Director)

**Central sterilising facility:** Sol Koppmann, Dawn Walsh (Manager)

**Commercialisation team:** Mark Ashton\* (Executive Director), Stephen Earl\*, Rob McLachlan\*, Peter Wilson

\*Employed by UniQuest

**Communications:** Bronwyn Adams (Manager), Aimee Parker, Kate Sullivan (parental leave), Gemma Ward

**External relations:** Melanie Gray

**Finance:** Robyn Craik, Angela Gardner (Manager), Louise Hendriks, Sharmila Mangalamkat, Hyo Park, Rosanna Perry, Sanjay Sundaral



Wicking group

**Research grants manager:** Michelle Foley

**Human resources:** Caraine Gomez (parental leave), Kathleen Hillsdon, Liza Leibbrandt, Felicity Ray (Manager)

**IMB biomathematics:** Nick Hamilton, James Lefevre

**Information technology:** Damien Beverley, Matthew Bryant, Lyndon Cook, Christian De Marco, Brett Dunsmore (Manager), Calvin Evans, Chris Hunt, Nelson Marques, Scott Martin, Lance Rathbone, Yves St-Onge, Jimmy Wu

**Infrastructure support:** Kristie Barclay, Chris Barnett (Manager), Jill Bradley, Tim Bruxner, Karl Byriel, Angelika Christ, Dan Croker, Christine Fraser, John Griffin, Jacky Hung, Alun Jones, Ian Lane, Miki Miyagi, Darren Paul, James Springfield

**Operations:** Ian Taylor (Director)

**Postgraduate office:** Amanda Carozzi, Olga Chaourova, Cody Mudgway

**Safety manager:** Paul Lovelock

**Stores:** Bob Allen, Barry Pitt (Manager), Wayne Sheldrick

**QFAB Bioinformatics:** Anne Bernard, Pierre-Alain Chaumeil, Xin-Yi Chua, Emma Cowie, Mark Crowe, Dominique Gorse (CEO), Anne Kunert, Roxane Legaie, Nicholas Rhodes, Stephen Rudd, Justin Scott, Michael Thang

**Workshop and maintenance:** Gary Carlross, Rene Croisier, Jason Hurst, Leigh Rose, John Srnka, Mick Thwaite (Manager)

## UQ joint appointments

**Professor Philip Hugenholtz**  
School of Chemistry and Molecular Biosciences

## Honorary and adjunct appointments

**Associate Professor Timothy Bailey**  
University of Nevada, Reno

**Dr Peter Beattie AC**  
Former Premier of Queensland

**Professor Frances Brodsky**  
University of California, San Francisco

**Dr Norelle Daly**  
James Cook University

**Dr Melissa Davis**  
The University of Melbourne

**Professor John W Funder AC**  
Hudson Institute of Medical Research

**Professor Frank Gannon**  
QIMR Berghofer Medical Research Institute

**Professor Wanjin Hong**  
Institute of Molecular and Cell Biology

**Professor David Hume**  
The Roslin Institute

**Professor David Julius**  
University of California, San Francisco

**Dr Vincent Lavergne**  
University of California, San Francisco

**Dr Gary Leong**  
Lady Cilento Children's Hospital

**Professor Yingrui Li**  
BGI Tech Solutions

**Professor Melissa Little**  
Murdoch Childrens Research Institute

**Professor John Mattick AO**  
Garvan Institute of Medical Research

**Dr Wim Meutermans**  
Audeo Oncology

**Dr Grant Montgomery**  
QIMR Berghofer Medical Research Institute

**Dr Josh Mylne**  
University of Western Australia

**Professor Nicos Nicola**  
Walter and Eliza Hall Institute of Medical Research

**Dr John Pearson**  
QIMR Berghofer Medical Research Institute

**Mr Ken Roberts**  
Former Managing Director of Wellcome Australasia Limited

**Professor Peter Turnbull**  
QFAB Bioinformatics

**Dr Nicola Waddell**  
QIMR Berghofer Medical Research Institute

**Dr Andrew Whitten**  
Australian Nuclear Science and Technology Organisation

**Professor Marino Zerial**  
Max Planck Institute of Molecular Cell Biology and Genetics

## UQ affiliates

**Dr Antje Blumenthal**  
Diamantina Institute

**Dr Mikael Boden**  
School of Chemistry and Molecular Biosciences

**Dr Andrew Brooks**  
Diamantina Institute

**Professor Matthew Brown**  
Diamantina Institute

**Dr Richard Clark**  
School of Biomedical Sciences

**Professor Ian Frazer AC**  
Translational Research Institute

**Associate Professor Bryan Fry**  
School of Biological Sciences

**Professor Elizabeth Gillam**  
School of Chemistry and Molecular Biosciences

**Associate Professor Stuart Kellie**  
School of Chemistry and Molecular Biosciences

**Professor Bostjan Kobe**  
School of Chemistry and Molecular Biosciences

**Professor Alan Mark**  
School of Chemistry and Molecular Biosciences

**Dr Mehdi Mobli**  
Centre for Advanced Imaging

**Dr Zoltan Neufeld**  
School of Mathematics and Physics

**Dr Johan Rosengren**  
School of Biomedical Sciences

**Associate Professor Joseph Rothnagel**  
School of Chemistry and Molecular Biosciences

**Professor Maree Smith**  
TetraQ

**Dr Kate Stacey**  
School of Chemistry and Molecular Biosciences

**Associate Professor Peter Thorn**  
School of Biomedical Sciences

**Professor Istvan Toth**  
School of Chemistry and Molecular Biosciences

**Associate Professor Christine Wells**  
Australian Institute for Bioengineering and Nanotechnology

**Professor Paul Young**  
School of Chemistry and Molecular Biosciences





# SUPPORTING INFORMATION

Financial statement

Research grants

Research support facilities

Occupational health and safety

Scientific publications



# FINANCIAL STATEMENT

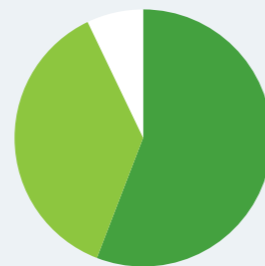
# RESEARCH GRANTS

	2013	2014	2015
Income	\$'000	\$'000	\$'000
<b>Peer reviewed income</b>			
ARC grants	7,280	7,355	7,814
NHMRC grants	21,732	18,843	16,327
Queensland Government grants	2,224	1,035	356
Other peer reviewed grants - domestic	3,328	3,735	1,753
Other peer reviewed grants - international	1,624	914	3,523
<b>Operating income</b>			
UQ awarded grants	3,742	3,571	3,277
UQ operating funding	6,803	9,419	14,321
Queensland Government operating grant	10,000	5,000	0
Sales and services revenue	1,337	2,554	1,775
<b>Other income</b>			
Philanthropy	217	309	335
Commercialisation	2,740	2,761	2,293
Other income and recoveries	918	835	860
<b>TOTAL INCOME</b>	<b>61,945</b>	<b>56,330</b>	<b>52,634</b>

	2013	2014	2015
Expenditure	\$'000	\$'000	\$'000
<b>Remuneration expenditure</b>			
Researchers	36,328	33,635	28,351
Infrastructure	2,816	2,879	2,819
Administrative	2,145	2,242	2,475
<b>Research expenditure</b>			
Research services	17,753	15,356	12,464
Commercialisation*	356	35	26
Research higher degree support	1,570	1,563	1,478
UQ internal collaborations and agreements	912	820	950
<b>Operating expense</b>			
Capital equipment	3,230	2,355	2,735
Information technology	438	749	617
Administration and support	290	409	517
Infrastructure and development	749	857	660
<b>TOTAL EXPENDITURE</b>	<b>66,587</b>	<b>60,899</b>	<b>53,093</b>
<b>NET SURPLUS/(DEFICIT)</b>	<b>(4,642)</b>	<b>(4,569)</b>	<b>(459)**</b>

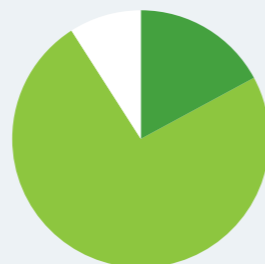
\*UniQuest (IMBcom) service agreement

\*\*This figure includes an allowable operating deficit of \$586k and the remainder is the expenditure of carried forward research funds



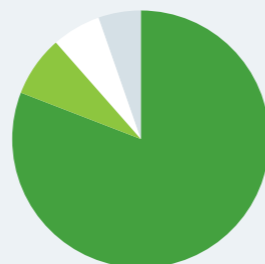
### Total income

56% Peer reviewed (competitive)  
37% Operating  
7% Philanthropy, commercialisation and other income and recoveries



### Operating (core) income

17% UQ awarded grants  
0% Queensland Government operating grant  
74% UQ operating funding  
9% Sales and services revenue



### Distribution of expenditure

81% Research  
8% Infrastructure  
6% Administration  
5% Capital equipment

Please note only newly awarded grants commencing in 2015 are included in this list. IMB researchers are indicated in bold.

Granting body	Investigators	Project title	Duration	Total Grant
ARC Discovery Early Career Researcher Award	<b>Muttenthaler M</b>	Molecular probe development for the oxytocin and vasopressin receptors	3 years	\$373,254
ARC Discovery Project	<b>Alexandrov K</b>	Developing orthogonal synthetic signaling cascades	4 years	\$534,700
ARC Discovery Project	<b>Collins B, Parton R</b>	Structural basis for the assembly of caveolae	4 years	\$507,800
ARC Discovery Project	<b>Craik D, Durek T, Gilding E</b> , Ploegh H	The chemistry and biology of circular proteins	5 years	\$659,100
ARC Discovery Project	Adams D, <b>Craik D</b> , Hung A, <b>Kaas Q</b> , Luo S	Nicotinic receptor structure and function probed with conotoxins	5 years	\$634,100
ARC Discovery Project	<b>Fairlie D</b>	Engineering cyclic peptides for oral bioavailability	3 years	\$503,000
ARC Discovery Project	<b>Hankamer B</b> , Happe T	High-efficiency bio-inspired solar H <sub>2</sub> production from water	3 years	\$443,900
ARC Discovery Project	<b>Hogan B</b> , Harvey N	Defining the earliest events in lymphatic vasculature formation from veins	3 years	\$375,800
ARC Discovery Project	<b>Hogan B, Yap A</b>	Cell-cell adhesive force in vascular development	4 years	\$444,900
ARC Discovery Project	<b>Koopman P</b>	Switching on sex: how key mammalian sex-determining genes are activated	3 years	\$457,600
ARC Discovery Project	<b>Ragan M, Chan CX</b> , Battacharya D	Symbiodinium: the evolutionary transition to coral reef symbiont	3 years	\$475,600
ARC Discovery Project	<b>Teasdale R, Kerr M</b>	Formation of the chlamydial inclusion requires host trafficking pathways	3 years	\$370,600
ARC Discovery Project	Verbruggen H, <b>Chan CX</b> , Bhattacharya D, Olson B	Genome dynamics following plastid endosymbiosis	3 years	\$443,900
ARC Discovery Project	<b>Yap A</b>	Tissue tension homeostasis by junctional mechanosensing	4 years	\$449,900
ARC Future Fellowship	<b>Henriques S</b>	Breaching membrane barriers	4 years	\$677,352
ARC Australian Laureate Fellowship	<b>Craik D</b>	Taking Australia from the farm to the pharm	5 years	\$2,977,310
ARC Linkage Project	<b>Alexandrov K, Watt P</b>	In vitro expression of macrocyclic peptides	3 years	\$670,242
ARC Linkage Project	<b>Hankamer B</b>	Model guided design of advanced microalgae production systems	3 years	\$340,000
ARC Linkage Infrastructure, Equipment and Facilities	<b>Hankamer B, Landsberg M</b> , Mackay J, <b>Parton R</b> , Young P, Monteiro M, Stock D	Reaching new heights in high-resolution electron microscopy	1 year	\$590,000
ARC Linkage Infrastructure, Equipment and Facilities	<b>Ragan M, Coin L</b> , Ranganathan S, <b>Gorse D</b> , Lambert D, Zhou Y, Quinn R, Beagley K, Liu F, <b>Lewis R</b> , Little M, Mackay-Sim A	A multi-omics platform for molecular evolution and developmental biology	1 year	\$540,000



Granting body	Investigators	Project title	Duration	Total Grant
NHMRC/Heart Foundation Career Development Fellowship	<b>Hogan B</b>	The genetic and cellular control of lymphangiogenesis in health and disease	3 years	\$455,452
NHMRC Development Grant	<b>Fairlie D</b> , Andrews K	Development of antimalarial histone deacetylase inhibitors	3 years	\$556,795
NHMRC Program Grant	Sinclair A, <b>Koopman P</b> , Harley V	Disorders of sex development: genetics, diagnosis, informing clinical care	5 years	\$5,509,450
NHMRC Program Grant	<b>Lewis R, Alewood P</b> , Adams D, Macdonald C, <b>King G</b>	Ion channel modulators of pain pathways	5 years	\$9,209,205
NHMRC Project Grant	Brooks A, <b>Waters M</b> , Mark A	A new paradigm for class I cytokine receptor activation	4 years	\$936,392
NHMRC Project Grant	<b>Cooper M</b> , O'Neill L, <b>Schroder K</b> , Woodruff T, <b>Robertson A</b>	Inhibitors of NLRP3 activation for treatment of inflammatory CNS diseases	3 years	\$991,062
NHMRC Project Grant	<b>Craik D, Durek T, Schroeder C, Kaas Q</b>	Development of selective melanocortin receptor agonists and antagonists	3 years	\$663,592
NHMRC Project Grant	<b>Craik D, Henriques S</b>	Development of peptide-based scaffolds for intracellular cancer targets	5 years	\$1,418,103
NHMRC Project Grant	<b>Fairlie D</b>	Downsizing a human protein to modulate inflammatory diseases	3 years	\$500,615
NHMRC Project Grant	<b>Fairlie D, Iyer A, Muscat G</b> , Prins J	Targeting protease-activated receptor 2 in immunometabolism and obesity	3 years	\$698,475
NHMRC Project Grant	Khosrotehrani K, <b>Francois M</b>	Role of resident endothelial progenitor cells in melanoma vascularisation and progression	3 years	\$922,589
NHMRC Project Grant	<b>Hogan B, Francois M</b>	A critical new signaling axis in lymphatic vascular angiogenesis	3 years	\$678,846
NHMRC Project Grant	<b>Hogan B</b>	Novel transcription factor regulation of lymphatic vascular angiogenesis in health and disease	3 years	\$800,084
NHMRC Project Grant	<b>Martin J, Collins B</b> , Hu S	Unraveling the dynamic Munc18a:Syntaxin1a interaction required for neurotransmission	3 years	\$653,472
NHMRC Project Grant	<b>Powell J</b>	Determining shared genetic control of RNA transcription across 45 human tissue types	3 years	\$256,398
NHMRC Project Grant	<b>Schroeder C, Henriques S</b> , Mobli M	Understanding how toxins interact with lipid membranes and ion channels	3 years	\$579,492
NHMRC Project Grant	Simpson P, <b>Ragan M</b> , Waddell N	Defining the genomic and therapeutic landscape of familial breast cancer	3 years	\$1,135,067
NHMRC Project Grant	Vesey D, Gobe G, Nikolic-Paterson D, <b>Lohman R, Suen J</b>	Modulating inflammatory and fibrogenic pathways in kidney disease using a novel antagonist of protease-activated receptor 2	3 years	\$591,576
NHMRC Research Fellowship	<b>Alewood P</b>	Pain drugs from venom peptides	5 years	\$739,980
Advance Queensland Women's Academic Fund	<b>Spiller C</b>	Support to maintain progress during maternity leave	1 year	\$10,400
Department of Innovation, Industry, Science and Research - Australia-India Strategic Research Fund	<b>King G, Anangi R</b>	Tailoring plant protease inhibitors for control of the crop pest <i>Helicoverpa armigera</i>	2 years	\$199,496
Wound Management Innovation CRC	<b>Gorse D</b> , Lazzarini P	Establishing Diabetic Foot Australia (DFA) - phase one	1 year	\$44,032
Wound Management Innovation CRC	<b>Gorse D</b> , Gibb M	Australian Wound Registry - phase one	1 year	\$149,500
Agroscope	<b>Herzig V</b>	Spider venom peptides for control of parasitic <i>Varroa</i> mites in honeybee colonies	1 year	\$46,695

Granting body	Investigators	Project title	Duration	Total Grant
Australian Cancer Research Foundation	Reutens D, <b>Cooper M</b> , Smith M, Boyd A, Richards L, Bartlett P, Russell P, Walker D, Bhalla R, Barth M, Palmieri C, Thurecht K, Venkatachalam T, Allavena R, Straw R, Tesiram Y, Bunt J, <b>Francois M</b> , Osborne G	ACRF Facility for Molecular Imaging Agents in Cancer	7 years	\$2,500,000
Brainchild Foundation	<b>Wainwright B</b>	Establishment of patient-derived xenografts from paediatric brain tumours to facilitate a personalised genomic approach to treatment	1 year	\$80,000
Bill and Melinda Gates Foundation	Yench C, Ghislain M, Fei Z, Buell R, <b>Coin L</b> , Ssemakula G, Carey T	GTSPI: Genomic Tools for Sweet Potato Improvement	4 years	US\$12,409,389
CURE: Citizens United for Research in Epilepsy	<b>King G</b> , Petrou S	A novel therapeutic intervention for Dravet syndrome	2 years	US\$249,500
Human Frontier Science Program	Gross S, Bozza P, <b>Parton R</b> , Pol A	Mammalian lipid droplets: a central role in the organismal antibacterial response?	3 years	US\$1,350,000
MAWA (Medical Advances Without Animals) Trust	<b>Deplazes E</b> , O'Mara M	Characterising new therapeutic targets in the fight against pneumococcal disease using computational simulations as an alternative to animal models	1 year	\$18,182
Motor Neurone Disease Research Institute of Australia Inc	Woodruff T, <b>Cooper M</b> , McCombe P, <b>Schroder K</b> , Gordon R	Therapeutic targeting of the NLRP3 inflammasome using a potent and orally active inhibitor in experimental MND	1 year	\$100,000
National Breast Cancer Foundation-Innovator Grant	<b>Alexandrov K, Stein V</b>	Development of point-of-care biosensors for detection of breast cancer relapse	2 years	\$200,000
National Heart Foundation - Future Leader Fellowship	<b>Hogan B</b>	Understanding the molecules that control vein and lymphatic vessel formation	4 years	\$200,000
The Cancer Council Queensland	<b>Coin L</b> , Simpson P, Waddell N, <b>Ganesamoorthy D</b>	Using somatic copy number and methylation profiling of circulating tumour DNA to monitor heterogenous tumour development in breast cancer	2 years	\$185,000
The Cancer Council Queensland	<b>Koopman P, Bowles J, Spiller C</b> , Looijenga L	Nodal/Cripto signaling in germ cell development and tumorigenesis	2 years	\$200,000
The Cancer Council Queensland	<b>Wainwright, B</b>	A Synthetic lethal based approach for the treatment of medulloblastoma	2 year	\$200,000
The Cancer Council Queensland	<b>Yap A</b>	Controlling the Rho off-switch: a novel target in breast cancer	2 years	\$200,000
The Clive and Vera Ramaciotti Foundations Biomedical Research Award	<b>Craik D</b>	The Clive and Vera Ramaciotti Facility for Producing Pharmaceuticals in Plants	3 years	\$1,000,000
The Michael J. Fox Foundation for Parkinsons Research	Woodruff T, <b>Cooper M</b> , <b>Schroder K</b> , Gordon R, <b>Robertson A</b>	Pharmacological targeting of the NLRP3 inflammasome in pre-clinical models of Parkinson's disease using a potent orally active inhibitor	2 years	\$318,580
The Wellcome Trust	<b>Cooper M</b>	Community for Open Antimicrobial Drug Discovery (CO-ADD)	2 years	\$3,079,635
The CASS Foundation	<b>McMahon R</b>	Travel award to attend and participate in the American Society of Microbiology Biodefense and Emerging Diseases Research Meeting	1 year	\$3,500
The CASS Foundation	<b>Koltowska K</b>	Travel award to attend Angiogenesis: New Mechanisms in Vascular Patterning and Specialization: From Cells to Functional Networks	1 year	\$2,750
Group of 8 Australia - Germany DAAD Joint Research Cooperation Scheme	<b>Vetter I</b> , Zimmerman K	TRPC5 in teeth- a novel target for tooth pain treatment	2 years	\$20,000



Granting body	Investigators	Project title	Duration	Total Grant
The Ian Potter Foundation	<b>Boucher D</b>	Toll 2015 - Targeting Innate Immunity conference	1 year	\$1,900
The Ian Potter Foundation	<b>Coll R</b>	8th International Congress of Familial Mediterranean Fever and Systemic Autoinflammatory Diseases	1 year	\$1,100
The Ian Potter Foundation	<b>Deplazes E</b>	60th annual meeting of the Biophysical Society	1 year	\$1,997
The Ian Potter Foundation	<b>McMahon R</b>	European Melioidosis Congress	1 year	\$1,740
The Ian Potter Foundation	<b>Shakespeare M</b>	Toll 2015 - Targeting Innate Immunity conference	1 year	\$2,240
The Ian Potter Foundation	<b>Srihari S</b>	San Antonio Breast Cancer Symposium	1 year	\$1,600
UQ Advancing Women Researchers Grant	<b>Schroeder C</b>	Conference support (international)	1 year	\$5,000
UQ Advancing Women Researchers Grant	<b>Smith K</b>	Conference support (national)	1 year	\$1,846
UQ Collaboration and Industry Engagement Fund	<b>Capon R</b>	Aquaculture: anti-infective agents from the sea	1 year	\$4,000
UQ Early Career Researcher Grant	<b>Iyer A, Lohman R</b>	Targeting the progress of inflammatory bowel disease to cancer in mice	1 year	\$25,000
UQ Early Career Researcher Grant	<b>Ranzoni A</b>	Rapid and culture-free detection of bacterial pathogens in blood products	1 year	\$25,000
UQ Early Career Researcher Grant	<b>Bezbradica Merkovic J</b>	Microbial killing versus wound repair: how does the body direct an appropriate response?	1 year	\$25,000
UQ Early Career Researcher Grant	<b>Koltowska K</b>	Establishing 3D embryonic transcriptome tomography at UQ: proof of principle using novel zebrafish lymphatic mutants	1 year	\$25,000
UQ Foundation Research Excellence Award	<b>Vetter I</b>	Identifying new pain targets in peripheral sensory neurons	1 year	\$99,717
UQ Major Equipment and Infrastructure and NHMRC Equipment Grant	<b>Collins B, King G, Alexandrov K, Martin J, Gambin Y, Landsberg M, Craik D, Kobe B, Mobli M, Vetter I</b>	Protein Analysis Facility	1 year	\$57,276
UQ Major Equipment and Infrastructure and NHMRC Equipment Grant	Roberts J, Paterson D, <b>Cooper M</b> , Lipman J, Roberts M, Schembri M	The hollow fibre in vitro infection model	1 year	\$391,948
UQ Major Equipment and Infrastructure and NHMRC Equipment Grant	Monteith G, Roberts-Thompson S, Cabot P, Parat M, Parekh H, Gonda T, <b>Vetter I</b>	The assessment of mitochondrial oxygen consumption and cytoplasmic glycolysis in cells to identify and characterise new therapeutic targets for diseases	1 year	\$97,500
UQ Major Equipment and Infrastructure and NHMRC Equipment Grant	<b>Vetter I, Lewis R, Fairlie D, Craik D, Alewood P, Teasdale R, King G, Iyer A, Schroder K, Cooper M</b> , Cabot P	Murine behavioural phenotyping facility	1 year	\$162,801
UQ Major Equipment and Infrastructure and NHMRC Equipment Grant	<b>Yap A, Teasdale R, Stow J, Hogan B, Parton R, Smith K, Francois M</b>	Femtosecond laser imaging system for multi-photon microscopy	1 year	\$278,800
UQ Postdoctoral Research Fellowship	<b>Boucher D</b>	Molecular mechanisms of caspase-induced pyroptotic cell death	3 years	\$348,576
UQ Postdoctoral Research Fellowship	<b>Siddihali Wickrama Hewage A</b>	Identification, biological evaluation and bio-delivery of conopeptides as pesticides against Australian agricultural pests	3 years	\$343,797
UQ Postdoctoral Research Fellowship	<b>Shakespeare M</b>	Discovering new approaches to treat inflammatory diseases	3 years	\$343,519
UQ Vice Chancellor's Research Focussed Fellowship	<b>Alexandrov K</b>	Engineering next generation of biosensors for research and biotechnology	3 years	\$760,417

# RESEARCH SUPPORT FACILITIES

## ACRF Cancer Biology Imaging Facility

The Australian Cancer Research Foundation (ACRF) Cancer Biology Imaging Facility is one of the largest and most comprehensively equipped facilities in Australia.

Founded in 2010 with a \$2.5 million ACRF grant, the facility houses 23 high-performance microscopes and provides on-site expert technical support and training. In 2015, 166 unique users across UQ used the facility.

By using techniques such as laser scanning and spinning disc confocal microscopy, deconvolution, high-throughput multi-well imaging and 3D optical projection tomography, researchers made breakthroughs in a range of areas.

**A notable breakthrough came when researchers identified a mechanism involved in kidney development. Using this knowledge, they generated kidney organoids that contain multiple cell types arranged to mimic human kidney structure and function.**

With the facility's support, these and other studies published in 2015 have uncovered important new knowledge in health and disease, and generated data for more than 39 peer-reviewed publications.

The facility acknowledges funding from the Australian Cancer Research Foundation.

## IMB Sequencing Facility

The IMB Sequencing Facility (ISF) was established in May 2014 to provide sequencing services to IMB, UQ and the research community in the greater Brisbane region. The ISF provides services on Illumina's NextSeq 500 and the MiSeq sequencing platforms.

**The facility offers sample preparation for sequencing of RNA from any species, whole exome sequencing for human DNA and whole genome sequencing for non-human species.**

The ISF also offers sample preparation and sequencing of custom projects including large-scale projects, for which the facility is equipped with a high-throughput sample preparation robot.

In 2015, 30 unique research groups and 45 individual users from UQ, QIMR Berghofer Medical Research Institute and other research institutes used the facility for sample preparation and sequencing services.

## Mass Spectrometry Facility

IMB's Mass Spectrometry Facility (MSF) provides researchers with state-of-the-art mass spectrometry, high-performance liquid chromatography and robotic instrumentation.

The MSF provides technical advice and research and training support in a number of mass spectrometric applications, including investigating protein interactions and structures, amino acid sequence determination, post-translational modification discovery and quantification, compound stability, and bioavailability of potential therapeutics in a range of biological systems.

**In 2015, 125 unique users and 31 research groups from UQ, CSIRO, QIMR Berghofer Medical Research Institute, University of the Sunshine Coast, Griffith University, Queensland University of Technology and James Cook University accessed the facility for guidance and support with experimental design, methodology, data acquisition, data processing, project reporting and publication.**

The facility supported a number of projects resulting in major discoveries and over 50 publications, including the use of mass spectrometry to study the stability and bioavailability of potential therapeutics, protein biomarker discovery and quantification, toxin evolution, protein interaction networks and peptide/protein composition of animal venoms under varying biological conditions.

The facility acknowledges funding from the Australian Research Council Linkage Infrastructure, Equipment and Facilities (LIEF) Project.





UQ ROCX Crystallisation and X-ray Diffraction Facility

### Biomolecular NMR Facility

IMB's Biomolecular Nuclear Magnetic Resonance (NMR) Facility makes the powerful technique of NMR spectrometry accessible to its research and industry clients. The facility comprises a 600 MHz spectrometer with a recent upgrade of a cryoprobe and autosampler, and a 500 MHz spectrometer equipped with a robotic sample changer.

In addition to the institute's extensive NMR infrastructure, researchers have access to a 900 MHz spectrometer equipped with a cryoprobe and sample changer. This instrument, located at IMB, is an instrument of the Queensland NMR Network and is the most powerful state-of-the-art NMR spectrometer in Australia.

**Key discoveries made in 2015 using the facility included structural characterisation of several naturally occurring peptides from plants and numerous venoms, and NMR-guided rational design and synthesis of orally bioavailable peptides.**

The facility is available on a user-pays system to researchers from a range of scientific disciplines both within IMB and across UQ. The facility also holds collaborations with researchers from other Australian universities as well as several international collaborations, most recently with scientists from Belgium, China, and the United States.



Biomolecular NMR Facility

### UQ ROCX Crystallisation and X-ray Diffraction Facility

The UQ Remote Operation Crystallisation and X-ray Diffraction (UQ ROCX) Facility provides research training and support for protein structure determination.

This support includes protein crystallisation condition screening, crystal diffraction screening, data collection, data processing, and structure determination.

The diffraction facility houses Queensland's brightest research X-ray source and the state's only robotic crystallographic sample storage and retrieval system. The crystallisation facility is fully equipped for screening membrane proteins and for fragment screening.

**In 2015, a total of 71 users accessed the facility. Collectively, users performed 96,000 crystallisation experiments and collected 10 in-house diffraction data sets.**

A total of 62 crystals were screened at UQ ROCX for synchrotron use. UQ ROCX coordinated 17 remote-access and 4 on-site data collection beam times at the Australian Synchrotron, enabling several hundred diffraction data sets to be collected from over 2,000 frozen crystals sent.

In addition to servicing the crystallography requirements of users who are crystallographers, UQ ROCX provides services to non-crystallographers. This year, three projects were undertaken for non-crystallographer researchers. Two of these projects involved the optimisation of crystallisation conditions to produce diffraction-quality crystals. The third project involved diffraction screening to check the diffraction of crystals grown by the researcher.

Ten scientific papers that acknowledged support by the facility were published in 2015.

UQ ROCX is funded by the Australian Research Council and UQ.



Solar Biofuels Research Centre

### Solar Biofuels Research Centre

IMB's Solar Biofuels Research Centre (SBRC) provides a research hub for industry and university partners skilled in biology, engineering and systems development.

**Located at Pinjarra Hills in Brisbane, the SBRC is home to a pilot-scale test facility that develops microalgae systems for the production of food, fuel, biofuels, bioproducts and bioremediation.**

The SBRC project was developed as part of a \$3.48 million grant. The facility incorporates advanced pilot facilities with the capacity to develop high-efficiency microalgae systems and processes. It was launched in 2013 by IMB in partnership with the Queensland Government, KBR, Neste Oil, Cement Australia, Siemens, Bielefeld University and the Karlsruhe Institute of Technology in Germany.

Capabilities of the SBRC include strain purification; cryopreservation; nutrient and light optimisation; metabolic engineering; high-value product development and screening; photobioreactor and raceway system design; and techno-economic analysis.



Mass Spectrometry Facility

### QFAB Bioinformatics

QFAB Bioinformatics (QFAB) provides rapid, flexible and customised bioinformatics and biostatistics services to life sciences and clinical researchers.

Working closely with researchers, QFAB team members apply data management, integration, analysis and visualisation techniques to unlock the full value of large-scale biological and clinical datasets.

**In 2015, QFAB undertook over 40 projects supporting researchers from industry, universities, medical research institutes, and government departments. These projects included developing a laboratory management system to track the screening activities of the Community for Open Antimicrobial Drug Discovery and deploying a computational platform to undertake large-scale multi-omics based research.**

To further empower researchers in mastering their data generation and analysis, QFAB has developed a training portfolio covering statistics, computing and bioinformatics.

Researchers also have the opportunity to receive free consultations during weekly clinics to help with research projects and grant applications.

QFAB's systems biology platform consists of leading software packages, data repositories and workflow engines deployed in a scalable high-performance computational environment. This platform enables investigations across the biological continuum by combining bioinformatics and cheminformatics approaches.


QFAB Bioinformatics partners with UQ, Queensland University of Technology and Griffith University.



# 2015 OCCUPATIONAL HEALTH AND SAFETY


  
271  
personnel attended IMB inductions

  
97  
contractors inducted

  
97%  
completion rate for fire safety online modules

  
98.5%  
completion rate for workplace safety online modules

  
96%  
completion rate for lab safety online modules

  
97%  
completion rate for chemical safety online modules

As a continuation of the 2014 efforts to align IMB policies and procedures more closely with those of the university, significant effort was directed in 2015 at providing UQ safety training for supervisors and managers in-house.

Twenty-three IMB group leaders were given training by the IMB Safety Manager in basic OHS principles and procedures using the OM0008 component (OHS for Supervisors and Managers) of the UQ Staff development program. The significance of OHS compliance as an integral part of performance appraisal was emphasised in these sessions and, independently, a draft plan to establish a formal OHS performance evaluation process was developed in cooperation with IMB Human Resources. The plan continues to be developed for implementation in 2016.

The composition of the IMB floor manager group also underwent significant changes in 2015. Dr Ian Lane and Mr Jacky Hung departed to other positions at the university and were replaced by Dr Kristie Barclay and Dr Donna Easton respectively. Dr Simon Cridland was recruited to fill a position that had been left vacant since 2012. We now have a complete cohort with one manager on each laboratory floor. Our floor managers play a vital role in monitoring and maintaining workplace safety as well as ensuring the facilities and research services at IMB are kept to an extremely high standard.

In this regard, our floor managers are set for a busy 2016: planning for the integration of new research facilities and new research groups at IMB began in 2015, for implementation in 2016. These new facilities will require the structural modification of some laboratory areas, liaison with the relevant regulatory bodies such as OGTR and DAFF, internal relocation of some research groups and induction and training of a significant number of new personnel.

Transitioning chemical labelling requirements to the GHS system by early 2017 will also be a significant task for IMB support and research personnel.

IMB continues to work closely with the relevant regulatory bodies: during the year the institute passed all Department of Agriculture (Biosecurity) and UQ biosafety (GM facility) audits. IMB has also been a stakeholder in consultations with the Department Of Agriculture and Water Resources on its new Biosecurity Import Conditions (BICON) electronic permit application system, which was implemented in October 2015. IMB OHS also continued the process relating to Queensland Health's draft Medicine, Poisons and Therapeutic Goods Bill.

IMB OHS made significant contributions to the university OHS system during 2015, as a member of the UQ database governance group involved in transitioning to a new risk management and incident reporting database; assisting with pre-certification audits and assistance of other entities for the use of carcinogens; and as a member of the committee involved in preparing sections of the university for the worker's compensation self-insurance audit conducted in 2015. This committee performed ably, winning a 2015 UQ Award for Excellence in Wellness and Safety. Locally, IMB IT systems were also updated to improve OHS and regulatory compliance; an update on the IMB purchasing system screening process for various regulated chemicals was implemented; and both the import register and training record database formats were simplified.

The institute was fortunate to have the help of a committed group of individuals performing a diverse range of roles throughout the year. Our sincere thanks go to all of those first aiders, fire wardens, safety committee members, ambassadors and health and safety representatives who volunteered their time and energy to maintain our safety systems in 2015.

# SCIENTIFIC PUBLICATIONS

IMB researchers contributed to 344 scientific publications during 2015, including 44 high-impact publications that each had an impact factor greater than 10.



344

scientific publications



44

high-impact publications  
(impact factor >10)

Impressively, IMB researchers contributed 33 per cent of UQ's ranking in the *Nature Publishing Index Asia Pacific* as at the last quarter of 2015. UQ leads Australian institutions and is among the Asia Pacific's top 10 in the Index.

Disseminating new discoveries to research colleagues around the world is critical to the success of IMB. Publications are a key indicator of the institute's exceptional research quality and output.

Our researchers published in journals including

- Nature
- Nature Reviews Drug Discovery
- Nature Reviews Molecular Cell Biology
- Nature Methods
- Nature Medicine
- Nature Biotechnology
- Nature Chemistry
- Nature Communications
- Science Translational Medicine
- Genome Research
- Journal of Allergy and Clinical Immunology
- Journal of Experimental Medicine
- American Journal of Respiratory and Critical Care Medicine
- Journal of the American Chemical Society





## High-impact peer reviewed papers (impact factor >10)

1. Alioto, Tyler S., Buchhalter, Ivo, Derdak, Sophia, Hutter, Barbara, Eldridge, Matthew D., Hovig, Eivind, Heisler, Lawrence E., Beck, Timothy A., Simpson, Jared T., Tontonoz, Laurie, Sertier, Anne-Sophie, Patch, Ann-Marie, Jager, Natalie, Ginsbach, Philip, Drews, Ruben, Paramasivam, Nagarajan, Kabbe, Nicol, Chotewutmontri, Sasithorn, Diessl, Nicole, Previti, Christopher, Schmidt, Sabine, Brors, Benedikt, Feuerbach, Lars, Heinold, Michael, Grobner, Susanne, Korshunov, Andrey, Tarpey, Patrick S., Butler, Adam P., Hinton, Jonathan, Jones, David, Menzies, Andrew, Raine, Keiran, Shepherd, Rebecca, Stebbings, Lucy, Teague, Jon W., Ribeca, Paolo, Giner, Francesc, Beltran, Sergi, Raineri, Emanuele, Dabad, Marc, Heath, Simon C., Gut, Marta, Denroche, Robert E., Harding, Nicholas J., Yamaguchi, Takafumi N., Fujimoto, Akihiro, Nakagawa, Hidewaki, Quesada, Victor, Valdes-Mas, Rafael, Nakken, Sigve, Vodak, Daniel, Bower, Lawrence, Lynch, Andrew G., Anderson, Charlotte L., Waddell, Nicola, Pearson, John V., Grimmond, Sean M., Peto, Myron, Spellman, Paul, He, Minghui, Kandoth, Cyriac, Lee, Semin, Zhang, John, Letourneau, Louis, Ma, Singer, Seth, Sahil, Torrents, David, Xi, Liu, Wheeler, David A., Lopez-Otin, Carlos, Campo, Elias, Campbell, Peter J., Boutros, Paul C., Puente, Xose S., Gerhard, Daniela S., Pfister, Stefan M., McPherson, John D., Hudson, Thomas J., Schlessner, Matthias, Lichter, Peter, Eils, Roland, Jones, David T.W. and Gut, Ivo G. (2015) A comprehensive assessment of somatic mutation detection in cancer using whole-genome sequencing. *Nature Communications*, 6 10001: doi:10.1038/ncomms10001 **IF: 11.470**
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The Clive and Vera Ramaciotti Foundations, administered by trustee Perpetual, have funded a new facility to accelerate Professor David Craik's revolutionary research to turn plants into 'biofactories' to inexpensively produce medicines for everything from HIV to chronic pain.

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Brainchild's motivation is to provide support and better tomorrows to the children and families effected by brain and spinal cord tumours, and to strive for a cure for these diseases.

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The National Breast Cancer Foundation is supporting Professor Kirill Alexandrov to develop biosensors that can detect tumour markers and rapidly transmit the information to electronic devices such as smartphones. This will allow frequent, rapid, at-home monitoring for patients, while keeping their doctors informed.

The National Breast Cancer Foundation's motivation is to achieve zero deaths from breast cancer by 2030.

## Just imagine a cure for epilepsy

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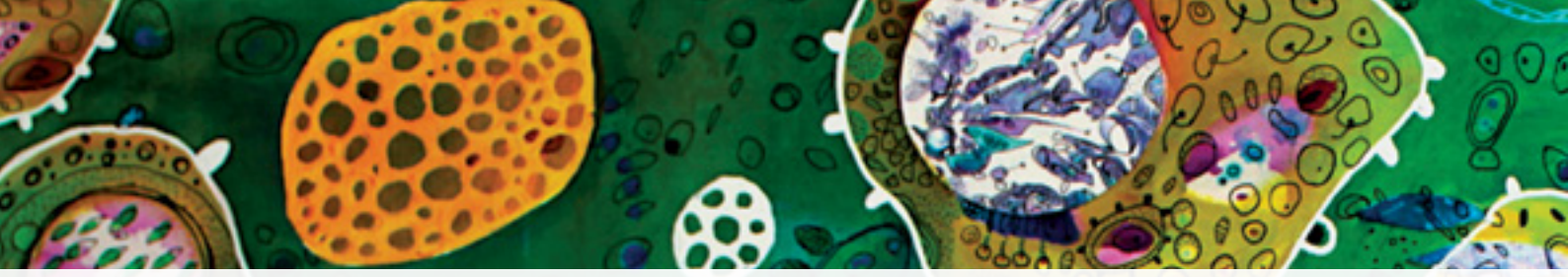
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