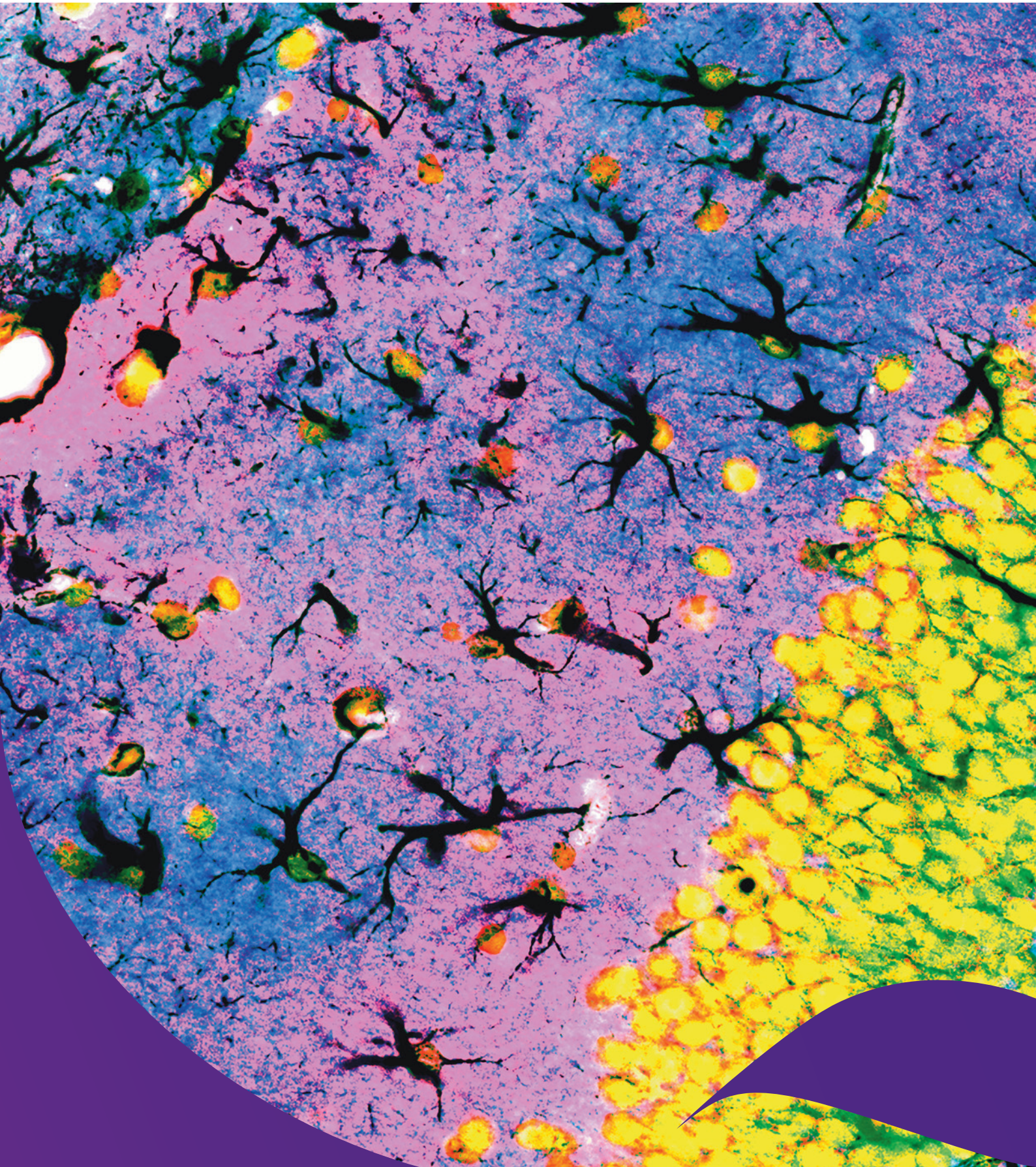
The University Of Queensland
AUSTRALIA

CREATE CHANGE

Queensland Brain Institute **2018 Annual Report**



Vice-Chancellor's message

The Queensland Brain Institute was established in response to two of the greatest challenges in modern science: understanding brain function and the prevention and treatments of disorders of brain function. QBI's 450-plus research staff cohort includes dynamic group leaders, postdoctoral fellows and students, all working together to tackle these challenges. Their discoveries are regularly published in top-tier scientific journals. Indeed, the 2018 Excellence in Research for Australia (ERA) results reinforce the quality of QBI research. As in all previous ERA assessments, UQ's neuroscience was rated "well above world standard". This is the highest possible rating and was secured largely due to QBI researchers' work.

In the past 12 months, this team of researchers has made impressive progress.

To begin, QBI has done a magnificent job advancing its promising ultrasound project. Professor Jürgen Götz and his team at the Institute's Clem Jones Centre for Ageing Dementia Research are developing a device that delivers ultrasound to the brain through the skull, helping drugs and other therapeutics reach their targets more effectively. This team demonstrated for the first time in 2015 that ultrasound can have a therapeutic effect on mice with Alzheimer's disease. Now, just a few years later, the team has partnerships with medical-device engineers and clinicians, and will begin human-safety trials soon. The project exemplifies what QBI is about: in collaboration with commercial partners and clinicians, the institute takes basic neuroscience discoveries as the basis to develop new approaches to brain disease, leading to clinical trials and ultimately treatments.

It was an important year for the Clem Jones Centre for Ageing Dementia Research in other ways too. The centre's significant effort to secure funding for the next five years was rewarded with a $10 million Australian Government commitment and a $5 million Queensland Government pledge for the ultrasound project. Donations of several million dollars included gifts from The Clem Jones Foundation and The Brazil Family Foundation. I was pleased to add strategic University funding towards Professor Götz's team and their outstanding research that continues to draw global attention.

Internationally in 2018, QBI Director Professor Pankaj Sah and colleagues renewed and strengthened agreements with Japan's RIKEN Center for Brain Science and the Chinese Academy of Sciences' Institute of Neuroscience. These are important outcomes from the Institute's strategic focus on developing top-level neuroscience research collaborations globally.

QBI also strengthened UQ's relationship with the Southern University of Science and Technology (SUSTech) in Shenzhen, China. UQ's Faculty of Engineering, Architecture and Information Technology

Professor Peter Høj
Vice-Chancellor and President

(EAIT) had existing links with this emerging university in a technological boom city. Now, SUSTech and UQ are close to jointly establishing a neuroengineering laboratory and a Master in Bioengineering, to be run through EAIT. This multifaceted relationship between UQ and one of the world's most rapidly rising universities offers exciting, transformative scientific potential.

In a difficult environment, QBI researchers continued their success in competitive funding schemes. In National Health and Medical Research Council project grants, QBI's 35 per cent success rate compares to a 17 per cent national average. In Australian Research Council Discovery grants, QBI's 33 per cent success rate compares with the 22 per cent national average.

Meanwhile, much-valued industry and clinical partners continue to work with and support the Institute. QBI was established 15 years ago and the occasion was celebrated with an event at Customs House in October last year. Executives from the wider University, past and present QBI staff, donors and others who have contributed to the Institute's success gathered to mark its standing as a world-class neuroscience research centre.

It is a privilege to lead a university with the capacity to create change in many ways. QBI's excellent research, commitment to strategic partnerships and efforts to secure diverse financial support exemplify qualities we promote across UQ.

Congratulations to Professor Sah and his team on their tremendous achievements this year. I look forward to QBI maintaining its upwards trajectory in the next 15 years.

Director's message

Professor Pankaj Sah
Director

2018 was another highlight-filled year for the Institute, as we continue to grow our reputation as a leading neuroscience centre in the Asia-Pacific region. There were significant accomplishments in research funding and awards, faculty recruitment, student training, strategic partnerships, translation and commercialisation, infrastructure, facilities and resources, and community engagement. By any measure this was a year to be proud of.

The accomplishment of our researchers in securing competitive grants shows no sign of slowing. Our success rates in both the NHMRC Project Grant and ARC Discovery Grant rounds continue to be well ahead of the national averages, and are detailed within this report.

It is not just our researchers that contribute to QBI's success, and so we were delighted that two members of our IT team—Jake Carroll and Irek Porebski—won their second Gold Award at the Australian Computer Society Digital Disruptor award ceremony.

Several new appointments in 2018 brought new expertise to QBI in areas of strategic focus. Dr Susannah Tye was recruited from the Mayo Clinic as a Senior Research Fellow in Neuromodulation. Susannah will link closely with the deep brain stimulation expertise we have within our Asia Pacific Centre for Neuromodulation. Dr Zhaoyu Li joined us from the University of Michigan as the inaugural Bartlett Fellow, and will be part of a growing team of QBI researchers who use *Caenorhabditis elegans* as a model system. Dr Adam Walker joins us from Macquarie University as the new Ross Maclean Fellow and will boost our strength in motor neurone disease research. Finally, we also welcome Associate Professor Gail Robinson as a joint appointment with the School of Psychology. Gail brings expertise on the neurocognitive aspects of dementia and her work will complement the activities within CJCADR.

There were also significant developments in some of our larger strategic activities. Our partnership with the Southern University of Science and Technology (SUSTech), in Shenzhen, China, is progressing well in two respects: a joint program in Neuroengineering (also in collaboration with UQ's Faculty of Engineering, Architecture and Information Technology), and a joint neuroengineering laboratory. The two-part program will complement a relationship we have formed with Shenzhen's Bao'an District Hospital, which will provide training in deep brain stimulation surgeries to local surgeons and neurologists.

Another major strategic focus was to secure continued funding for the Clem Jones Centre for Ageing Dementia Research (CJCADR) and to raise capital for the development of an ultrasound-based device for the treatment of Alzheimer's disease. In its June Budget, the Queensland State Government committed $5 million towards this, followed by a $10 million pledge from the Federal Government. In a reversal of roles, we were also delighted this year to present Queensland Science Minister Leeanne Enoch with QBI's first commercial return from the Institute's activities. This was based on the development of a new drug candidate for motor neurone disease, work that Emeritus Professor Perry Bartlett and Emeritus Professor Andrew Boyd of UQ and QIMR Berghofer began over a decade ago.

2018 also saw continued improvements to our physical infrastructure. The breakthrough from the CJCADR space in the QBI building to Level 3 of the adjacent Ritchie building was completed, providing a walkway between these spaces. We also finalised the fitout of our clinical rooms in Ritchie, which include a Memory Clinic for testing patients with neurodegenerative disease, and a small room equipped for taking blood samples.

Finally, the International Research Review Board undertook their second visit to QBI in December, following an earlier trip in 2017. The IRRB has now reviewed all QBI faculty and have offered some well-considered recommendations that QBI will look to implement in the coming years. The timing of this is fortunate, as QBI is scheduled for its 7-year Academic Board Review in 2019. This is a great opportunity to reflect on all that the Institute has accomplished in recent years, but also to map a path that brings us even more success in the years ahead.

In closing, I wish to extend my thanks to UQ's Vice-Chancellor Professor Peter Høj and Provost Professor Aidan Byrne for their staunch support. I am also indebted to Mr Jeff Maclean and all other Advisory Board members for their wise counsel. Thanks also to my Deputy Directors: Professor Linda Richards (Research), Mr John Kelly (Strategy) and Ms Helen Weir and Ms Stephanie Surm (Operating; Helen to August, and Stephanie from August to year-end) for their commitment to the Institute. Helen has now taken up a senior management role at QUT, whilst John Kelly is retiring in early 2019 after a stellar 39 years of service to UQ. Last, but by no means least, my thanks go to all at QBI for your ongoing contributions to our successes. I am looking forward to another fantastic year of achievement in 2019!

Chair's message

2018 has been a year of significant milestones for QBI, which has been supported by the continuing work of the QBI Advisory Board in raising the profile of the Institute, and its cutting-edge research, to external audiences.

The Board has provided strategic advice to Professor Pankaj Sah and QBI's senior executive with the main goals being the future sustainability of the Institute, the commercialisation of research, and engagement with the community.

After three years as Director, Professor Sah is making his own mark on the future direction of QBI, including the appointment of a Deputy Director of External Engagement, who will drive the business growth and strategic planning of the Institute moving forward.

The Federal Health Minister's announcement of $10 million in funding for dementia research was an incredible achievement for UQ and QBI. This support, along with ongoing support from generous donors including the Clem Jones Foundation, the Brazil Family Foundation, McCusker Charitable Foundation and The Yulgilbar Foundation, as well as UQ and the Queensland State Government, is pivotal for this research to continue towards its goal of reducing the devastating effects of dementia.

The phase 1 trial, which is planned for 2020, will be a first-in-human safety trial of the ultrasound technique developed at QBI in 2015 for use in the fight against dementia, which currently has no effective treatments.

Another exciting step for QBI was the announcement of Emeritus Professor Perry Bartlett and Emeritus Professor Andrew Boyd's clinical safety trial for a potential drug candidate to slow the progress of motor neurone disease (MND), planned for mid-2019, which will have important implications for the future treatment of MND, spinal cord injury, as well as other neurological diseases. This is the culmination of over 20 years of research work.

The numerous other major discoveries for QBI during 2018 are too many to mention, but suffice to say progress in brain research is taking place on many fronts.

This year also saw the departure of several long-term, valued members of the QBI team. John Kelly, QBI's Deputy Director – Strategy, whose wealth of QBI knowledge is unsurpassed, retired after 39 years at UQ. John's significant contribution to the success of the Institute will be forever recognised, and I would like to personally thank John for his incredible service. Helen Weir, Deputy Director (Operations), left QBI after 12 years, taking on a new challenge. Mikaeli Costello, Director (Advancement), was promoted to Director (Alumni Relations) at UQ in December, moving on from QBI after seven years. Mikaeli has been integral in building QBI's philanthropic endeavours to the success that they are today. I thank her for her commitment and hard work and wish her the best in her new role.

Mr Jeff Maclean
Chair, QBI Advisory Board

I would like to thank all my fellow Board members for their hard work, especially Sallyanne Atkinson and Beverley Trivett, who have contributed enormously in providing introductions to key people in business, industry and government. Professor Aidan Byrne, UQ Provost, has also been a valuable member of the Board.

Our vision as a Board is to continue to increase community awareness of the world-class research taking place at QBI. I believe we have established a sound platform from which to build. QBI has some of the smartest minds working on the biggest issues facing humanity but our biggest obstacle is financial. In addition to securing funding through grants and donations for disease-focussed research, we also need to support blue-sky research. This will give our researchers the freedom to explore entirely new possibilities through curiosity-driven research and help people live longer, healthier and smarter lives.

We look forward to the challenges and opportunities that 2019 will bring.

QBI's 15 year anniversary

On October 20, over 250 guests descended upon Customs House to mark the 15th anniversary of the Queensland Brain Institute. The event was a chance to celebrate QBI's many achievements, reflect on the progress we are making towards understanding the mechanisms of brain function and how these fail in disorders of the brain, and importantly, to thank our many friends for their support.

On a wonderful night enhanced further by music from the Queensland Symphony Orchestra, and with a menu from acclaimed Brisbane chef Philip Johnson of e'cco *bistro*, attendees heard engaging speeches from Founding Director Professor Perry Bartlett, current Director Professor Pankaj Sah, and UQ Vice Chancellor Peter Høj. All were united in recognising the importance of QBI's network of supporters, including members of the public, Advisory Board members, the University, Government, and last but certainly not least, our generous donors. Indeed two of our donors, Janice Rushworth and Jeff Maclean, were kind enough to appear in tribute videos recounting the value they have received via their support for QBI.

The celebration was a great occasion to mark our progress and celebrate our achievements to date. What also became clear during the night, however, was that QBI is still very much on an upwards trajectory, with several clinical trials ongoing and exciting new partnerships developing. Despite our accomplishments, it is fair to say that we are "just getting started"

A neurosurgical milestone

A significant milestone was reached in 2018 by QBI's deep brain stimulation (DBS) team, which performed its 1000th DBS surgery. Professor Peter Silburn, a neurologist, and Associate Professor Terry Coyne, a neurosurgeon, have a longstanding partnership and have trained over 85% of Australian deep brain stimulation teams. They are both members of the Asia Pacific Centre for Neuromodulation (APCN), a joint initiative between QBI and St Andrew's War Memorial Hospital.

Deep brain stimulation involves using electrical stimulation of structures deep within the brain to modulate function and behaviour. Conditions characterised by movement abnormalities, such as Parkinson's disease and dystonia, have been treated by DBS for many years. More recently, the team has started trialling DBS for psychiatric conditions such as obsessive-compulsive disorder and anorexia.

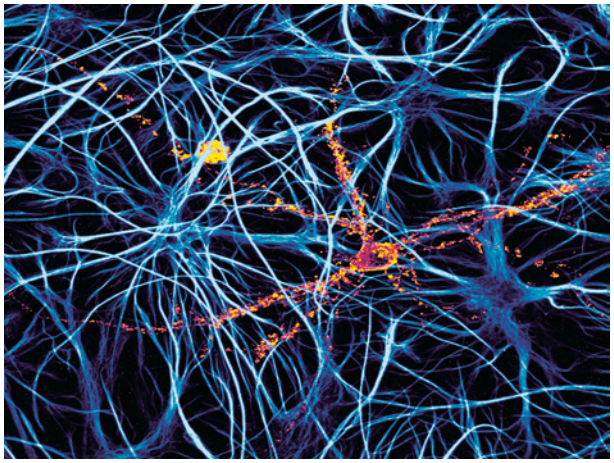
The highly intricate surgeries require extremely precise targeting of the electrode to small brain regions. This means that experience goes a long way in determining patient outcome.

Recently, the team has been collaborating with QBI researchers to make surgical targeting and assessment more accurate and more reliable. The hope is that instead of relying so much on the surgical team's experience and expertise, more objective markers of electrode location can be discovered.

Research highlights

A selection of QBI discoveries is highlighted below.

Newborn neurons in the amygdala

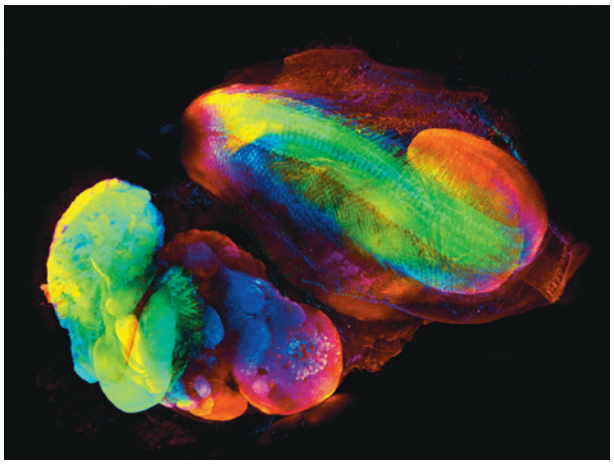


In an elegant joint study published in *Molecular Psychiatry*, members of the **Jhaveri**, **Bartlett** and **Sah** laboratories reported that the adult amygdala, an area of the brain playing a key role in emotional learning and memory, harbours a small number of neural precursor cells which are capable of generating new, functional neurons.

Dementia protein impairs mitochondria

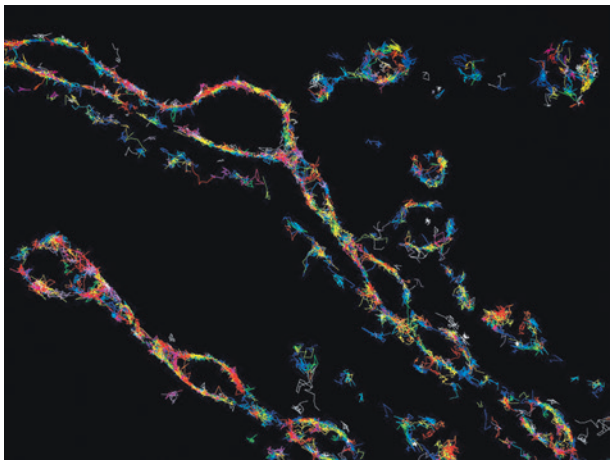
Nadia Cummins in the **Götz** Laboratory, together with **Dr Steven Zuryn's** team, revealed that the protein tau, which forms insoluble aggregates in Alzheimer's disease and frontotemporal dementia, impairs a vital function of mitochondria: the removal of damaged mitochondria by mitophagy. The laboratory has previously shown that other functions of mitochondria—oxidative phosphorylation, mitochondrial transport and mitochondrial dynamics (fission and fusion)—are also impaired by pathological forms of tau.

Crustaceans reveal retinal specialisations



The laboratory of **Professor Justin Marshall** provided the first description of the stomatopod lobula, which is a processing centre for visual information in stomatopod (mantis shrimp) crustaceans. The lobula is the third synaptic networks and integration centre beneath the retina and the study supported the idea that the stomatopod's highly divergent retinal morphology enables integration of colour, polarization and luminance information.

A high-resolution look at anaesthesia

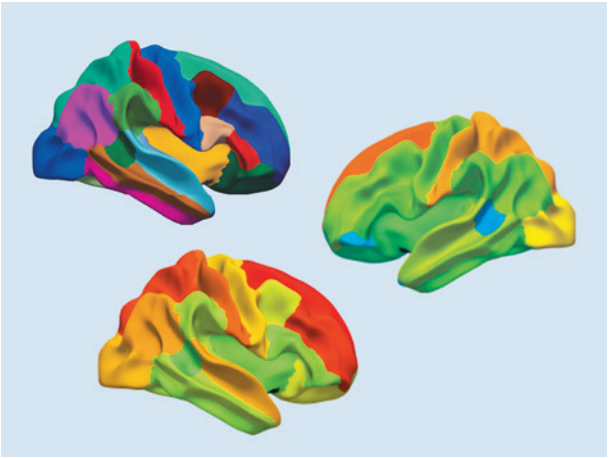


Associate Professor Bruno van Swinderen and colleagues demonstrated that Propofol, a commonly used general anaesthetic in humans, impairs neuro-transmitter release by interfering with a step in SNARE complex formation, resulting in non-functional syntaxin1A nanoclusters. This study was made possible through the use of QBI's single-particle tracking photoactivated localization microscopy (sptPALM).

Speedy fMRI increases scan resolution

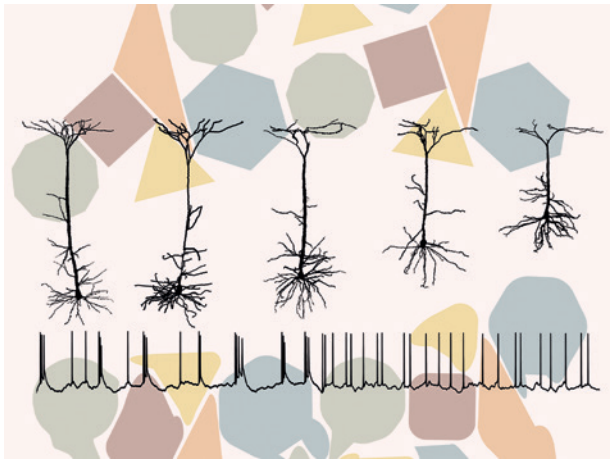
Dr Hsu-Lei Lee and **Associate Professor Kai-Hsiang Chuang** developed a novel technique that enables ultrafast functional magnetic resonance imaging of the rodent brain. The new technology can achieve whole brain imaging with nearly 100 ms temporal resolution without the need for a high density coil array. The high sampling increases the statistical power and enhances the detection of transient activity in the brain.

Twins reveal genetic link to brain regions



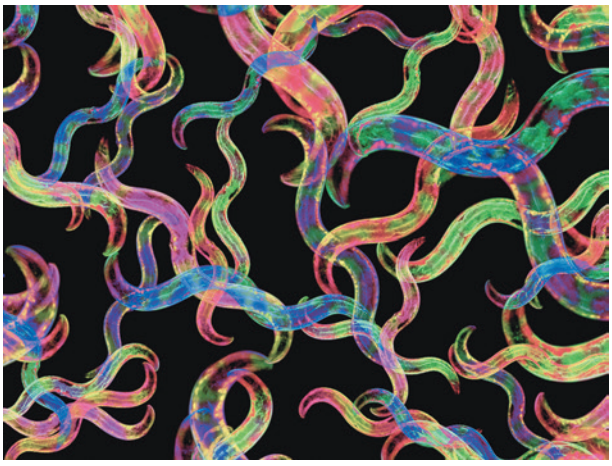
Using a large population sample of young adult twins, **Associate Professor Margie Wright** and her team demonstrated a complex pattern of genetically mediated inter-regional associations in the cortical structure of the brain. While the surface area of different brain regions was weakly associated, cortical thickness was strongly associated both within and across lobes, mostly due to genetic factors. The discovery that genetic factors are the dominant force behind the regional patterning across the cortex helps our understanding of the origins of normal and abnormal brain circuitry.

Form and function in cortical computations



Professor Stephen Williams and **Lee Fletcher** revealed an exquisite relationship between neocortical structure and neuronal computation. They further demonstrated that the cholinergic system controls the dendritic activity of Layer 5b pyramidal neurons by positively modulating dendritic excitability.

A new tool for analysing mitochondria



The mitochondrial genome is critical for life but is prone to mutation and molecular lesion, with mitochondrial DNA being linked to a range of chronic diseases and age-related neurodegenerative conditions. The **Zuryn** Laboratory's advances in isolating mitochondria from specific cells of diverse tissue systems in *Caenorhabditis elegans* showed that transmission of damage to the mitochondrial genome (mtDNA) across generations is restricted so that it does not accumulate. This work earned **Dr Arnaud Ahier** QBI's Best Postdoctoral Publication Prize (2018).

Commercialisation, clinical trials, and partnerships

QBI extended its collaboration in China with Bao'an Hospital in Shenzhen, with QBI researchers providing training and education to clinicians in Deep Brain Stimulation. With the award of a RMB 3 million (A$628,000) grant from the Shenzhen Government, this collaboration will continue on, with significant development occurring in 2018. In June 2018 QBI hosted Bao'an Hospital clinicians who specialise in deep brain stimulation, while QBI researchers and clinicians made several trips to Shenzhen to further develop this partnership.

QBI continues its relationship with leading global medical device developer Medtronic. In 2018, QBI clinicians Peter Silburn and Terry Coyne continued to enrol patients for a clinical trial in obsessive-compulsive disorder (OCD). The trial aims to identify electrophysiological biomarkers during deep brain stimulation of patients with treatment-resistant OCD.

Researchers at the Clem Jones Centre for Ageing Dementia Research are developing novel research tools to advance dementia research. One of these is an antibody against the protein tau, and can help detect late-stage pathology in tissue with Alzheimer's disease or fronto-temporal dementia. This antibody was licensed to Merck-Millipore in 2018, with QBI to share in the proceeds of commercialisation.

Takeda Pharmaceuticals, the largest pharmaceutical company in Asia, visited QBI in October to determine alignment with research in four separate QBI laboratories: Adam Walker (identifying targets against the TDP-43 protein in a mouse model of Motor Neurone Disease); Frederic Meunier (single-molecule tracking in nerve terminals in models of neurodegenerative disease); Rodrigo Medeiros (neuroinflammatory changes at onset of Alzheimer's disease and during disease progression); and Elizabeth Coulson (a peptide to block a cell death pathway implicated in a mouse model of Motor Neurone Disease).

Dr Fatima Nasrallah is working with members of the newly established Jamieson Trauma Institute to improve our understanding of traumatic brain injury. Dr Nasrallah is collaborating with clinicians in the Metro North Hospital service to enrol patients, collect blood samples, and identify blood- and brain-based biomarkers of concussion.

QBI continued to strengthen ties with the Southern University of Science and Technology (SUSTech) in Shenzhen. Complementing the PhD exchange arrangement established in 2017, QBI has worked with UQ's Faculty of Engineering, Architecture and Information Technology (EAIT) to create a joint neuroscience laboratory with SUSTech, including the appointment of new faculty in neuroengineering. In addition, QBI, EAIT and SUSTech are working to create a neural engineering stream within EAIT's Master of Engineering (Bioengineering); SUSTech students are already able to articulate their studies into this degree. These developments are likely to be finalised in 2019, strengthening QBI's presence in Shenzhen, China alongside the clinical training and education to be delivered in partnership with Bao'an Hospital (see above).

Awards, honours, and fellowships

A number of QBI staff received awards, honours and fellowships in recognition of their research. Professor Peter Visscher was elected as a Fellow of the UK Royal Society, a highly prestigious honour, while Dr Marta Garrido received the Young Investigator Award from the Australian Cognitive Neuroscience Society. Members of our IT team were also recognised for their work in developing UQ's research super-computing infrastructure.

Australian Cognitive Neuroscience Society

Dr Marta Garrido
Young Investigator Award [$1,000]

Australian Computer Society

Mr Jake Carroll and Mr Irek Porebski
Digital Disruptor Gold Award

Australian Institute of Policy and Science

Dr Sean Coakley
Young Tall Poppy Award [$10,000]

Australian Research Council

Dr Fanny de Busserolles
Discovery Early Career Researcher Award (DECRA) [$365,058]

Dr Alex Puckett
Discovery Early Career Researcher Award (DECRA) [$365,058]

Professor Peter Visscher
ARC Laureate Fellowship [$3,460,832]

Professor Jian Yang
ARC Future Fellowship [$918,125]

Brain and Behavior Research Foundation

Dr Rodrigo Suarez
NARSAD Young Investigator Award [$92,636]

Horizon 2020

Dr Kelly Garner
Marie Sklodowska-Curie Fellowship

Humboldt Foundation

Dr Odette Leiter
Feodor Lynen Research Fellowship

MND Victoria

Britt Berning
The Nina Buscombe Award

Dr Rebecca san Gil
The Nina Buscombe Award

National Health and Medical Research Council

Associate Professor Timothy Bredy
NHMRC Research Fellowship [$640,210]

The Royal Dutch Academy of Science

Professor Peter Visscher
Elected as Foreign Member of the Royal Dutch Academy of Science

The Royal Society

Professor Peter Visscher
Elected as Fellow of the Royal Society

The University of Queensland

Associate Professor Thomas Burne
UQ Award for Excellence in Research Higher Degree Supervision [$5,000]

Dr Xiang Li
UQ Development Fellowship [$171,914]

Dr Laura Fenlon
UQ Development Fellowship [$172,211]

Dr Zhitao Hu
UQ Foundation Research Excellence Award [$89,000]

Mr Jake Carroll
Vice-Chancellor's UQ Award for Excellence in Innovation [$5,000]

Westpac

Ms Esmi Zajaczkowski
Future Leaders Scholarship [$120,000]

Grants

2018 was another successful year for QBI in attracting competitive funding from the ARC and NHMRC. Success rates were once again well above the national averages for NHMRC Project Grants (34% vs. 17% national average) and ARC Discovery Project Grants (71% vs. 19% national average).

Australian Government

Endeavour Postgraduate Scholarship

Cooper Smout
[$10,000]

Australian Research Council

ARC Discovery Projects

Geoffrey Goodhill
Spontaneous activity and neural decoding in the developing brain [$536,390]

Kai-Hsiang Chuang, Patricio Opazo and Pankaj Sah
Brain connectome: from synapse, large-scale network to behaviour [$360,517]

Justin Marshall, Fabio Cortesi, John Endler, Karen Carleton and Martin Stevens
Unravelling reef fish vision through gene-editing and behavioural ecology [$550,496]

Marta Garrido, Naotsugu Tuchiya, Ueli Rutishauser and Ralph Adolphs
Multimodal testing for a fast subcortical route for salient visual stimuli [$414,792]

Timothy Bredy and Robert Spitale
Cell-type specific profiling of nascent RNA in the brain during learning [$406,550]

ANZ Trustee Mason Foundation

Medical and Scientific Research Grant: Alzheimer's disease

Rebecca Nisbet
Therapeutic treatment of tau transgenic mice with a novel N-terminal tau-specific monoclonal antibody [$64,800]

Elizabeth Coulson
Is reduced cerebral blood flow in Alzheimer's disease mediated by cholinergic neuron dysfunction? [$100,000. Awarded to and administered by the School of Biomedical Sciences]

Boston Scientific Pty Ltd

Investigator Sponsored Research Grant

Pankaj Sah and Warren Ward
Deep Brain Stimulation (DBS) of the nucleus accumbens for treatment-resistant severe and enduring anorexia nervosa: a phase 1 open trial [$1,105,316]

The CASS Foundation

Travel Grant

Jocelyn Widagdo
[$2,000]

CNGBio Corporation

Frederic Meunier
Neurotrophic effect of Lion's Mane mushroom and ginkgo leaf extract [$17,000.69]

Conservation Volunteers Australia

Diana Kleine
Funding to deliver activities for ReefBlitz 2018

Edmund and Lily Safra Center for Brain Sciences

Advanced PhD Student Travel Grant

Cong Wang

FightMND

Translational Research Grant-in-Aid

Perry Bartlett, Robert Henderson, Pamela McCombe, Andrew Boyd and Mike Gerometta
A novel ephrin receptor A4-Fc fusion protein for the treatment of MND [$1,000,000]

Ian Potter Foundation

Travel Grant

Merja Joensuu
Single molecule imaging of recycling synaptic vesicles in living nerve terminals by subdiffractional tracking of internalized molecules [$1,000]

Japan Neuroscience Society

Travel Award

Angelo Tedoldi
[$1,150]

MND Research Institute of Australia

PhD top-up Grant

Britt Berning
Sub-cellular dysfunctions associated with pathological TDP-43 in MND: disease mechanisms and therapeutic relevance

National Science Week

National Science Week Citizen Science Grant

Justin Marshall and Monique Grol
Corals in the outback - Sustainability tour [$16,000]

Queensland Emory Drug Discovery Initiative

Frederic Meunier
Selective PI3K-delta inhibition as a novel pharmacological target in Alzheimer Disease

QUEX Institute

Initiator Grant

Victor Anggono and Asami Oguro-Ando
Uncovering the role of an autism-associated gene in neurodegeneration [$15,000]

National Health and Medical Research Council

NHMRC Project Awards

Victor Anggono and Brett Collins
Regulation of glutamate receptor trafficking by the calcium- and lipid-binding protein, copine-6 [$548,590]

Timothy Bredy and Xiang Li
Novel DNA modifications underlying sex differences in fear-related learning and memory [$531,978]

Helen Cooper and Mike Piper
Aberrant ependymal development and the formation of hydrocephalus [$660,005]

Darryl Eyles, John McGrath and Andrew Whitehouse
Developmental Vitamin D-deficiency and Autism; exploration of potential mechanisms and refining phenotype in an animal model [$442,249]

Jürgen Götz and Liviu-Gabriel Bodea
Role of the microglial adaptor molecule TYROBP in Alzheimer's disease pathology [$462,952]

Jürgen Götz and Rebecca Nisbet
Exploring Scanning Ultrasound (SUS), a novel method to treat and prevent neurodegenerative disease [$765,708]

Massimo Hilliard
Identification and study of novel conserved molecule with an axonal protective function [$625,005]

James Kesby
Dopamine neuron ontogeny: convergent neurobiological pathway for risk factors of schizophrenia [$337,214]

Joseph Lynch and Nela Durisic
The effects of human epilepsy utations on synaptic GABA-A receptors studied by localization-based superresolution microscopy [$516,978]

Frederic Meunier, Bruno van Swinderen and Brett Collins
Unveiling the origin of Munc18-1 and alpha-synuclein co-aggregation at nanoscale [$620,005]

Stephen Williams and Elizabeth Coulson
A dendritic substrate for the cholinergic control of neocortical output [$898,340]

Sea World Research and Rescue Foundation Inc

Marine Vertebrate Grant

Justin Marshall, Betty Laglbauer, Fabio Cortesi, Fanny de Busserolles
How do manta and mobula rays see their world? [$25,987]

Simons Foundation Autism Research Initiative (SFARI)

Explorer Award

Geoffrey Goodhill
Neural circuit development in the Fragile X zebrafish [$456,911]

Australian Government Funding Scheme	QBI applications		
	Total	Awarded	Success Rate
NHMRC Projects	32	11	34% ^
ARC Discovery Projects	7	5	71% #

^ National Average: 16% # National Average: 19%

The University of Queensland

UQ Early Career Researcher Grant

Sean Coakley
Discovering molecular mechanisms that protect sensory neurons from mechanical damage [$30,000]

Fatima Nasrallah
Sports Concussion: Informing recovery by imaging the brain abnormality in a rodent model [$18,000]

Jocelyn Widagdo
Epitranscriptomic landscape in ageing and dementia [$18,000]

UQ Major Equipment And Infrastructure Grant

Pankaj Sah, Jürgen Götz, Thomas Burne, Fatima Nasrallah, Timothy Bredy, Dhanisha Jhaveri, Perry Bartlett, Kai-Hsiang Chuang, Linda Richards, Jana Vukovic and Daniel Blackmore
A specialised surgical and behavioural facility for longitudinal, multimodal examination of the rodent brain [$310,000]

UQ NHMRC Equipment Grant

Zhitao Hu, Zhaoyu Li, Massimo Hilliard, Steven Zuryn and Bruno van Swinderen
A multifunctional platform for monitoring and manipulating neural activities with freely behaving small animals [$67,440]

UQ Global Strategy and Partnerships Seed Funding Scheme

Susannah Tye
[$10,000]

US Office of Naval Research

Long Range Broad Agency Announcement for Navy and Marine Corps Science and Technology

Justin Marshall
NICOP - Bio-inspiration from a 400 million-year-old arms-race: Stomatopods v Cephalopods and the fight for visual system dominance [$155,627]

Justin Marshall
CSP - International Congress of Neuroethology 2018 [$13,635]

Yulgilbar Foundation

NNIDR International Early Career Researcher Travel Award

Alessandra Martini
Amyloid-beta impairs Tom1-mediated receptor internalization and promotes Alzheimer's disease progression [$2,200]

QBI Executive and Faculty

QBI Executive

Professor Pankaj Sah
Institute Director

Professor Linda Richards
Deputy Director (Research)

Mr John Kelly
Deputy Director (Strategic)

Ms Helen Weir
Deputy Director (Operations) until 7/9/18

Ms Stephanie Surm
Acting Deputy Director (Operations) remainder of 2018

QBI Faculty

Dr Victor Anggono
Synaptic neurobiology

Professor Perry Bartlett
Neurogenic regulation of cognition

Associate Professor Tim Bredy
Cognitive neuroepigenetics

Associate Professor Thomas Burne
Developmental neurobiology

Associate Professor Kai-Hsiang Chuang
Functional and molecular neuroimaging

Associate Professor Helen Cooper
Neural migration

Professor Elizabeth Coulson
Nerve cell survival

Associate Professor Terry Coyne
Neurosurgery and deep brain stimulation

Professor Ross Cunnington
Brain and action

Professor Barry Dickson
Locomotor circuits in *Drosophila*

Professor Darryl Eyles
Neurobiology of mental health

Professor Geoff Faulkner
Computational and molecular biology

Dr Marta Garrido
Computational cognitive neuroscience

Professor Geoffrey Goodhill
Computational, systems and developmental neuroscience

Professor Jürgen Götz
Basic neuroscience and ageing dementia

Associate Professor Massimo Hilliard
Molecular and cellular neurobiology

Dr Zhitao Hu
Neurotransmitter release

Dr Dhanisha Jhaveri
Cellular regulation of stress and depression

Professor Tianzi Jiang
Brainnetome and neuroimaging

Dr Zhaoyu Li
Neural circuits and behaviour

Professor Joseph Lynch
Molecular neuroscience

Professor Justin Marshall
Sensory neurobiology

Professor Jason Mattingley
Cognitive neuroscience

Professor John McGrath
Epidemiology and clinical trials

Dr Rodrigo Medeiros
Neurodegenerative diseases

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Single molecule neuroscience

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Complex trait and disease genomics

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Psychiatric genomics

Dr Fatima Nasrallah
Functional neuroimaging and brain injury

Professor Peter Nestor
Cognitive neurology

Dr Patricio Opazo
Synaptic memory

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Regenerative neurology

Professor Linda Richards
Brain development and disorders

Associate Professor Gail Robinson
Cognitive and clinical neuropsychology

Professor Pankaj Sah
Synaptic plasticity

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Professor Mandyam Srinivasan
Neuroscience of vision and aerial robotics

Dr Susannah Tye
Functional neuromodulation and novel therapeutics

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Cognitive and behavioural neuroscience

Professor Peter Visscher
Neurogenetics and statistical genomics

Dr Jana Vukovic
Neuroimmunology and cognition

Dr Adam Walker
Neurodegeneration pathobiology

Professor Stephen Williams
Synaptic integration in neural networks

Professor Naomi Wray
Neurogenetics and statistical genomics

Associate Professor Margie Wright
Imaging genomics

Professor Jian Yang
Neurogenetics and statistical genomics

Dr Steven Zuryn
Epigenetics and mitochondrial biology

QBI Students

There were a total of 88 Higher Degree by Research (HDR) students enrolled at QBI, which included 6 Master of Philosophy candidates. 11 HDR students graduated in 2018.

2018 Graduates

Asad Ali PhD
Principal advisor: Professor Darryl Eyles
Developmental vitamin D deficiency rat model of autism spectrum disorder

Suhailah Ali MPhil
Principal advisor: Professor Darryl Eyles
Maternal immune activation adversely affects the ontogeny of dopamine neurons: is vitamin D neuroprotective?

Adekunle Bademosi PhD
Principal advisor: Professor Frederic Meunier,
Control of neurotransmission by diffusional properties of a presynaptic plasma membrane protein: syntaxin1A

Brendan Bicknell PhD
Principal advisor: Professor Geoffrey Goodhill
Noise and sensitivity in cell signalling

Kok Siong Chen PhD
Principal advisor: Dr Jens Bunt
The role of nuclear factor I transcription factors in glioma

Nadia Cummins PhD
Principal advisor: Professor Jürgen Götz
The role of tau in mitochondrial dynamics and quality control

Kimberley Day MPhil
Principal advisor: Dr Dhanisha Jhaveri
Defining key structural and functional changes in the adult brain in a mouse model of depression

Anthony Harris PhD
Principal advisor: Professor Jason Mattingley
The role of neural oscillations in visual attention and awareness

Michael Hodges-Langford PhD
Principal advisor: Associate Professor Helen Cooper
Elucidating the role of Wnt signalling in choroid plexus development

Anne Maallo PhD
Principal advisor: Professor Geoffrey Goodhill
Neural correlates of visual function in agenesis of the corpus callosum

Jennifer Pavlides MPhil
Principal advisor: Dr Jacob Gratten
Integrating genome-wide association study data with gene expression to understand complex traits and common diseases

Roshini Randeniya MPhil
Principal advisor: Dr Marta Garrido
Structural and effective neural networks in schizotypy: in light of auditory prediction errors

Michelle Sanchez Vega PhD
Principal advisor: Associate Professor Thomas Burne
Effects of developmental vitamin D deficiency and prenatal exposure to ethanol on brain development and behaviour in mice

Despite only embarking on her PhD in 2018, **Esmi Zajaczkowski** (a student in Associate Professor Timothy Bredy's laboratory) has a long association with QBI. Aged just 14, she won the Queensland final of the Australian Brain Bee Challenge in 2010. In 2016, she was one of 6 students to enrol in QBI's MPhil (Neuroscience) program, during which she worked in the laboratories of Associate Professor Helen Cooper and Associate Professor Tim Bredy. After completing the MPhil in 2018, Esmi continued her research studies by commencing a PhD in the laboratory of Associate Professor Tim Bredy, where she is investigating the molecular basis of cognitive ability.

This year Esmi received a prestigious Westpac Future Leaders Scholarship. These highly competitive awards—only 17 were granted throughout Australia in 2018—provide up to $120,000 to help today's brightest young minds in technology and innovation with their postgraduate studies, while also developing their leadership skills.

Lachlan Strike PhD
Principal advisor: Associate Professor Margaret Wright
Examining the impact of genetic variation on the structure and function of the human brain

Michael Troup PhD
Principal advisor: Associate Professor Bruno van Swinderen
Mechanisms of sleep and general anaesthesia in Drosophila melanogaster: the unresponsive brain

Matthew Van De Poll MPhil
Principal advisor: Professor Geoffrey Goodhill
Investigating the links between spontaneous activity and behaviour in the zebrafish optic tectum

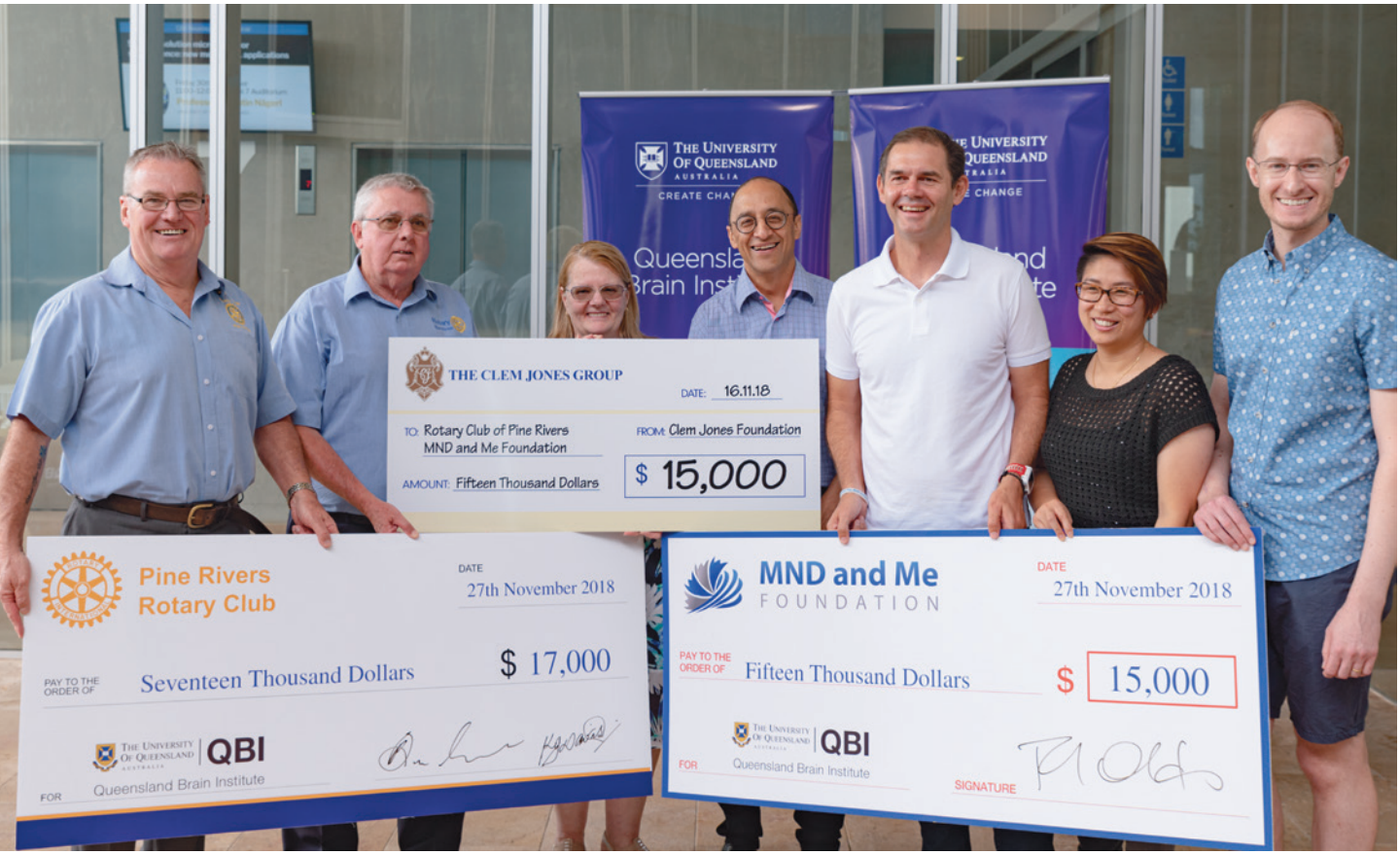
Michelle Watts PhD
Principal advisor: Professor Charles Claudianos
Hypoxia-regulated MicroRNA-210 in neuronal plasticity

Lisa Wittenhagen PhD
Principal advisor: Professor Jason Mattingley
The influence of selective attention on modal completion in the human visual system

Shanzhi Yan PhD
Principal advisor: Professor Pankaj Sah
NMDA receptors in the neural circuit underlying fear learning

Esmi Zajaczkowski MPhil
Principal advisor: Associate Professor Tim Bredy
Developing novel approaches toward spatiotemporally-controlled capture of nascent RNA in neurons

Philanthropy



Professor Pankaj Sah receives donations for research on motor neurone disease.

QBI received a total of $7,667,739 from 860 donors in 2018. We continue to work hard to meet the expectations of our donors and are grateful for their support.

Impact of Philanthropy

Philanthropic donations play a vital role in helping our scientists accelerate their research into new ideas and innovations, allowing them to make ground-breaking discoveries and ultimately, improve lives.

Our scientists are focused on answering fundamental science questions related to how the brain functions. This research can then be adapted to discover treatments to fight some of the most challenging diseases our society is facing including dementia, motor neurone disease (MND), stroke, Parkinson's disease, depression, anxiety and schizophrenia.

Your generosity is important to us and helps us address unmet needs—supporting young researchers; backing early stage, high-risk, high-reward projects; and as seed funding to secure government support for larger initiatives and research centres. The support of loyal donors assists QBI to have a large impact on health, wellbeing and society through the cultivation of the next generation of scientists and innovators.

Thank you for your belief in and support of our work.

How to support the Queensland Brain Institute:

Donations

There are many ways in which you can help support QBI's research effort, including:

- Make a donation for a specific research area
- Purchase scientific equipment
- Fund scholarships for talented students
- Provide fellowships for early- to mid-career scientists
- Support Professorial Chairs
- Undertake laboratory dedications
- Provide gifts in memoriam
- Fundraise using the community fundraising platform Everyday Hero

Bequests

By leaving a bequest to QBI in your will, you are leaving a lasting legacy that accelerates current research and preserves future projects. Bequests can include:

- A percentage of an estate
- The residuary of an estate (what remains after all other gifts and costs have been deducted)
- A gift of a specific sum of money
- A particular asset, such as property, works of art, shares, or an insurance policy

Under current legislation, gifts to the Queensland Brain Institute are tax deductible. To discuss how you can support the Institute, please contact us at:

Telephone: **+61 7 3346 6413**
Email: **communications@qbi.uq.edu.au**
Website: **www.qbi.uq.edu.au/donate**

Donors to QBI in 2018

A sincere thank you to ALL our donors, including those who prefer to remain anonymous.

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QBI expresses its sincere appreciation for the charitable bequests received from the following estates in 2018.

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Alastair's legacy continues

Following the loss of her husband Alastair to early-onset Alzheimer's disease in 2016, Janice Rushworth, friends and supporters, raised over $39,0000 in 2018 to support PhD candidate Joseph Benetatos, a member of Professor Jürgen Götz's laboratory in the Clem Jones Centre for Ageing Dementia Research. In October 2018, Janice continued Alastair's legacy, taking on the beautiful Three Capes Track in Tasmania with the goal of raising a further $26,000 (the annual amount of a PhD scholarship) to support of Joey.

Janice felt compelled to support Alzheimer's research after seeing how the disease affected her husband Alastair. A practical, outward-looking person, he gradually lost the personality that gave him identity and the independence that gave him dignity. Recalling the point of Alastair's diagnosis, Janice laments the inability of herself and medical staff to do anything to help him.

Despite researchers' best efforts, there remains no treatment or cure for dementia, which is the second leading cause of death in Australia, the leading cause of death for Australian women, and a disease that affects almost one in 10 people over the age of 65. QBI researchers like Joey are working towards potential breakthroughs, offering hope to millions of people around the world.

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Public engagement

Jason Rebello (L) and Professor Geoff Goodhill (R) performing at the Jazzing up the Brain event, which combined music and neuroscience.

QBI once again ran a host of events in 2018 to engage the public in our research, to spread knowledge of the importance of brain research, to inform them of our own research, and to develop a sense of connection to our scientists.

We continued our popular Breakfast Series, in which QBI scientists engage with key supporters, influencers, community groups, not for profits and corporations through informative, interactive research lectures. Five breakfasts were held this year, covering Parkinson's disease, Motor Neurone Disease, Learning and Memory, Stroke, and Dementia.

In April we held a somewhat unique event, with world-renowned jazz pianist Jason Rebello visiting QBI to perform in the Institute auditorium, with Professor Geoff Goodhill discussing the neuroscience of music, creativity and improvisation. The free event proved extremely popular with local musicians as well as scientists.

QBI also continued its strong association with the Australian Brain Bee Challenge, hosting the Queensland Finals in July. The Australian Brain Bee Challenge is a competition for year 10 students that encourages them to learn about the brain and neuroscience research, and to find out about careers in neuroscience. Founded in 2006 by QBI's Deputy Director (Research), Professor Linda Richards, and with the Queensland event coordinated this year by Associate Professor Bruno van Swinderen, the event saw 138 students from 43 Queensland schools visit QBI. With some of the state's brightest mind in attendance, and with previous winners subsequently undertaking their graduate studies at QBI, the event is a fantastic opportunity to advertise the value of brain research to the next generation of neuroscientists.

Our major public lectures for 2018, the Peter Goodenough Memorial Lecture and the Merson Lecture, were delivered by some of the most eminent scientists in Australia and beyond. In August, the Peter Goodenough Memorial Lecture was given by UQ Professor Ian Frazer, who spoke about his journey in developing the cervical cancer vaccine Gardasil. In October, 2018 Australian of the Year Professor Michelle Simmons delivered the Merson Lecture, speaking about the promises and pitfalls of quantum computing, on which she is a world authority. QBI is grateful to have had two speakers of such outstanding calibre deliver its major public lectures for the year.

QBI also hosted numerous tours for donors, school groups and interested members of the public, and provided speakers to various community events throughout the year.

Named Lectures

Peter Goodenough Memorial Lecture
Professor Ian Frazer
The University of Queensland
9 August

Merson Lecture
Professor Michelle Simmons
University of New South Wales
24 October

Community events and talks

Carers Australia talk
27 February

Palm Beach Currumbin High School talk
3 March

Rotary club of Ashgrove talk
7 March

International Women's Day panel discussion
8 March

Parkinson's disease and movement disorders information session for patients and carers
10 March

Public forum and continuing professional development seminar for teachers
17 March

Lions Club of Camp Hill Carindale talk
26 March

Jazzing up the Brain musical performance
10 April

Parkinson's disease research breakfast
12 April

Brisbane Orthopaedic Network Education Services (BONES) education seminar
18 April

Motor neurone disease awareness breakfast
9 May

Ross Maclean Fellowship Raceday
19 May

Brisbane Metropolitan Lions Club talk
7 June

Probus Club of St Lucia talk
7 June

Brisbane Girls Grammar School Medical Research panel discussion
13 June

Probus Club of Chapel Hill talk
19 June

U3A Winter School talk
9 July

Australian Brain Bee Challenge
18 and 24 July (QLD finals)

Clem Jones Centre for Ageing Dementia Research public dementia forum
31 July

Learning and memory research breakfast
8 August

Redlands U3A talk
22 August

Stroke research breakfast
6 September

Brisbane Girls Grammar School year 12 address
18 September

Dementia research breakfast
19 September

St Lucia East club talk
20 September

St Margaret's Professional Women's Network talk
18 October

QBI 15 Year Anniversary Dinner
20 October

Churchie Cricket Luncheon
21 November

Research tours of QBI

National Youth Science Forum
11 and 17 January

BICARE Foundation and friends
8 February

UQ alumni
15 February

Probus Club of Indooroopilly
13 March

Probus Club of Carseldine
20 March

Probus Club of Salisbury East
20 March

St Peters Lutheran College
4 May

Elston Financial Solutions
29 May

Probus Club of Indooroopilly West
21 June

QBI donors
27 June and 31 August

Patheon Biologics
20 September

The Royal Australian Chemical Institute
29 October

White Label Noba
14 November

Brisbane Girls Grammar School Old Girls Association
20 November

Brisbane Boys' College
26 November

Scientific seminars & symposia

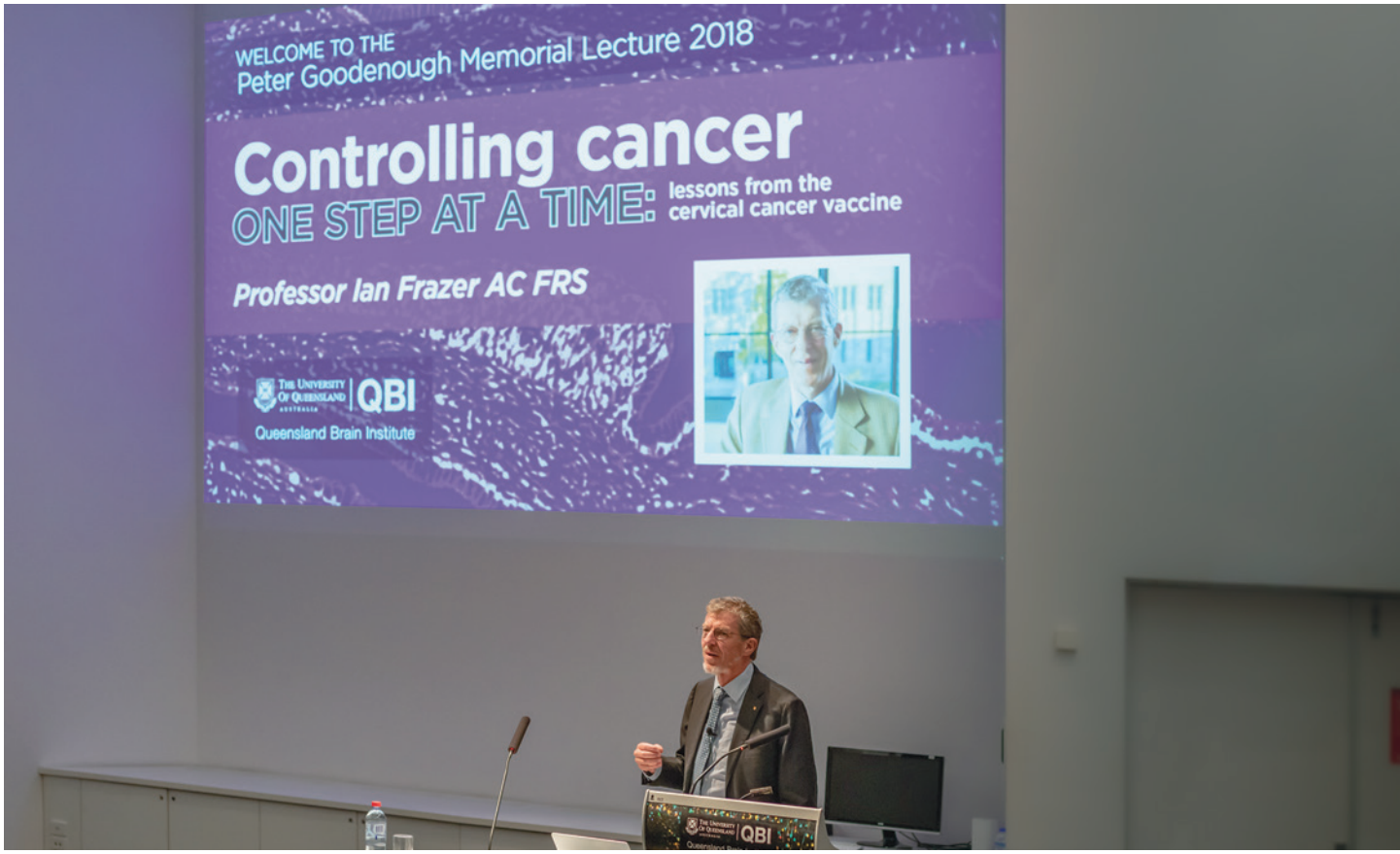
Speakers at the 3rd Symposium on Frontiers in Spinal Cord Injury

The QBI Weekly Seminar Series ran once again throughout 2018, providing staff and students the opportunity to hear the latest research from colleagues within QBI as well as from national and international peers. The seminars play a major role in advancing neuroscience in the Asia-Pacific region, promoting excellence through the exchange of ideas, establishing new collaborations, and augmenting existing partnerships. Highlights of the year include a lecture from Professor Florian Engert (Harvard University) on decision making in zebrafish, Professor Nicholas Turk-Browne's (Yale) lecture on statistical learning in the hippocampus, and insights into paediatric brain tumours from Professor Marcel Kool of the German Cancer Research Center. In August, the Institute also hosted the 3rd symposium on Frontiers in Spinal Cord Injury Research, which included speakers from Ohio State University, Oxford University, the Karolinska Institute in Sweden, and various Australian institutions.

QBI-hosted symposia

Joint QBI-LMU Munich Center for Neurosciences Symposium
13 July

3rd Symposium on Frontiers in Spinal Cord Injury Research
24 August



Professor Ian Frazer AC FRS gives the 2018 Peter Goodenough Memorial Lecture

QBI Neuroscience Seminars

Dr Rachel Templin
Queensland Brain Institute, The University of Queensland
Circular polarization vision in stomatopod crustaceans

Professor Josh Kaplan
Harvard University
From compost to the clinic: using C. elegans to study psychiatric disorders

Professor Mike Cousin
Edinburgh University
Activity-dependent bulk endocytosis: presynaptic function and dysfunction in Huntinton's disease

Dr Lin Kooi Ong
University of Newcastle
Modulating the trajectory of brain recovery after stroke from bench to bedside

Professor Dame Linda Partridge
Max Planck Institute for Biology of Ageing
The ageing fly nervous system

Shanzhi Yan
Queensland Brain Institute, The University of Queensland
NMDA receptors in the neural circuit underlying fear learning

Assistant Professor Sajikumar Sreedharan
National University of Singapore
The p75 neurotrophin receptor is a necessary mediator of synaptic and behavioral changes induced by sleep deprivation

Casey Linton
Queensland Brain Institute, The University of Queensland
Function and regulation of the fusogen EFF-1 during axonal repair

Associate Professor Ethan Scott
The University of Queensland
Whole-brain imaging of sensory processing in larval zebrafish

Professor Marcel Kool
German Cancer Research Center
Molecular characterization of pediatric brain tumors and preclinical models

Adekunle Bademosi
Queensland Brain Institute, The University of Queensland
Lateral trapping of syntaxin1A in nanodomains: key to neuroexocytosis?

YeJin Chai
Queensland Brain Institute, The University of Queensland
A highly Munc18-ocentric Hitchhiker's Guide to the Galaxy

Dr Nathalie Dehorter
Australian National University
Molecular control of interneuron identity

Associate Professor Adam Vogel
University of Melbourne
Who cares about speech and what can it tell us?

QBI Neuroscience Seminars (continued)

Katie Drummond
Florey Neuroscience Institute of Mental Health
Influence of psychological stress on fear extinction during development

Dr Tara Walker
Center for Regenerative Therapies, Germany
Cell death in adult hippocampal neurogenesis is ferroptotic and rescued by selenium

Dr Asami Oguro-Ando
University of Exeter
CNTN4, a candidate gene for autism spectrum disorders, affects hippocampal neuronal function and behaviour

Suhailah Ali
Queensland Brain Institute, The University of Queensland
Maternal immune activation adversely affects the ontogeny of dopamine neurons. Is vitamin D neuroprotective?

Professor Jonathon Howard
Yale University
Dendritic branching morphogenesis: motors and cytoskeleton

Marge Maallo
Queensland Brain Institute, The University of Queensland
Neural correlates of visual function in agenesis of the corpus callosum

Professor Anthony Hannan
University of Melbourne
Gene-environment interactions mediating experience-dependent plasticity in the healthy and diseased brain

Asad Amanat Ali
Queensland Brain Institute, The University of Queensland
Developmental vitamin D deficiency rat model of autism spectrum disorder

Dr Michael Hodges-Langford
Queensland Brain Institute, The University of Queensland
WNT signaling in choroid plexus development

Dr Alice Stamatakis
Inscopix
Catalyzing discovery through next generation miniature microscopes for circuit neuroscience

Dr Alessandra Martini
University of California, Irvine
Amyloid-beta impairs interleukin-1β signaling: impact on Alzheimer's disease

Professor Richard Gronostajski
State University of New York
NFI genes in CNS development

Professor Elizabeth Coulson
School of Biomedical Sciences and Queensland Brain Institute, The University of Queensland
The cholinergic basal forebrain and Alzheimer's disease: from obstructive sleep apnoea to the p75 neurotrophin receptor

Assistant Professor Mathew Blurton-Jones
University of California, Irvine
Using human iPSC-derived microglia and chimeric mouse models to study Alzheimer's disease

Professor Margaret McCarthy
University of Maryland
Microglia, maleness and marijuana: how endocannabinoids sculpt brain sex differences

Jessica McFadyen
Queensland Brain Institute, The University of Queensland
Shortcuts for fear, conscious perception, and surprise in hierarchical visual systems

Dr Karly Turner
University of Cambridge
Shifting roles of the dorsal striatum in action sequence learning

Dr Eric Kim
Northeastern University
Cortical pathology of Huntington's disease in the human brain & nanoparticle-based sensors for neurobiology

Professor Florian Engert
Harvard University
Neuronal mechanisms of evidence accumulation and decision making in the larval zebrafish

Professor Ian Frazer
The University of Queensland
Controlling cancer one step at a time: lessons from the cervical cancer vaccine (Peter Goodenough Memorial Lecture)

Professor Jianyuan Sun
Institute of Biophysics, Chinese Academy of Sciences
Quantal transmission at single central synapses displays large variation in size with subunit

Associate Professor Gail Robinson
Queensland Brain Institute, The University of Queensland
Frontal lobe functions in health and disease: evidence from neuropsychology

Professor Bryan Mowry
Queensland Brain Institute, The University of Queensland
Genetic analyses of schizophrenia in Tamil Nadu, India

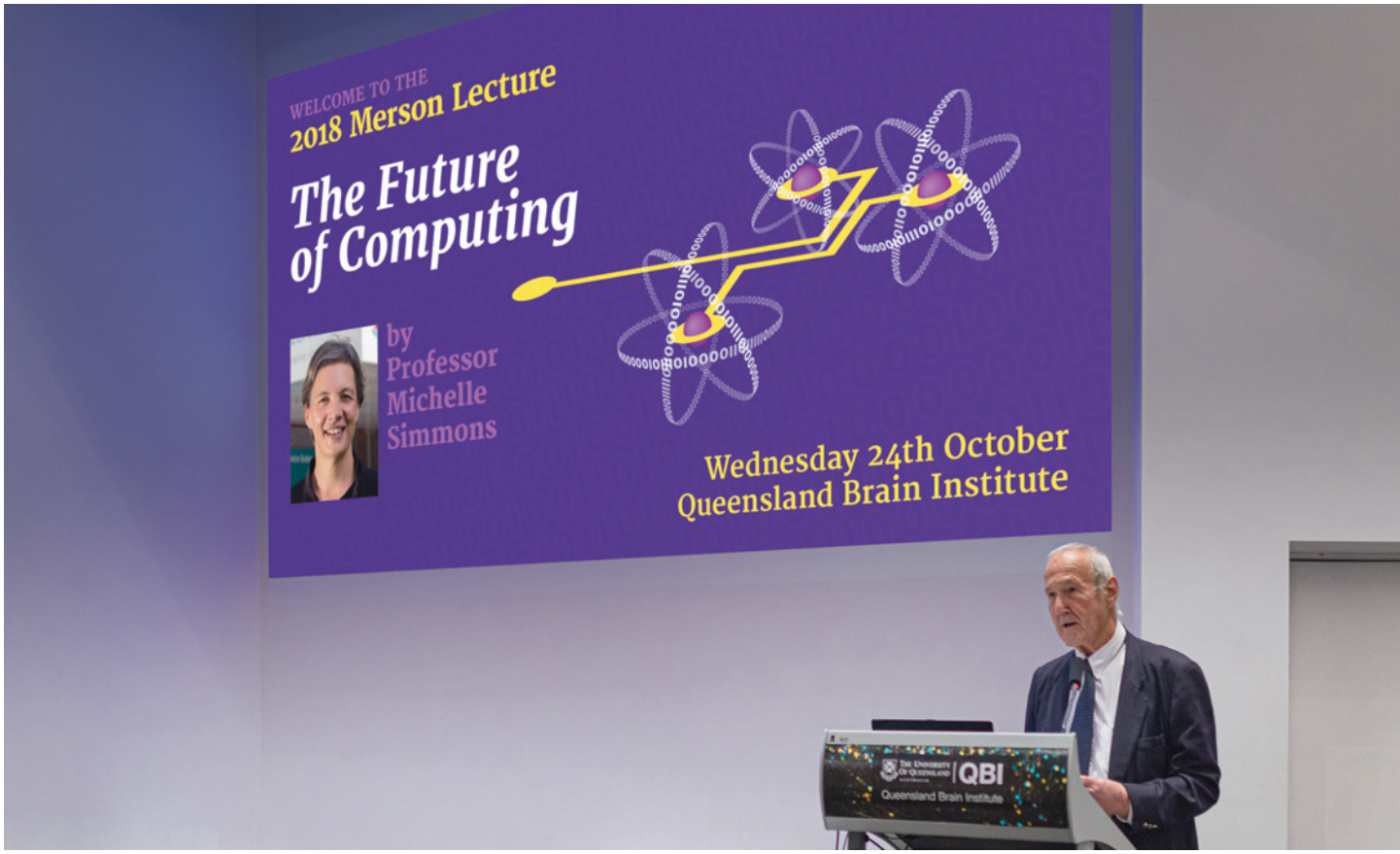
Professor Jian Yang
Institute for Molecular Bioscience and Queensland Brain Institute, The University of Queensland
Finding genetic and modifiable risk factors for common diseases

Dr Frank Jacobs
University of Amsterdam
Human-specific NOTCH2NL genes: possible contributors to human's evolutionary increase in brain size

Dr Yee Lian Chew
MRC Laboratory of Molecular Biology, UK
How a worm thinks: lessons from C. elegans neuropeptide signalling

Associate Professor Andrew Crowden
The University of Queensland
Neuroethics: the ethics of neuroscience and the neuroscience of ethics

Sandrine Kingston-Ducrot and Dr Rebecca Deuble
The University of Queensland
UQ Research Data Manager Presentation



Dr David Merson introduces the 2018 Merson Lecture by Professor Michelle Simmons

Professor Brandon Wainwright
The University of Queensland
Diseases of the cerebellum: genomics drives new therapeutic paradigms

Professor Darryl Eyles
Queensland Brain Institute, The University of Queensland
The troubled journey of a dopamine neuron towards psychosis

Dr Susannah Tye
Queensland Brain Institute, The University of Queensland
Insulin signaling moderates the rapid antidepressant actions of ketamine in treatment resistant depression

Professor Michelle Simmons
University of New South Wales
The future of computing (Merson Lecture)

Professor Urs Meyer
University of Zurich
Epigenetic and transgenerational mechanisms in immune-mediated neurodevelopmental disorders

Professor Geraint Rees
University College London
The conscious phenotype

Professor Peter Visscher
Institute for Molecular Bioscience and Queensland Brain Institute, The University of Queensland
The genetics of educational attainment

Professor Sylvain Baillet
McGill University
Perception as prediction: network architectures of brain perceptual inferences

Professor Matthew Lambon-Ralph
University of Cambridge
Semantic representation and its disorders

Professor Nicholas Turk-Browne
Yale University
Statistical learning in the hippocampus

Dr Shankar Sachidhanandam
University of Bern
Neural dynamics of sensory perception and decision making in the mouse posterior parietal cortex

Adjunct Professor Pirta Hotulainen
University of Helsinki
Vital role of the tropomyosin decorated actin filaments in the structure and function of the axon initial segment

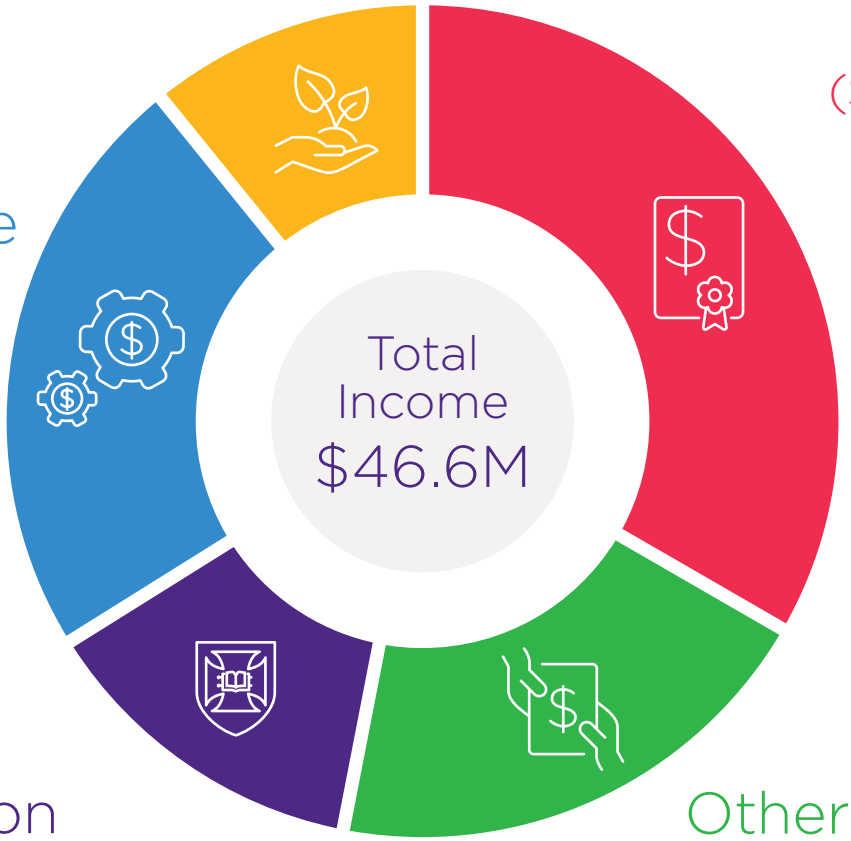
Professor Valentin Nägerl
The Institute for Interdisciplinary Neuroscience, University of Bordeaux
Super-resolution microscopy for neuroscience: new methods & applications

Funding and income

Philanthropy
($5.1M)^

Australian Competitive Grants
($15.5M)#

Other Revenue
($10.7M)*



UQ Allocation
($6.1M)^

Other Grants
($9.2M)#
Government, industry and not-for-profit organisations

Amount allocated for 2018

^ Amount received in 2018

* Includes: Commonwealth Research Block Grant; tuition fees; scholarships; commercial services, fees & charges; and other operating income

Publications

QBI researchers have contributed to the following publications. Some publications appeared as electronic publications in 2018 ahead of print but are now available in print in 2019.

Acosta-Cabronero J, Machts J, *et al* (2018) Quantitative susceptibility MRI to detect brain iron in amyotrophic lateral sclerosis. *Radiology* 289: 195-203.

Agosta F, Altomare D, *et al* (2018) Clinical utility of FDG-PET in amyotrophic lateral sclerosis and Huntington's disease. *European Journal of Nuclear Medicine and Molecular Imaging* 45: 1546-1556.

Al-Amin M, Bradford D, *et al* (2019) Vitamin D deficiency is associated with reduced hippocampal volume and disrupted structural connectivity in patients with mild cognitive impairment. *Human Brain Mapping* 40: 394-406.

Ali A, Cui X, *et al* (2018) The placental immune response is dysregulated developmentally vitamin D deficient rats: Relevance to Autism. *Journal of Steroid Biochemistry and Molecular Biology* 180: 73-80.

Alonso J, Saha S, *et al* (2018) The association between psychotic experiences and health-related quality of life: a cross-national analysis based on World Mental Health Surveys. *Schizophrenia Research* 201: 46-53.

Altshuler DL & Srinivasan MV (2018) Comparison of visually guided flight in insects and birds. *Frontiers in Neuroscience* 12: 157.

Alvares GA, Dawson PA, *et al* (2018) Study protocol for the Australian autism biobank: An international resource to advance autism discovery research. *BMC Pediatrics* 18: 284.

Anttila V, Bulik-Sullivan B, *et al* (2018) Analysis of shared heritability in common disorders of the brain. *Science* 360: eaap8757.

Arbizu J, Festari C, *et al* (2018) Clinical utility of FDG-PET for the clinical diagnosis in MCI. *European Journal of Nuclear Medicine and Molecular Imaging* 45: 1497-1508.

Armstrong SD, Sale MV, *et al* (2018) Neural oscillations and the initiation of voluntary movement. *Frontiers in Psychology* 9: 2509.

Arnau-Soler A, Adams MJ, *et al* (2018) Genome-wide interaction study of a proxy for stress-sensitivity and its prediction of major depressive disorder. *PLOS ONE* 13: e0209160.

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Bauer AE, Maegbaek ML, *et al* (2018) Familiality of psychiatric disorders and risk of postpartum psychiatric episodes: A population-based cohort study. *American Journal of Psychiatry* 175: 783-791.

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