2017 was another year of strong achievement in our research output, as reflected in the number and quality of our peer-reviewed publications in leading scientific journals, and our grant success in both the NHMRC Project Grant and the ARC Discovery Project schemes. It was particularly pleasing that many of our younger recruits obtained grant funding.

QBI's clinical links were strengthened through a joint appointment with Mater Neuroscience; Professor Peter Nestor, a clinical neurologist from the German Center for Neurodegenerative Diseases, started in October. Refurbishment of the Ritchie building occurred during much of the year, and a number of Faculty have moved across into the new space; the breakthrough from the Clem Jones Centre for Ageing Dementia Research (CJCADR) into the Ritchie building on Level 3 is also complete, and seamlessly links the two buildings. This space forms a visible clinical interface for QBI, and will include a Memory Clinic for testing patients with neurodegenerative diseases.

In August, QBI hosted the first official visit of the newly appointed International Research Review Board. Half of the Faculty were reviewed, and the research focus, current and future, of the Institute was reviewed. The remaining half are also scheduled for review in December 2018. The initial Report was very supportive, and noted that the breadth of neuroscience research was impressive, and that QBI is a world-leading Institute that enjoys high international visibility. Recommendations outlined in the Report will be examined in detail over the coming year.

Professor Pankaj Sah
Director, Queensland Brain Institute
Research highlights

There were several major research discoveries in 2017, as well as the progression of a number of research outcomes towards commercialisation.

Professor Jürgen Götz and Dr Rebecca Nisbet have found that ultrasound can enhance the effectiveness of an immunotherapeutic in a mouse model of Alzheimer’s disease. Following the 2015 discovery that ultrasound by itself could improve Alzheimer’s pathology in mice, the latest research adds another powerful tool to our fight against dementia: ultrasound as an adjunct therapy to improve the delivery of therapeutics for brain disorders.

Dr Fatima Nasrallah began a groundbreaking concussion study that aims to detect brain changes following a concussion. The study will recruit healthy athletes for brain scans with follow-up at regular intervals if they experience concussion. Dr Nasrallah says that identifying early brain changes following concussion will help researchers know how long the brain requires to rest and heal. The study follows the 2016 launch of QBI’s #nobrainnogame campaign to fund research into concussion.

Dr Marcin Kielar developed an optical force sensor with Professor Pankaj Sah, thus creating a new human-machine interface based on organic electronics. This innovative, modern day technology can convert conventional plastic or glass into smart surfaces. The original pressure sensor is based on organic light-emitting diodes and organic photodetectors and pressure sensing is achieved through changes in light intensity.

QBI’s Senior IT Manager Mr Jake Carroll has played a key role in procuring a powerful supercomputer for brain research at UQ. The supercomputer, expected to be operational by February 2018, will help process the extremely high-resolution images captured with state-of-the-art microscopes. Neuroscience research today produces huge amounts of data, and leading-edge computing infrastructure is essential for enabling researchers to do their job.
Professor Linda Richards has found a common developmental brain disorder may be linked to a condition in which people involuntarily mirror movements in opposing limbs. Professor Richards and her group found that mutations in the DCC gene produced a developmental condition known as agenesis of the corpus callosum, which results in a partial or complete absence of nerve fibres connecting the right and left sides of the brain. The same gene is implicated in mirror movement disorder.

Dr Marta Garrido and colleagues at The University of Queensland, the University of Newcastle, and University College London have found a biomarker with the potential to reduce the rate of misdiagnosis in schizophrenia, which is currently estimated to be around 10 per cent. The team will study the use of this technique in people at risk of developing a mental disorder to try and predict how likely they are to develop schizophrenia.

Professor Mandym (Srini) Srinivasan’s work into the flight preferences of honeybees has shown bees have individual biases toward flying left or right through obstacles, and the discovery could lead to strategies for steering drone aircraft fleets. This work has continued from research funded by the ARC Linkage Projects and in collaboration with QUT and Boeing Defence Australia Ltd.

Building on work from 2016, Professor Darryl Eyles found that vitamin D plays an important role in the development and prevention of autism. Giving vitamin D supplements to mice during pregnancy completely prevented autism traits in their offspring. The discovery provides further evidence of the crucial role vitamin D plays in brain development and could have potential implication for future therapeutics.
Clinical trials

**Cadence BZ trial**
This trial aims to determine whether a common food preservative, sodium benzoate, can assist psychosis recovery.

**Cadence M trial**
This trial will test whether rind from the tropical fruit mangosteen might help in the treatment of schizophrenia.

**Exercise/Cognition trial**
This study aims to establish exercise guidelines for the elderly that will help prevent or even reverse cognitive decline. The trial is being run in collaboration with UQ’s School of Human Movement and Nutrition Sciences.

**OCD/DBS trial**
Run in conjunction with the Asia-Pacific Centre for Neuromodulation, this will test the effectiveness of deep brain stimulation in treating severe obsessive-compulsive disorder.

**MND trial**
This trial will test whether a drug, which blocks the effects of the protein EphA4, can prevent the progression of motor neurone disease. The EphA4 protein ordinarily prevents regrowth of nerves; blocking the protein has the potential to remove the brakes from the repair process.
Partnerships

QBI continued to develop a number of key strategic research collaborations with Australian and overseas research partners, and national or global businesses, including several new collaborations for 2017, whilst maintaining a number of existing, strategic collaborations.

QBI entered into 82 research collaborations including visiting academic arrangements, collaborative research or research services, and clinical trial agreements. The key collaborations are as follows:

QBI continued to work with Boston Scientific, a medical device company, in relation to conducting new research at the Asia-Pacific Centre for Neuromodulation.

Professor Perry Bartlett’s team is working with NuNerve Pty Ltd to progress the EphA4fc potential therapeutic to clinical trial.

QBI assisted in developing UQ’s collaboration with the Southern University of Science and Technology (SUSTech) University in Shenzhen, through the signing of a further agreement around the exchange of PhD students between UQ and SUSTech.

QBI-IT commenced development and deployment of the world first ‘Wiener’ deconvolution supercomputing facility with HPC. This work, done in collaboration with UQ’s research institutes and the RCC, will produce a supercomputer optimised for processing the super high-resolution images needed in neuroscience.

QBI extended its collaboration in China with the Bao’an People’s Hospital in Shenzhen, with QBI researchers providing training and education to clinicians in Deep Brain Stimulation.

QBI has significant support in the concussion area of research, to support Dr Nasrallah’s study into concussion.

QBI entered into a major industry project, establishing an umbrella research agreement to engage Hydrix Engineering Pty Ltd to develop a prototype ultrasound medical device for treating dementia.

Professor Fred Meunier’s work with Korean company CNGBio to establish the neurotrophic effect of the combined Ginseng and Lion’s mane mushroom extracts.
Grants

QBI had a particularly successful year in being awarded competitive funding in both the ARC and NHMRC grant rounds, with a success rate of 46.9% for NHMRC Project Grants (national average 15.2%) and 33.3% for ARC Discovery Projects (national average 17.8%).

Alzheimer's Research (UK)
Target Validation Pathfinder Grant
Elizabeth Coulson [administered by UQ SBMS]

Australian Research Council
ARC Discovery Projects
Victor Anggono
Regulation of synaptic vesicle endocytosis by membrane-sensing proteins
Geoffrey Goodhill
Advanced statistical methods for analysing maps in the visual brain
Frederic Meunier
Unveiling the intra and intermolecular steps underpinning vesicular priming

Australia-China Young Scientists Exchange Program
Australia-China Science and Research Fund Grant
Victor Anggono

Avant Mutual
Doctor in Training Research Scholarship Program
Shuichi Suetani
A comparison study of three physical activity measurement tools examining acceptability in people with psychotic disorders

Contributing to Australian Scholarship and Science
CASS Travel Grants
Jean Giacomotto
Rodrigo Suárez

Cure SMA
Basic Research Grant
Jean Giacomotto
Zebrafish models of Spinal Muscular Atrophy optimised for chemical genetics and drug discovery. From proof-of-principle to new insights and treatments

FightMND
Translational Research Grant-in-Aid
Perry Bartlett, Andrew Boyd, Mike Gerometta, Robert Henderson, Pamela McCombe
A novel ephrin receptor A4-Fc fusion protein for the treatment of sporadic MND

Group of Eight Australia
Germany joint research co-operation scheme
Kai-Hsiang Chuang
Understanding functional and metabolic brain connectivity in mice

Ian Potter Foundation
Travel Grant
Lena Oestreich

International Brain Research Organization
International Travel Grant
Laura Fenlon

Mater Research
BICARE Grant
Tatjana Ewais, Jakob Begun, Kai-Hsiang Chuang and Simon Knowles
A randomised-control validation trial of Mindfulness-based cognitive therapy (MBCT): An eight-week mindfulness program for youth living with Inflammatory Bowel Disease and co-morbid depression

Motor Neurone Disease Research Institute of Australia Inc
Grants-in-Aid
Jean Giacomotto, Edor Kabashi and Naomi Wray
New and innovative polygenic approach for understanding and modelling MNDs in zebrafish
Shuyan Ngo
Metabolic exploration in neurodegenerative disease (MEND): synergy between derangements in systemic and muscle metabolism in MND [administered by UQ SBMS]

Port of Brisbane
Community Grant
Diana Kleine (on behalf of CoralWatch)

Queensland Government
Advance Women's Academic Fund Maternity Funding
Marta Garrido
Fatima Nasrallah
Leonie Kirshenblat

Department of Environment and Heritage Protection Community Sustainability Action grant
Justin Marshall (on Behalf of CoralWatch)
How do I save the Great Barrier Reef?

Society for Mental Health Research
ECR Project grant
Shuichi Suetani, Dan Siskind and John McGrath
Acceptability of physical activity measures in people with psychotic disorders
National Health and Medical Research Council

NHMRC Project Grants

Peter Visscher, Naomi Wray and Jian Yang
Complex trait genomics [administered by UQ IMB]

Perry Bartlett, Fatima Nasrallah and Daniel Blackmore
Exercise reverses cognitive decline in aged animals by growth hormone stimulation of neurogenesis in the hippocampus

Darryl Eyles and Oliver Howes
A new animal model of the prodrome in schizophrenia: Enhanced Dopamine in Prodomal Schizophrenia (EDiPs)

Darryl Eyles and Urs Meyer
Maternal vitamin D supplementation in a maternal immune activation model of schizophrenia: mechanisms of prevention

Jürgen Götz and Frederic Meunier
Tau and its master regulator Fyn in neurons

Massimo Hilliard and Frederic Meunier
Understanding axonal fusion: an alternative mechanism to repair injured axons

Zhitao Hu and Joshua Kaplan
Investigation of the function of the scaffolding protein LIN-2/CASK in cholinergic synapses

Joseph Lynch
The alpha5 GABA-A receptor: delineating an emerging therapeutic target

Rodrigo Medeiros
Impact of interleukin-18 on Alzheimer’s disease

Rodrigo Medeiros
Investigating interleukin-37 as a treatment and biomarker for Alzheimer’s disease

Frederic Meunier, Justin Cooper-White, Rohan Teasdale and Elizabeth Coulson
Unravelling the mechanism coupling synaptic activity with neurotrophin signaling in the nervous system

Frederic Meunier and Emma Sierrecki
Unravelling a new fatty acid pathway involved in neuroexocytosis and memory

Linda Richards, Elliot Sherr, and Richard Leventer
Astrogial remodelling of the interhemispheric midline is regulated by deleted in colorectal cancer (DCC) signalling and is required for corpus callosum formation

Pankaj Sah
Neural circuits that mediate fear extinction

Steven Zuryn and Massimo Hilliard
Epigenetic determination of neuronal vulnerability and neurodegenerative disease

Jason Mattingley, Paul Dux, and Hartwig Siebner
Do ongoing cognitive demands affect the efficacy of transcranial electrical brain stimulation in young and older healthy adults?

Rebecca L Cooper Medical Research Foundation

Research Grant

John McGrath, Helen Gooch, Pankaj Sah, Victor Anggono, Darryl Eyles and Thomas Burne
Voltage-gated calcium channels and vitamin D: investigating the convergent links between risk factors for schizophrenia

James Kesby
Understanding early dopamine function and schizophrenia

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Grants

The University of Queensland
UQ Genomics Strategic Funding
Peter Visscher, Mark Blows, David Evans, Ben Hayes, Grant Montgomery, Joseph Powell, Naomi Wray and Jian Yang, Jian
UQ Genomics Complex Trait Genomics Analytical Hub
UQ Global Strategy and Partnerships Seed Funding
Geoffrey Goodhill and Pankaj Sah
UQ Major Equipment and Infrastructure grant
Geoffrey Goodhill, Linda Richards, Frederic Meunier, Helen Cooper, Justin Marshall, Bruno van Swinderen, Robert Parton and Rumelo Amor
Two-photon light-sheet microscope
Pankaj Sah, Linda Richards, Perry Bartlett, Jürgen Götz, Elizabeth Coulson, Thomas Burne, Fatima Nasrallah, Danisha Jhaveri, Jana Vukovic, Kai-Hsiang Chuang, Pato Opazo, Darryl Eyles, Helen Cooper, Frederic Meunier, Timothy Bredy and Daniel Blackmore
Establishment of surgery and behavioural laboratory for longitudinal, multimodal examination of the rodent brain
UQ NHMRC Equipment Grant
Linda Richards, Pankaj Sah, Perry Bartlett, Daniel Blackmore, Thomas Burne, Darryl Eyles, Helen Cooper, Jürgen Götz, Frederic Meunier and Robert Sullivan
Histology Cryostat
UQ Early Career Researcher Grant
Nela Durisic
Effects of de novo epilepsy mutations on function and synaptic clustering of GABAA receptors
James Kesby
Psychosis and goal-directed action in schizophrenia: the role of dopamine in the associative striatum
Rodrigo Suárez and Lilach Avitan
Spatial, temporal and functional dynamics of early cortical waves. Using marsupials to study ‘embryonic’ brain development in vivo
Tour de Cure
Scott Canner Young Researcher Grant
Jens Bunt and Linda Richards
Activation of the NFIB pathway as a treatment for glioblastoma
US Department of the Air Force
Asian Office of Aerospace Research and Development
Justin Marshall
Bio-inspired GPS-free navigation using mantis shrimp (stomatopod) vision
Wesley Medical Research Ltd
Project Grant
Dr Shuyan Ngo [administered by UQ SBMS]

Fellowships

CSL Limited
Professor Geoff Faulkner
CSL Centenary Fellowship
Danish National Research Foundation
Professor John McGrath
Niels Bohr Professorship
German Research Foundation
Dr Martyna Grabowska
Postdoctoral Fellowship
National Health and Medical Research Council
Professor Linda Richards
NHMRC Research fellowship
Dr Rodrigo Medeiros
NHMRC Boosting Dementia Research Fellowship
The Royal Australasian College of Physicians
Dr Shuichi Suetani
Boosting Dementia Research Leadership Fellowship
The University of Queensland
Dr Fabio Cortesi
UQ Development Fellowship
Dr Leonie Kirszenblat
UQ Development Fellowship
Dr Md Asrafussaman Riyadh
UQ Development Fellowship
United Nations Educational, Scientific and Cultural Organization
Professor Ross Cunningham
UNESCO Neuroscience Fellowship
Westpac
Ms Laura Leighton
Future Leaders Scholarship
Awards and honours

In 2017, QBI researchers were once again recognised via numerous high-profile appointments and honorary awards: Professor Perry Bartlett, the Institute’s founding Director, was chosen as the Queensland Senior Australian of the Year in recognition of his work in understanding the brain, and in helping deliver Queensland a world-class brain research institute; Professor Linda Richards was elected President of the Australasian Neuroscience Society; Professor Jian Yang was awarded the Frank Fenner Prize for Life Scientist of the Year; and Dr Lilach Avitan was elected as a ‘Superstar of STEM’ by Science & Technology Australia. A more complete list of awards is given below.

**Australasian Neuroscience Society**  
Professor Linda Richards  
Elected president of ANS

**Australian Academy of Science**  
Dr Tong (Iris) Wang  
JG Russell Award

**Australian Computer Society**  
Mr Jake Carroll and Mr Irek Porebski  
Digital Disruptor Award

**Australian Government**  
Associate Professor Terry Coyne  
Medal of the Order of Australia (OAM)

**Australian Information Industry Association’s Queensland iAwards**  
QBI and the UQ Research Computing Centre  
Merit in the category of Infrastructure for Data Intensive Science

**Australian Research Council**  
Dr Tong (Iris) Wang  
Discovery Early Career Researcher Award  
Dr Jocelyn Widagdo  
Discovery Early Career Researcher Award

**Australian Society for Medical Research**  
Professor Jian Yang  
Queensland Senior Researcher Award

**Brain and Behavior Research Foundation**  
Associate Professor Timothy Bredy  
NARSAD Independent Investigator Award  
Dr Zhitao Hu  
NARSAD Young Investigator Award

**German National Academy of Sciences**  
Professor Mandyam Srinivasan  
Elected to the membership of the Academy

**National Australia Day Council**  
Professor Perry Bartlett  
Queensland Senior Australian of the Year

**Queensland Government**  
Professor Perry Bartlett  
Queensland Greats Award

**Science and Technology Australia**  
Dr Lilach Avitan  
Superstar of STEM

**Strömgren Foundation**  
Professor John McGrath  
Erik Strömgren Medal

**The Prime Minister’s Prize for Science**  
Professor Jian Yang  
Frank Fenner Prize for Life Scientist of the Year

**The University of Queensland**  
Dr Marta Garrido  
UQ Foundation Research Excellence Award  
Mr Paul Marshall  
UQ Alumni Friends Golden Jubilee Bursary

**Women in Technology**  
Dr Laura Fenlon  
PhD Career Start Award
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)

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 Zhaooyu 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

Professor Frederic Meunier  
Single molecule neuroscience

Professor Grant Montgomery  
Complex trait and disease genomics

Professor Bryan Mowry  
Psychiatric genomics

Dr Fatima Nasrallah  
Functional neuroimaging and brain injury

Professor Peter Nestor  
Cognitive neurology

Dr Patricio Opazo  
Synaptic memory

Mr Geoff Osborne  
Flow cytometry

Professor Michael O’Sullivan  
Regenerative neurology

Dr Michael Piper  
Neural stem cells

Professor Linda Richards  
Brain development and disorders

Professor Pankaj Sah  
Synaptic plasticity

Professor Peter Silburn  
Neurosurgery and deep brain stimulation

Professor Mandyam Srinivasan  
Neuroscience of vision and aerial robotics

Associate Professor Bruno van Swinderen  
Cognitive and behavioural neuroscience

Professor Peter Visscher  
Neurogenetics and statistical genomics

Dr Jana Vukovic  
Neuroimmunology and cognition

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 117 Higher Degree by Research (HDR) students enrolled at QBI, which included 7 Master of Philosophy candidates. 19 HDR students graduated in 2017.

2017 Graduates

Lacey Jae Atkins MPhil
Principal Advisor: Professor Elizabeth Coulson
An investigation of risk factors for Alzheimer’s disease in obstructive sleep apnoea patients

Siân Baker PhD
Principal Advisor: Professor Jürgen Götz
Investigating in vivo the principles governing the spread of tau phosphorylation and amyloid-beta excitotoxicity

Madhusoothanan Bhagavathi Perumal PhD
Principal Advisor: Professor Pankaj Sah
Organization of a reverberating cell assembly in the basolateral amygdala: networks, circuits, and synapses

Baptiste Couvy-Duchesne PhD
Principal Advisor: Associate Professor Margaret Wright
Breaking down the genetics of depression using brain endophenotypes

Ivana Dzafic PhD
Principal Advisor: Professor Bryan Mowry
The neuroimaging and genetics of emotion perception in schizophrenia

Laura Fenlon PhD
Principal Advisor: Professor Linda Richards
Contralateral targeting of the corpus callosum

Luke Hearne PhD
Principal Advisor: Professor Jason Mattingley
Characterisation of functional brain networks underlying cognitive reasoning and intelligence

Gerhard Leinenga PhD
Principal Advisor: Professor Jürgen Götz
Investigations of the effects of scanning focused ultrasound in mouse models of Alzheimer’s disease

Robert Maier PhD
Principal Advisor: Professor Naomi Wray
The genetic architecture of psychiatric disorders

Morgane Nouvian PhD
Principal Advisor: Dr Judith Reinhard
Neural and molecular mechanisms underlying the olfactory modulation of aggression in honeybees

Natalie Rens PhD
Principal Advisor: Professor Ross Cunnington
Neural dynamics of voluntary decision-making

Chase Sherwell PhD
Principal Advisor: Professor Ross Cunnington
Predictive timing in perception and action

Dr Laura Fenlon went from strength to strength after completing her PhD. Following on from a Women in Technology award in 2016, Laura published six papers during her PhD, including a co-first-author in the prestigious journal, Neuron. She was also awarded the Krieg Cortical Kudos Scholar Award for graduate students from one of the world’s oldest neuroscience societies, the Cajal Club. Laura is now a UQ Development Fellow in the Richards laboratory at QBI.

Reuben Strydom PhD
Principal Advisor: Professor Mandyam Srinivasan
Bio-inspired strategies for autonomous aerial navigation, guidance and interception

Yajie Sun PhD
Principal Advisor: Professor Pankaj Sah
Anatomy and physiology of the central extended amygdala

Rachel Templin PhD
Principal Advisor: Professor Justin Marshall
Circular polarization vision in stomatopod crustaceans

Tong Wu PhD
Principal Advisor: Professor Tianzi Jiang
Functional network study on the wild type and DISC1 transgenic mice

Di Xia PhD
Principal Advisor: Professor Jürgen Götz
The molecular mechanism of the Tau-Fyn interaction and dendritic targeting in neurons

Hon Yap PhD
Principal Advisor: Associate Professor Bruno van Swinderen
Electrophysiological analyses of sleep states in Drosophila

Yan Zhang PhD
Principal Advisor: Professor Joseph Lynch
Physiological properties of glycineergic synapses with defined subunit compositions
Philanthropy

QBI received a total of $8,596,806 in donations in 2017, from 502 donors. Of note was the generous $5M philanthropic donation from the Brazil Family Foundation to fund 5 years of research through the establishment of the Brazil Family Program in Neurology. This program has a focus on research in Stroke and Motor Neurone Disease (MND).

Another significant gift was a $1M philanthropic grant by FightMND towards Professor Perry Bartlett’s MND program in EphA4.

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

**Bequests**

QBI expresses its sincere appreciation for the charitable bequests received from the following estate in 2017.

Estate of Barry Max Stevenson

**Principal donor organisations**

FightMND
Mater Foundation
Motor Neurone Disease Research Institute of Australia Inc
The Brazil Family Foundation
The University of Queensland in America, Inc.
UQ Endowment Fund Limited

**Major donor organisations**

Anonymous organisation
BICARE Inc.
Cambooya Pty Ltd
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St Andrew’s War Memorial Hospital
The Crem Jones Foundation
The Helpful Foundation
The Rotary International District 9640 Ltd
The Stafford Fox Medical Research Foundation
The Sylvia & Charles Viertel Charitable Foundation
The Trustee for Tour De Cure Trust
The Yulgilbar Foundation

**Donor organisations**

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Loganlea Pharmacy and Maridale Park Pharmacy
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Morgans Foundation
Nicol Foundation
Order of the Eastern Star, Grand Chapter of Queensland
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Rebecca L Cooper Medical Research Foundation Ltd
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Megan Alexander
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Margo Andrews
Beverley Angus
Liz Anstey
John Armstrong
Melanie Armstrong
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Carolyn Barry
Anthea Barry
Gregory Bartlett
Perry Bartlett
Meredith Baxter
Pauline Beames
Peter Bell
Katherine Bell
Judith Bell
Alan Bennett
Elena Bertuna
Robyn Besley
Alan Biggs
Margot Biggs
Wendy Blacker
Mary Blakene
Sarah Blakeford
Lara Bliss
Anthony Blue
Simon Bottomley
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Kylie Dunn
Julie Dunn
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Wendy Edmond
Susan Edwards
Cinzia Egodagamage
Barbara Elliott
Clarence Evans
Kenneth Eyre
Robyn Farrell
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Qld Emergency Services Charity Golf Day supports Dementia Research

On an annual basis, emergency services workers and corporate staff from Queensland Ambulance, Queensland Fire and Emergency Services and Queensland Police take to the greens at the Emergency Services Charity Golf Day, to network and raise funds for dementia research at UQ’s Queensland Brain Institute (QBI).

Starting out as a joint networking event for emergency service workers, the Golf Day has grown over the years to include philanthropy as a goal, raising over $10,000 for QBI’s research into dementia research over the past four years. Their fundraising efforts are supported by generous long term sponsors including Telstra, Fujitsu-Lenovo and VoIP.

Funds raised go towards the Peter Hilton Research Fellowship, which was established by Robyn Hilton, in memory of her late husband Peter Hilton, who died from Alzheimer’s disease in 2011.

Fiona Ferrier, one of the organisers of the golf day, is a childhood friend of Robyn’s and saw how living with dementia affected Peter, inspiring her to help support research to find a treatment for this devastating disease.

Dr Liviu-Gabriel Bodea is the current Peter Hilton Research Fellow and his research explores the interactions of the nervous and immune systems during memory and learning, and how these systems are disrupted in dementia.

Philanthropy is critical to the research at the Queensland Brain Institute and we are very grateful for the support of Queensland Emergency Services Staff and other individuals and organisations that fundraise on QBI’s behalf. For more information on how you can be involved with fundraising for QBI visit qbi.uq.edu.au/get-involved

Individual donors (continued)

Paula Van Loon  Tracy Whipple
Geoff Voller  Patsy Wigham
Emma Walkinshaw  Jason Wilkins
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Adrian Webb  Irene Willett
Anne-Marie Webber  Margaret Williams
Catherine Webster  Clive Williams OAM
Helen Weir  David Wood
Gillian Wetkin  Peter Woodward
Trent Whayman  Craig Worling
Bozena Zembrzuski
Public engagement

2017 saw QBI once again host a range of events that variously targeted scientists and members of the public. Highlights included the annual Merson Lecture, which this year was given by Australia’s Chief Scientist Dr Alan Finkel AO. An ex-neuroscientist and engineer, Dr Finkel talked about the importance of combining brain research with a focus on technological tools and applications.

This year’s Peter Goodenough Memorial Lecture was given by Professor John Parker of Saluda Medical, an Australian company commercialising a spinal stimulation device for the management of chronic pain. Coincidentally, this lecture perfectly fit the theme of Dr Finkel’s Merson Lecture.

On March 13 and 14, members of QBI including Associate Professor Bruno Van Swinderen and the SLRC’s Stephanie MacMahon visited Innisfail State College in Far North Queensland to raise awareness of QBI and the SLRC, spark interest in science amongst year 10 students and assist preparations for the Australian Brain Bee Challenge. The students participated in a number of workshops to learn about neuroscience and the brain, and the staff participated in a professional development session on digital multi-tasking, drawing from SLRC research on the impact of multi-tasking on cognitive functioning. The visit was a wonderful success with both students and teachers learning lots about the work of QBI.

CJCADR once again ran a one-day Public Dementia Forum that looked at the dementia problem from the perspectives of research, treatment and care, and the dementia-focused Hand Heart Pocket Gala was once more run in conjunction with Alzheimer’s Australia.

The Australian Brain Bee Challenge Queensland Final was attended by 124 students from 39 schools across Queensland. The students spent the day participating in the neuroscience competition, as well as touring QBI’s state-of-the-art facilities and mingling with QBI’s neuroscientists.

QBI had over 250 people come through the building when it opened its doors to the public as part of Brisbane Open House. As well as viewing the building, visitors had the chance to hear from CJCADR researchers discussing dementia research and how it translates to clinical trials and potential future treatments.

QBI also hosted a number of community tours and provided speakers to various community events.
Commemorative Lectures

Peter Goodenough Memorial Lecture
Professor John L Parker
Saluda Medical
13 September

Merson Lecture
Dr Alan Finkel AO
Chief Scientist of Australia
24 October

Public Lectures

Autism: Progress in Understanding the Genetics
Professor Elliot Sherr
Brain Development Research Program, UCSF
8 May

The anatomy of violence: the biological roots of crime
Professor Adrian Raine
University of Pennsylvania
30 October

Community events

Ross Maclean Fellowship Raceday
11 February

International Women’s Day Lunch
8 March

Innisfail State College visit
13–14 March

CJCADR Public Dementia Forum
11 May

Queensland Final of the Australian Brain Bee Challenge
18 July

Parkinson’s & Movement Disorders Information Session for Patients & Carers
2 September

Brisbane Open House: Dementia Research, from the bench to the public
8 October

Parkinson’s disease research breakfast
25 September

Hand Heart Pocket Gala Evening
21 September

The BRAIN series

QBI produced a further two issues of The BRAIN magazine. Issue Two on Learning & Memory was published in June, whilst Issue Three on Dementia was published in September. The BRAIN: Learning & Memory was distributed to every school across Australia, and The BRAIN: Dementia was sent out via the Dementia Australia network. Both issues were also distributed via the Australian Financial Review.

Learning & Memory
Issue Two, July

Dementia
Issue Three, September
QBI was fortunate to once again host outstanding speakers at its seminars, which continue to be well attended. This year also saw the organisation of the inaugural Australian C. elegans Symposium (ACeS), drawing together a community of researchers dedicated to this excellent model organism. QBI also hosted the second SCiNDU (Systems & Computational Neuroscience Down Under) conference after a highly successful inaugural event in 2015.

Finally, QBI continued to run its weekly seminar series, with an excellent mix of in-house and external (including international) speakers. A full list of community- and academic-focused events for the year is below.

QBI-hosted symposia

Australian C. elegans Symposium
25–27 October

Deep Brain Stimulation Symposium
24–25 November

Systems & Computational Neuroscience Down Under (SCiNDU)
13 December

The 2nd Super-Resolution Microscopy Symposium
7 December
QBI Neuroscience Seminars

Professor Andreas Lüthi
Group Leader, Friedrich Miescher Institute for Biomedical Research, Basel, Switzerland
Deconstructing fear

Professor Li-Huei Tsai
Professor and Director, Picower Institute for Learning and Memory, Dept of Brain and Cognitive Sciences, Massachusetts Institute of Technology, Cambridge, USA
Using patterned neural activity to modify Alzheimer’s disease pathology

Dr Jai Yu
Howard Hughes Medical Institute, Department of Physiology, University of California, San Francisco
Encoding and storing experience in hippocampal-cortical networks

Dr Zhaoyu Li
Life Science Institute, University of Michigan, USA
Synaptic and circuit mechanism of sensorimotor integration in C. elegans

Dr Jean Giacomotto
Queensland Brain Institute, The University of Queensland
Innovative genetic and chemical genetics approaches to understand and treat motor neuron diseases

Professor Geoff Faulkner
Mater Research and Queensland Brain Institute, The University of Queensland
Somatic L1 mosaicism: ‘dark matter’ in mammalian genetics

Professor Brent Reynolds
Department of Biomedical Sciences, Faculty of Medicine and Health, Macquarie University, NSW
Investigating the disease mechanisms of MND and frontotemporal dementia related to TDP-43 pathology

Jing Zhao
Queensland Brain Institute, The University of Queensland
Role of EphA4 in regulating adult hippocampal neurogenesis and motor neuron disease

Tong Wu
Queensland Brain Institute, The University of Queensland
Functional brain network study on wild type and DISC1 transgenic mice

Professor Brent Reynolds
Department of Neurosurgery, University of Florida, USA
Eco-Oncology: Applying principles of ecology to improve outcomes in oncology

A/Professor Zhiyi Wei
Department of Biology, Southern University of Science and Technology of China (SUSTech)
Structural Insights into Presynaptic Active Zone Assembly

Professor Scott Tyo
The University of New South Wales at the Australian Defence Force Academy, Canberra
Do you see what I see? Exploiting advanced properties of light and mimicking biological vision systems to develop new imaging and sensing methods

Dr Andrew Higginson
Psychology Department, University of Exeter, UK
Learning to be ill? Adaptive decision-making systems with limited information may cause ill health

Reuben Strydom
Queensland Brain Institute, The University of Queensland
Bio-inspired Strategies for Autonomous Aerial Navigation, Guidance and Interception

Dr Christian Winterflood
Zurich, Switzerland
Applications of supercritical angle and single-molecule fluorescence

Lacey Atkins
Queensland Brain Institute, The University of Queensland
An investigation of risk factors for Alzheimer’s disease in obstructive sleep apnoea patient

Professor Lars Ittner
School of Medical Sciences, UNSW
On the molecular role of Tau in regulating post-synaptic toxicity

Professor Brenda Gannon
Centre for Business and Economics of Health, The University of Queensland
Connecting health economics and brain research

Professor Geoff Faulkner
Mater Research Institute and Queensland Brain Institute, The University of Queensland
Somatic L1 mosaicism: ‘dark matter’ in the mammalian brain

Dr Vincent Daria
ANU College of Medicine, Biology and Environment
Understanding brain circuits using nanotechnology and photonic tools

Professor George Augustine
Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore
Optogenetic mapping of novel cerebellar circuits

Professor Linda Richards
Queensland Brain Institute, The University of Queensland
Interhemispheric axonal plasticity in developmental brain disorders

Madhusoothanan Bhagavathi Perumal
Queensland Brain Institute, The University of Queensland
Organization of a reverberating cell assembly in the basolateral amygdala

Robert Maier
Queensland Brain Institute, The University of Queensland
Improving genetic risk prediction in psychiatric disorders and other complex traits

Dr Jana Vukovic
Queensland Brain Institute and the School of Biomedical Sciences, The University of Queensland
Understanding the role of microglia as regulators of adult neurogenesis in the intact and injured brain

Dr Susannah Tye
Director, Translational Neuroscience Laboratory, Mayo Clinic Depression Center, Rochester, USA
Metabolic Deficits in Antidepressant Resistance are a Functional Target for Neuromodulation

Dr Hari Subramanian
Asia-Pacific Centre for Neuromodulation, Queensland Brain Institute, The University of Queensland
The midbrain periaqueductual gray: A novel circuit for treatment of intractable neurogenic autonomic disease via neuromodulation

Professor Michael Nilsson
Director, Hunter Medical Research Institute, NSW
Emerging avenues in stroke rehabilitation: focus on recovery and secondary neurodegeneration
Anthony Harris  
Queensland Brain Institute, The University of Queensland  
The role of neural oscillations in human visual attention and awareness

Dr Jeehyun Kim  
Lab Head, Developmental Psychobiology Laboratory, Behavioural Neuroscience, The Florey Institute, VIC  
Understanding the development of emotional memory to treat anxiety and addiction

Professor Loren Frank  
Department of Physiology, University of California, San Francisco  
Neural substrates of memories and decisions

Professor David Tremethick  
Head of the Dept of Genome Science, The John Curtin School of Medical Research, ANU, Canberra  
What does reproduction and memory have in common? The epigenetic regulator H2A.B

Professor Sunil Gandhi  
Department of Neurobiology and Behaviour, School of Biological Sciences, University of California, Irvine  
Rewiring the circuits of high acuity spatial vision

Professor Christian Haass  
Department of Biochemistry, Ludwig-Maximilians University  
TREM2 in Alzheimer’s disease: from microglial dysfunction to human patients

Professor Michael Milford  
Science and Engineering Faculty, Queensland University of Technology, Garden Point Campus, Brisbane  
From Rats to Robot Navigation and Beyond

Professor Aleksandra Filipovska  
Laboratory Head, Mitochondrial Medicine and Biology, Harry Perkins Institute of Medical Research, Perth, WA  
The role of mitochondrial dysfunction in neurodegenerative diseases

Professor Alison Goate  
Director, Ronald M. Loeb Center for Alzheimer’s disease and Department of Neuroscience, Icahn School of Medicine at Mount Sinai  
Rare and Common Genetic Variation implicates microglial function in Alzheimer’s disease risk

Associate Professor Frini Karayanidis  
Director, Functional Neuroimaging Laboratory, School of Psychology, University of Newcastle, NSW  
Age-related decline in cognitive control: Role of CV risk factors

Professor Barry Dickson  
Queensland Brain Institute, The University of Queensland and Janelia Research Campus, Howard Hughes Medical Institute, Virginia, USA  
The neurobiology of Drosophila mating behavior

Dr Justin Wong  
Head, Gene Regulation in Cancer Lab, Gene and Stem Cell Therapy Program, Centenary Institute of Cancer Medicine & Cell Biology, University of Sydney  
Intronic nonsense: why we should stop ignoring them?

Dr Iris Wang  
Queensland Brain Institute, The University of Queensland  
Neuronal trafficking: Linking mechanisms to functions in live neurons
Professor John McGrath
Queensland Brain Institute, The University of Queensland
Convergent evidence implicates vitamin D deficiency and voltage-gated calcium channel function in schizophrenia

Professor Pankaj Sah
Queensland Brain Institute, The University of Queensland
Anxiety and depression: the search for better therapeutics

Associate Professor Tim Bredy
Queensland Brain Institute, The University of Queensland
Evolving insights into the qualitative nature of RNA and its functional diversity in the brain

Melvyn Yap
Queensland Brain Institute, The University of Queensland
Electrophysiological analyses of sleep states in Drosophila

Dr Dhanisha Jhaveri
Mater Research Institute and Queensland Brain Institute, The University of Queensland
Regulation and function of distinct neurogenic precursors in the adult brain

Professor Stephen Williams
Queensland Brain Institute, The University of Queensland
Cholinergic modulation is an essential component of neocortical circuit computations

Dr Melissa Sharpe
Princeton Neuroscience Institute & National Institute on Drug Abuse, Princeton, New Jersey
The contribution of dopamine to the model-based world

Jenny Pavlides
Queensland Brain Institute, The University of Queensland
Integrating genome-wide association study data with gene expression to understand complex traits and common diseases

Dr Rena Li
Beijing Institute of Brain Disorders, Capital Medical University
Sex-specific targets to Alzheimer’s disease

Dr Yong Shen
University of Bordeaux, France
Why is single molecule, BACE1, involved with multiple types of brain disorders?

Prof Daniel Choquet
University of Bordeaux, France
The interplay between synapse nanoscale organization and function

Dr Jean-Baptiste Sibarita
University of Bordeaux, France
Pushing the limits of SMLM toward deeper, more colours and more throughput imaging

Dr James Daniel
Molecular Neurobiology Group, Max Planck Institute of Experimental Medicine, Göttingen, Germany
Wrestling with SUMO at the synapse

Professor Mandayam A Srinivasan
Director, TouchLab, Massachusetts Institute of Technology, USA, University College London, UK
Haptics: science, technology, and applications
In 2017, QBI authors published 336 peer-reviewed, original research articles, 19 of which were in Nature journals, and three of which were in Science journals. Three articles were featured as covers in their respective journals (see below). In addition, QBI researchers authored 1 book and 12 book chapters, as well as 4 peer-reviewed conference papers.

2017 also saw growth in the number of original research articles submitted to QBI's open-access Nature Partner Journal, npj Science of Learning. QBI researchers continue to serve as editors for this journal, including the Editor-in-Chief role.

Scientific publications


Richter S, Helm C, Meunier FA, Hering L, Campbell LL et al. (2017) Comparative analyses of glycerotoxin expression unveil a novel structural organization of the bloodworm venom system. BMC Evolutionary Biology 17: 64.


Turner KM, Simpson CG & Burne THJ (2017) BALB/c mice can learn touchscreen visual discrimination and reversal tasks faster than C57BL/6 mice. Frontiers in Behavioral Neuroscience 11: 16.


