

IHBI

QUT **ihbi**
Institute of Health and Biomedical Innovation

ANNUAL REPORT 2015



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A message from the Executive Director

Research excellence at the heart of a successful year

IHBI strives for research excellence, relevance and impact and is achieving results through collaboration, building capability and ultimately translation. In 2015, significant competitive funding was secured, partnerships were established with industry and input from clinicians steered research towards outcomes to improve people's lives. Researchers benefited from cutting-edge technology at numerous specialist laboratories and access to patients and their samples at hospitals and clinics.

It was pleasing to see IHBI's research excellence confirmed in 2015 through ERA (Excellence in Research for Australia), an exercise that evaluates the quality of research undertaken at Australian universities against national and international benchmarks.

QUT scored at or above world standard in nine categories of research that are conducted at IHBI, with the highest ranking of 5, or well above world standard, for research in human movement and sports science; and medical biotechnology. We received a 4, or above world standard, in biomedical engineering; oncology and carcinogenesis; nursing; public health and health services; and nutrition and dietetics.

IHBI researchers advanced their research in 2015 through industry partnerships with Health Focus Products Australia, Johnson & Johnson, Blackmores, DePuy Synthes and Honda. The partnerships show great potential in developing therapeutics for infections and diseases, improving treatment efficacy of migraine and correcting vision problems.

In a tough funding climate, IHBI secured competitive national funding in 2015, with four new Australian Research Council awards and nine new National Health and Medical Research Council awards.

Strategic appointments to further our research and create critical mass include IHBI Deputy Director Professor Greig de Zubicaray and IHBI Director at the Centre for Children's Health Research (CCHR), Professor Geoff Cleghorn.

Professor Cleghorn will provide leadership for multidisciplinary research teams that relocated to CCHR in 2015 to benefit from the collaborative environment and a focus on child and adolescent health research.

Collaboration and new research insights will also flow from the opening in late 2015 of the Herston Imaging Research Facility, enabling enhanced understanding of the human body and improved patient diagnoses and treatment.

IHBI and QIMR Berghofer entered into a partnership in 2015, with access for our researchers to specialist QIMR-B facilities and collaborations enabling translational research in infectious disease, neuroscience and neuroimaging.

Another IHBI facility enabling research translation is the Medical Engineering Research Facility (MERF). In 2015, a MERF operating theatre was used to implant and assess a newly developed artificial heart, before its use in human patients. The work has involved collaboration between IHBI, MERF and Prince Charles Hospital clinicians, as outlined further within this report.

It is pleasing to see such achievements in research, collaboration and translation in 2015, placing us in a good position to meet our goal of producing better health outcomes in our lifetime.

Professor Lyn Griffiths

IHBI Executive Director
April 2016



IHBI 2015

2015 overview

Capacity building through strategic appointments and the opening of new facilities, enabling advances in key IHBI research areas, were highlights in 2015.

The measures were part of IHBI's focus on working with the best minds from around the world and using the latest technology to bring about impact and ensure relevance. They laid the ground work for IHBI to:

- Access new facilities with relocation of research groups to the Centre for Children's Health Research and use of the Herston Imaging Research Facility
- Expand research in areas such as neuroscience and neuroimaging, radiology, statistical and genomic epidemiology, paediatrics and nursing
- Secure competitive grants, collaborate with high-profile researchers and partner with industry
- Support early career researchers and higher degree students through fellowships, travel, awards and mentoring.

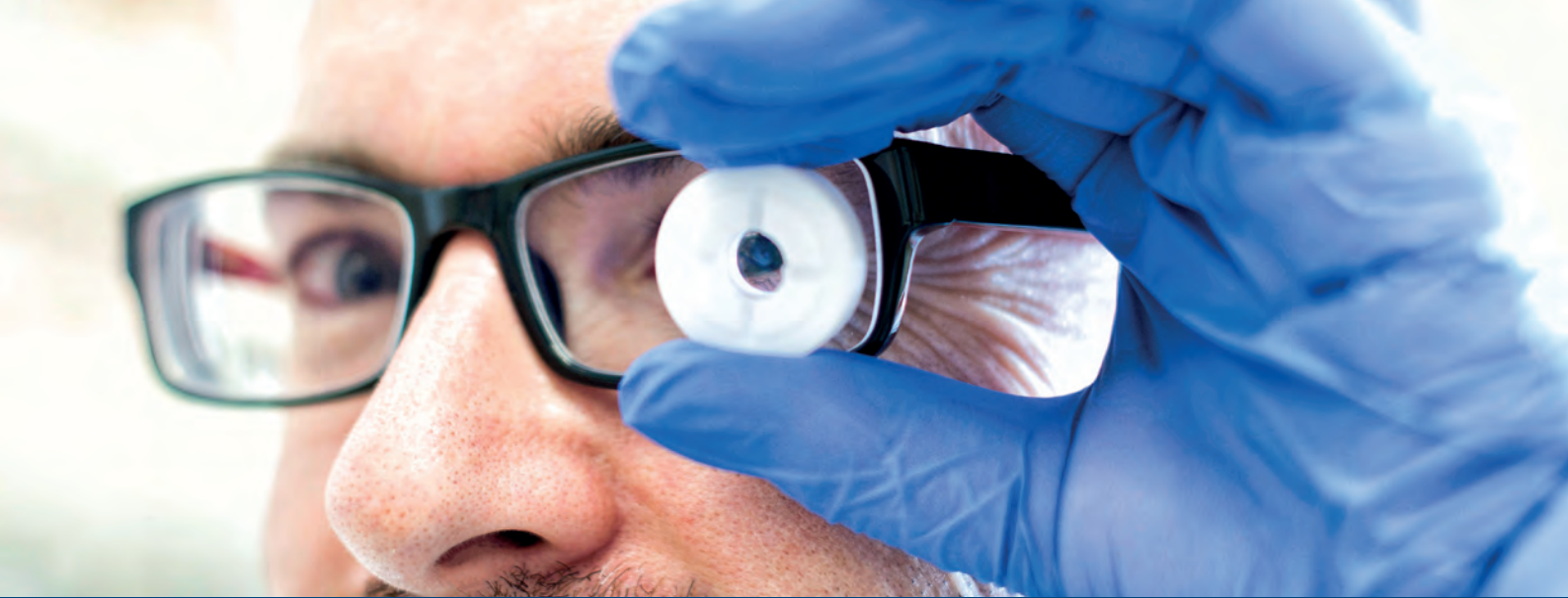
IHBI achieves growth across key performance indicators

IHBI's key performance indicators (KPIs) are defined by the IHBI Executive, QUT. Core KPIs of increasing research income and student numbers have been achieved in 2015 and publication figures continue to be substantial.

IHBI's KPIs are also strongly aligned with the requirements of Queensland's Department of Science, Information Technology and Innovation. The KPIs address employment, collaboration, technology transfer and commercialisation.

KPI	2006	2013	2014	2015
External Income	\$ 20 133 104	\$ 39 800 212	\$ 41 602 035	\$ 46 038 752
Academic impact- Publications	380	838	934	874
HDR students- domestic	204	377	418	460
HDR students- international	52	200	215	198

Table 1: IHBI maintained sound achievement of its KPIs



Impact

IHBI research is having a direct impact on advancing knowledge in the field and treatments in the clinic. At the core is a culture of research excellence, wide collaboration with the best minds and support from competitive funded grants.

Image: Associate Professor Damien Harkin

Associate Professor Damien Harkin is leading a collaborative research project aiming to validate techniques and materials for use in corneal tissue transplantations that overcome donor rejection, using \$886 032 in new funding.

The project involves Associate Professor Harkin working with a multidisciplinary team from the Queensland Eye Institute (QEI) and the University of Melbourne's Centre for Eye Research Australia (CERA).

A National Health and Medical Research Council (NHMRC) Project Grant will support the research for three years, bringing together the nation's leading corneal research groups and continuing Associate Professor Harkin's collaboration with QEI chief scientist Professor Traian Chirila and CERA senior consultant ophthalmic surgeon Associate Professor Mark Daniell.

The research aims to improve the success rate of corneal tissue transplantations without the need for organ donation, the associated fear of organ rejection, reliance on suitable donor tissue and the significant logistical and safety issues that are presented.

Transplants generally restore structure and function to the most posterior layer of the cornea, the corneal endothelium. Cultivated corneal endothelial cells (CEC) show potential in replacing donated organs and instigate repair and regeneration in a patient's eye.

The potential exists for multiple sheets of CEC to be manufactured to a desired density from each donor cornea. Cultivated CEC implants need a scaffold to provide physical support during cell culture and implantation.

Associate Professor Harkin will work with his collaborators to establish an optimal technique for CEC cultivation and compare two novel materials developed as suitable scaffolds – fibroin membranes and hydrogel films.

“We will address the growing demand for donor tissue, by maximising the number of patients who can be treated from each sample of donor tissue.”

“In establishing an optimal technique for the cultivation, we will have addressed the first question in designing a national protocol – how best to grow corneal endothelial cells from explants,” Associate Professor Harkin said. “By developing a protocol, we will enable multiple patients to be treated using CEC derived from a single donor. We will address the growing demand for donor tissue, by maximising the number of patients who can be treated from each sample of donor tissue.”

The project will generate data necessary to advance studies towards a phase I/II clinical trial in patients with corneal endothelial cell dysfunction.

“Importantly, this project has the additional significance of bringing together Australia’s two leading research groups aimed at developing cultured CEC implants, combining our respective skills and resources,” Associate Professor Harkin said.

Previous collaborations between Associate Professor Harkin and QEI experts have received the support of three NHMRC Project Grants and led to advancements in the field through publications in high-impact journals.

“The collaborative approach will also impact positively on subsequent translation of our research outcomes to the clinic on a national scale and serve as an exemplar for research in other areas of national importance.”

- **Professor Patsy Yates** is at the centre of a Palliative Care Education and Training Collaborative, set up with more than \$10 million in funding from the Australian Department of Health. The collaboration aims to build capability and capacity in the health workforce to provide quality care at the end of life.
- **Professor David Kavanagh** led a successful NHMRC Project Grant bid, securing \$895 032 for a project titled A new, low-cost e-health treatment for Alcohol Use Disorder using mental imagery.
- **Professor Colleen Nelson** led a successful NHMRC Project Grant bid, securing \$780 338 for a project entitled Targeting a master regulator of tumour cell plasticity as a new adjuvant therapy for prostate cancer.
- **Dr Michael Doran** led a successful NHMRC Project Grant bid, securing \$561 012 for a project entitled The Microniche: A novel in-vitro and in-vivo prostate cancer model system.
- **Dr Joanne Voisey** received a prestigious Hilton Family Foundation Inc (US) grant of \$165 838 to investigate DNA Methylation Analysis of Schizophrenia Biotypes.
- **Dr Yinghong Zhou** was awarded an NHMRC Early Career Peter Doherty – Australian Biomedical Fellowship, with \$314 644 for a research project entitled Dissecting the cell signalling cues for periodontal regeneration.
- **Distinguished Professor Judith Clements** received \$200 000 from the Prostate Cancer Foundation of Australia and the It’s a Bloke Thing Foundation for the Australian Prostate Cancer Bio-Resource, a collection of 140 000 tissue samples from more than 5500 men for use in research into disease progression and clinical trials.



Achievements of outstanding researchers

IHBI has built a culture of research excellence that translates into better healthcare and adds important knowledge in scientific fields. The excellence is being recognised nationally and globally, through high-level awards, honorary memberships and fellowships.

Image above: Distinguished Professor Judith Clements AC

Middle image: Professor Nathan Efron AC

Image far right: Professor John Aaskov OAM

Outstanding contributions to health research are at the core of national recognition for IHBI researchers. Distinguished Professor Judith Clements and Professor Nathan Efron were accorded the nation's foremost honour in the Queen's Birthday Honours List, each being made a Companion of the Order of Australia (AC). Professor John Aaskov was recognised with a Medal of the Order of Australia (OAM) in the 2015 Australia Day honours.

Distinguished Professor Judith Clements

Professor Clements heads a multidisciplinary team focusing on the spread of prostate cancer to the bone and the role of kallikrein proteins in progressing the spread.

She works with experts in biomedical engineering who have developed 3D models of tissue-engineered bone to accurately mimic how cancer cells invade the bone environment. The models enable the study of various cells to determine their potential roles in cancer development, progression, diagnosis and treatment.

Ultimately, the team aims to find ways to block proteins such as the kallikreins that may trigger bone metastasis, the secondary form of prostate cancer that most commonly proves fatal.

Bone metastasis is a typical outcome of advanced prostate cancer but little is known of the underlying mechanisms.

Professor Clements is Chair of the Australian Prostate Cancer BioResource, involving the collection, interpretation and distribution of prostate cancer tissues and other clinical samples for use in research in Australia and overseas.



Professor Nathan Efron

Professor Efron is identifying markers in the eye that aid in the diagnosis of diabetes and point to the state of disease progression. He monitors deterioration and regeneration of the structure and function of nerve fibres in the cornea and retina of people with diabetes.

In systemic diseases such as diabetes, fine nerves in the arms and legs are impacted to a similar extent as nerves in the eye. By observing changes in eye nerves, it can be assumed that similar changes are occurring in the arms and legs.

Professor Efron said using the eye was a major advantage because accessing nerves in other parts of the body required invasive procedures and came with the risk of infection.

Diabetes is the most common cause of neuropathy, or nerve damage. Nerve damage to the foot can cause an absence of sensation and can result in accidental damage, such as cuts from sharp objects, going undetected. Deep tissue injuries can track to the surface of the foot and form an ulcer that in some cases can become infected. Chronically infected and open sores can eventually result in amputation.

Professor Efron brings to the project a track record of vision and eye research dating to the 1980s and work in product development, including a pivotal role in developing the world's first daily disposable contact lens.

Professor John Aaskov

Professor Aaskov is developing tests to diagnose mosquito-borne viral diseases and the vaccines and vaccine strategies to prevent them. He also is assisting in the development of safe, reliable, diagnostic laboratories in Southeast Asia.

His team uses expertise in biology and genetics to understand diseases caused by mosquito-borne viruses, such as dengue and Ross River virus, and their spread. Professor Aaskov's research at IHBI has underpinned the development of a vaccine against Ross River virus infection.

His interest now focuses on the population dynamics of emerging arboviruses and how they can be exploited to limit or prevent disease. The research team collaborates with clinicians, virologists, immunologists and public health experts to ensure vaccines produce levels of 'herd immunity' to provide comprehensive protection.

Professor Aaskov is Director of the World Health Organisation Arbovirus Reference Centre. He has undertaken research into mosquito-borne diseases with scientists from Iran to French Polynesia and has had long term engagements in Myanmar and Indochina. He assisted in the establishment of the Arbovirology Department at the Australian Army Malaria Institute.

OTHER IHBI ACHIEVEMENTS

- Emeritus Professor Mark Pearcy was inducted into the Engineers Australia Hall of Fame for outstanding contribution to biomedical engineering.
- Professor Pam Russell was awarded the 2015 Women in Technology Life Sciences Outstanding Achievement Award and named a fellow of the Australian Academy of Health and Medical Sciences.
- Professor David Kavanagh was awarded the Distinguished Contribution to Psychological Science Award. It is the highest peer based recognition in Australia.
- Dr Esben Strodl received the Australian Psychological Society College of Health Psychologists' Award of Distinction, recognising significant contributions.
- Professor Michael Schuetz was presented the AOA Research Award 2014 at Australian Orthopaedic Association Annual Scientific Meeting in March 2015.
- Professor Nathan Efron received Australia's premier research prize, the H Barry Collin Research Medal from Optometry Australia; and the Kenneth W Bell Medal from the Cornea and Contact Lens Society of Australia.
- Professor Rik Thompson received the Commitment to NBCF Research Investment Award, recognising a long-term commitment to the National Breast Cancer Foundation.
- Professor Christian Langton received an Honorary Doctorate from the University of Eastern Finland.
- Professor Patsy Yates was appointed to the NHMRC Research Committee.
- Professor Helen Edwards was appointed a member of the NHMRC Ethics Committee.
- Dr Heidi Sutherland was listed on the NHMRC peer-reviewer honour roll.



International collaborations

Collaborative partnerships continued to be built and cemented in 2015, enabling IHBI to take a leading role in improving public health, enabling knowledge sharing and impacting on government policy and decision-making.

Image: His Excellency Governor Zhu Ziaodan, Governor of Guangdong Province, watches virtual fireworks with QUT Vice-Chancellor Professor Peter Coaldrake AO

Guangdong Provincial Department of Science and Technology

QUT signed a research collaboration agreement with China's Guangdong Provincial Department of Science and Technology in 2015, providing a platform for the development of joint research with IHBI in air quality; tissue engineering and regenerative medicine; and public health. The agreement also enables researchers to apply for joint funding in China and Australia.

Guangdong is the largest province in China, has significant science and research depth and offers opportunities for IHBI researchers to work together with Chinese counterparts at scale on shared problems.

Sun Yat-sen University, in Guangzhou, is one of the most important partners of the IHBI-based Australia-China Centre for Tissue Engineering and Regenerative Medicine (ACCTERM), adding to QUT agreements enabling student and staff exchanges and study tours.

Other university partners in the Guangdong Province include South China University of Technology; Guangzhou Medical University, largely focussing on nursing; Guangdong Medical College; and Southern Medical University.

Professor Jean Paul Thiery

Professor Rik Thompson is at the centre of an IHBI collaboration with Professor Jean Paul Thiery that aims to culture cancer cells from blood to tailor medicines for individual patients.

Professor Thiery visited Australia from the National University of Singapore to spend two weeks in IHBI laboratories and share his knowledge with researchers and students.

He developed the most successful method yet for culturing small numbers of circulating tumour cells (CTCs), cancer cells present in blood that are responsible for metastasis. The culturing enables researchers to increase the cell numbers to a point of critical mass for testing medicines.

IHBI researchers aim to use the method of harvesting and propagating cancer cells for treating with various cancer medicines in the laboratory, to test for efficacy before one day being prescribed to patients.

The culturing method has the potential to also provide insights for IHBI lung cancer expert Professor Ken O'Byrne; Australian Prostate Cancer Research Centre – Queensland director Professor Colleen Nelson; and head and neck cancer researcher Associate Professor Chamindie Punyadeera.

Professor Thompson's collaboration with Professor Thierry will involve sharing research data, jointly analysing results and writing papers for scientific journals.

Australia-China Centre for Public Health

The Australia-China Centre for Public Health built on its establishment in 2014, with the second annual Research Forum in Beijing in November 2015.

IHBI Professor MaryLou Fleming led a delegation of researchers to Peking University for the forum, to meet with delegates from Shandong University, Sun Yat-sen University, Shandong Centre for Disease Control and Prevention and the Australian National University. QUT delegates included several heads of school and senior researchers from across the Faculty of Health, IHBI and the Centre for Children's Health Research.

Meeting outcomes included the identification of a number of research projects for collaborative development and submission for funding.

The centre has a focus on collaborative research in public health and aims to advance knowledge and understanding of the evidence base for public health services in an international context.

Support will be provided for developing future research leaders through postdoctoral and PhD student mentorships by international leaders, international teaching, student and staff exchanges, and the transfer of knowledge and skills between the partners.

Australia – China Centre for Air Quality Science and Management

Health impacts were a focus of the Australia-China Centre for Air Quality Science and Management Annual Meeting at QUT in December 2015.

The meeting coincided with the centre's first anniversary and involved leading researchers and government officials from the two countries, with expertise in health effects, personal exposure, adverse birth outcomes, health policy and planning and emission measurement and prevention. The centre was launched in Beijing in December 2014.

IHBI Professor Lidia Morawska leads the centre at QUT, driving transnational research investigating the science of, and solutions to, all forms of air pollution.

Member organisations from China and Australia include the Chinese Research Academy for Environmental Sciences, East China University of Science and Technology, Fudan University, Hong Kong City University, Hong Kong Polytechnic University, Hong Kong University, Hong Kong University of Science and Technology, Peking University, Shanghai Academy of Environmental Sciences, Tsinghua University, QUT, CSIRO Oceans and Atmosphere, Curtin University, the University of New South Wales and the University of Sydney.

Supporting organisations involved in setting the centre's strategic direction include the World Health Organisation; the Chinese Ministry of Environmental Protection; Clean Air Asia; and Queensland's Department of Science, Information Technology and Innovation.

"(Air pollution) already does immense damage to people and the environment, and that damage is expected to intensify as the populations, economies and cities of China and other developing countries expand over the coming decades," Professor Morawska said.

"Pollutants from vehicles, factories and power plants, as well as airborne dust from deserts and exposed soil, cause or contribute to many health problems, especially cardiovascular and respiratory diseases as well as cancer."

OTHER GLOBAL INITIATIVES

- Professor Joanne Wood was the recipient of the 2015 Glenn A Fry Lecture Award, presented at the American Academy of Optometry meeting in New Orleans and given in recognition of research quality, significance, impact, and relevance; and was awarded the Arthur Bennet Prize by the College of Optometrists in the UK for her contribution to the fields of vision, ageing and driving.
- Professor Elizabeth Beattie was inducted into the Sigma Theta Tau International Nurse Researcher Hall of Fame.
- Professor John Aaskov was invited to become an Honorary International Fellow of the American Society of Tropical Medicine and Hygiene.
- Professor Lidia Morawska chaired the World Health Organisation Second Meeting of the WHO Global Platform on Air Quality and Health in Geneva, Switzerland.
- Professor Debra Anderson presented her women's wellness research at the United Nations in New York at the 59th session of the Commission on the Status of Women.
- Professor Michael Schuetz was invited to join an Australian trade delegation led by Mathias Cormann.
- Professor Dietmar Huttmacher received 248 000 Swiss francs from the Swiss AO Foundation for a project entitled Prevention of bisphosphonate related osteonecrosis of the jaws using a novel tissue engineering strategy.
- Geneticist and lecturer Dr Bao Chi Bui from the University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam completed a two-month executive internship at IHBI, working closely with IHBI Executive Director and genomics researcher Professor Lyn Griffiths, as part of an Australian Government Endeavour Fellowship.
- Dr Vaida Glatt was awarded a Swiss AO Foundation start up grant of 99 600 Swiss francs for her research into the effect of fixation stability on fracture healing using mice with different size marrow canals.



Industry involvement

IHBI researchers work with companies on product development, vaccines, therapeutics, diagnostic tests, rehabilitation devices, online interventions, injury prevention and health management systems. Underpinning the research is a focus on commercial application and industrial and clinical relevance.

Image: Dr Trudi Collet

Collaboration with Health Focus Products Australia

A collaboration between Dr Trudi Collet and industry partner Health Focus Products Australia is using compounds from Australian native plants to develop therapeutics for infections and diseases. The collaboration shows great potential in improving the lives of people with Alzheimer's disease, Parkinson's disease and chronic and antibiotic-resistant wounds.

Dr Collet will use her expertise in wound healing, immunology, pharmacology, complementary medicines and molecular microbiology to conduct research into the compounds found in the native plants.

Health Focus Products Australia will provide more than \$1 million to support the research, as well as providing expertise in the development of a marketable product. The funding also incorporates successful grants from the Commonwealth Government's Innovation Connections scheme.

The research will be split into three projects, with two native plants the focus for use as antimicrobials for treating the antibiotic-resistant infection MRSA. Another three native plants will be studied for use in wound healing and antimicrobial and anti-inflammatory properties. The third project will investigate a compound derived from the leaves of a native plant for treating neurodegenerative diseases such as Alzheimer's and Parkinson's.

"Given the increasing incidence of antibiotic resistance coupled with the high prevalence of MRSA-infected wounds, the potential benefits are substantial," Dr Collet said.

"This does not apply just to chronic wounds as the application of a novel broad-spectrum antibiotic could have implications on a global scale, especially since present therapies capable of treating and successfully clearing infections are limited."

Very few medicines capable of significantly promoting wound repair are commercially available. Dr Collet aims to use compounds from three native plants to overcome the high incidence of chronic non-healing wounds, often exacerbated by poor circulation, a person's general ill-health or advanced age.

“Present therapies capable of treating and successfully clearing infections are limited.”

Dr Collet says the research draws on IHBI strengths in tissue repair and regeneration, infectious disease, chronic disease and ageing. It also leverages Health Focus Products Australia’s expertise in product development and industrial-scale therapeutics to ensure the research has a focus on translation and clinical relevance.

Partnership with Johnson & Johnson

IHBI is at the centre of a major new partnership between QUT and healthcare company Johnson & Johnson, established in 2015.

Johnson & Johnson will establish a partnering office at IHBI, providing researchers access to the company’s resources and expertise in industrial research, product development, investor and commercial business sectors to help build, nurture and accelerate Queensland life sciences. The Queensland Government is providing support through a broader Advance Queensland initiative designed to better translate excellence in medical biotechnology research into healthcare products.

IHBI Professor Michael Collins has an ongoing collaboration with Johnson & Johnson Vision Care. In 2015, Professor Collins had two active projects with Johnson & Johnson involving an investment of more than \$1.5 million. The projects are focused on developing better contact lens designs to correct vision problems.

The collaboration with Johnson & Johnson Vision Care has continued since 1998.

Industry link with Blackmores

IHBI’s Genomics Research Centre has a long-standing collaboration with Blackmores, Australia’s leading natural health brand. Blackmores has provided a targeted nutraceutical treatment for three clinical trials, investigating treatment efficacy in reducing the frequency, severity and pain of migraine.

Outcomes from the trials have been promising and IHBI researchers are presently discussing options for marketing the treatment with Blackmores.

- **Dr Beat Schmutz** has worked closely with DePuy Synthes product development groups in Switzerland and the US to translate research into clinical use, including a nail implant to treat femoral fractures. Dr Schmutz has been involved in the development, design and validation of several implants for fracture treatment. The new TFN-Advanced Nail was the latest, with research behind the new product attracting a travel award to the 88th Annual Meeting of the Japanese Orthopaedic Association and a poster award at the AOTrauma Asia Pacific Scientific Congress & TK Experts’ Symposium.
- **Professor Greg Marston** led a successful Australian Research Council Linkage Project bid, securing \$238 265 to work with Jobs Australia Limited on a project titled Seamless Journeys to Work for Young Adults with Physical Disabilities. He also secured an ARC Discovery Project bid for \$210 000 to fund a project entitled Meeting the low carbon challenge: the role of planning and social policy.
- **Dr Ronald Schroeter** led a successful ARC Linkage Project scheme bid, with \$300 000 to partner with Honda Research Institute in the US on a project titled Engaging Augmented Reality on 3D Head-Up Displays to Reduce Risky Driving.
- IHBI’s Injury Prevention and Trauma Management theme hosted an Industry Partnership Showcase featuring high-profile industry partners including Stryker, DePuy Synthes, Vald Performance and Queensland Academy of Sport, highlighting successful theme-industry research partnerships through paired presentations.



Clinical application

IHBI researchers have first-hand understanding of the needs of healthcare professionals, support staff, therapists, carers, patients and their families. The understanding is based on work at multiple sites including hospitals, collaborations with clinicians, industry links and interactions with patients.

Image: Professor Ross Crawford
Facing page: Dr Daniel Timms

IHBI played a major role in assessing a prototype of an artificial heart in 2015, with a successful operation at the Medical Engineering Research Facility (MERF).

Biomedical engineer and QUT graduate Dr Daniel Timms worked with surgeons, engineers and researchers in a MERF operating theatre to implant his artificial heart, the BiVACOR, in an anaesthetised sheep. The operation's success opened the door for additional assessment of the BiVACOR before implanting the device in human patients.

MERF operations manager Anton Sanker said the operation was a highlight for MERF and demonstrated the facility's capabilities in progressing medical research.

"Operations such as this validate important research and take us closer to radical improvements in treatment for disease and injury in the future," Mr Sanker said. "It is exciting to support and enable researchers to take these steps forward."

The MERF operating theatres are used to test biomaterials such as those used for musculoskeletal regeneration and improved procedures including knee arthroscopies. MERF is also used for anatomy education, surgical training and workshops for paramedic training.

MERF deputy director Dr Roland Steck said the facilities, capabilities of staff members and network of collaborators combined at MERF, providing a critical mass of expertise needed to progress research.

MERF is based at the Prince Charles Hospital campus, where Professor John Fraser leads the Critical Care Research Group that developed the experimental models used for the BiVACOR operation.

The facility underpins QUT and IHBI collaborations including those with Imperial College London and the University of Southampton in the UK, the Fraunhofer Institute of Würzburg in Germany and the University of Sydney. Collaborating researchers use MERF to conduct preclinical experiments for the testing of new biomaterials and medical devices.

MERF Director and orthopaedic surgeon Professor Ross Crawford uses the facilities to further a collaboration with global orthopaedics company Stryker, involving two clinical fellowships enabling his team to provide training and research in hip and knee replacement surgery.



“MERF is the best facility in Australia to conduct late-stage preclinical experiments for testing biomaterials and devices for musculoskeletal regeneration.”

Professor Crawford's team is having success in using robotics for knee arthroscopies, easing the physical and mental demands on surgeons. Robots can be designed and programmed to use vision technology to perform precision movements under a surgeon's supervision.

Professor Crawford said benefits included a reduction in patient waiting times and healthcare costs, simplification of new surgeon training and the prolonging of their labour-intensive careers.

“Medical and healthcare robotics is an exciting area of research,” he said. “It wouldn't be possible without being able to be here at MERF and using the facilities that we have that sit under the MERF/IHBI umbrella.”

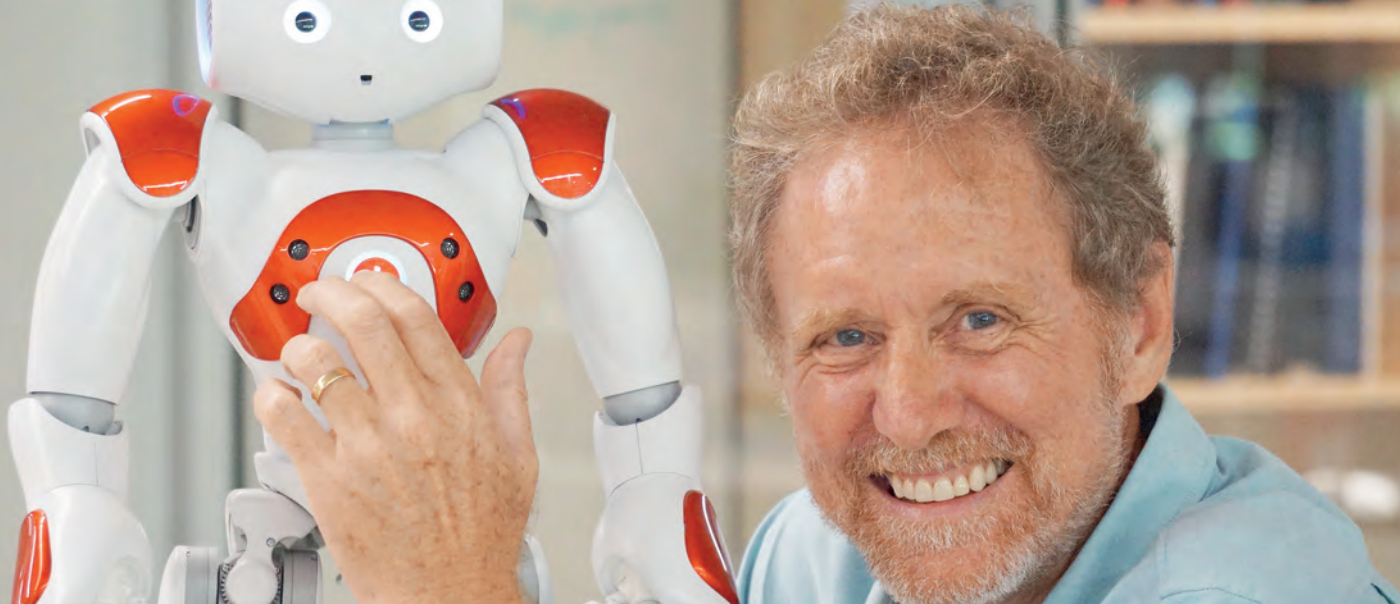
Dr Steck is collaborating with IHBI researchers on projects that focus on the development of new medical devices, biomaterials and orthopaedic procedures for the treatment of bone and cartilage defects, joint disorders and injuries to muscles and ligaments.

“The collaboration gives me insight into the projects and what drives the research activities further,” Dr Steck said. “Here at MERF we are perfectly equipped to apply cutting-edge technology in an environment that is as close as it gets to a clinical setting.

“MERF is the best facility in Australia to conduct late-stage preclinical experiments for testing biomaterials and devices for musculoskeletal regeneration.

“That is because of the facility itself, including its cell culture, mechanical testing and medical imaging capabilities, but also because of the microCT imaging and histology services available at IHBI. MERF is probably one of only a handful of facilities worldwide with all those capabilities.”

- IHBI is central to a research consortium provided with \$25 million in State Government funding to translate genomics research into practice in the healthcare industry. The consortium is coordinated by the University of Queensland and includes QUT, QIMR-B, the CSIRO and Queensland Health. IHBI's Genomics Research Centre will play a major role for QUT, with expertise in molecular diagnostics and genomics, including neurogenetics diagnostic testing; clinical genomics testing at the PA Hospital and TRI; and DNA sequencing focussed on cancer genomics at TRI.
- IHBI's Australian Centre for Health Services Innovation (AusHSI) was provided with renewed Queensland Department of Health funding for a further two years to help hospital and health services achieve excellence in service delivery. It follows an external review of AusHSI in 2014 resulting in strong commendations. In the previous three years of operations, AusHSI supported 40 research initiatives worth more than \$2.4 million. Findings from four of the grants demonstrated how \$160 million in savings could be made as well as improving health outcomes.
- **Professor Lisa Nissen** led the HealthFusion Team Challenge; Building Stronger Healthcare Queensland project to a third place in the Nurturing Employability Award category of the Wharton-QS Stars Awards.
- **Associate Professor Adrian Barnett** secured an Australian Heart Foundation Vanguard Grant to investigate thermal clothing to reduce morbidity in winter.
- **Associate Professor Dale Nyholt, Professor Lyn Griffiths, Dr Miles Benton and Associate Professor Rod Lea** co-authored two articles published in prestigious journal *Nature*.
- **Professor Elizabeth Beattie** conducted the first study on the quality of life for people with dementia in Australian aged care facilities.
- **Associate Professor Beatrix Feigl** was the first to show Intrinsically photosensitive retinal ganglion cells (ipRGC) are affected in macular degeneration.



Excellent facilities for translating research

IHBI facilities enable researchers to see how disease, injury and ageing impact on people. State-of-the-art equipment is matched with multidisciplinary teams of clinicians, researchers and engineers at multiple sites. The combination ensures research relevance, impact and efficacy.

Image: Professor David Kavanagh

Mental imagery is a major component of Professor David Kavanagh's research into helping people strengthen and sustain their motivation for leading healthy lifestyles. Research from Professor Kavanagh's team has potential to improve the lives of people with chronic illnesses such as diabetes and address problems with alcohol use, smoking, physical inactivity and diet.

His research team relocated to the new Centre for Children's Health Research (CCHR) in 2015. The relocation enables the research team to continue refining use of the latest technology, including web-based psychological programs, phone apps and, most recently, robots. The team is also building collaborations with clinicians at the adjacent Lady Cilento Children's Hospital.

CCHR brings together child and adolescent health researchers to create a critical mass of expertise and specialist knowledge covering childhood cancer, Indigenous health, infectious diseases, physical activity, obesity, burns and wound repair.

"An important component of what my colleagues and I do is with young people and being at a children's health research centre is really very important for furthering that," Professor Kavanagh said. "Being able to talk to other people from different disciplines enables me to be more effective at what I am doing – to provide practical, real-world solutions to people."

Professor Kavanagh provided early success at CCHR in 2015, securing \$895 032 in new funding from a National Health and Medical Research Council Project Grant for his team to research a new, low-cost e-health treatment for Alcohol Use Disorder using mental imagery.

Alcohol Use Disorder treatment

Professor Kavanagh is applying 10 years of research into desire and motivation to the effective self-management of alcohol misuse, particularly when a person is dealing with periods of acute temptation and craving.

The project involves a large randomised controlled trial to compare the impact of three forms of motivational intervention on Alcohol Use Disorder, tracking their outcomes for 12 months and examining their relative cost-effectiveness. The treatments are delivered by phone – and in some cases are supported by mobile phone apps. A particular focus is whether training people to use imagery in everyday situations will affect alcohol consumption and quality of life, and whether increased delivery costs are offset by greater gains.

Since the treatment can be delivered by phone and requires only four hours of therapist contact, it has potential to be taken to scale, servicing large numbers of affected Australians. Strong and sustained results to date give researchers a realistic expectation that the program will have a substantial impact on people who receive it.

Robots for adolescents with diabetes

Professor Kavanagh is collaborating with clinicians in the Endocrinology Department at the Lady Cilento Children's Hospital, with plans to use robots to improve glycaemic control in adolescents with type 1 diabetes. Adolescence is a period when adherence rates fall dramatically, with potentially serious long-term effects on health.

The collaboration involves a novel intervention called Functional Imagery Training (FIT), with a multi-platform app to cue imagery practice, build confidence and create plans. Researchers are exploring FIT delivery via robots, considered especially appropriate for early adolescence.

Using 30-minute robot-led FIT sessions and Skype sessions, Professor Kavanagh aims to help adolescents become more adept at controlling their blood sugar, by restricting high-carbohydrate snacking and using insulin effectively.

"The research is important," Professor Kavanagh said. "Non-adherence to diabetes regimens in adolescents has very serious potential consequences including a greater risk of retinopathy, kidney disease, neural and cardiovascular disease."

"An important component of what my colleagues and I do is with young people and being at a children's health research centre is really very important."

Translational Research Institute (TRI):

IHBI researchers based at TRI continued to have success in 2015 in securing funding, building collaborations and ensuring a clinical focus on their activities. Australian Prostate Cancer Research Centre – Queensland Director Professor Colleen Nelson led two successful National Health and Medical Research Council (NHMRC) funding bids. Dr Michael Doran was awarded an NHMRC Project Grant to lead a team of researchers and clinicians investigating a novel in-vitro and in-vivo prostate cancer model system.

Medical Engineering Research Facility (MERF):

A major achievement in 2015 was the recommendation from NATA for GLP recognition for MERF. GLP recognition represents a significant opportunity for MERF to conduct pre-clinical testing for medical device companies seeking to potentially bring a product to market. MERF also held 60 Surgical Training and Education workshops in 2015, involving medical device companies and specialist allied health organisations. The Surgical Orthopaedic Anatomy Course involved 29 registrants with a future focus on other allied health professionals. QUT had 226 second-year undergraduate students participating in the Paramedic Management of Medical and Surgical Emergencies Course at MERF.

Herston Imaging Research Facility (HIRF):

HIRF was opened in late 2015, enabling IHBI researchers to use state-of-the-art biomedical imaging technology to enhance understanding of the human body and improve patient diagnoses and treatments through research and training. IHBI researchers using the technology have an interest in brain disorders, cardiovascular disease, injuries and cancer. HIRF adjoins the Royal Brisbane and Women's Hospital, providing access to patients and staff for clinical trials.

QIMR Berghofer partnership:

IHBI and QIMR Berghofer entered into a partnership in 2015 that will promote greater collaboration. IHBI will have access to specialist health and medical research facilities in the QIMR Berghofer complex. QUT research strengths in health sciences, automation, big data, mathematics and technology will complement QIMR Berghofer's biomedical science expertise. The collaboration will enable translational research with a focus on infectious disease, neuroscience and neuroimaging.



Capability building

A focus on building capability is attracting the best minds to IHBI, with high-level appointments made in 2015 advancing IHBI research at newly-established facilities and strengthening key research areas. It creates critical mass, strengthens an established culture of collaboration and adds to the multidisciplinary approach to research.

Image: Professor Greig de Zubicaray
Facing page: Professor Geoff Cleghorn

Professor Greig de Zubicaray: neuroscience and neuroimaging

Professor Greig de Zubicaray was appointed Assistant Dean (Research) of QUT Faculty of Health and IHBI Deputy Director in 2015. He brings a wealth of knowledge in neurobiology of language and memory, cognitive neuroscience, neuroimaging and psycholinguistics and will establish research projects at the newly-constructed Herston Imaging Research Facility (HIRF).

His focus is on brain mechanisms responsible for language processing and the effects of injuries due to tumours and stroke.

Professor de Zubicaray said language was important to recovery for patients after both surgery to remove a tumour and a stroke. Language impairment is directly linked a person's ability to return to work, social interaction and even long-term survival.

Yet treatment options for tumour and stroke patients differed. The slow growth typically associated with a tumour enabled the brain to reorganise its language and cognitive functions in regions away from the tumour site. A stroke, on the other hand, was sudden and often without warning.

"Different pathophysiological mechanisms responsible for stroke and primary brain tumours necessitate different approaches and imaging protocols," Professor de Zubicaray said. "It is exciting to have access to state-of-the-art imaging equipment at HIRF and leverage those capabilities to design projects that advance our understanding in these areas."

Such knowledge has the potential to improve the survival rates and quality of life of people with brain tumours and those recovering from a stroke.



HIRF involves IHBI partnering and collaborating with the Royal Brisbane and Women's Hospital, the University of Queensland, and the QIMR Berghofer Medical Research Institute. The facility will enhance understanding of the human body and improve patient diagnoses and treatments via research and training activities.

HIRF adjoins the hospital, providing access to patients and staff for clinical trials. The technology available at the facility will progress IHBI research into brain disorders, cardiovascular disease, injuries and cancer.

Professor de Zubicaray is designing research projects that involve capabilities in neuroimaging with MRI. The technology will also enable him to expand his knowledge in how a person's genome, a complete set of DNA that includes all genes, enables the human brain's unique capacity for speech.

Professor Geoff Cleghorn: children's health

Professor Geoff Cleghorn was appointed QUT IHBI Director at the Centre for Children's Health Research (CCHR), QUT Professor in Child Health and senior paediatrician at the Children's Nutrition Research Centre at CCHR. He brings expertise in energy expenditure and body composition analysis to disease states including chronic liver disease, cystic fibrosis and nutritional rehabilitation.

IHBI-CCHR's 63 academic researchers and professional staff, 47 research higher degree students and increasing numbers of adjunct titleholders constitute nine research teams in disciplines including nutrition and exercise science, burns and trauma, paediatric spinal research, child development, allergy and pollen research, medical microbiology, sleep pathophysiology and respiratory medicine.

Professor Cleghorn brings with him more than 30 years of experience as an active clinician and researcher in paediatrics, paediatric gastroenterology and nutrition. He has been an invited lecturer and public speaker on a number of infant related issues including perinatal and paediatric nutrition.

His experience and reputation will enable Professor Cleghorn to assist in leveraging new research linkages between QUT, IHBI and the broader paediatric community within Child Health Queensland and developing new linkages across the region. He will also assist in mentorship of early and mid-career researchers in his new role.

Professor Cleghorn said the renewed attention applied to the health and wellbeing of vulnerable infants and young children is paramount for the subsequent overall development and health of people throughout their entire life. "Our understanding of perinatal and infant nutrition has led to significant changes in our understanding of this time period," he said. "QUT's new and strategic emphasis on child health research and scholarship is both vital and timely."

OTHER IHBI INITIATIVES

- Joint appointments made in 2015 will facilitate research collaboration and translation, including Professor Carolyn Mountford's conjoint appointment to TRI and the QUT Faculty of Health as Professor of Radiology.
- Professors Theresa Green and Fiona Coyer were each appointed as Professor of Nursing, involving roles at Metro North Hospital and Health Service and QUT School of Nursing.
- Professor Paul Cumming is a joint appointment encompassing roles at QIMR Berghofer and QUT School of Psychology.
- Associate Professor Dale Nyholt adds capacity in statistical and genomic epidemiology, specifically in migraine research.
- Dr Oliver Neubauer is a Senior Research Fellow investigating the links between the inflammatory state and the roles of exercise and diet.
- Adjunct Associate Professor Ray Chan was appointed Director of Research and Innovation at West Moreton Hospital and Health Service, to develop infrastructure and support clinicians to translate research into practice.
- Neuroscientist Dr Belinda Garner was appointed to TRI, to investigate novel treatments to enhance biological resilience to stress.
- The IHBI Visiting Researcher Program provided funding for researchers of strategic importance to visit IHBI and generate research activity. The funding attracted seven researchers from France, Austria, China, New Zealand and the US.
- IHBI Sponsorship Scheme funding was provided to nine researchers to host selected international conferences and symposia; and provide event sponsorship.
- Dr Jyotsna Batra received a QUT Bluebox/IHBI BIO 2015 Travel Fellowship to attend the week-long intensive networking event that attracts more than 15 000 biotechnology and pharma leaders and enables knowledge sharing, collaboration and investment.
- IHBI offered 21 research development events in 2015 to enhance researcher capacity, including workshops and forums covering career development, grant refinement and funding opportunities.



Higher Degree Research support

IHBI is attracting and supporting higher degree research students, providing them with significant opportunities to develop research and analysis skills, be part of multidisciplinary teams of leading scientists and build a collaborative network.

Image: PhD candidate Joan Rohl

Joan Rohl: chronic wound healing

Joan Rohl is nearing completion of her PhD studies in wound healing and credits mentoring and support at IHBI with her success in securing international travel grants, two publications and several awards.

Ms Rohl received an Australia and New Zealand Society for Cell and Development Biology (ANZSCDB) Leica PhD Student International Travel Award to present at a joint meeting of the European Tissue Repair Society and the Wound Healing Society in Copenhagen, Denmark in 2015. She also secured an Australian Wound and Tissue Repair Society (AWTRS) International Conference Travel Award and a QUT Faculty of Health Grant-in-Aid to support the travel and conference attendance.

While in Copenhagen, she met leading scientists at the Statens Serum Institut, one of Denmark's largest health research institutions. Meeting Professor Karen Krogh and Dr Mette Skindersø enabled Ms Rohl to gain insights valuable for her PhD studies into ways to dampen inflammation in wound healing.

The studies involve investigating how enzymes that prevent new tissue from forming in chronic wounds are released from immune cells. With the support of supervisor Dr Rachael Murray, Ms Rohl has identified proteins inside immune cells that regulate the process and may be targeted therapeutically to improve wound healing outcomes.

Success in the work led to two first-author publications for Ms Rohl in the journal *Wound Practice and Research* and two more manuscripts being prepared. Since 2013, she has also won or placed in poster award competitions at Australian Society for Medical Research, AWTRS and ANZSCDB conferences.

Ms Rohl is expected to complete her PhD studies in 2016 and plans to further her career in an area of tissue repair and regeneration. "I am interested in continuing in research," she said. "I enjoy the challenges that research presents and I thrive in a collaborative, multidisciplinary team with input from colleagues who bring skill-sets different to my own. That is certainly what I have found at IHBI."

“My aim is to join an immunology team in which I can make an innovative contribution to translational research. The skills I have learnt at IHBI, the network of contacts I have made through my research, conference presentation and my travels will enable me to make that contribution.”

Laure Martine: models to study bone metastasis

Research excellence while Dr Laure Martine was still a student has been recognised with a 2015 ASMR Postgraduate Student Award from the Australian Society for Medical Research. The award rewards her work on tissue-engineered models that aim to understand mechanisms involved in breast cancer-induced metastasis into bone.

After completing her PhD as a member of Professor Dietmar W Hutmacher’s regenerative medicine group, Dr Martine continued her work at IHBI as a Postdoctoral Research Fellow. Support for her work was provided in 2015 with an IHBI Early Career Researcher grant.

The work involves multidisciplinary research across tissue engineering, disease models, stem cells and cancer research disciplines and has been featured in high-impact journals such as *Biomaterials*, *Stem Cells* and *Oncotarget*.

It aims to better understand and ultimately treat bone metastasis that occurs in 80 per cent of women with advanced breast cancer and remains incurable to date. Hampering the development of new therapies is the lack of an appropriate model to mimic the disease. The tissue-engineered models that Dr Martine developed were based on human cells obtained from adult patients to accurately reproduce interactions of human breast cancer cells and human bone.

“The model provides a platform to investigate potential therapeutic targets and improve our understanding of bone metastatic disease,” Dr Martine said. “I believe the multidisciplinary nature of our team and the cutting-edge technologies we use enable us to create better tools for cancer biologists and researchers to gain a better understanding and one day impact on treatment regimes for people with bone metastatic disease. That is why I am passionate about the research we do.”

“I enjoy the challenges that research presents and I thrive in a collaborative, multidisciplinary team.”

- Recent PhD graduate **Boris Holzapfel** was first author of the publication recognised as the overall winner of the Carla Patterson Awards, announced at IHBI in December. The publication details homing mechanisms of prostate cancer metastasis in tissue-engineered bone and was featured in the journal *Biomaterials* while Dr Holzapfel was still a PhD candidate.
- **Holly Harris** was awarded an Endeavour Postgraduate Scholarship, enabling six months of research collaboration at the University College of London.
- **Elizabeth Brown** received the Princess Alexandra Hospital Young Investigator of the Year Award in the Student-Clinical category.
- **Marie-Luise Wille** was a finalist for the Women in Technology PhD Career Start Award, recognising research excellence.
- At the TRIP symposium, **Xi (Bob) Zhang** was awarded the Novice award and New TRIPster Award for impressive new investigator study for his presentation Saliva: Linking oral health with heart failure.
- **Michelle Fitts** received the Peter Vulcan Award for the best paper at the Australasian Road Safety Conference 2015.
- **Nataly Stylianou** was recognized for the best student and early career researcher oral presentation at the VII International Epithelial-Mesenchymal Transition (EMT) Meeting.
- **Arutha Kulasinghe** won the best student and early career researcher oral presentation at the 2nd Thomas Ashworth CTC symposium at same EMT Meeting.
- **Peter Mulvey** received the student poster prize in mucosal immunology at the Australian Society for Immunology meeting in Canberra.



Early career researcher, mid-career researcher support

Outstanding early career researchers and health practitioners at IHBI are demonstrating their skills and capabilities as future leaders. They are conducting important research, collaborating internationally, gaining high-level recognition and securing competitive national funding.

Image: Dr Ronald Schroeter
Facing page: Dr Yinghong Zhou

Dr Ronald Schroeter: reducing risky driving

Dr Ronald Schroeter leads a collaboration with the Honda Research Institute that aims to use cutting-edge in-car technologies to address risky driving behaviour, using an Australian Research Council Linkage Project grant of \$300 000.

Dr Schroeter is working with colleagues at IHBI's Centre for Accident Research and Road Safety – Queensland (CARRS-Q) to understand how to use augmented reality to induce a state of optimal engagement and performance among drivers. The research will include use of IHBI's advanced driving simulator, incorporating a life-size car mounted on a motion platform that enables observation and accurate recording of a driver's physiological state, reactions and skills.

The multidisciplinary work will inform visual design principles for three-dimensional augmented reality head-up displays that Honda researchers have developed and installed on the windscreen of a driveable prototype car.

Contributing to the research are IHBI professors Andry Rakotonirainy, with expertise in road safety and context-aware systems, and Joanne Wood, with skills in vision and driving; and Associate Professor Daniel Johnson, with experience in psychology and human-computer interactions.

Collaboration with CARRS-Q colleagues enables Dr Schroeter to benefit from its long-term partnerships with government and industry bodies in many countries, involving education, shaping public debate and influencing policymakers in road safety.



Dr Yinghong Zhou: periodontal regeneration

Collaboration with some of the world's best minds through IHBI's Australia-China Centre for Tissue Engineering and Regenerative Medicine (ACCTERM) and national competitive funding is assisting Dr Yinghong Zhou in her research.

Dr Zhou received a National Health and Medical Research Council (NHMRC) Early Career Peter Doherty – Australian Biomedical Fellowship to support her research into periodontal regeneration. The funding is a major achievement given she completed her PhD studies under IHBI bone and tissue engineering researcher Professor Yin Xiao less than two years ago.

She is developing a novel implant to enhance tissue regeneration in people with periodontitis, an inflammation that can degrade specialised supportive tissue and ultimately lead to a loss of teeth.

The implant is created using bio-ink and a person's stem cells to form an intricate construct that encourages the body's regenerative mechanisms. Infusing growth enhancer and a person's own stem cells encourages growth of the correct tissue type to repair the site and overcomes the fear of rejection associated with donated organs or foreign material. The construct will eventually break down in the body as new tissue grows to replace it.

Dr Zhou says IHBI is an advantageous place for the work, given its multidisciplinary approach to research, focus on clinical relevance and international links to a network of leaders in their field. She works closely with Professor Xiao, who heads ACCTERM and has more than 10 years of clinical experience.

Dr Tim Dargaville: new materials for medical use

Mentoring has been an important element in Dr Tim Dargaville's success in building a research career at IHBI. Dr Dargaville has secured an Australian Research Council Future Fellowship to further his research and enable travel to international conferences and labs of collaborators in Europe and the US.

He is developing a 3D micro-moulding process for accurately manufacturing biomaterials based on hydrogels that can be used for tissue transplants, cell guides for treating spinal cord injuries, soft robotics and microfluidic devices to study cancer metastasis.

An aim of the newly-funded research project is to overcome the difficulty in reproducing in hydrogels the transport properties, such as vascularisation, that are found in human tissue. Vascularisation is a natural process whereby body tissue develops capillaries and enables blood flow.

Dr Dargaville said his IHBI colleagues collaborated widely with key international researchers and appreciated the importance of ensuring their work had clinical relevance and scale-up potential for industry.

The Future Fellowship will support Dr Dargaville in attending and presenting at international conferences in the US, Canada, Germany and the Netherlands until 2018. Travel will also enable him to undertake secondments in the laboratories of collaborators in Belgium, Germany, the US and Wollongong in Australia.

"IHBI places an emphasis on mentoring programs and supporting of early-career researchers in building their careers," Dr Dargaville said. "I had invaluable mentoring from Professors Graeme George and Zee Upton when I was recruited as deputy leader of the Tissue Repair and Regeneration program at IHBI, with a multidisciplinary team and exciting research at the interface between polymer materials science and biology."

OTHER ECR/MCR HIGHLIGHTS

- Dr Sally Staton received an NHMRC ECR Fellowship for her work entitled Sleep health and sleep problems in early childhood: What role does childcare play?
- Associate Professor Willa Huston was awarded the inaugural Franklin Women travel scholarship, an award that pays child care costs while a primary caregiver attends a conference.
- Dr Jyotsna Batra was recognised with the QUT Vice-Chancellor's Award for Excellence for Academic Leadership, Research.
- Dr Simon de Veer won the 2015 Henner Graeff Young Investigator Award for presenting impressive results with high significance at the international Symposium on Kallikreins and Kallikrein-Related Peptidases.
- IHBI Early Career Researcher Scheme funding, for talented researchers or teams to undertake innovative research, was provided to doctors Laure Martine, Ali Shokoohmand, Marie-Luise Wille, Mariann Martins, Katie Page, Nathalie Bock, Alison Carey, Johanna Kenyon, Christina Parker and Brian Tse.
- The IHBI MCR Scheme, to build capacity in mid-career researchers to enhance their opportunity to apply for external funding, provided support to Associate Professor Jane Shakespeare Finch and doctors Elena Juan Pardo, Indira Prasadam, Luke Johnson, Elke Hacker, Mandana Mazaheri, Jyotsna Batra, Jenny Ekberg and Shivashankar Nagaraj.



Contributing to the public good

Links with the community and an understanding of people's behaviour, genetics and disease risk ensures IHBI research is targeted to produce better health outcomes. The understanding drives development of prevention strategies and treatment options, while collaboration gives people an opportunity to see how technology and innovation can shape the future.

Image: Professor Stewart Trost

Early prevention of obesity in childhood

Translating research so that families benefit is a major aim of IHBI Professor Stewart Trost, as he establishes the Queensland node of the Centre of Research Excellence (CRE) in the Early Prevention of Obesity in Childhood.

Working with IHBI colleague Professor Lynne Daniels at the Centre for Children's Health Research, Professor Trost will determine how best to ensure obesity prevention programs borne from evidence-based research are rolled out to the public and have a real health impact.

"Translating research into practice requires an understanding of the policy context and how to engage clinical practitioners and parents in the community," he said.

The CRE aims to address knowledge gaps such as determining the most effective obesity prevention programs for children up to the age of five; and the most accurate monitoring of obesity-related behaviours, given the large variations in activity, sleep and diet among children.

It also aims to evaluate obesity preventions targeting children for cost-effectiveness, acceptability, sustainability and scalability.

Funding for the CRE was secured from the National Health and Medical Research Council in a bid led by the University of Sydney. IHBI researchers will collaborate with CRE partners at the University of South Australia, the University of Sydney and Deakin University.

The centre's ultimate objectives include developing rapid, validated measurement tools of key obesity-related behaviours and user-friendly online resources. The tools and resources will be designed to address poor diet, inadequate sleep and insufficient activity, known to be key obesity-related behaviours among infants and young children.

Parenting, eating and activity for child health

IHBI researchers are helping Queensland families with children above the healthy weight range with a free lifestyle program that arms parents with the skills and confidence to enable the whole family to eat better and be more active.

Professor Lynne Daniels leads the PEACH (Parenting, Eating and Activity for Child Health) program, with funding from the State Government to roll out the program around Queensland.

More than 800 families and 1000 children have already taken part in the program's group sessions, delivered by trained facilitators at more than 40 sites across Queensland. Topics covered include behaviour change, people's relationship with food and making active play enjoyable.

Outcomes to date show that the program has resulted in some reduction in weight among participants, improvements in diet and activity levels and increased parent confidence to manage eating and activity for their family.

TOMMORROW Trial

People from around South East Queensland have been recruited for an ongoing global clinical trial studying genetic risk and investigating a potential treatment that may reduce early symptoms associated with Alzheimer's disease.

IHBI Executive Director Professor Lyn Griffiths is Program Director of the TOMMORROW Trial, with QUT among the 50 participating trial sites worldwide. Recruitment for the trial concluded in September 2015, with participants continuing on the trial treatment for five years while being assessed for changes in their cognitive state.

Professor Griffiths said TOMMORROW was the largest clinical trial of its type being conducted globally. "We are pleased to be involved as one of the four Australian sites," she said. "Outcomes from this long-term study will help in developing a genetic test to predict the risk of developing Alzheimer's disease, as well as determining the efficacy of a new treatment to slow the onset of cognitive decline."

"Translating research into practice requires an understanding of the policy context and how to engage clinical practitioners and parents in the community."

- IHBI provided Queensland Minister for Science and Innovation, the Honourable Leeanne Enoch MP, an insight into biofabrication, breast cancer and genomics research during a tour of laboratories.
- Queensland Minister for Health, the Honourable Cameron Dick MP, also visited IHBI in 2015.
- Peers, collaborators, industry partners, clinicians and health administrators joined IHBI researchers at the 2015 IHBI Gala Dinner in October, with a showcase of IHBI research highlighting innovation, use of technology, clinical relevance and key collaborations. The program featured a keynote address from Dr Daniel Timms, a QUT graduate and inventor of innovative artificial heart, the BiVACOR; and an opening address from Queensland Minister for Health, the Honourable Cameron Dick MP.
- IHBI held its fundraising breakfast Pink Ribbon, Blue Sky in October, showcasing research diversity, collaboration and translation; and acknowledging the personal, family and community impact of women's cancers. Pink Ribbon, Blue Sky raised more than \$3700 for IHBI and the National Breast Cancer Foundation.
- IHBI's External Engagement Committee (EEC) welcomed new members Professor Michael Irving and Jane Seawright; and appointed new ambassadors Ian Humphries and Helen Besley. The EEC aims to provide community engagement and networking opportunities, advocate for IHBI in the community, cultivate philanthropic prospects and provide advice on profiling opportunities benefiting IHBI and its research.
- The EEC held a successful profiling event as part of its focus on bridging the gap between IHBI and the broader professional community. An Evening with Allan Border AO was held in conjunction with Ashurst to introduce the law firm's clients to IHBI and highlight skin cancer research conducted at the institute. It was IHBI's first profiling event and attracted more than 100 guests.



Knowledge transfer

IHBI brings together the best minds from around the world, collaborates widely and takes seriously its role as a member of the research community. Researchers are actively pursuing avenues for networking and the transfer of knowledge.

Image above: Speakers at the International Symposium on Kallikreins and Kallikrein-Related Peptidases

Facing page: Professor Narelle Haworth at the Australasian Road Safety Conference 2015

Kallikrein conference

Distinguished Professor Judith Clements chaired the International Symposium on Kallikreins and Kallikrein-Related Peptidases (ISK2015), attracting speakers from the US, Canada, the UK, France, Germany, Austria, Finland and around Australia.

ISK2015 was held across four days at the Translational Research Institute in October 2015, covering topics such as tumour microenvironments, barrier function, neural patterning, cardiovascular biology and pathology, cancer biomarkers, genetics and epigenetics and structural biology.

A highlight for IHBI at ISK2015 was Dr Simon de Veer's win in the 2015 Henner Graeff Young Investigator Award, recognising his research in rational design, synthesis and characterization of inhibitors targeting skin-expressed kallikreins and new therapeutic avenues for treatment of skin diseases.

Global researchers at TEMTIA

IHBI Professor of Breast Cancer Research Rik Thompson was the conference convenor of the Epithelial Mesenchymal Transition International Association conference (TEMTIA-VII) in Melbourne. He arranged a program that included plenary speakers from RIKEN in Japan, Cancer Research UK Manchester Institute and the Institute of Molecular and Cell Biology (IMCB) in Singapore.

TEMTIA was designed to bring together developmental biologists, cancer biologists and pathologists, who might not normally interact in discipline-specific meetings, to discuss the common and disparate elements of epithelio-mesenchymal transition in their various research fields.

Results presented at TEMTIA in cancer metastasis, organ fibrosis, wound healing and embryonic development are expected to lead to new insights and approaches that will move each of the respective research fields and advance health research.



Brisbane Cancer Conference

IHBI lung cancer expert Professor Ken O'Byrne coordinated the two-day Brisbane Cancer Conference in December, with the aim of advancing collaborative efforts in cancer research.

The conference included satellite symposia, plenary lectures and tumour-site specific workshops and attracted about 500 people. Workshops covered genomics, morphology, diagnosis, clinical interventions, radiology, imaging, targeting, clinical trials and palliative care.

Among IHBI speakers were Executive Director Professor Lyn Griffiths, detailing genomics research in Brisbane; QUT School of Nursing head Professor Patsy Yates, addressing patient outcomes in research; Professor Sandi Hayes, talking about exercise in cancer care; and Associate Professor Derek Richard, outlining DNA repair.

IHBI RESEARCHERS PLAYED MAJOR ROLES IN NATIONAL AND INTERNATIONAL CONFERENCES, AS ORGANISERS, HOSTS AND PRESENTERS.

- The Centre for Accident Research and Road Safety – Queensland hosted the Australasian Road Safety Conference 2015, sharing information to make roads safer and reduce road injuries and deaths.
- Australian Prostate Cancer Research Centre-Queensland director Professor Colleen Nelson hosted the Prostate Cancer Collaborative Research 2015 Symposium at TRI in November, providing an opportunity for prostate cancer clinicians, scientists and other professionals to share research. The symposium attracted presenters from Canada, the US, Ireland, the UK and Australia.
- Leading biomaterial, tissue engineering and regenerative medicine scientists from QUT, Griffith University and top universities and research institutes in China came together for the Australia-China Centre for Tissue Engineering and Regenerative Medicine's third annual research forum, hosted at IHBI and on the Gold Coast. Researchers at the forum, chaired by Professor Yin Xiao, shared emerging science, exchanged ideas, strengthened collaborative links and developed innovative research project concepts.
- IHBI Professors Colleen Nelson and Rik Thompson convened the Brisbane Diamantina Health Partners Circulating Tumour Cell Symposium at TRI in March. The symposium attracted 130 delegates from QUT, the University of Queensland and Griffith University, affiliated research institutes, Queensland Health and representatives from universities, government agencies and industry from around Australia.
- IHBI and QUT's Institute for Future Environments co-hosted B3, Big Biology and Bioinformatics Symposium in November, with a focus on integrating multiple 'omics' data sets for the dissection of complex problems in human health, plant biology and non-model systems.
- IHBI hosted 28 undergraduate and postgraduate students from Peking University, Sun Yat-sen and Nanjing Medical University as part of a study tour. The visit included a presentation from Australia-China Centre for Tissue Engineering and Regenerative Medicine director Professor Yin Xiao highlighting the diverse research conducted at IHBI and a tour of laboratories.
- The first MERF Research Day in May was a success, with more than 30 participants from IHBI and the Prince Charles Hospital's Critical Care Research Group in attendance. The 12 presentations of research projects, methods and capabilities showcased a variety of research conducted at MERF and opened the door to potential new collaborations.

Research quality

Funding

IHBI's external funding exceeded \$46 million in 2015, representing 47 per cent of QUT's total research income awarded during the year.

The National Health and Medical Research Council (NHMRC) awarded \$3 150 504 in competitive research funding and another \$1 573 780 came from the Australian Research Council (ARC).

IHBI research income received in 2015

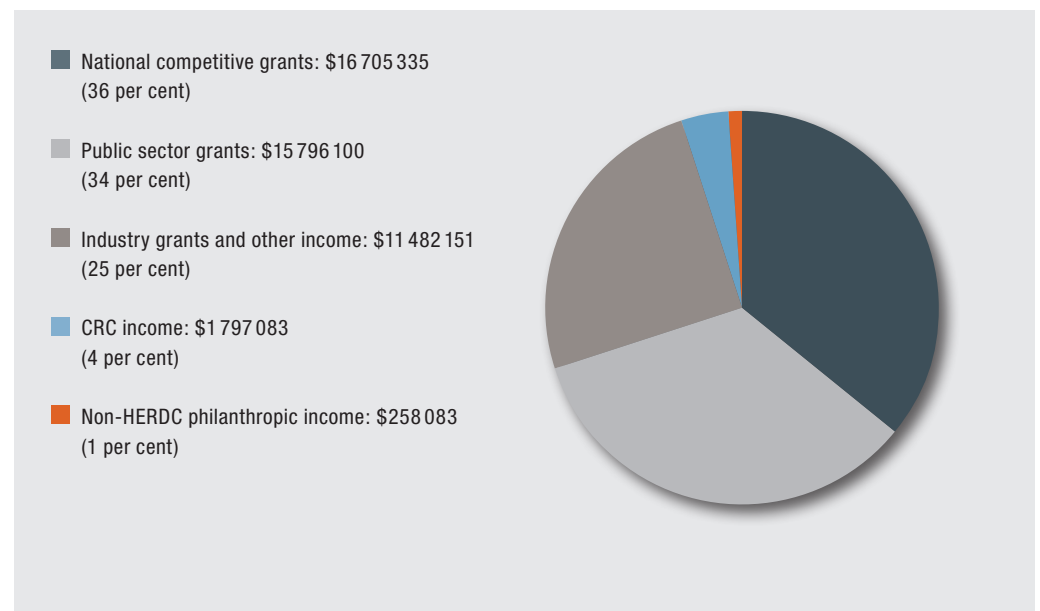


Figure 1: IHBI research income received in 2015 (provisional HERDC data based on December 31, 2015 figures)

Philanthropic and development funding

A range of individual donors, philanthropic foundations and trusts and corporations contributed \$5.76 million to IHBI research and community service projects.

Philanthropic and foundation funding in 2015 included contributions from:

- Aboriginal and Torres Strait Islander Healing Foundation Limited
- Access Community Services Ltd
- Alzheimer's Australia Inc
- ANZUP Cancer Trials Group Limited
- Arthritis Foundation of Australia
- Australian and New Zealand Association of Oral and Maxillofacial Surgeons
- Australian Dental Research Foundation Inc
- Australian Orthopaedic Association
- Australian Prostate Cancer Research Centre
- Australian Red Cross Society
- Cancer Council Queensland
- Chenhall Charitable Trust
- Collective Donations
- CQ Prostate Support & Awareness Group
- Equity Trustees Wealth Services Limited
- F A Wilson Trust
- Gallipoli Medical Research Foundation
- Hammond Care Group
- Ian Potter Foundation
- ICON Cancer Foundation
- It's a Bloke Thing Foundation
- L Di Lizio and Pty Ltd
- Lioness Club of Palm Beach Currumbin
- Lions Club Capalaba
- Lung Foundation
- Macular Disease Foundation Australia
- Mater Misericordiae
- Mates in Construction Ltd
- McKenzie Park-Nerang Mens Bowls Club
- Medical Advances Without Animals
- Movember Foundation
- Murdi Paaki Regional Enterprise Corporation
- National Breast Cancer Foundation
- National Heart Foundation
- Nicol Foundation
- Northgate Remembrance Lodge No.285
- NRMA – ACT Road Safety Trust
- Prince Charles Hospital Foundation
- Princess Alexandra Hospital
- Prostate Cancer Foundation of Australia Limited
- Queensland Community Foundation
- Queensland X-Ray
- Robyne Fisher & Associates Pty Ltd
- Royal Brisbane and Women's Hospital Foundation
- Sisters of Charity of Australia
- The Atlantic Philanthropies
- The Children's Hospital Foundation
- The Movember Group Pty Ltd
- The Salvation Army
- The Trustee for Queensland Orthopaedic Research Trust
- The Wesley Research Institute LTD
- White Cloud Foundation

Philanthropic and development income

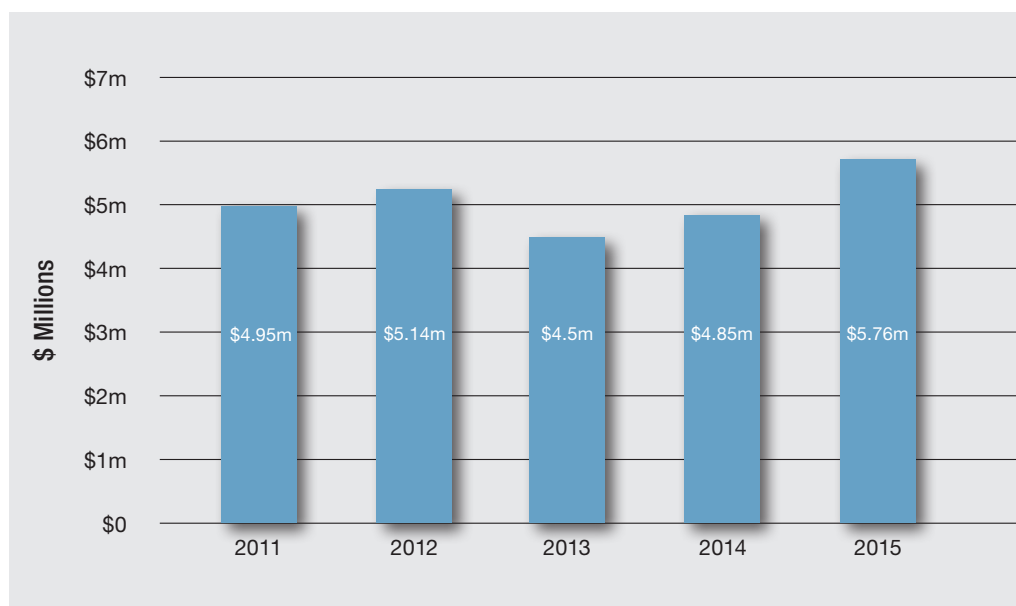


Figure 2: Philanthropic and development income has stayed consistently strong and grew from 2014 to 2015

Publications

IHBI research was disseminated in 874 peer-reviews publications.

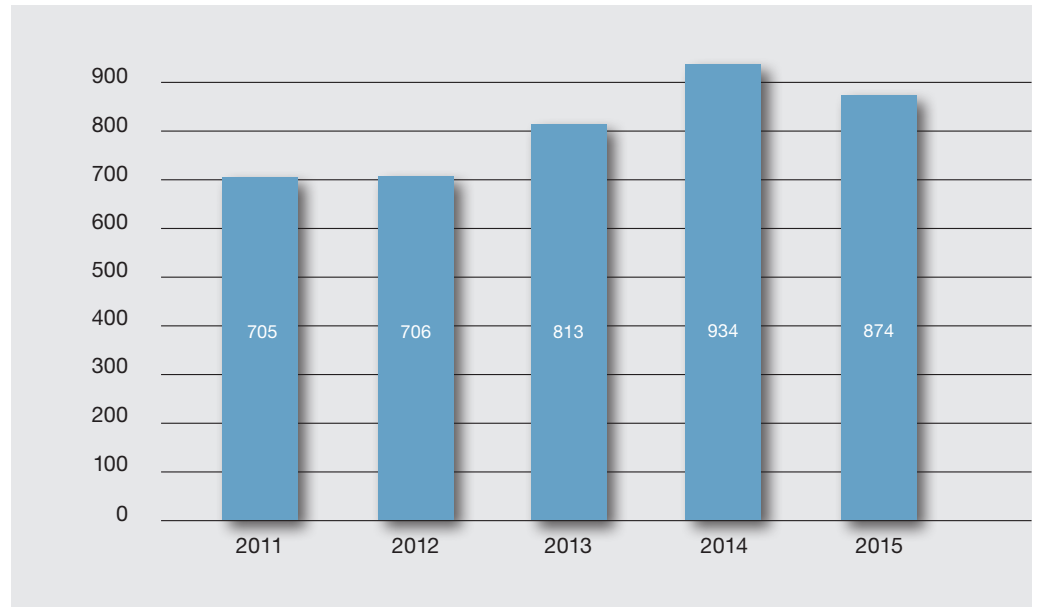


Figure 3: IHBI researchers disseminated their research results through peer-reviews journals with a focus on more high-quality publications in higher impact journals (Confirmed HERDC data. 2015 figures based on publications published in 2014)

Commercialisation

IHBI brings the benefits of our research to healthcare practice through commercialisation.

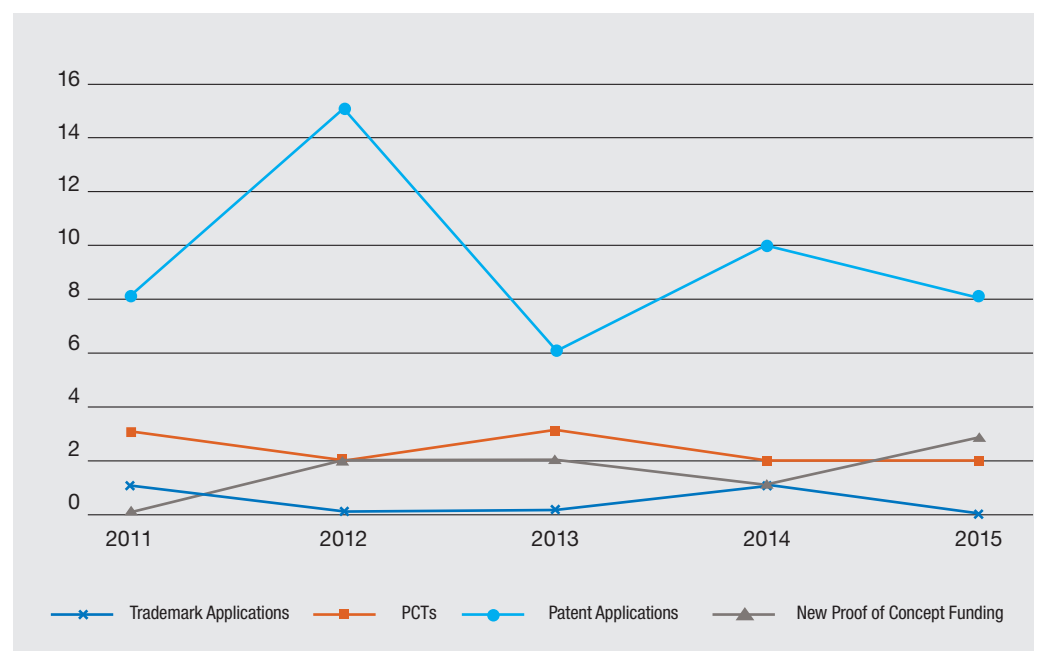


Figure 4: IHBI's new proof of concept funding increased from 2014 to 2015

Attracting HDR students

IHBI hosts 658 higher degree research students from our partner QUT faculties, providing significant opportunities for HDR student support and career development programs. In 2015, 204 HDR students commenced, 100 completed their studies and 42 were under examination on December 31, 2015. Of the 658 students, 198 were international students.

Our HDR students are reporting a positive experience and IHBI is delivering higher outcomes across the board than the national average



Figure 5: Performance against KPIs: PREQ data, 2015 HDR outcomes

Appendices

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Research themes

IHBI has three research themes, providing focus, differentiation and critical mass in select areas of significant research strength. The themes encourage cross-disciplinary research, an important factor in creating synergy and creativity. The themes are:

- **Health determinants and health systems**, covering diabetes, mental health, disease prevention and health services research
- **Injury prevention and trauma management**, including arthritis, orthopaedics, musculoskeletal care, tissue repair, biofabrication and road safety
- **Chronic disease and ageing**, covering cancer, dementia, cardiovascular disease, vision impairment and infectious disease.

Research theme highlights



Health determinants and health systems

Theme leader: Professor Monika Janda

Social, environmental and behavioural factors impact on health and wellbeing. Researchers in the theme use molecular, epidemiological, qualitative, health economics and clinical research methods to improve disease prevention, treatment and healthcare delivery and efficacy.

A multidisciplinary approach within the theme enables research teams to recognise the complexity of health issues and take into account social and societal factors, human behaviour, environmental and genetic risk. A theme strength is the real-world relevance and impact of the research, including the use of technology and innovation to address:

- **Disease prevention:** Researchers drive preventative initiatives to reduce chronic diseases such as obesity and cancer.
- **Healthy lifestyles:** Strategies to promote healthy lifestyles and prevent disease are based on insights gained about the environmental, social and individual determinants of behaviours, particularly physical activity and diet. The theme also has a focus on health outcomes and optimal survivorship.
- **Child and adolescent health:** Partnering with families and support services enables researchers to address childhood development, obesity, nutrition, sleep and prevention of child maltreatment, as well as ensuring equitable health outcomes for all, including for the Indigenous population.
- **Mental health:** Research encompasses genetics, genomics, pharmacology, behavioural neuroscience, psychology and online interventions to treat people with mental health issues, improve brain health and better understand post-traumatic stress disorder.
- **Health services and systems:** Using technology and innovation, researchers are working to contain rising healthcare costs, reduce hospital-acquired infection rates and improve patient care.
- **Environmental health:** Researchers measure, analyse and determine the health impacts of pollutants, climate, hydration, UV radiation and climate change on people's health.

Quick facts and figures

Number of staff	316 members, including 143 professional staff
PhD/Masters research students	246 higher degree students enrolled in 2015. 8 Masters by Research and 23 PhD students graduated in 2015 (18 domestic and 13 international students)
Research income	\$9 475 694
Patents	No patent or trademark applications were filed in 2015
Research papers published	374 research papers published
Key achievements 2015	<ul style="list-style-type: none"> • Professor Geoff Cleghorn joined IHBI as QUT Professor in Child Health and IHBI's Director at the Centre for Children's Health Research (CCHR). He is also senior paediatrician at CCHR's Children's Nutrition Research Centre. • Professor Greig de Zubicaray was appointed Assistant Dean (Research) of QUT Faculty of Health and IHBI Deputy Director, bringing a wealth of knowledge in neurobiology, cognitive neuroscience, neuroimaging and psycholinguistics. • A successful ARC Linkage Project bid was led by: <ul style="list-style-type: none"> – Professor Greg Marston, \$238 265 to work with Jobs Australia Limited on a project titled Seamless Journeys to Work for Young Adults with Physical Disabilities. • A successful ARC Discovery Project bid was led by: <ul style="list-style-type: none"> – Professor Greg Marston, \$210 000 for a research project entitled Meeting the low carbon challenge: the role of planning and social policy. • A successful NHMRC Project Grant bid was led by: <ul style="list-style-type: none"> – Professor David Kavanagh, \$895 032 for a project titled A new, low-cost e-health treatment for Alcohol Use Disorder using mental imagery. • Dr Sally Staton was the recipient of a NHMRC Australian Public Health and Health Services Fellowship, with \$314 644 for a research project entitled Sleep Health and sleep problems in early childhood: What role does childcare play? • Professors Lynne Daniels and Stewart Trost were Chief Investigators on a successful NHMRC Centres of Research Excellence bid led by the University of Sydney in Population Health. • Professor Monika Janda was a Chief Investigator on a successful Centres of Research Excellence bid led by the University of Queensland focused on Clinical Research. • Associate Professor Adrian Barnett was awarded an Australian Heart Foundation Vanguard Grant to investigate using thermal clothing to reduce morbidity during winter. • Dr Esben Strodl received the Australian Psychological Society College of Health Psychologists' Award of Distinction for 2015, in recognition of significant contributions to the college and to psychology generally. • Professor David Kavanagh was awarded the Distinguished Contribution to Psychological Science Award for 2015, recognising outstanding distinguished theoretical or empirical contributions to psychology. It is the highest peer based professional recognition for a psychologist in Australia. • Dr Sally Staton was listed on the NHMRC peer-reviewer honour roll. • The Australian Centre for Health Services Innovation (AushSI) was provided with renewed Queensland Department of Health funding for a further two years to help hospital and health services achieve excellence in service delivery.



Injury prevention and trauma management

Theme leader: Professor Christian Langton

Theme researchers use novel medical technologies and behavioural approaches to promote health, wellbeing and injury prevention, along with treatment and rehabilitation. A multidisciplinary approach ensures teams consider the multitude of molecular, environmental and social risk factors for disease and injury.

Researchers work collaboratively with clinicians and health practitioners to better understand the needs of patients, people in the community, healthcare workers and support staff. The engagement ensures real-world relevance and research impact.

The researchers use advanced technologies and approaches at world-class facilities including the Medical Engineering Research Facility, the Translational Research Institute, the Centre for Children's Health Research, the Herston Imaging Research Facility and QUT's Central Analytical Research Facility.

Theme strengths and expertise are in biological, behavioural and clinical sciences, biofabrication, biomedical engineering, health technologies and intelligent transport technologies. The strengths are employed in:

- developing novel diagnostics and therapeutics for healing and recovery
- creating new interventions to treat damaged cartilage and reduce arthritis
- encouraging wound healing and functional recovery
- preventing and rehabilitating hamstring injuries among athletes
- studying the functional consequences of injury and disorders of skin and musculoskeletal tissues
- investigating and overcoming workplace health and safety issues
- developing preventative strategies to enhance road safety and reduce injury incidence
- preventing injuries among high-risk groups such as children, adolescents and older people, including predicting falls risk in people with neurodegenerative disease.

The theme has a focus on commercial application, developing new tissue engineering therapies, orthopaedic and rehabilitation devices, and trauma and emergency care management systems based on research.

Researchers are developing e-health technologies to monitor fatigue, balance and falls risk; e-health assessments to monitor patients and inform best practice health care; and wireless technologies to monitor vehicle movements and provide alerts. A technology-inspired environment drives translation of knowledge into products and services.

Quick facts and figures	
Number of staff	238 members, including 88 professional staff
PhD/Masters research students	188 higher degree students enrolled in 2015. 5 Masters by Research and 25 PhD students graduated in 2015 (15 domestic and 15 international students)
Research income	\$12 120 567
Patents	2 patent applications were filed in 2015
Research papers published	244 research papers published
Key achievements 2015	<ul style="list-style-type: none"> • Emeritus Professor Mark Pearcy was inducted into the Engineers Australia Hall of Fame for outstanding contribution to biomedical engineering and impact in the community. • Professor Christian Langton received an Honorary Doctorate from the University of Eastern Finland. • A successful ARC Linkage Project scheme bid was led by Dr Ronald Schroeter, \$300 000 to partner with Honda Research Institute in the US on a project titled Engaging Augmented Reality on 3D Head Up Displays to Reduce Risky Driving. • Dr Yinghong Zhou was awarded a NHMRC Early Career Peter Doherty – Australian Biomedical Fellowship, with \$314 644 for a research project entitled Dissecting the cell signalling cues for periodontal regeneration. • Dr Vaida Glatt was awarded a Swiss AO Foundation start-up grant of 99 600 Swiss francs for her research into the effect of fixation stability on fracture healing using mice with different size marrow canals. • PhD graduate Boris Holzapfel was first author of the publication recognised as the overall winner of the Carla Patterson Awards. • The Australia-China Centre for Tissue Engineering and Regenerative Medicine (ACCTERM), based at IHBI, hosted its third annual research forum, bringing together leading biomaterial, tissue engineering and regenerative medicine scientists from QUT, Griffith University and top universities and research institutes in China to share emerging science, exchange ideas, strengthen collaborative links and develop innovative research project concepts. • The Centre for Accident Research and Road Safety – Queensland (CARRS-Q) hosted the Australasian Road Safety Conference 2015 at the Gold Coast, providing an opportunity to share information to make roads safer and reduce road injuries and deaths – and gaining widespread, daily media coverage. • The theme hosted an Industry Partnership Showcase featuring high-profile industry partners including Stryker, DePuy Synthes, Vald Performance and Queensland Academy of Sport, highlighting successful IPTM-industry research partnerships through paired presentations.



Chronic disease and ageing

Theme leader: Professor Erik (Rik) Thompson

Researchers in the theme are developing new ways of understanding, treating and managing chronic conditions and age-related maladies and to identify molecular, genetic and environmental contributing factors. They conduct research into molecular mechanisms and genomics of chronic and infectious diseases, as well as vision, palliative and end-of-life care, wellness after cancer, and support for people with dementia and their carers.

Using state-of-the-art technologies, researchers ensure their work has real-world relevance and impact. A multidisciplinary approach ensures teams recognise the complexity of health issues and take into account social factors, human behaviour and genetic risk. Theme strengths are:

- biomedical science and molecular modelling expertise to understand disease behaviour and progression
- a focus on detecting genes and organisms involved in disease susceptibility and progression
- expertise in advanced nursing research, based on direct links with hospitals, community services, residential aged care facilities and carers
- strength in palliative care best practice
- the links between nutrition, exercise and wellness after disease; and with ageing
- a focus on the multiple facets of cancer, from genetic and biological studies dealing with onset and early diagnostics, to helping people live healthy lives following treatment
- work at the Australian Prostate Cancer Research Centre – Queensland to improve clinical management; develop diagnostics, therapeutics and treatments; and study biomarkers
- collaborative efforts across several cancers (prostate, breast, gynaecological cancers, lung, head and neck cancers) and neurological diseases (migraine and stroke) for better diagnostics and therapeutics; and hosting of QUT's Breast Cancer Research Network
- multidisciplinary approaches to cardiovascular disease, aided by formation of the Cardiovascular Partnerships in Research group
- expertise in vision research focusing on diagnosis, assessment and treatment of ocular and vision disorders
- strength in infectious diseases, including international recognition for chlamydia research, clinical trials for a Ross River virus vaccine and state-of-the-art molecular techniques for rapid diagnosis of bacterial infections
- a leading role in the Dementia Collaborative Research Centre, working to enhance assessment and care of people with dementia.

Quick facts and figures	
Number of staff	354 members, including 132 professional staff
PhD/Masters research students	224 higher degree students enrolled in 2015. 6 Masters by Research and 33 PhD students graduated in 2015 (24 domestic and 15 international students)
Research income	\$24 442 491
Patents	6 patents were filed in 2015
Research papers published	283 research papers published
Mission	To foster and facilitate individual development and cross-disciplinary growth within the theme, and with other IHBI themes, optimising our research potential and output.
Key achievements 2015	<ul style="list-style-type: none"> • Distinguished Professor Judith Clements and Professor Nathan Efron received the Companion of the Order of Australia. • Professor John Aaskov was awarded the Medal of the Order of Australia in the Australia Day Honours. • Professor Pam Russell was awarded the 2015 Women in Technology Life Sciences Outstanding Achievement Award. • Professor Joanne Wood was the recipient of the 2015 Glenn A Fry Lecture Award, presented at the American Academy of Optometry meeting in New Orleans and given in recognition of research quality, significance, impact, and relevance to optometry. • Professor Nathan Efron was awarded Australia's premier research prize for optometry, the 2015 H Barry Collin Research Medal from Optometry Australia. • Professor John Aaskov was invited to become an Honorary Member of the American Society of Tropical Medicine and Hygiene. • Professor Elizabeth Beattie was inducted into the Sigma Theta Tau International Nurse Researcher Hall of Fame. • Professor Pam Russell was named a fellow of the Australian Academy of Health and Medical Sciences, recognising her distinguished professional achievement. • Professor Helen Edwards was appointed a member of the NHMRC Ethics Committee. • Professor Joanne Wood was awarded the Arthur Bennet Prize by the College of Optometrists in the UK for her contribution to the fields of vision, ageing and driving through the development of an original, multidisciplinary approach to research. • Professor Rik Thompson received the Commitment to NBCF Research Investment Award, recognising a long-term commitment to the National Breast Cancer Foundation. • Professor Lisa Nissen led the HealthFusion Team Challenge; Building Stronger Healthcare Queensland project to a third place in the Nurturing Employability Award category of the Wharton-QS Stars Awards, a global competition with submissions from 427 universities and enterprises from 43 countries. • Dr Heidi Sutherland was listed on the NHMRC peer-reviewer honour roll. • Dr Jyotsna Batra received a QUT Vice Chancellor's Award for Excellence for Academic Leadership, Research. • Associate Professor Dale Nyholt, Professor Lyn Griffiths, Dr Miles Benton and Associate Professor Rod Lea co-authored two articles published in prestigious journal <i>Nature</i>. • Professor Patsy Yates is at the centre of a Palliative Care Education and Training Collaborative, set up with more than \$10 million in funding from the Australian Department of Health. The collaboration aims to build capability and capacity in the health workforce to provide quality care at the end of life. • Dr Trudi Collet signed a partnership with Health Focus Products Australia for more than \$1 million to fund drug discovery and testing of compounds derived from Australian native plants. • Successful NHMRC Project Grant bids were led by: <ul style="list-style-type: none"> – Associate Professor Damien Harkin, \$886 032 for a project entitled Cultivated corneal endothelial cell implants for restoring vision. – Professor Colleen Nelson, \$780 338 for a project entitled Targeting a master regulator of tumour cell plasticity as a new adjuvant therapy for prostate cancer. – Dr Michael Doran, \$561 012 for a project entitled The Microniche: A novel in-vitro and in-vivo prostate cancer model system. • A successful NHMRC Development Grant bid was led by: <ul style="list-style-type: none"> – Professors Colleen Nelson and Pam Russell, \$703 540 to investigate a new test for prostate cancer, using technology developed by Australian industry partner Minomic. • A successful ARC Discovery Project bid was led by: <ul style="list-style-type: none"> – Professor Ken Ostrikov, \$430 000 for a research project entitled Low-Temperature Plasma Processes for High-Quality Graphene Films.

Quick facts and figures (continued)

Key achievements 2015

- Dr Rachel Okolicsanyi received a NHMRC-ARC Dementia Research Development Fellowship Grant, with \$569 644 for a research project entitled The role of proteoglycans in neurodegeneration.
- Distinguished Professor Judith Clements is in the sixth year of an ongoing NHMRC Research Fellowship funding her prostate and ovarian cancer research.
- The Dementia Collaborative Research Centre, headed by Professor Elizabeth Beattie, was awarded \$1.4 million to continue with the development of robust interventions to improve the quality of life of people with dementia and those who care for them.
- Dr Joanne Voisey received a prestigious Hilton Family Foundation Inc (US) grant of \$165 838 to investigate DNA Methylation Analysis of Schizophrenia Biotypes.
- Distinguished Professor Judith Clements received \$200 000 from the Prostate Cancer Foundation of Australia and the It's a Bloke Thing Foundation for the Australian Prostate Cancer Bio-Resource, a collection of 140 000 tissue samples from more than 5500 men for use in research into disease progression and clinical trials.
- A Heart Foundation Vanguard Grant was awarded to chief investigator Associate Professor Chamindie Punyadeera, with \$75 000 for a research project entitled Spit test for heart failure.
- Professor Debra Anderson presented her women's wellness research at the United Nations in New York at the 59th session of the Commission on the Status of Women.
- Professor Jean Paul Thiery, a pioneer in the field of circulating tumour cells and credited with developing a method for culturing cancer cells in blood, visited IHBI as part of a collaboration with Professor Rik Thompson.
- Adjunct Associate Professor Raymond Chan was appointed Director of Research and Innovation at West Moreton Hospital and Health Service, based at Ipswich Hospital. He remains a joint appointment between the health service and IHBI.

Translational Research Institute

**Associate Director, IHBI (TRI):
Professor Adrian Herington**



Quick facts and figures

Number of staff	135 members, including 21.8 professional staff
PhD/Masters research students	54 higher degree students enrolled in 2015 6 Masters by Research and 8 PhD students graduated in 2015 (6 international students)
Research income	\$9 838 447
Patents	2 patent applications were filed in 2015
Research papers published	79 research papers published
Key achievements 2015	<ul style="list-style-type: none"> • The new CEO for TRI, Professor Carolyn Mountford, started in February. • The appointment of Professor Matt Brown and transfer of his genomics research team to QUT was announced in November. • Distinguished Professor Judith Clements received the Companion of the Order of Australia (AC). • Dr Jyotsna Batra was the recipient of the Vice-Chancellor's Award for Excellence in July. She also won the Young Investigator Award – Junior Researcher in the Basic Science Category in the Princess Alexandra Hospital Health Symposium. • Lakmali Silva was awarded the Best Poster Award in the Poster Expo, in the Basic Science category at the Princess Alexandra Health Symposium. • Dr Nathalie Bock was awarded the Wake Forest Institute for Regenerative Medicine Young Investigator Award. • Professors Colleen Nelson and Pam Russell were awarded a NHMRC Development Grant for \$703 541 for a project entitled Novel prostate cancer target for diagnosis, imaging, detection of recurrence and response to therapy. • NHMRC Project Grants were awarded to: <ul style="list-style-type: none"> – Professor Colleen Nelson and her team of Dr Brett Hollier, Professor Martin Gleave and Dr Melanie Lehman, \$780 338 for a project entitled Targeting a master regulator of tumour cell plasticity as a new adjuvant therapy for prostate cancer. – Dr Michael Doran and his team of Dr Ian Vela, Dr Brian Tse and Professor Pam Russell, \$561 012 for a project entitled The Microniche: A novel in-vitro and in-vivo prostate cancer model system. • Distinguished Professor Judith Clements was awarded a one-year extension for her NHMRC Principal Research Fellowship, \$150 660 for a project entitled Defining the potential of the kallikrein proteases as therapeutic targets in prostate and ovarian cancer. • Cancer Council Queensland Grants worth \$200 000 each were awarded to: <ul style="list-style-type: none"> – Distinguished Professor Judith Clements for a project entitled Targeting Kallikrein proteases to improve treatment options for ovarian cancer. – Dr Eloise Dray for a project entitled Deciphering the role of the protein phosphatase EYA4 in genomic maintenance and breast cancer avoidance. – Professor Lisa Chopin for a project entitled The ghrelin receptor antisense long non-coding RNA gene, GHSROS, as a potential target for prostate cancer therapy. • Prostate Cancer Foundation Australia grants were awarded to: <ul style="list-style-type: none"> – Distinguished Professor Judith Clements, \$99 732 for a project entitled KLK14 as a novel therapeutic target in muscle wasting induced by androgen deprivation therapy. – Dr Nathalie Bock, \$100 000 for a project entitled Using bioengineered 3D in vitro models to replicate the tumour microenvironment in prostate cancer bone metastasis.

Quick facts and figures (continued)

Key achievements 2015

- Dr Nathalie Bock was also awarded an Advance Queensland Women's Academic Fund maternity support of \$21 000.
- Professor Selena Bartlett was the recipient of \$200 000 from the Children's Health Foundation Queensland for a project entitled Cognitive, social and emotional learning for reducing obesity risk in adolescence.
- Professor Colleen Nelson received \$50 000 from the PA Research Foundation and Private Practice Trust Fund Grants (Princess Alexandra Hospital) for a project entitled Investigating the biological response to stereotactic radiation in oligometastatic prostate cancer in mouse intra-tibial human prostate cancer models.
- Professor Michael Schuetz was awarded \$50 000 as part of a Trauma and Disaster Management Project Grant for a project entitled Understanding serious quad bike-related injuries in Queensland and the Northern Territory: comparing circumstances, patterns, severity, costs and outcomes.
- TRI SPORE Grants – new collaborative, cross-institutional grants – were awarded to:
 - Professor Rik Thompson and his team/collaborators, \$50 000 for a project entitled Portable, single-sided MRI for routine, low-cost analysis of mammographic density.
 - Professor Ken O'Byrne and his team/collaborators, \$50 000 for a project entitled Nucleoplasmin (NPM)1 a critical repair protein required for genomic stability.

**Note: Data represented in this table may also be detailed within the affiliated theme highlights.*

Governance

2015 IHBI Executive Committee

The IHBI Executive Committee met four times in 2015 and continued to provide oversight of significant institute activities. The 2015 IHBI Executive Committee consisted of:

Professor Arun Sharma	DVC (Research & Commercialisation) and Chair
Professor Lyn Griffiths	Executive Director, IHBI
Professor Carol Dickenson	Senior Deputy Vice-Chancellor
Professor Ross Young	Executive Dean, Faculty of Health
Professor Gordon Wyeth	Executive Dean, Science and Engineering Faculty
Professor Paul Burnett	Dean of Research and Research Training
Mr Stephen Pincus	Executive Director, Division of Finance and Resource Planning
Ms Elizabeth Kerr	Institute Manager, IHBI (Secretary)
Ms Carol Richter	Executive Officer, Division (R&C) (Observer)

2015 IHBI Research Committee

The IHBI Research Committee met monthly from February 2015 and continued to lead facilitation and implementation of IHBI's strategic research development. The 2015 IHBI Research Committee consisted of:

Professor Lyn Griffiths	Executive Director, IHBI and Chair
Professor Ken Beagley	Deputy Director, IHBI
Professor Monika Janda	IHBI Theme Leader, Health Determinants and Health Systems
Professor Christian Langton	IHBI Theme Leader, Injury Prevention and Trauma Management
Professor Rik Thompson	IHBI Theme Leader, Chronic Disease and Ageing
Ms Elizabeth Kerr	Institute Manager, IHBI
Associate Professor Renata Meuter	Head of School, Psychology and Counselling
Professor MaryLou Fleming	Head of School, Public Health and Social Work
Associate Professor Ian Stewart	Representative of Head of School, Exercise and Nutrition Sciences
Professor Patsy Yates	Head of School, Nursing
Associate Professor Terry Walsh	Head of School, Biomedical Sciences
Associate Professor Peter Hendicott	Head of School, Optometry and Vision Science
Professor Lisa Nissen	Head of School, Clinical Sciences
Professor Greig de Zubicaray Professor Neil King	Assistant Dean (Research), Faculty of Health

2015 IHBI Research Committee (continued)

Professor Neil King	Director, Research Training, Faculty of Health
Professor Helen Edwards	Assistant Dean (International and Engagement), Faculty of Health
Ms Monica Rimland	Faculty Manager, Faculty of Health
Professor John Bell	Head of School, Chemistry, Physics and Mechanical Engineering
Professor Ian Turner	Head of School, Mathematical Sciences
Professor David Lovell	Head of School, Electrical Engineering and Computer Science
Professor Bronwyn Harch	Assistant Dean (Research), Science and Engineering Faculty
Professor Christine Bruce Professor Kunle Oloyede	Director, Research Training, Science and Engineering Faculty
Ms Elizabeth Wickham	Faculty Manager, Science and Engineering Faculty
Professor Adrian Herington	Associate Director, IHBI (TRI)
Professor Narelle Haworth	Centre Director, CARRS-Q
Ms Tanya Edwards	Minute Secretary

IHBI directorate

2015 IHBI Senior directorate staff

A team of professional and academic staff ably supports IHBI researchers. The IHBI Directorate is responsible for the development, implementation and provision of administrative, financial, development, operational, research and information technology services to the institute's researchers, students and professional staff.

The IHBI Directorate team leaders included:

Ms Elizabeth Kerr	Institute Manager
Dr Dimitrios Vagenas	Research Methods Group Leader
Mr Allan McLardy	Senior Development Officer
Ms Christine Lane	Senior Project Officer
Mr Shannon Jackson Ms Catherine Grey	Finance Manager
Ms Lorrelle Allen	Laboratory and Building Services Manager
Ms Danqing Zhang	Information Technology Manager
Ms Radka Preclikova Dr Emily Alvino	Research and Administration Services Manager
Mr Erik de Wit	Communication Program Coordinator

Collaboration

Selected visitors to IHBI

In 2015, IHBI hosted 227 conferences, events, seminars, forums, research methods workshops, professional education events and tours. IHBI researchers received 1681 visitors during the year to learn about the institute's research and work on collaborative projects, grant applications and publications. They include:

Asia

- Professor Fong-Chin Su, National Cheng Kung University, Tainan, Taiwan (January 20)
- Associate Professor Celia la Choo Tan, Group Director, Allied Health, Singapore Health Services (February 26)
- Dr Camilla Wong Min Lee, Deputy Group Director, Allied Health, Singapore Health Services (February 26)
- Jasper Tong Weng Kong, Deputy Group Director, Allied Health, Singapore Health Services (February 26)
- Rosy Tai, Manager, Allied Health, Singapore Health Services (February 26)
- Dr Bao Chi Bui, the University of Medicine and Pharmacy, Ho Chi Minh City, Vietnam (March–April)
- Professor Tao Tao, Xiamen University, China (April 17)
- Professor Jean Paul Thiery, the Institute of Molecular and Cell Biology, Singapore (October 28)
- Associate Professor Po-Liang Lai, Centre for Tissue Engineering, Department of Orthopaedic Surgery, Chang Gung Memorial Hospital, (November 27)

The Americas

- Dr David O'Gorman, Director of Cellular Research, the Roth McFarlane Hand and Upper Limb Centre, London, Ontario; Lawson Scientist, Lawson Health Research Institute; Assistant Professor, Departments of Surgery and Biochemistry, the University of Western Ontario, Canada (May 7)
- Dr Anton E. Bowden, Department of Mechanical Engineering, Brigham Young University, Provo, Utah, US (July 8)
- Professor Dawn M. Elliott, Professor and Chair, Biomedical Engineering, College of Engineering, the University of Delaware, Newark, US (July 13)
- Professor Ray Bingham, the University of Michigan, US (October 12)
- Professor Ralph Tripp, Georgia Research Alliance Chair in Vaccine and Therapeutic Studies; Co-Director, Biomedical Health Sciences Institute; Co-director, Center of Molecular Medicine, the University of Georgia, US (November 23)

Europe

- Professor Thoralf Niendorf, Berlin Ultrahigh Field Facility, Max-Delbrueck Center for Molecular Medicine, Berlin, Germany (February 13)
- Dr Christoph Groenegrass, Virtual Environments for Neuroscience, the University of Barcelona, Spain (June 3)
- Professor Doris Marko, Head, Department of Food Chemistry and Toxicology, the University of Vienna, Austria (August 27)
- Professor Peter Wakker, Erasmus School of Economics, the Netherlands (September 9)

Australia and New Zealand

- Damian Topp, Chief Executive, PA Research Foundation (February 3)
- Dr Carrie Hillyard, Chairwoman, fitgenes (February 3)
- Geoff Hadwen, Division Manager, Cardno (February 3)
- Nigel Chamier OAM, Executive Chairman, NAC Investments (February 3)
- Helen Besly, Managing Director, Rowland (February 3)
- Dr Ehsan Vaghefi, the University of Auckland (February 24)
- Paul Betti, Executive Director, Australian Financial Advisors (March 16)

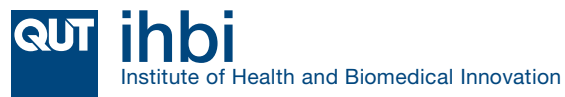
- Associate Professor Alex Dobrovic, Peter McCallum Cancer Centre (March 23)
- Associate Professor Robin Anderson, Peter McCallum Cancer Centre (March 23)
- Dr Anthony Dowling, St Vincent's Hospital, Melbourne (March 23)
- Dr Mark Waltham, St Vincent's Institute of Medical Research (March 23)
- Professor Christobel Saunders, the University of Western Australia (March 23)
- Dr Linda McInnes, the University of Western Australia (March 23)
- Dr Elgene Lim, the University of Melbourne (March 23)
- Dr Ian Street, CRC for Cancer Therapeutics, Walter and Eliza Hall Institute (March 23)
- Professor Matt Trau, the Australian Institute for Bioengineering and Nanotechnology, the University of Queensland (March 23)
- Professor Rodney Scott, the University of Newcastle (March 23)
- Kym Berchtenbreiter, Breast Cancer Network Australia (March 23)
- Gary Morgan, Executive Director, MPT Innovation (March 30)
- Peter Johnstone, Chief Executive Officer, The Clem Jones Group (May 12)
- Gabrielle Quilliam, Co-founder, Queensland Kids and Hummingbird House (May 26)
- Associate Professor John Field, Centre for Orthopaedic Trauma and Research, the University of Adelaide (May 29)
- Professor Drew Dawson, Director, Appleton Institute, Central Queensland University, Adelaide Campus (June 1)
- Professor Caroline McMillen, Director, Business Higher Education Round Table; member, NSW Innovation and Productivity Council (September 3)
- Chris Oliver, Research Director, Blackmores Institute (September 8)
- Professor Helen Berry, Faculty of Health, the University of Canberra (October 9)
- Professor Chris del Mar, Bond University (October 16)
- Dr Amanda McCullough, Bond University (October 16)
- Dr Marlene Hansen, Bond University (October 16)
- Professor Mieke van Driel, the University of Queensland (October 16)
- Professor Charles Gilks, the University of Queensland (October 16)
- Dr Minyon Avent, the University of Queensland (October 16)
- Tammie Staltari, Department of Health (October 16)
- Dr Marilyn Cruickshank, Australian Commission on Safety and Quality in Healthcare (October 16)
- Dr Phil Russo, the University of Melbourne (October 16)
- Dr Noleen Bennett, the University of Melbourne (October 16)
- Professor David Looke, Queensland Health (October 16)
- Professor John Lowe, University of the Sunshine Coast (October 16)
- Associate Professor Sam Charlton, the University of Waikato, New Zealand (October 20)
- Professor Osmat A. Jefferson, Principal Scientist, Cambia, Canberra (November 2)
- Dr Nir Eynon, Senior Lecturer, ARC DECRA Fellow, the Institute of Sport, Exercise, and Active Living, Victoria University, Melbourne (November 17)

Queensland Parliamentary visitors

- The Hon Cameron Dick MP, Queensland Minister for Health and Ambulance Services (April 22)
- The Hon Leeanne Enoch MP, Queensland Minister for Science and Innovation (September 1)

International delegations

- Peking University Medical School, Sun Yat-sen University Medical School and Nanjing Medical University student visit (July 27)
- Johnson & Johnson senior executive (November 17)



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