

INSTITUTE FOR GLYCOMICS

Fighting diseases of global impact



Institute for Glycomics

Queensland, Australia



Our mission

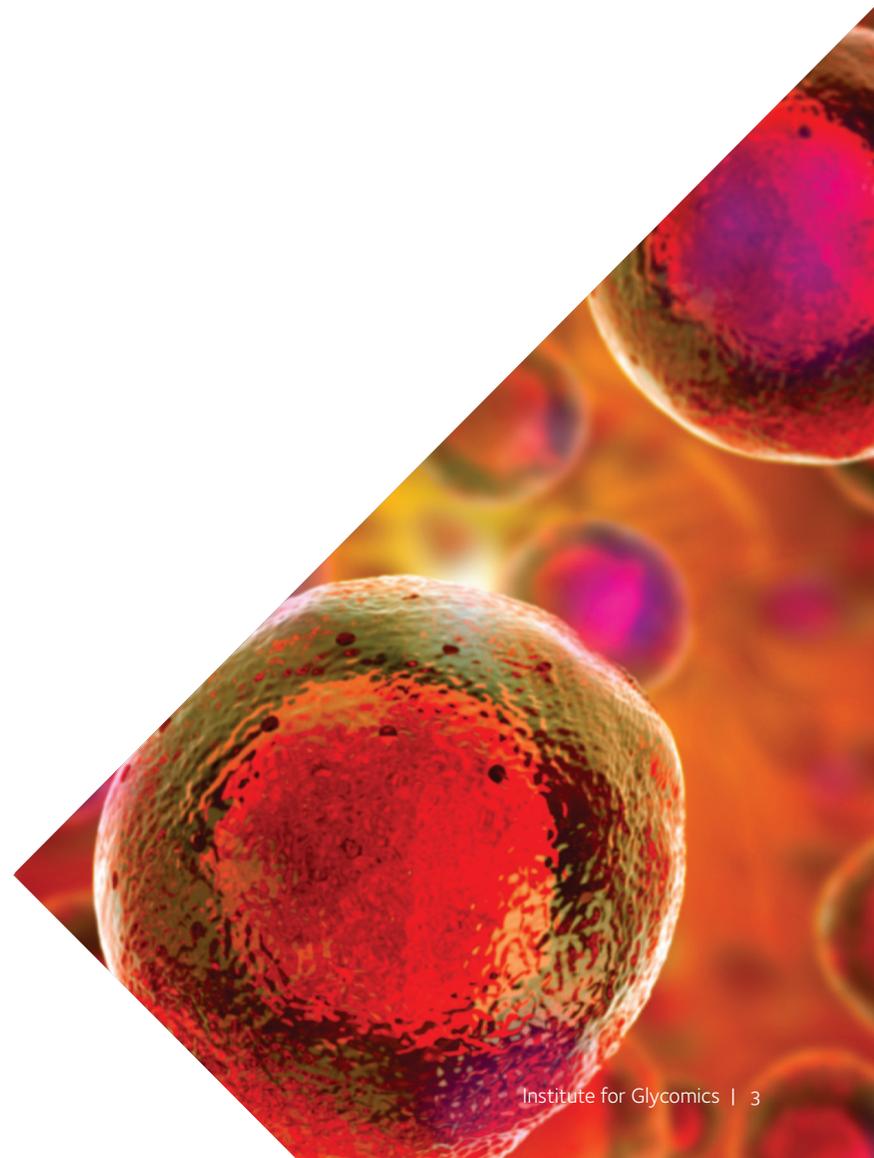
Fighting diseases of global impact through discovery and translational science.

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Our vision

To be a world-leader in the discovery and development of drugs, vaccines and diagnostics through the application of innovative, multidisciplinary science in a unique research environment.





About us

Comprising over 200 researchers, we strive to be world leaders in the discovery and development of next generation drugs, vaccines and diagnostics for diseases of global impact.

Established in 2000, through investment by Griffith University and the Queensland Government, the Institute for Glycomics is one of Australia's flagship multidisciplinary biomedical research institutes, based in the heart of Griffith University's Gold Coast campus and the Gold Coast Health and Knowledge Precinct.

The Institute boasts state-of-the-art facilities combined with some of the world's most outstanding researchers focused on Glycoscience, a constantly expanding field that explores the structural and functional properties of complex carbohydrates (or sugars). Our research is conducted via worldwide partnerships, in projects that cut across multiple disciplines to apply new approaches to the treatment and prevention of diseases. The Institute's research primarily targets prevention and cures for cancers and infectious diseases, with a focus on translational research to have a positive impact on global human health.

The Institute's rich research environment provides exceptional postgraduate education programs for the nation's future scientists. The Institute engages with industry, other premier research institutes, philanthropic organisations and governments from across the globe, giving it significant research capacity to provide healthcare solutions to address some of the world's most intractable diseases.

With an outstanding track record in translating biomedical discoveries to the clinic, there is little doubt that our unique approach will play a major role in the discovery and development of next generation drugs, vaccines and diagnostics with the power to change our future.

Institute highlights



3 Major

RESEARCH THEMES

- Cancer research
- Infectious diseases
- Other metabolic diseases

120+
PUBLICATIONS
per year



\$1 For \$1

In Philanthropic Funding
Supports Our Research

200+
INSTITUTE
MEMBERS



Income Sources

FOR 2018

- Research grant funding \$6.4 million
- Industry & other support \$8.1 million



6
PATENTS FILED ON
NEW INSTITUTE
TECHNOLOGIES



11,500+
CITATIONS
(Over 10 Years)



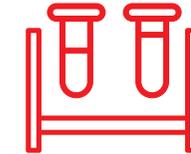
Partnering

- Engagement with over 35 industry partners for basic research, translation and commercialisation



Community Engagement

- **ROTARY DISTRICT 9640** A partnership to fight malaria globally
- **ORDER OF ST JOHN** A partnership in the fight against cancer
- **WOMEN IN RACING** A partnership to support Glycomics research



Clinical Trials

- **Phase 2 clinical trial study by Paradigm Biopharmaceuticals Ltd** – Re-purposed drug for treatment of Ross River virus-induced arthritis
- **Phase 1 clinical trial by Sirtex Medical** – Drug for treatment of sepsis
- **Phase 1b clinical trial by Griffith University (with support from Rotary)** – Vaccine for prevention of malaria
- **Phase 1b clinical trial** – Vaccine for prevention of Group A Streptococcus

Vice Chancellor's welcome

It is with great pride that I introduce you to Griffith University's Institute for Glycomics. Griffith University believes in and celebrates remarkable people; and the Institute for Glycomics is a testament to this statement.

The Institute comprises some of Australia's most reputable researchers who are world-renowned in their various fields of expertise including chemistry, biology, biophysics, analytical science, and many more. Combine this with the Institute's state-of-the-art facilities and equipment, professional administrative and business support personnel, and outstanding postgraduate students; the opportunities are endless.

Griffith University is a comprehensive, research-intensive university, ranking in the top 2% of universities worldwide, and the Institute for Glycomics is a great contributor to our research excellence, and our strong ties to industry. This is demonstrated by their impressive track record of translational outcomes in the fight against diseases of global impact.

This includes a malaria vaccine in human clinical trials; malaria is a disease that infected 219 million people and killed 435,000 people worldwide in 2017 alone. If proven successful, this vaccine has the potential to significantly reduce the burden of malaria globally.

A clinical trial has also been completed for a drug candidate to treat sepsis, co-invented by Institute researchers and driven by Sirtex Medical Limited. Sepsis arises when the body's response to any infection injures its own tissues and organs. If not recognised early and managed promptly, it can lead to septic shock, multiple organ failure and death. Sepsis is reported to affect more than 30 million people worldwide every year, potentially leading to 6 million deaths, so this new drug candidate has the potential to save millions of lives.

Additionally, the Institute is in the early stages of developing a vaccine for streptococcal infections; Group A Streptococcus (Strep A) is a common bacterial pathogen which can cause many different infections ranging from minor illnesses like pharyngitis (Strep throat) to very serious and potentially deadly diseases like acute rheumatic fever (ARF) and rheumatic heart disease (RHD). If left untreated, RHD causes heart failure, arrhythmias, stroke, endocarditis and complications during pregnancy. It is estimated that over 340,000 people die from RHD each year. The vaccine candidate is now ready to be tested in human volunteers and is being prepared for a clinical trial. If we can prevent streptococcal infections through this vaccine, we can reduce the risk of ARF and RHD altogether.

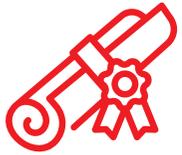
With this in mind I would like to encourage you to support and follow the progress of the Institute for Glycomics; by doing so, you would be contributing to major, positive health changes of global proportions, indirectly playing a part in saving millions of lives.

Professor Carolyn Evans

Vice Chancellor and President, Griffith University



About Griffith University



200+
DEGREES



50,000+
STUDENTS INCLUDING
8,500+ INTERNATIONAL STUDENTS



4,000+
STAFF



130+
NATIONALITIES

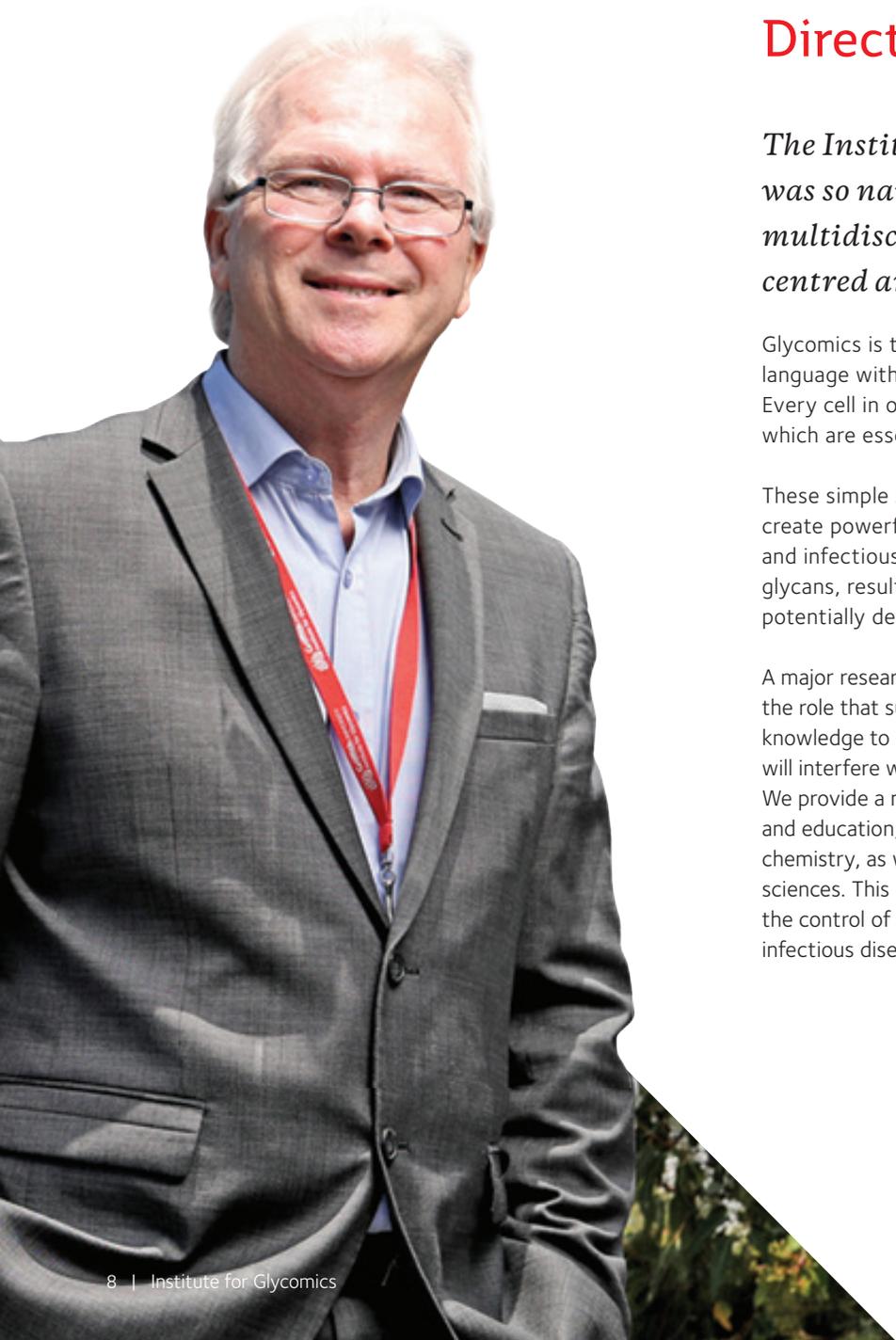


5 Campuses
ACROSS SOUTH EAST QUEENSLAND
PLUS A GROWING DIGITAL CAMPUS



200,000+
GRADUATES





Director's welcome

The Institute for Glycomics was so named due to its unique multidisciplinary research approach centred around glycomics.

Glycomics is the study of the carbohydrate or sugar language within our body, referred to as the 'glycome'. Every cell in our body is decorated with these sugars, which are essential to our health and wellbeing.

These simple sugar molecules connect together to create powerful structures called 'glycans'. Cancers and infectious diseases can take advantage of glycans, resulting in major health problems and potentially death.

A major research theme within our Institute is discovering the role that sugars play in disease and using that knowledge to develop new drugs and vaccines which will interfere with the biological process of disease. We provide a multidisciplinary approach to research and education, spanning medicinal and computational chemistry, as well as various biological and physical sciences. This approach presents an exciting platform for the control of a wide-range of medical conditions across infectious disease, cancer and other disorders.

Our unique research expertise makes us the only institute of its kind in Australia and only one of a handful in the world. We seek to collaborate with leading scientists around the world to build a critical mass around this multidisciplinary research. Global collaboration is essential to achieving our vision to bring forward novel drugs and vaccines to the community.

From the laboratory bench to the patient's bedside, translational outcomes are the ultimate goal of the Institute for Glycomics. Our community supporters and donors have played such a critical role in helping us to achieve this goal, and we rely greatly on future donations to be able to continue our ground-breaking research.

Through the generosity of our donors, we have been able to progress a malaria vaccine candidate through to human clinical trials, make further promising discoveries in childhood leukaemia and other cancers, as well as advance our infectious diseases research. Ongoing community support means we have also been able to obtain new equipment to enhance our infrastructure and research capacity.

Community support and donations are imperative for the Institute to continue its fight against diseases of global impact. Through the help of collaborations and philanthropy, we are able to maintain our focus on translational science, providing hope for our future.

Professor Mark von Itzstein AO

Founder and Director, Institute for Glycomics

Our research areas

We have over 15 research group leaders at the Institute, guiding each of their dedicated research teams to new opportunities that can lead to new drugs, vaccines and diagnostics, translating research into tangible benefits for the global community. Our specialist research programs are centred around cancer and infectious diseases research.

Cancer research

The Australian Centre for Cancer Glycomics (A2CG) is one of our Centres of Excellence at the Institute for Glycomics. This unique national resource is dedicated to cancer glycomics research, which involves understanding the role that sugars/carbohydrates play in the development of cancers. Using this knowledge, our researchers can invent new drugs, vaccines and diagnostics to treat, prevent or diagnose cancer.

The state-of-the-art equipment and infrastructure, coupled with the brightest scientific talent in the field of cancer glycoproteomics, makes the A2CG an exciting hub of truly revolutionary cancer research. Our researchers focus on some of the world's most devastating forms of cancer, including leukaemia, breast, ovarian, prostate, and skin cancers.

Infectious diseases research

Infectious diseases pose some of the world's biggest health challenges. Our research programs within this area encompass bacterial, viral, parasitic and fungal infectious diseases.

Bacterial infections – The Institute's research into the role of sugars/carbohydrates in diseases caused by bacteria represents new and exciting opportunities for the discovery of next generation antibiotics and vaccines. Many of the bacteria that cause some of the world's most devastating diseases are rapidly developing resistance to antibiotics. Types of bacterial infections included within our infectious diseases research program include Strep A/Rheumatic Heart Disease, middle ear infections, gonorrhoea, melioidosis, meningitis, and gastroenteritis/food poisoning.

Viral infections – Diseases caused by viruses have plagued humanity for time immemorial. Unfortunately, drugs that combat viruses are extremely limited in number and are not broad spectrum. The Institute's research into viral infections such as hand, foot and mouth disease, HIV, influenza, parainfluenza, Respiratory Syncytial Virus (RSV), Ross River virus, chikungunya and other emerging alphaviruses, seeks to understand how sugars/carbohydrates are utilised in viral infections so that scientists may identify targets for the development of new drugs that will treat and cure these diseases.

Parasitic infections – Parasitic infections such as malaria still present as important public health challenges in tropical environments, with devastating socio-economic consequences in developing countries. It is now becoming clear that some of these parasites rely on carbohydrate-binding proteins in the host for attachment and invasion of human host cells. Our research in this area will yield useful information for the design of diagnostic tools, vaccines and drugs to fight these diseases.

Fungal infections – *Aspergillus fumigatus* is the most prevalent airborne fungal pathogen in developed countries; and, in immuno-compromised patients, causes the fatal disease, invasive aspergillosis. The Institute's research into this fungal infection will yield useful insights into the design of new anti-fungal drugs to treat it.



Our dedicated business team

Translation and commercialisation

From our postgraduate students to our research group leaders, there is a shared passion amongst our members to deliver remarkable research to the patients who need it most, through translation and commercialisation of our drug, vaccine and diagnostic discovery science.

The Institute has invested heavily to ensure that researchers are well-equipped to deliver patient-focused and commercially-relevant outcomes. In particular, researchers can draw on the expertise of the Institute's business personnel, who have developed a robust platform for translation and commercialisation, particularly through its licencing and co-development strategy with industry. Partnerships with industry, from local biotech companies to multinational pharmaceutical companies, ensure that our drug, vaccine and diagnostic technologies are translated into products that are accessible by patients globally.



Internationalisation

Our unique research expertise makes us the only institute of its kind in Australia and only one of a handful in the world.

We seek to collaborate with leading scientists around the world to build a critical mass in this multidisciplinary research. Global collaboration is essential in order to achieve our vision to bring forward novel drugs and vaccines to the community. We work with partners worldwide that share our commitment to fighting diseases of global impact. One such example is our Centre of Excellence, The Fraunhofer International Consortium for Anti-Infective Research (iCAIR).

iCAIR is an internationally-funded program which was established in conjunction with our German partners, the Fraunhofer Institute for Toxicology and Experimental Medicine and Hannover Medical School.

Infectious diseases and antimicrobial resistance are deadly threats worldwide. Previously effective antibiotics are becoming less and less viable for use against multi-resistant bacteria, and there is an urgent need to develop new drugs and treatments to combat infection.

iCAIR aims to develop new anti-infective drugs to combat respiratory viruses including influenza viruses and respiratory infection-causing bacteria and fungi.

Our facilities

Our state-of-the-art amenities facilitate our world-class research, and cover the entire spectrum of drug discovery and development, including:



Separation sciences



Glycobioanalytical Facility



Computational chemistry
and visualisation



Advanced mass
spectrometry



Nuclear magnetic resonance
and spectroscopy



Protein X-ray crystallography



Flow cytometry and cell sorting



Irradiation Facility



ZymeBank





OUR
SUPPORTERS

Our supporters

Our supporters make our discoveries possible.

Local community support is vital to the Institute's ongoing research in the fight against cancer and infectious diseases. We are deeply grateful for the philanthropy of our donors and for all donations, large and small.

Philanthropic donations change people's lives – whether it contributes to student scholarships, enhances researchers' careers, allows us to purchase new equipment, or helps us to complete a research project. Every gift matters. Every gift makes a difference. Giving transforms lives.

The Institute also acknowledges the support of the Australian Government through funding from schemes including the National Health and Medical Research Council and the Australian Research Council, and from the Queensland Government through funding from schemes such as Advance Queensland. It also recognises the importance of international research funding schemes including the US National Institute of Health (NIH), through which the Institute is substantially funded.

Choosing to be a supporter of the Institute for Glycomics will establish you in highly esteemed company, as is evidenced by the list of our Major Supporters and Honorary Fellows on the following page.

Thank you for your generosity.



Our supporters

Major supporters

- Queensland State Government
- City of Gold Coast
- Honda Foundation
- Mark Carnegie
- John Singleton
- Lewis Land Group of Companies
- Jim Raptis, Raptis Group
- Amitabha Buddhist Association & Pureland Learning College
- Aston Milan
- Lilly Hwoo
- Jenny Wong, DUniv
- Macquarie Bank Foundation
- Alison Kearney & John Kearney Jr
- Conrad N. Hilton Foundation
- Warren von Bibra & Sally von Bibra
- S2F Pty Ltd
- Mayoress Community Benefit Fund Gold Coast
- Harry Triguboff and Rhonda Triguboff
- Lorraine Dickinson
- Merchant Charitable Foundation
- Women in Racing Inc.
- The Atlantic Philanthropies
- Mr Toshiaki Ogasawara
- Rotary Club of Southport
- Ms Beverly McIlwain
- Zarraffa's Foundation
- Zarraffa's Franchising Pty Ltd

- Steve Byrne and Sue Byrne
- BLIAQ Loving Care Group
- Larry Klinge and Penny Klinge
- Nick Moraitis
- Paul Moraitis and Ildi Moraitis
- Geoffrey Thomas
- "Q" Clubs Buyers Group
- Palazzo Versace
- Gold Coast Titans Community Foundation
- Order of St John – Gold Coast Commandery
- John Penglis and Brenda Penglis
- John Barnes Foundation
- Ken Tregeagle and Noelene Tregeagle
- Southern Paradise Foundation
- Win Schubert AO
- Dennis Croft and Shirley Croft
- 2018 Commonwealth Games Legacy C'tee
- Ray James and Jill James
- Vince Rehbein
- Reuben Pelerman Benevolent Foundation
- The Snow Foundation
- Rotary Australia Benevolent Society
- John Nicholson
- The Heart Foundation
- Paradise Point Community Bank®
Branch of Bendigo Bank
- Maureen Stevenson

Honorary Fellows

- Mary Roosevelt
- Cr Dawn Crichlow OAM
- Jenny Wong, DUniv
- Warren von Bibra and Sally von Bibra
- The Hon Peter Beattie AC
- John Penglis
- James Wadham
- Dennis Standfield
- Bernard Ponting
- Lex Bell OAM
- Emeritus Professor Graham Jones AM
- The Hon Sam Doumany
- Beverly McIlwain
- Harry Triguboff AO, DUniv and Rhonda Triguboff
- The Hon Leneen Forde AC
- Roma Blair
- Greg Dillon
- Baslyn Beel
- Jennifer Bartels



Supporter testimonials

"We have been supporting the Institute for Glycomics since 2006. We had the distinct pleasure of meeting Professor Mark von Itzstein who gave us a tour of their state-of-the-art facilities and an overview of the work being done by their remarkable team of world-renowned researchers; research of ground-breaking proportions. It is an honour and a privilege to support them in their fight against diseases of global impact; diseases that affect and devastate so many people's lives each day. We feel confident that our financial donations are helping to shape a brighter, healthier future - a future filled with hope."

Sally and Warren von Bibra

"Bendigo Bank strengthens local communities by reinvesting in programs for health, education, the environment and many more. We are immensely proud to support the world-class research undertaken by Griffith University's Institute for Glycomics. Our sponsorship ensures that the Institute and its researchers have access to the most innovative assets as they deliver on their vision of delivering novel drugs and vaccines to the community. We love the ground-breaking research of the Institute and follow their discoveries with great interest and admiration."

**Tony Jensen, Senior Manager
Paradise Point Community Bank®
Branch of Bendigo Bank**





Institute for Glycomics

Queensland, Australia

Contact us

Phone: (07) 5552 8051

E-mail: glycomics@griffith.edu.au

Website: www.griffith.edu.au/glycomics

Address: Institute for Glycomics, Griffith University
Gold Coast, QLD 4222