



**DISCOVERY
INNOVATION
LEADERSHIP**

criticalcare
RESEARCH GROUP

Research Prospectus 2023-24



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The Critical Care Research Group would like to acknowledge the Traditional Owners of the land on which our offices and laboratories are located, the Turrbal peoples.

We pay our respects to Elders past, present and emerging.

We acknowledge Aboriginal and Torres Strait Islander peoples across the State for they hold the wisdom and knowledge as the first researchers, scientists and healers.



ccrg.org.au



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[CriticalCareResearch](https://www.facebook.com/CriticalCareResearch)



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WHY WE DO WHAT WE DO

The **Critical Care Research Group (CCRG)** was founded in 2004 based on the needs of the critically ill patient. Our aim then and now remains unchanged – to translate today’s research into tomorrow’s treatment, and ensure that the critically ill patient thrives and doesn’t just survive.

20 years on, we continue to grow collaborations with the world’s best researchers, creating a silo-free global ecosystem of patients, medicine, engineering, biology and beyond. It is the ethos of “patient first” that has brought some of the brightest minds to us, allowing us to grow into Australia’s largest multidisciplinary research group.

It is this team that allows CCRG to be such a successful “hot house” of new talent – all of whom have access to this fertile ecosystem. The publications, PhDs and presentations are all useful measures of our Fellows’ successes, but the camaraderie built during your time at CCRG continues long after each researcher returns home with new skills, new networks and new ideas, all of which will one day improve a patient’s survival.

From Kenya to the UK, Estonia to the UAE, France to Japan, clinical staff, scientists and engineers come to discover and innovate through creative partnerships. We know that so much more can be achieved through these collaborations than by working in one’s own backyard.

If you are keen to be part of the solution, to seize opportunities and think outside your comfort zone whilst becoming a leader in the field of critical illness, all in the sunshine of beautiful Queensland, Australia, then we invite you to contact us to discuss what it takes to join the program.

Go well,

John

Professor John F Fraser

MB ChB PhD FRCP(Glas) FRCA FFARCSI FCICM FELSO
Founder & Director, Critical Care Research Group



ICETLab **Innovative Cardiovascular Engineering & Technology Laboratory**

MISSION

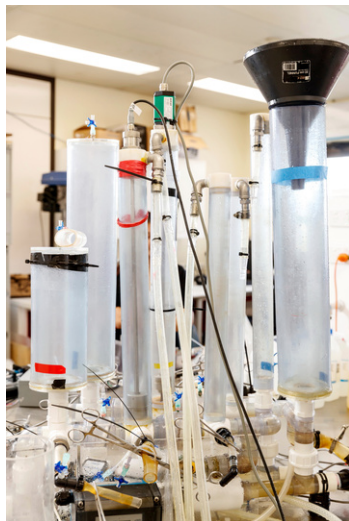
To expedite the development of novel cardiovascular technologies while investigating challenges with existing devices.

WHY

Mortality from cardiovascular disease is expected to rise exponentially over the next 20 years. Cardiovascular devices play an important role in managing these conditions, yet the pathway to clinical implementation for novel devices is convoluted and their subsequent uptake is often slow.

FACILITIES & CAPABILITIES

Computational Fluid Dynamics (CFD), Custom Pump Controllers, Particle Image Velocimetry (PIV), Rotary Moulding, Blood Circulatory Loop, 3D Printing, Left Ventricular Assist Device (LVAD).



From its world-class laboratories, multidisciplinary team and extensive global reach, CCRG offers the perfect springboard into a research career.

Dr Silver Heinsar

CCRG PhD Research Program (Estonia)

STARLab

Scientific & Translational Research Laboratory

MISSION

To understand the most serious health conditions facing critically ill patients.

FOCUS AREAS

Extracorporeal Membrane Oxygenation (ECMO), Heart and Lung transplantation, Heart Disease and Failure, Acute Respiratory Distress Syndrome (ARDS) and Endothelial Dysfunction.



WHY

After decades of research, mortality rates for many critical illnesses, including sepsis, ARDS, and cardiac shock, are still unacceptably high. Without rapid innovation these challenges are set to plague future generations.

PRIMELab Preclinical Innovative Medical & Engineering Laboratory

MISSION

To develop and test the efficacy and safety of novel medical and surgical interventions.

WHY

Cardiovascular diseases (CVDs) are the leading cause of death globally, taking the lives of an estimated 17.9 million people each year. This figure represents 32% of all global deaths, with over three quarters of CVD deaths take place in low- and middle-income countries.¹

Only 26% of donated hearts make it to transplantation.² We are working to fix this.

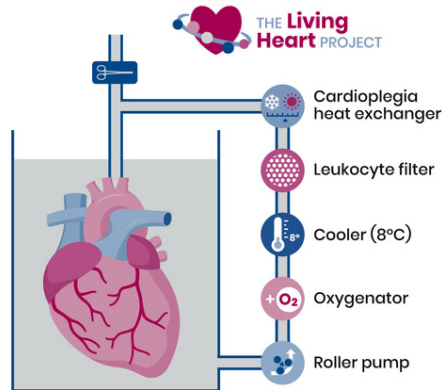
FOCUS AREAS

The team works across six main fields of investigation: Severe Cardiac Failure, Heart Transplantation (HTx), Shock States, ARDS, ECMO, and Pulmonary Diseases and Imaging.

THE LIVING HEART PROJECT continues to investigate the use of Hypothermic Ex Vivo Perfusion (HEVP), with phase two focusing on HTx following donation after circulatory death (DCD).



Alex Moroianu received a new heart through **The Living Heart Project**. Scan to learn more about her HTx journey.



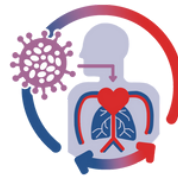
The bottom line is, there is now no heart anywhere in Australia or New Zealand that cannot be transported to a transplant centre,... (HEVP) has the potential to change the practice of cardiac transplantation worldwide.

Professor David McGiffin

Head, Cardiothoracic Transplantation Research
Co-Principal Investigator, The Living Heart Project



COVID Critical



**COVID-19 Critical
Care Consortium**
Incorporating **ECMOCARD**

A GLOBAL COLLABORATION BORN FROM A GLOBAL CRISIS

Founded by **Professor John Fraser, A/Professor Gianluigi Li Bassi** and **Dr Jacky Suen**, the COVID-19 Critical Care Consortium brings together a global alliance of researchers and clinical personnel from **400+** hospitals and sites in over **60** countries.

Through data modelling, COVID Critical has been able to generate clinical insights about COVID-19, a disease that was completely unknown before January 2020.

COVID Critical has revolutionised the way data can be safely and securely shared across the world. This is health care without borders, without politics, and without financial gain.



GLOBAL CONNECTIONS

- World Health Organization
- Bill and Melinda Gates Foundation
- University of Oxford
- IBM & Aridhia Informatics
- Asia-Pacific, North American and European Chapters of the Extracorporeal Life Support Organisation

During the pandemic, CCRG single-handedly assembled a global alliance of health care professionals to support those at the coalface. This will have an impact on the way medical research operates for generations to come.

Dr Leticia Helms MD

PGY1 Internal Medicine, Columbia Medicine Residency
(Brazil/USA)





*This is true science to me.
That's why I get excited....*

Dr Mark Ogino MD

International President, ELSO
COVID Critical Steering Committee

COVID CRITICAL IN NUMBERS



60+

**Countries with COVID Critical
research presence**



350,000+

Hours of Data Entry, most of it pro bono



440+

Collaborating centres



25,000+

Enrolled participants



17

**Manuscripts published with 20+ in various
stages of preparation**



**Connecting ICUs in resource-poor
countries with world-leaders in
critical care**



TODAY'S RESEARCH TOMORROW'S TREATMENTS

The Critical Care Research Group brings together a diverse team of passionate scientists, engineers and clinical professionals, united by the common goal of improving treatment outcomes for the critically ill.

CCRG is a springboard to some of the most sought after research positions in the world. From world renowned universities to cutting edge science institutes, CCRG Alumni go on to hold senior positions and reach incredible advancements in many fields of medical research.

As a CCRG collaborator you will:

- Participate in clinical studies and preclinical trials
- Contribute to life-changing translational research aimed at making a real impact to the lives of critically ill patients
- Have access to a multi-disciplinary team, state-of-the-art facilities, and supportive team and management
- Have a streamlined pathway to a career in academia and research
- Have access to world-leading tertiary education providers including The University of Queensland, Queensland University of Technology, Monash University, Bond University, and Griffith University

A faint, light-colored outline of a world map is visible in the background of the entire page. The map shows the continents and major islands, with a slightly darker shade in the upper half and a lighter shade in the lower half.

HONOURS

Students interested in undertaking a research project for their 4th year honours thesis at CCRG have access to a unique multidisciplinary environment and mentorship, gaining real-world experience in preparation for a career in research.

Students are selected based on their CV, academic record, work ethic, and can expect to be involved in groundbreaking preclinical trials across a range of exciting projects.

PhD and MPhil

PhD students receive unparalleled education in the fields of critical care medicine, cardiology, pulmonary medicine and bioengineering. We welcome students with specific ideas related to our existing research as well as those looking to explore broader research topics. We value candidates who demonstrate dedication and are capable of working autonomously.

POSTDOCTORAL PROGRAM

We look for candidates who are driven and take ownership of their research careers. Postdocs typically lead a multi-disciplinary team on a large project, and are encouraged to take on student supervision, as well as grant applications.



WELCOME TO QUEENSLAND

Australia's Critical Care Research Group is based at The Prince Charles Hospital, Brisbane, Queensland.

On the doorstep of the Great Barrier Reef and the world-famous Gold and Sunshine Coasts, Brisbane is a thriving multicultural city, with an innovation-led economy and an enviable outdoor lifestyle. A global hub in scientific innovation, mining and resources, technology, education, and cultural attractions, Brisbane is a natural home for business, work, and study.

The Prince Charles Hospital (TPCH) is the largest cardiothoracic hospital in Australia with a reputation for delivering excellence in health care. TPCH is the centre for leading clinical and translational research programs, particularly in the fields of cardiac thoracic medicine and surgery, and critical care.



CCRG offers unique research possibilities found in a combination of engineering, biology lab, preclinical models and patients, all on one campus.

Maximilian Malfertheiner

Former CCRG Research Fellow
Intensive Care & Internal Medicine Specialist
University Hospital Regensburg (Germany)

criticalcare

RESEARCH GROUP



550+

Manuscripts and publications



400+

International collaborating sites



80+

Scientists, Surgeons, Intensivists, Researchers & Engineers



Choose CCRG if you are highly driven and want to learn from some of the brightest minds in preclinical research.

A/Prof Shaun Gregory

Former CCRG Honours Student
Senior Research Fellow
Mechanical & Aerospace Engineering, Monash University



Research is all about solving problems through innovation. CCRG provides me with the opportunity to do this, and more, while working alongside a highly skilled and motivated team.

Lucia Gandini

CCRG Research Fellow (Italy)



CCRG offers me research opportunities I may otherwise never have had access to. The work we do has the potential to make a real difference to the lives of critically ill patients and their families. And for that I am truly grateful.

Dr Nchafatso Obonyo

CCRG Postdoctoral Researcher (Kenya)



YOUR RESEARCH CAREER STARTS HERE

Join us on our quest to find better treatment options for
the critically ill

criticalcare
RESEARCH GROUP

Endorsed and supported by



Queensland
Government



THE COMMON GOOD
AN INITIATIVE OF THE PRINCE CHARLES HOSPITAL FOUNDATION



WESLEY MEDICAL
RESEARCH



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA



World Health
Organization

