Victor Chang
Cardiac Research Institute

IMPACT REPORT 2019

Finding cures for cardiovascular disease through world-class medical research

For 25 years the Victor Chang Cardiac Research Institute has been Australia's home of heart research. Since 1994, the Institute has made an unshakeable contribution to the fight against cardiovascular disease, and that makes us overwhelmingly proud.

In 2020 we farewell our pioneering Executive Director, Professor Bob Graham. Nevertheless, we are confident that in Professor Jason Kovacic we have a champion who will not only continue this legacy but take the Institute to the next level, as the new leader of the organisation.

This special 25th Anniversary edition is dedicated to you, our loyal supporters. After a quarter of a century, thanks to you, we're only just getting started. Here's to another 25 illustrious years!

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About Us

Australia's home of heart research

The Victor Chang Cardiac Research Institute is dedicated to finding cures for cardiovascular disease through world class medical research.

Solving the Unsolved

Renowned for the quality of its scientific discoveries, the team at the Institute is working urgently to discover better ways of diagnosing, treating and preventing the onset of heart disease.

With over 200 scientists and doctors working together across 21 laboratories, the Victor Chang Cardiac Research Institute has earned its place on the global stage as one of the most respected medical research facilities in the world.

Our Research Focus

- HEART ATTACK
- HIGH CHOLESTEROL
- HEART TRANSPLANTATION
- ARRHYTHMIA
- CARDIOMYOPATHY
- CONGENITAL HEART DISEASE
- GENETIC ANALYSIS

Our Mission

The relief of pain and suffering and the promotion of wellbeing, through an understanding of the fundamental mechanisms of cardiovascular biology in health and disease.

Our Values

Excellence:
to achieve excellence in research

Creativity:
to demonstrate creativity in the pursuit of scientific discovery

Integrity:
to act with honesty, integrity and fairness at all times

Impact:
to undertake research that has significant impact and makes a difference

Teamwork:
to promote a sense of teamwork and collegiality amongst staff and collaborators

Our 2019 Statistics

240

researchers and staff

135

scientific publications

21

laboratories

11,036

people tested by our Heart Health Check team

Discovering why

#1 **Heart disease is the single biggest killer of Australians**

12 **Every 12 minutes one Australian dies from cardiovascular disease**

3X **Three times more women die of heart disease than breast cancer**

$12 billion **Cardiovascular disease costs Australia $12billion annually**

4 **Each week 4 babies die from congenital heart disease around the world**

Country girl making a big difference

Three years ago on a cold morning in country NSW, Karlee Jones started her Sunday as she always did, lying in bed with a coffee. Unfortunately for Karlee 13 November 2016 was no normal Sunday.

Karlee with her son Declan

At 32 Karlee was a fit, healthy, young woman who adored living in the regional town of Orange.

"I was born in the local hospital, went to school down the road and grew up riding the streets with the same friends that now meet me for a coffee." Karlee counts herself very lucky. She is surrounded by family and has a job she loves, managing the local service station. But one morning she rose from bed feeling unwell which came as a surprise, "generally I don't get sick. I jumped in the shower thinking I could shake it off but suddenly there was an excruciating pain in my chest."

Taking some deep breaths, she waited for the feeling to pass but it intensified. "It felt like a horse had kicked me in the ribs, I had never felt anything like it before. It slowly moved down my arms, a pressure and pain that transmitted all the way to my elbows." She adds, "it was almost like a nasty heat that slowly expanded and took over my upper half."

Karlee called her Mum who immediately raced to her daughter's home. She found her daughter on the bed, conscious but pale, in shock and scared. The pair rushed to Orange Hospital.

Doctors automatically assumed Karlee was experiencing a simple panic attack, overwhelming anxiety that presented as pain. Karlee challenged the clinicians immediately. "I just knew I wasn't worried or stressed about anything, I'm actually quite the opposite, probably too laid back!". Days later Karlee was correctly diagnosed. She had experienced a heart attack and had a condition known as spontaneous coronary artery dissection (SCAD).

"As I did, the public thinks 'heart attack' and presumes the victim is an old, overweight man. No one would ever think that a 32-year-old woman would be having heart problems," says Karlee.

Karlee is committed to supporting scientists to understand more about the condition. She is now taking part in Australia's first research program into SCAD led by the Victor Chang Cardiac Research Institute. "We need to learn more about this disease. I'm just a young woman from Orange but I'm super pleased to be making a difference to global research and breakthroughs led by the Institute." As part of the program, blood samples from SCAD patients are collected to analyse DNA. Spearheading the project is Professor Bob Graham, "we have been able to identify a genetic risk factor for SCAD, and we are the first in the world to create stem cell lines from SCAD patients. This allows us to investigate the underlying cause and test therapeutics to see if we can prevent the SCAD from occurring again, which it can, in up to 30% of cases." "But", he adds, "we have a long way to go."

As for Karlee, life has returned to normal in country-town Orange, but with one big difference - her contribution to medical research is now supporting women like her around the world.

What is SCAD?

SCAD is a serious condition that results when an inner layer of one of the blood vessels that feeds the heart - tears. Blood seeps between the artery layers, causing the artery wall to bulge into the cavity, which can slow or block blood flow to the heart, causing chest pain, a heart attack, abnormalities in heart rhythm or sudden death. Interestingly, it affects mostly women with 90-95% of SCAD patients being female, who are mostly around 40-50 years old and typically have few, if any, traditional cardiovascular risks.

A Message From The Chairman

It has been an enormous privilege to be the Chairman of the Victor Chang Cardiac Research Institute as we celebrate its 25th Anniversary. I am only the third Chairman in its 25-year history, following in the footsteps of Steven Lowy AM and the founding Chairman the Hon Neville Wran AC QC.

The longevity of my predecessors and my own commitment to the Institute can be attributed to one man, our Founding Executive Director, Professor Robert Graham AO, who has been at the helm for the last 25 years.

The Institute was established in 1994, in honour of Dr Victor Chang, a humanitarian and pioneer of modern heart transplantation. According to those who knew him well, Dr Chang was passionate about the power of discovery and he had a bold vision to establish a world-class research institute, knowing that while he could save hundreds of lives through surgery, he could save thousands more through research.

Bob brought this vision to life, as a caring clinician, a pioneer of molecular cardiology, and above all else, a true leader who has successfully fostered scientific excellence and innovation at the Institute for 25 years.

Honouring and thanking Professor Robert Graham for his service to the Institute and the community

As a relative newcomer to the Institute, it didn't take me long to recognise why the Institute has enjoyed so much success over such a long and sustained period. It really came down to two key ingredients.

First of all, the Institute has incredibly **strong foundations**. The Sisters of Charity setting the mission with the full backing of St Vincent's Hospital, strong underpinning from the State and Federal Governments, broad community support led by the Packer and Lowy families, official openings led by Prime Ministers, Princess Diana and Princess Mary, formidable governance led by former Premier the late Hon Neville Wran, with eminent directors including Steven Lowy and Mark Johnson, and finally, of course, the wonderful and incredible legacy of Dr Victor Chang to live up to.

The second ingredient to the Institute's long term success has obviously been **leadership**. How else could you build an Institute from a handful of scientists into a world leading heart research enterprise with over 200 scientists, led by global leaders in their respective fields and responsible for some of the world's most important breakthroughs in cardiovascular research?

And for that we are all very fortunate that a young man by the name of Bob Graham, who at the age of 45, decided to return home after 17 years of working in the US at some of the most prestigious medical research organisations, under the tutelage of not one but two Nobel Laureates.

As many of you know, Bob is an amazing individual with extraordinary kindness and a razor like intellect across almost any field. He's a pioneer of molecular cardiology and, above all else, a true leader who, with an enormous generosity of spirit, has fostered the development of so many scientists on the world stage in cardiovascular research.

I have learnt so much from Bob in these past 6 years and we have also had a lot of fun. So Bob thank you for that from me and my family.

I know that so many of the Institute's supporters who have shared this wonderful journey feel the same about Bob. In recognition of Bob's achievements, we were very excited to announce, at a celebration dinner at the Sydney Opera House, that the Institute is establishing an Endowment to fund the Robert M Graham Chair for Cardiovascular Research.

Chairman Matthew Grounds AM

The Robert M Graham Chair for Cardiovascular Research

The Endowed Chair will be held by the Executive Director of the Institute. In the Board's view, this is the best way to both recognise the past, and also build for the future. The Robert M Graham Chair will not only ensure that Bob's achievements and legacy are enshrined in the Chair's name, but will also provide critical on-going funding for the future leadership of the Institute.

I am delighted that five of the Institute's philanthropic family partners have generously donated $1million each to kick start the Endowment Fund for this Chair including The Douglass Family, The Lowy Family, the WA based Simon Lee Foundation, The Oatley Family and The Ritchie Family.

We were honoured that their vision to start the Endowment with $5million is also shared by several of our valued supporters. This includes Mark and Sandra Johnson who have made a $500k commitment, together with The Vidor Family, The Gutman Family and The Selig family who have also made very generous donations to the Fund that will serve as a legacy to honour the scientific excellence Bob has fostered in perpetuity.

The impact of Bob's decision to retire as Executive Director in early 2020 was softened by his desire to return to his laboratory full-time to focus on the vitally important research he and his team are doing into SCAD (spontaneous coronary artery dissection), together with the appointment of a new leader for the Institute, who has impeccable credentials to take the Institute to new heights.

Welcome to Our New Executive Director Professor Jason Kovacic

Over the past 18 months a small sub-committee of the Board including David Craig and Annabel Spring, together with an eminent scientific panel, including former head of the Garvan Institute of Medical Research and the President of the Australian Academy of Science, Professor John Shine; WEHI Executive Director, Doug Hilton; former UNSW Dean of Medicine, Professor Rodney Phillips; and leading cardiologist and Harvard Medical School Associate Professor Calum MacRae, worked with international executive search firm Perret Laver to identify candidates for the leadership of the Institute. This process was extremely thorough. The sub-committee interviewed a number of potential candidates from all over the world and I'm pleased to report that we have found and appointed an extraordinary clinician and leader, Professor Jason Kovacic.

Jason was most recently Professor of Medicine and Acting Director of the Mount Sinai Cardiovascular Research Centre in New York. We are extremely fortunate to have been able to lure Jason back from New York, where he is recognised as a leading cardiologist and researcher at Mount Sinai Hospital. Jason is not a stranger to the Institute having completed his PhD with Bob whilst working at St Vincent's Hospital. We have every confidence that Jason will be able to build on Bob's legacy and we are very excited about what the future holds for the Institute.

The Foundation donors to the Robert M Graham Chair at the 25th Anniversary dinner.

NSW Government Support

I would like to commend the NSW Government's commitment to building capacity for cardiovascular research in the State with a commitment of $150million over 10 years.

Championed by the Victor Chang Cardiac Research Institute and the Heart Research Institute, the Cardiovascular Research Capacity Building Program is set to position NSW as the premier State in heart research. Not only are we equipping some of the greatest minds with the financial support they need to help save lives, but in the near future the Program will allow the recruitment of additional researchers to build capacity in cardiovascular research in NSW and, thus, to position the State at the global forefront of heart research.

Sohn Hearts & Minds Conference and HM1

We are extremely grateful to be the beneficiaries of the fourth Sohn Hearts & Minds Investment Leaders Conference, at which top fund managers from Australia and around the world share their best investment ideas in support of medical research. The conference goes from strength to strength and has grown in popularity to the point that this year the conference was also live streamed to attendees from the Drama Theatre to the Playhouse at the Sydney Opera House.

In its first year Hearts and Minds Investment Limited (ASX:HM1) has performed strongly. HM1 was established with support from the Institute and some of my fellow Directors including Hamish Douglass, Gary Weiss and David Craig. It is one of the first ever listed investment funds which has, as one of its pillars, the generation of revenue to benefit medical research, including at the Institute. The fund provides investors with exposure to approximately 25 individual company investments selected by the fund managers who present at the conference, and by the six core fund managers. The fund managers provide ideas pro bono and in lieu of management fees, the fund makes a donation to medical research, equal to 1.5% of the fund, annually.

My sincere thanks to all the participating fund managers and in particular the core fund managers; Caledonia Investments, Cooper Investors, Magellan Financial Group, Paradice Investment Management, Regal Funds Management and TDM Growth Partners together with the board of HM1, all of whom are generously donating their services.

Western Australia

We co-hosted the State-of-the-Heart Dinner at Bistro Guillaume, Crown Perth with long term supporters, the Simon Lee Foundation. At the dinner we showcased some of the ground-breaking research being done at the Victor Chang Cardiac Research Institute and by our University of Western Australia-based Faculty-at-Large, Professor Livia Hool.

Professor Hool has made an enormous impact on cardiovascular disease in WA. She is leading the way for the State to become a centre of excellence for cardiovascular research, by spearheading the recent formation of the Western Australia Cardiovascular Research Alliance, which brings together all of WA's key cardiovascular researchers.

We warmly thank the Trustees of the Simon Lee Foundation as well as Mimi Wong and her family, for their continuing support of the Victor Chang Cardiac Research Institute.

The Institute

2019 has been a landmark year for the Institute and whilst we celebrate 25 years of scientific achievements, we must acknowledge that none of our successes would be possible without the dedication and contributions of our Board members. In particular, I would like to thank David Craig, our Deputy Chairman and Chairman of the Finance Committee for his wholehearted commitment to supporting the Institute in a wide variety of ways.

I would like to express our gratitude to Director Angelos Frangopoulos AM, who stepped off the Board this year after more than a decade of service, for his exceptionally valuable contribution to the Institute, and also to Annabel Spring for her significant efforts since joining in 2017.

I would also like to express deep appreciation to all our Board members and Faculty, whose single-minded devotion to the vision of the Institute is unwavering.

Finally, whilst we have wonderful supporters like you, the need for philanthropic support of our cardiovascular researchers has never been greater as they tackle the *number one* health problem in our community. Why don't you join us and help our researchers solve the unsolved at Australia's home of heart research?

Matthew Grounds AM
CHAIRMAN

Executive Director's Report 2019

It is with a sense of sadness but also excitement for the future that I write this message.

As many of you now know, I shall be stepping down as the inaugural Executive Director of the Victor Chang Cardiac Research Institute in March, 2020, almost exactly 26 years since we started, so this will be my last Annual Report.

It's been an enormous honour and privilege to lead the Institute over that time. I want to take this opportunity to thank not only my Faculty, Staff, Board and Patrons for their support and guidance, but also our colleagues at UNSW Sydney and St Vincent's Hospital; our many collaborators both national and international; the Sisters of Charity, whose human kindness is simply without equal; all of our many supporters—you are all just such wonderful, amazing people— and, particularly, our patients, who provide the inspiration for our work. It's been an extraordinary journey for me and my family, so a great big thank you to all who have made this time so positive, productive and rewarding.

In 2019, we celebrated a major milestone - the Institute's 25th Anniversary - with a gala dinner at the Sydney Opera House. Given that I will be stepping down as the Executive Director, it featured a very humbling tribute to my leadership of the Institute since its inception in 1994. It was particularly lovely to have my family by my side at this event and I must convey my most sincere thanks to the Director of Fund Development, Ariane Gallop and our Chairman, Mathew Grounds, as well as many others for this wonderful function.

The year was marked with many other memorable moments and it was another productive year of discoveries for the Institute. Publication highlights for 2019 featured the ground-breaking "chemical sleuthing" by Professor Roland Stocker's laboratory. Working with a number of collaborators around the world, this work, published in the journal, Nature, reported on the discovery of an entirely novel chemical that is abundantly produced in people with severe infections. Made from the amino acid, tryptophan, the chemical causes profound dilatation of blood vessels, which results in marked falls in blood pressure; a condition known as septic shock that affects over 18,000 Australians every year and that, even today, causes death in up to 25% of victims. This landmark discovery provides promise for the future development of treatments for septic shock.

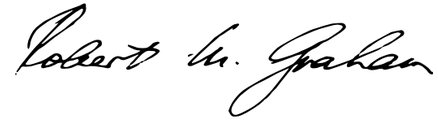
Other major discoveries included the elucidation of the first genomic marker for spontaneous coronary artery dissection, an increasingly recognised cause of a heart attack, particularly in women, most of whom are relatively young and have few traditional risk factors. This study, reported in the Journal of the American College of Cardiology, involved an international collaborative effort between groups in the UK, France, the US and at the Institute.

I am very proud to see that our homegrown, world-first advance in heart transplantation, pioneered by Professors Peter Macdonald and Kumud Dhital, is now being used at numerous centres around the globe, including in the UK, Belgium, Austria as well as the Massachusetts General Hospital and Duke University Medical Centre in the US. Peter and Kumud discovered how to revitalise a donor heart after it had stopped beating before transplanting it into a severely ill person. This advance will increase the number of heart transplants performed worldwide by about 30%, giving new life to hundreds of heart disease sufferers.

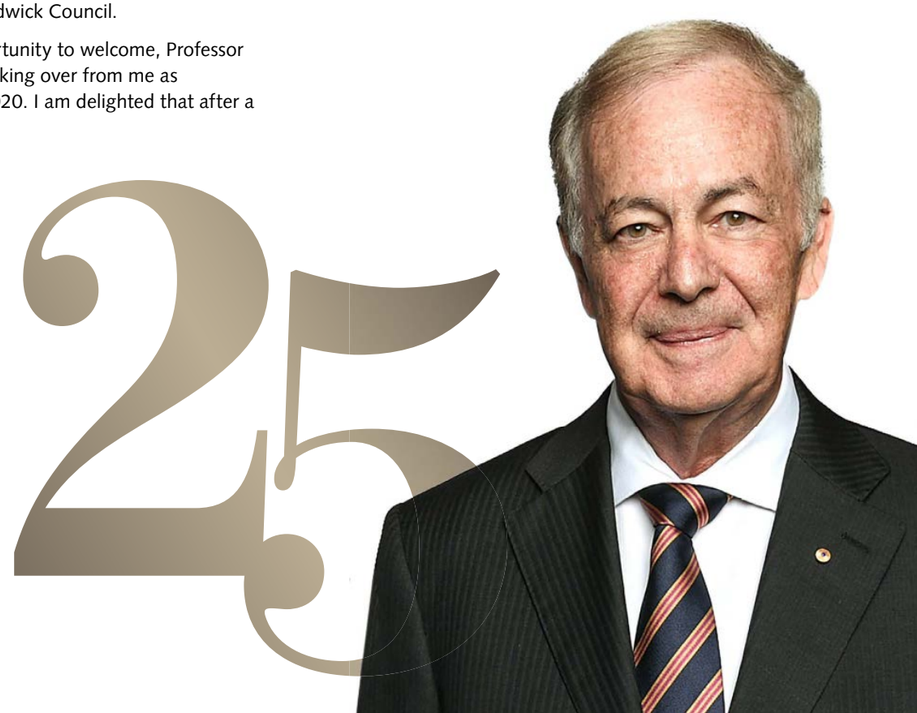
The achievements of our researchers were recognised by a spate of awards and honours both to our Faculty and trainees. In particular, I would like to highlight the recognition that Professor Sally Dunwoodie received with her 2018 grants being named the top ranked National Health and Medical Research Project Grants for that year. In addition, Sally was elected a Fellow of the Australian Academy of Health and Medical Sciences, while Professor Livia Hool, our Faculty-at-Large at the University of Western Australia was the recipient of the 2019 Research Achievement Award from the International Society for Heart Research World Council.

Other major events in 2019 included the Heart of Gold Ball that was hosted by the Riccio Family including Mark Vincent; the Bay Soiree hosted by our wonderful Young Appeals Committee and chaired by Jonathan Henry; the Heart of the West Ball at Club Marconi; the Women Against Heart Disease Luncheon in partnership with the Commonwealth Private Bank; another very successful Hearts and Minds Investment Leaders Conference; the Glen Carling Golf Day hosted by Gemma Carling and her family and friends; and the Des Renford Charity Gala Day hosted by Michael Renford and Randwick Council.

Finally, let me take this opportunity to welcome, Professor Jason Kovacic, who will be taking over from me as Executive Director in early 2020. I am delighted that after a stringent international hunt, our search committee, lead so ably by Matthew Grounds and, particularly, by our Deputy Chairman David Craig, selected Jason Kovacic. As a highly-respected cardiologist and researcher, with enormous leadership skills and great interpersonal strength, Jason is extraordinarily qualified to not only head the Institute but, importantly, to take it to the next level. I very much look forward to working with Jason and all of my colleagues at the Victor Chang Cardiac Research Institute as I continue my research and clinical practice.



Professor Robert M. Graham AO
EXECUTIVE DIRECTOR



Saving a broken heart

It was Australia Day 2017 and Colin and his heavily pregnant partner, were in their apartment when Colin started to feel "quite funny". The next thing he remembers was waking up in hospital to discover he had suffered a cardiac arrest and his pregnant partner had just saved his life.

The "healthy" father had just returned from the gym, so he wasn't particularly worried when he started getting "heartburn" with an odd sensation in his left arm. "I took some Panadol and lay on the couch," Colin recalls.

Karen decided to take his pulse, which appeared relatively steady and strong but "ten minutes later Colin became really stiff and looked like he was having a seizure." Karen put him into the recovery position on the couch and dialled Triple Zero. The call taker instructed her to get Colin onto the floor.

Karen managed to drag Colin onto the ground and performed effective CPR for nearly fourteen minutes until paramedics arrived. "I would have done it until I collapsed."

Karen's actions saved Colin's life. Three weeks later on the 17th of February, Karen gave birth to a little girl named Juliet. Remarkably Colin was out of hospital and by her side.

Following this near-fatal incident, Colin is now determined to raise awareness of heart disease. He knows that without medical research and outstanding medical care he would not be here to enjoy life today.

"A lot of men are reluctant to admit something is wrong because they see it as a sign of weakness. We are not bulletproof, it can happen to anyone," says Colin.

For her heroism, Karen was awarded a Victor Chang Heart of Gold Award which honours members of the community who have gone above and beyond to save the life of someone in cardiac peril. The medals acknowledge absolute courage when every second counts.

Karen and Colin with their children

"I was so heavily pregnant that I didn't think I could perform CPR. But with the man you love dying in front of you, and carrying his child, it is the biggest motivator you can ever imagine," Karen explains.

Organisational Structure

Victor Chang Cardiac Research Institute

Board of Directors

CHAIRMAN
Matthew Grounds AM

DEPUTY CHAIRMAN
David Craig

EXECUTIVE DIRECTOR 1994-2020
Professor Robert Graham AO

DEPUTY DIRECTORS
Professor Richard Harvey AM
Professor Jamie Vandenberg

DIRECTOR OF OPERATIONS & BUSINESS DEVELOPMENT
Georgia Hinton

Administration and Core Facilities

- Essential Services
- Finance
- Governance and Policy
- Grants
- Human Resources
- Information Technology
- Workplace Health & Safety

DIRECTOR OF FUND DEVELOPMENT
Ariane Gallop

Fund Development

- Bequests
- Corporate Partnerships
- Direct Marketing
- Events
- Heart Health Checks
- Media and Communications
- Philanthropy

Committee

Finance and Risk

CHAIR
David Craig

Scientific Advisory Board

Research Divisions

Cardiac Physiology and Transplantation
HEAD
Professor Peter Macdonald AM

Developmental and Stem Cell Biology
HEAD
Professor Richard Harvey AM

Molecular Cardiology and Biophysics
HEAD
Professor Robert Graham AO

Molecular, Structural and Computational Biology
HEAD
Dr Alastair Stewart

Vascular Biology
HEAD
Professor Roland Stocker

Member
St Vincent's Health Australia
CHAIR Paul Robertson AO

Affiliation
UNSW Sydney

Victor Chang Cardiac Research Institute Innovation Centre

DIRECTOR
Professor Sally Dunwoodie

DEPUTY DIRECTOR
Dr Adam Hill

CENTRE MANAGER
Johanna Barclay

Western Australia
Cardiovascular Electrophysiology Laboratory
HEAD
Professor Livia Hool

Board of Directors

The successful operations of the Victor Chang Cardiac Research Institute are heavily reliant on the dedication, commitment and vision provided by our Board of Directors, led by Mr Matthew Grounds.

ROBERT M GRAHAM AO
EXECUTIVE DIRECTOR

"Regrettably, almost everyone has been touched by someone who has died of heart disease. Despite great progress, heart disease remains amongst our leading killers. We still have much work to do, and we need your help."

MATTHEW GROUNDS AM
CHAIRMAN

"Heart disease is the leading cause of death for both men and women in Australia, with 1 in 5 Australians currently suffering from some form of heart disease. Our researchers at the Institute are at the global forefront of making new discoveries that help the significant populations around the world who suffer from cardiovascular disease."

DAVID CRAIG
DEPUTY CHAIRMAN

"We have assembled a world-class team of scientists and doctors to address Australia's number one killer – cardiovascular disease."

ANGELOS FRANGOPOULOS AM

"It's impossible not to be impressed by the depth of talent that makes up the Institute's researchers. Their scientific work is truly world class, and would make Victor Chang very proud of his legacy."

LOUISE DI FRANCESCO

"The vital work done by the Victor Chang Cardiac Research Institute scientists, who year after year strive to change the medical landscape with exciting new discoveries, make a difference not just nationally but globally."

PETER K ALLEN

"The Institute's medical research breakthroughs save lives. This is an extraordinary outcome, yet given the prevalence of cardiovascular disease globally, the Institute's world-class research and mission to promote well-being is more important than ever."

TERRY CAMPBELL AM

"The great thing about independent medical research facilities such as the Victor Chang Cardiac Research Institute is that they attract top research talent because, unlike universities, they are dedicated entirely to research at the highest levels."

JOHN KEAN OAM

"One of my heroes, Neil Armstrong, described research as creating new knowledge. In the case of the Victor Chang Cardiac Research Institute, using this knowledge is helping solve heart disease."

SHANGJIN (JIN) LIN AM

"The heart is where life starts. The work that the Victor Chang Cardiac Research Institute does is world class and critical in helping to mitigate one of Australia's biggest killers – heart disease."

HAMISH DOUGLASS AM

"My father was incredibly lucky to have received a heart transplant in 1990 at St Vincent's hospital, which extended his life by 16 years. My family has experienced first-hand from the benefits of breakthrough cardiac research."

JENNIFER DOUBELL OAM

"The Victor Chang Cardiac Research Institute is host to some of the world's brightest minds in cardiac research. We're fortunate in Australia to have such a powerhouse focused on finding better ways of preventing, detecting and treating cardiovascular disease, addressing one of the greatest burdens in our community."

DR GARY WEISS AM

"Cardiovascular disease is a major cause of death in Australia, and one of our largest health problems. Our Institute provides first-class medical research with groundbreaking results. From this research, we also strive to give all Australians the tools to maintain good heart health and thus prevent cardiovascular disease."

ANNABEL SPRING AM

"Heart disease is the leading cause of death for all Australians. Already the research results of the Institute are helping prevent birth defects, inherited heart diseases and heart attacks."

LESLIE FIELD AM

"The Institute brings together the best minds in cardiovascular research and the hands-on clinical care of real patients. The research teams are passionate in their pursuit for a better understanding of the complex causes of cardiac disease."

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Our Groundbreaking Discoveries Over 25 Years

The Victor Chang Cardiac Research Institute has made a multitude of major advances, many revolutionising our understanding of disease causation, mechanisms and medical treatment.

Here are just a few examples of what we have achieved in the fight against heart disease.

2019

In a landmark breakthrough we discovered a molecule that causes blood vessels to dilate and can lead to dangerously low blood pressure in patients suffering from severe sepsis, a syndrome which kills 100 Australians each week.

2018

In a world first, our scientists developed an 'early warning system' to help identify and treat people at high risk of heart attack – and potentially prevent it from occurring.

2017

Our scientists discovered that zebrafish have a special type of immune cell which enables them to heal their own hearts. The Victor Chang Cardiac Research Institute is now exploring the potential of self-healing in humans.

2017

In a blockbuster breakthrough that could change the way pregnant women are cared for globally, our researchers discovered that vitamin B3 has the potential to reduce recurrent miscarriages and various birth defects.

2014

Our professors were involved in the world first transplantation of a heart that had been revitalised after it had stopped beating. This discovery has enabled the lives of 30% more patients with severe heart failure to be saved.

2014

In another world first, our scientists developed a faster, more reliable way of diagnosing patients at risk of sudden cardiac death by simulating hundreds of thousands of heart beats in a virtual heart.

2014

Overturning a century of scientific dogma, we discovered that the heart can regenerate in pre-adolescents, which potentially means a heart could heal itself.

2012

Thanks to our scientists, an entire family is cured of a life threatening, inherited heart rhythm disorder. Some family members had such severe heart failure they were on the transplant waiting list.

2012

Our researchers made a fundamental discovery that showed for the first time how 'nature' and 'nurture' interact to cause birth defects.

2011

Our scientists identified and characterised a new population of stem cells in the adult heart.

2010

Our breakthrough discovery revealed how the tiny motors on bacteria allow them to move towards nutrients and away from toxins. This is crucial to understanding the spread of infections, such as those causing serious heart conditions.

2006

Our scientists showed that the diet of pregnant mothers can affect the health of their children and even their grandchildren.

2004

For the first time the Institute proved diseases can be caused not only by a defective gene (mutation), but by an inherited defect in the expression of a gene (an epimutation).

2002

The Victor Chang Cardiac Research Institute discovered that a new drug treatment can slow the progression of pulmonary arterial hypertension – a serious and progressive disease.

1999

Our scientists discovered the entire cellular machinery underlying growth and enlargement of skeletal muscle.

1994

Ground-breaking research at the Institute revealed an enzyme, previously only associated with clotting, actually has many functions and, uniquely, can also regulate how vigorously our hearts can beat.

Celebrating 25 years of Professor Bob Graham

In 2020 we farewell our pioneering Executive Director, Professor Bob Graham. Here are some of the heartfelt sentiments that Bob's colleagues far and wide, old and new, shared with us to mark the 25th Anniversary.

Bob has three greatest achievements. Number one, great kids, great family. Number two, what he's achieved in the Institute over the years. And number three, the fact that he's been able to do all this with such good humour and good grace.

Dr Andrew Owens

One of Bob's hallmarks is his generosity of spirit and willingness to support others in their endeavours and success.

Mr Matthew Grounds

Bob will never change. He'll always fight for cardiovascular research and in 10 years' time, he'll still be doing the same thing. Knocking on doors, trying to raise funds to improve the care of patients.

Prof Chris Semsarian

What is unique about Bob is his combination of gravitas, common sense and humour. He always allows others to shine. That's the mark of a fantastic leader.

Prof David Celemajer

I think what's unique about Bob is his breadth of knowledge. Bob often says imagine the unimaginable, and he really means it. Not only does he mean it, he's actually dedicated his life to trying to make it happen.

Prof Jamie Vandenberg

Bob has been a very kind and generous boss. I feel very much that I've worked with him, not for him. And it's been an absolute pleasure.

Heather Nobbs

Bob really is an incredibly humble guy. It's not until you get to know him that you realise he's completely brilliant. I mean his intelligence, his creativeness, his imagination, his leadership is incredible.

Dr John Hwa

He plays down his importance, but in all parts of the world Bob is respected and renowned for his hunger for knowledge, his brilliant leadership and for his humanity and kindness.

Mr John Kean

I don't think there's any question that Bob's legacy will be the stability and ongoing success of the Victor Chang Cardiac Research Institute.

Prof John Rasko

When you take on something from scratch, it's usually a bit of a gamble. But with him, there was always confidence that it would happen.

Mr Kerry James

I think Bob inspires you to pursue the best you can. I think he brings a discipline to his colleagues of how you can achieve a goal, and he's extremely caring.

Dr Nisha Nanda

He has always been incredibly dedicated to the mission of establishing the Institute. I've never seen someone so single-mindedly applying themselves to a task and bring something so complicated and difficult into being.

Prof Peter Currie

I am proud to have Bob as my friend. He's done wonders with the Institute. He's made it from the beginning to the top echelon of all institute's around the world.

Sir Frank Lowy

Without Bob, there would be no Victor Chang Cardiac Research Institute.

Mr Peter Joseph

Bob's own individual science is exquisite, and he does a magnificent job at anything he turns his hand to. It's his intellect, authenticity and compassion that sets him apart.

Prof Richard Harvey

Heart & Soul

A tribute to Professor Bob Graham

When you're traveling in a royal motorcade the traffic lights are always green. This random thought suddenly occurred to Professor Bob Graham as he sped along a Sydney street sitting in a darkened car next to Diana, Princess of Wales. Belatedly he realises; It's not every day you head to the airport to pick up a Princess...

In his 25 years as the founding Executive Director of the Victor Chang Cardiac Research Institute, there would be times that raced by with the speed and excitement of a Royal motorcade. And there'd be other times when the road ahead was unforgiving, marked with stop signs, detours and dead ends.

In 1996, Princess Diana was the Guest of Honour at the Victor Chang Cardiac Research Institute's Royal Ball, and Bob was her host. After the extravagant black-tie event, the Princess personally invited Bob and his children to her Double Bay hotel room for a pot of tea. Paparazzi in helicopters whined outside the window, unaware that this would be the last time Her Royal Highness would publicly visit Australia.

A yellowing photo of this rare moment still sits behind Bob's desk in his office. The dusty frame is competing for space, and the Princess is barely recognizable behind images of former students, colleagues, Nobel Prize-winning-friends and of course, grandchildren.

Suspended above the photo collection are six timber cupboard doors which conceal heavy textbooks on anatomy, physics, English grammar and non-fiction stories. The little library is like a glimpse inside Bob's brain – full of knowledge, gravitas and compassion.

"He really is a walking encyclopedia," his longtime friend and Institute Board Member John Kean will tell you. "He has a hunger for knowledge well beyond science. I'd say he's more gifted than the rest of us, mere mortals."

The very same word was often used to describe Dr Victor Chang – "*gifted*".

Bob was working in the United States when he was informed of the tragedy. It was a horrible shock. In the early seventies, the pair had briefly worked together at St Vincent's Hospital in Sydney, where

The Hon Neville Wran with Diana, Princess of Wales and Prof Bob Graham in 1996

Victor was Bob's boss. According to Bob, this was "long before Victor was famous." But even then, there was something unique about the way Victor saw the world and the way he cared for people.

Other than discussing patients, Bob and Victor had fairly limited interaction. But what they would share in common was the impact they had on people's everyday lives.

With Victor's tragic passing, a worldwide search began to select an Executive Director to build a research institute named after an Australian hero. It was more than just finding someone who could do the job. You had to be worthy of this great honour.

At the time, Bob had clocked up 17 "stellar" years building an envious career in the United States, working at Harvard Medical School, training under a Nobel Laureate at the Massachusetts Institute of Technology, before leading a large laboratory at the Cleveland Clinic. On weekends he went heliskiing with friends. Life was undeniably good.

But the chance to start an institute from scratch back home – well, that was too tempting to turn down.

"It's one thing to have the aspiration, it's another thing to actually execute. But with Bob there was never any doubt, he was the total package," says Peter Joseph, a former Director at St Vincent's Hospital.

Back then, the calibre of scientific talent was in stark contrast to the place where they worked – a pokey, dishevelled demountable in a dirty carpark. But not in Bob's eyes. With great pride, heavyweight recruitment prospects were given the "grand tour" of the makeshift laboratory. Professor Richard Harvey, co-Deputy Director of the Institute, thought it was a joke.

Prof Bob Graham with a portrait of Dr Victor Chang in 1994

"He brought me in for an interview and I said to myself, 'Bob, you've got to be kidding.' But before long I saw he had an exquisite sense of potential, a profound understanding of building a family, combined with a deep appreciation for biology. I was charmed over lunch and he convinced me that my future was better here at the Institute rather than anywhere else."

Former Deputy Director Prof Ahsan Husain and Prof Bob Graham in 2008

Long before the ten-storey Lowy Packer Building was constructed Bob had already seen it. This was more than just a dream, it was practically a prophecy. Magnetised by Bob's vision, some of the best scientific minds in the world were captivated one by one.

Among them was former Deputy Director, Professor Ahsan Husain.

"I was truly impressed by how little he actually had," Professor Husain recalls. "But as unimpressed as I was with the lab, I was very impressed with Bob's idea to build a centre full of scientific athletes."

Now all Bob needed was funding. Lots of it.

In the early 1990s when Kerry Packer was asked for $3million to help establish the Institute he famously replied "Jesus, that's a big ask! Isn't there any other bastard out there?".

Philanthropist, Chuck Feeney, was a little more subtle. In 2005 Bob traveled to San Francisco to persuade him to finance the construction of a purpose-built heart research headquarters.

"I was thanking Chuck for his time, and he had just turned to walk away when he said: 'Oh, by the way, you can have the $20 million to build your research centre'. He said it so casually," Bob recalls.

In a blink the bulldozers were on site, the tower rose up, the scaffolding came down and Her Royal Highness Princess Mary arrived in Sydney to cut the ribbon - officially opening the new research complex: The Lowy Packer Building.

To this day, Sir Frank Lowy and Professor Bob Graham are dear friends.

Mr Steven Lowy was Chairman of the Institute's Board for six years. He took the reins from former NSW Premier Neville Wran, before handing them to Mr Matthew Grounds, then CEO of UBS Australasia.

Bob has formed enduring friendships with all three Chairmen. He speaks of their outstanding contributions in equal measure, but their admiration for Bob is as intoxicating as the fireside Scotch they've shared.

Prof Bob Graham at the Institute's 25th Anniversary Celebration

Prof Bob Graham with Mr Steven Lowy and Mr Matthew Grounds in 2014

"He's a leader, a humanist, a world-class clinician, a renowned scientist, and a bloody good guy," explains Mr Lowy.

Current Chairman Matthew Grounds emphatically agrees. "The reality is, over the past 25 years I don't think there's any other Australian who's done more for heart research than Professor Bob Graham."

Let's pause a moment to let that statement sink in. In a quarter of a century it's widely believed that not a single person in the country has championed the fight against heart disease as successfully as Bob Graham.

Colleagues near and far, old and new, join in the applause.

Charles Homcy MD first met Bob in 1980 at Massachusetts General Hospital. They've been confidants and collaborators ever since.

"Oh, I think he's had a big footprint on heart research, my God! Just building the Victor Chang Cardiac Research Institute… what a wonderful body of work. A real magnum opus, an enduring institution. That by far is a remarkable achievement," says Dr Homcy.

With high praise like that, a lesser man would find his humility challenged.

"I think it's rare to have a leader whose ego is very much under control," explains Professor Sally Dunwoodie who has worked with Bob for 20 years.

"With Bob you get the constant impression he's not in it for himself, he's in it for everyone else."

Over and over Bob demonstrates his genuine modesty and fundamental care for his colleagues, his patients and total strangers. In 2014 a gardener was working at the Institute when he suddenly suffered a cardiac arrest right in front of the statue of Victor Chang.

Bob with his father Gunther and older sister Monica in the 1950s

"What will stick with me forever was how Bob immediately took over, got down on his hands and knees and started resuscitating him. He saved the life of this guy, and he did it with such style and commitment," Professor Harvey recalls.

Moments like that stay with you.

In the early seventies Bob was working at a hospital in rural New Zealand as a medical student. During one of Bob's shifts, a young mother who had just given birth, suddenly went into cardiac arrest. A senior doctor picked up a gigantic needle of adrenalin and told Bob to plunge it into the middle of her heart. He hesitated then stabbed. The injection was meant to shock her heart back to life, only it didn't work. So they bundled her into an ambulance and they headed for a larger hospital in Auckland. For 45 agonising minutes as the ambulance screamed through the countryside, Bob pumped the woman's chest with all his might. The new mother was dead by the time they reached the city. She never got to hold her baby in her arms.

Much like a Royal motorcade, the traffic lights are always green when you're traveling in the back of a speeding ambulance too. Only that time Bob was too exhausted and focused to notice.

Perhaps it was this moment that provided the morbid inspiration to forge a Herculean career in heart disease. Or perhaps Bob was thinking of the mum he couldn't save in the quiet moments late at night as he put the finishing touches on one of his 284 scientific research papers (and counting).

He keeps an exact tally. Research paper number 173 overturned more than a century of scientific dogma. Previously, it was widely accepted that heart muscle cells in mammals stopped replicating shortly after birth. Bob put a blowtorch to the theory and proved the heart has the remarkable potential to heal itself. The discovery was widely celebrated and published in the prestigious journal, Cell.

"His work ethic is unbelievable," says former colleague Professor Andrew Owens. "You could never imagine the amount of hours he spends doing the hard yards. Lots of scientists are hardworking, you have to be. But Bob is ferociously hardworking."

Bob, a father of four, did his best to ensure this didn't impact his homelife. According to his daughter Caitlin, while he'd often work late into the night, on weekends he was at home cooking crepes and schnitzel, teaching her how to ride a bike or building the latest jungle gym.

"We saw a different side of him at home, he's a silly, fun, pretty dorky dad who sends us the lamest dad jokes. But he has always had high expectations of us. From a young age I was very aware of how much he believed in me."

Bob's parents, Erica and Gunther Graham, had extremely high expectations of their son too. Gunther grew up in Eastern Germany in a little town called Breslau.

"Both my parents had to flee because of Hitler," Bob explains. "My father was actually in a concentration camp for three months before he got out and fled to England. It was right before the Holocaust in 1937 and 1938, this was even before the prisoners received tattoos in the camps. My dad was a strapping, big guy who played goalie for the state in soccer and they made him dig the latrines for the camps. He escaped, but dad's parents succumbed and so did my mother's side of the family too."

In 1938 Erica and Gunther arrived in Australia as migrant refugees with hardship in their eyes and a determination in their hearts that would inevitably be passed onto their children.

Few people realise Bob drove taxis to pay his way through medical school. Even fewer would be aware of the wild months he spent working at a hospital in remote Papua New Guinea, treating cannibals with exotic diseases, surviving an earthquake, and battling a plague of a billion locusts.

Prof Bob Graham with his daughter Caitlin on her wedding day

Prof Bob Graham with former PhD student Jason Kovacic in 2007

It's a long way from his office at the Victor Chang Cardiac Research Institute in downtown Sydney. In the centre of the room, paperwork cocoons his computer. To his right in the corner are two golf balls and a putter. In the other corner are some empty cardboard boxes. The boxes seem out of place and [Author's note] I wish they were. Bob is starting to pack up his office. After 25 spectacular years as Executive Director, he's decided it's time to move on and focus on his true passion, the research.

For the first time in 25 years another worldwide recruitment search has been underway, with only an elite few shortlisted for the role. And just as it was back in 1994, to fill such big shoes you have to be worthy of this great honour.

Scratch the surface and you'll find many similarities between Bob and his successor, Professor Jason Kovacic. As Cardiologists, they both spent several fruitful years working at hospitals and laboratories across the United States. Both have European heritage, refugee parents and speak fluent German. They also share a love of skiing, cycling, onion rings, and astronomy, and believe it or not, they even started working at the Institute on the exact same day 25 years apart.

They share an uncanny personal connection that seems to have been cast by destiny, a true master and apprentice tale.

The pair first crossed paths back in 2002. Kovacic was interested in doing a PhD under Bob's tutelage.

"I went to Bob with a head full of crazy ideas about what I wanted to research and Bob said, 'well, you can win the Nobel Prize later but right now I think this is a better idea for a PhD topic.' It was some of the best advice he ever gave me," Professor Kovacic laughs.

He completed his PhD in 2007 with Bob by his side. A photograph was taken at the time, without any awareness of its future relevance or significance – an image of a master and his apprentice looking with a mutual eye towards the future.

As the baton is passed, we are at the commencement of a new era, where Professor Kovacic will no doubt be eager to put his own personal stamp on the future direction of the Victor Chang Cardiac Research Institute.

Time and again Professor Kovacic has proven himself to be a *gifted* leader.

At Mount Sinai's Icahn School of Medicine in New York, he established a world leading laboratory focused on cardiovascular cell biology, while caring for patients with fibromuscular dysplasia and spontaneous coronary artery dissection.

Previously, Professor Kovacic was also a champion athlete who rowed alongside Australian Olympic Royalty, the Oarsome Foursome. And, incredibly, he was the medical doctor on tour with the Rolling Stones, personally treating Mick Jagger and Keith Richards.

But that's a story for another time. This story is dedicated to celebrating the man who has done more to combat heart disease than any other person in Australia.

With a worthy replacement ready, Bob feels it is time to move back to the laboratory.

Bob has cleaned out the bottom draw of his desk already. The faded photo of Princess Diana won't even be bubble wrapped before it goes into the moving box.

And as he packs, a painted portrait of Victor Chang hangs high on the wall watching over. It's the only physical possession Bob will leave behind.

After all there's something far greater he'll bestow to his successor. Something you can't touch or hold in your hands. And something you can't capture in a simple photograph. A legacy.

Prof Bob Graham with incoming Executive Director Prof Jason Kovacic

Diane's DNA

Hiking, Gardening and Molecular Genetics

On a quiet Saturday morning, Professor Diane Fatkin is elbow deep in mulch, tending to her garden after climbing a staggering 950 metres up Mt Solitary in the Blue Mountains. She is a long way from her world leading laboratory that investigates how genes can cause heart disease in families.

"I find a lot of inspiration from being in my garden and exploring the outdoors. The space helps my mind rest and allows me to think outside the box and consider new ways to approach problems. There's a lot of science in gardening - understanding elements, mixing chemicals, finding balance."

"We know every hiking trail in the Blue Mountains. My partner and I have systematically walked most of the trails in our area. You can't help but be inspired by the wild Australian bush and we are always keen to cover new ground. It enriches our lives," Diane explains.

From the valleys of the Blue Mountains to the snowcapped peaks of the Swiss Alps, it's clear Diane feels most at home on a hiking trail and in the laboratory.

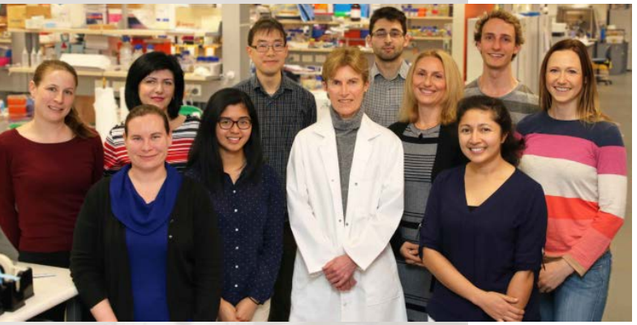
In the year 2000, Diane set up her first laboratory at the Victor Chang Cardiac Research Institute, under the guidance of Professor Bob Graham. According to Diane it was "the Golden Age of molecular genetics."

She had just completed her post-doctoral fellowship with globally renowned researchers, Professors Christine and Jon Seidman at Harvard Medical School. This dynamic husband and wife duo discovered the world's first gene mutation for inherited heart disease - a pinnacle breakthrough that left Diane transfixed.

"The Seidmans really drove me to see the power of genetics, the importance of understanding DNA and how this knowledge can ultimately improve the lives and outcomes of those living with chronic heart disease."

Prof Fatkin at the top of the Jungfrau in Switzerland

> "Like a good gardener, a scientist learns a lot from watching nature, from seeing what occurs naturally and using this knowledge to help solve problems. It's a lot of trial and error before a breakthrough."



Prof Fatkin with her laboratory members

Originally a clinical cardiologist, she shifted to research, knowing her genetic studies could potentially benefit more patients than just those she had the time to treat. But it wasn't her first career change. Diane also stepped away from medicine for two years to pursue a career in contemporary dancing.

"I adored the dancefloor but it was never a long term option for me. I could see my career was very limited and whilst I could play a role in helping people enjoy the theatre, I had the opportunity to help more in the lab, my true passion."

Twenty years on and Diane still leads a team of eight scientists who are committed to understanding how genetic mutations cause heart disease. And she is making headway too.

The Fatkin laboratory focuses on two of the most common types of inherited heart problems: dilated cardiomyopathy, which causes the heart to enlarge and weaken; and atrial fibrillation, an electrical problem with the heart. Both conditions can cause heart failure and stroke.

Symptoms of dilated cardiomyopathy often don't develop until adulthood. Which means a baby born with the inherited condition can seem perfectly healthy until adult life. Heart function can deteriorate at any stage and result in heart failure.

"In the past, treating the disease once symptoms start has simply been too late. But if we could prevent the symptoms and the disease developing in the first place – well now that's something really special. It's even better than a cure."

Diane is certain this is only possible through early genetic screening.

"We have reviewed the DNA of thousands of patients and found the exact genetic mutation that is causing disease in many families. It is incredibly valuable.

"We can now analyse the DNA of younger generations from these families and accurately predict who has an increased risk of developing disease in the future."

Early detection of family members at risk will enable early treatment, reducing the severity of the disease and possibly even preventing onset altogether."

Interestingly, it's a tiny tropical fish called a zebrafish that's helping Diane and her team uncover answers. Scientists study zebrafish because their hearts pump at a similar rate to humans, their embryos are transparent so scientists can see the inner workings of the heart, and their genetic make-up is surprisingly very similar to humans.

"In addition, we can look at the effects of the environment on heart disease, or see what medication and treatments work best. We even have echocardiograms and exercise testing we can conduct non-invasively on their tiny hearts, just like humans."

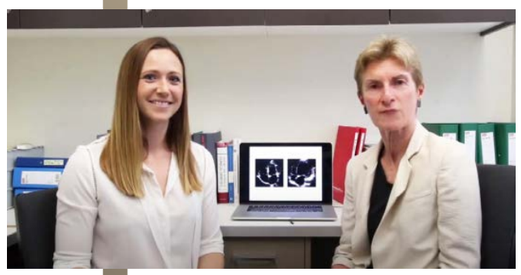
It's an incredible program providing valuable knowledge, but it requires critical funding to ensure its continued operation. That's just one of the challenges the year ahead presents for Diane and her team, who are calling for additional support to continue their life-saving research.

"We would like to offer whole genome sequencing to more patients and their families but it's enormously labor intensive. We need more staff to review data and more clinical hands to conduct testing on patients."

When asked what her ultimate dream would be if she had deeper pockets, her eyes light up. "We envisage a future where all patients have their entire genetic make-up analysed and we can study genetic mutations in the laboratory using a 3D-cardiac organoid."

In other words, Diane wants to study genetics in a miniature, human heart that's living and breathing in a petri dish. It's not a futuristic fantasy – the technology already exists and Diane is once again transfixed.

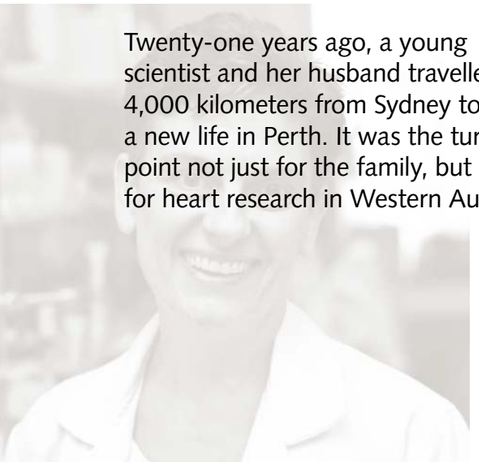
As for Diane's garden, like her laboratory, with hard work it will continue to flourish.



Prof Fatkin with colleague Dr Inken Martin

When leadership is in the blood

Twenty-one years ago, a young scientist and her husband travelled 4,000 kilometers from Sydney to start a new life in Perth. It was the turning point not just for the family, but also for heart research in Western Australia.



For anyone who knows Professor Livia Hool, the move to Western Australia came as no surprise. Her constant hunger to try something new, her confidence to give something a go, and her quest for answers led her to the opposite side of the country, where the young family knew just one distant cousin.

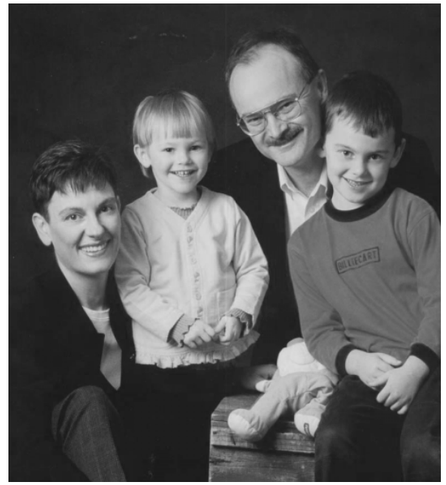
"I saw an opportunity. I would be the only cardiovascular electrophysiologist to set up a lab in Western Australia. I was ready to build my own identity and establish myself." Prof Hool adds, "I wanted to lead my own work and WA gave me the chance to do just that."

It's this leadership that has continued to drive Livia. Head Girl in her graduating year at high school, she says, "I had a challenging year as Head Girl because my father died of a brain tumor in Year 12 and I had to develop strategies to remain emotionally strong while leading the prefectship and navigating the academic year. The Principal was incredibly supportive and had full confidence entrusting these responsibilities in me. I felt privileged to hold the position and I learnt a lot."

But despite her natural propensity to lead, after just four short weeks in Perth, Livia and her husband almost gave up and returned home to their family in Sydney. Institutional bureaucracy and limited support led to delays and doubts as to whether it would be possible to establish a functional laboratory. She was also continuously asked why she wanted to start her own laboratory after only two years postdoctoral research, as most lab directors typically had double Livia's experience. To that, she smiles and replies "I enjoyed the challenge."

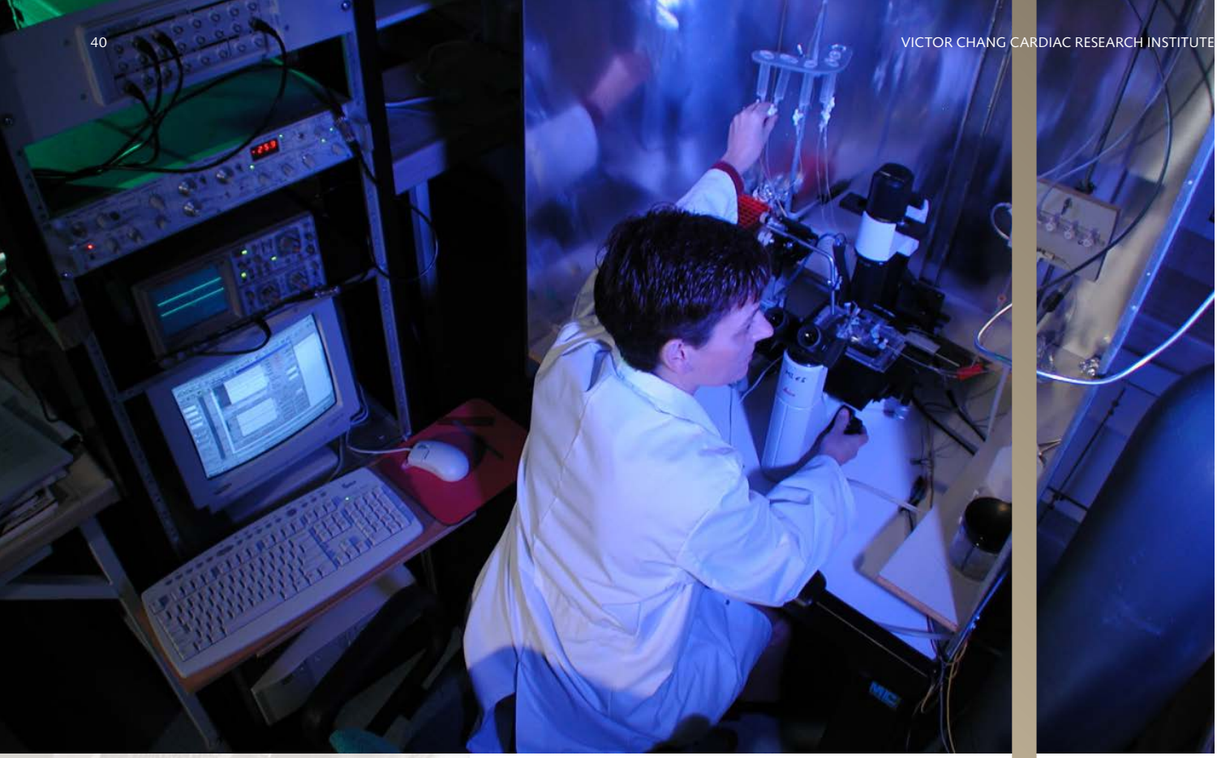
Livia's first project in WA was funded by the National Health and Medical Research Council and investigated how the heart senses changes in oxygen levels. "Since my earliest days I have been intrigued by the workings of the heart, it is truly a fascinating organ." Her early papers as single author in the prestigious journal, Circulation Research, were testament to her ability to establish and drive the research as a single investigator.

Two decades later and Livia heads up the position of the Victor Chang Cardiac Research Institute Faculty-



Prof Livia Hool with her family in 2003

Prof Livia Hool at Cottesloe Beach in WA



Prof Hool with her laboratory members

Prof Hool with her son at his graduation

at-Large in WA, where she has found the research opportunities are particularly unique.

"Cardiovascular healthcare delivery is as good on the west coast as the east, but we are in a very unique geographical situation." She adds, "Western Australia is stunning. Our State is huge with a pristine coastline and remote communities."

Perth is the most isolated city in the world and due to the sheer size of the State, the delivery of healthcare to remote regions presents challenges.

"We know that patients in remote regions are 40% more likely to die from a heart attack and twice as likely to be hospitalised. The local healthcare system needs to be able to respond rapidly to a patient having a heart attack on a cattle station in the Pilbara as well as service a sprawling urban population such as Perth."

A strong advocate for medical research in WA, Livia established the Western Australian Cardiovascular Research Alliance in 2019. Representing all cardiovascular researchers in the State, it aims to increase public awareness of the burden of cardiovascular disease and advocates for increased funding for heart research.

"Previously we had no identity. No voice. We could not represent the needs of cardiovascular researchers in WA at a national level or leverage funds from national grant bodies without this alliance. The support has been overwhelming and warmly welcomed by the universities, other institutes, hospitals and the business community."

Livia's leadership has also extended to international roles. She has just completed two terms as President of the International Society for Heart Research where she established policies on education and training particularly for early career researchers, and advocated for increased funds for cardiovascular scientists in Australia.

The excellence of her research has also been recognised by many accolades. Recently she was presented with the prestigious Research Achievement Award from the International Society for Heart Research. In 2019 she was also recipient of the RT Hall Prize from the Cardiac Society of Australia and New Zealand (CSANZ). It is the most prestigious research award from the Society and recognises sustained and outstanding research achievement.

"When I first moved to WA all of those years ago, I'd always hoped my research would make a difference. To be honoured in this way was a true career highlight for me."

There's no doubt leadership in heart research is in Livia's blood and it is pumping through the heart of the State.

About Livia's research

Professor Hool currently leads a team of twelve talented researchers. Her research focuses on the role of calcium in the heart. Calcium channels play a central part in many cardiac diseases such as hypertrophic cardiomyopathy.

Hypertrophic cardiomyopathy causes the heart to become dangerously large and is among the leading cause of death in Australians under 40. Unfortunately, the bigger the heart gets, the greater the chance a patient will suffer sudden cardiac death. The key to preventing the disease is diagnosis before symptoms develop.

In 2019, Prof Hool's team made an exciting double breakthrough. The group was the first to discover that a calcium channel can regulate energetics and that by targeting this calcium channel with a specific medication it can prevent the disease from developing.

"We achieved this using a mouse model. Over five weeks we administered the medication and we were able to prevent the disease from progressing altogether."

"The impact of this discovery is enormous. We now have the potential to stop the disease from progressing before symptoms develop and we could also reduce the risk of patients dying from sudden cardiac arrest."

Research Divisions

1

Cardiac Physiology and Transplantation

Macdonald Laboratory
- Heart transplantation
- Donor heart preservation
- New heart failure treatments

Hayward Laboratory
- Heart failure
- Left ventricular mechanical support devices

Feneley Laboratory
- Cardiomyopathy
- Heart attack
- Ischemic heart disease

Keogh Laboratory
- Pulmonary hypertension
- Heart failure
- Immunosuppression

Muller Laboratory
- Structural heart disease
- Valvular heart problems

Jabbour Laboratory
- Heart transplant rejection
- Magnetic resonance imaging

2

Developmental and Stem Cell Biology

Harvey Laboratory
- Heart development
- Congenital heart disease
- Heart stem cells & regeneration

Dunwoodie Laboratory
- Congenital heart disease
- Embryonic development
- Birth defects

Kikuchi Laboratory
- Heart muscle regeneration
- Heart failure

Winlaw Laboratory
- Congenital heart disease
- Genetic analysis

3

Molecular Cardiology and Biophysics

Graham Laboratory
- Cardiac regeneration
- Heart failure
- Hypertension

Vandenberg Laboratory
- Arrhythmias
- Electrical activity in the heart

Hill Laboratory
- Drug-induced arrhythmias
- Computational cardiology

Fatkin Laboratory
- Dilated cardiomyopathy
- Atrial fibrillation
- Inherited heart disease

Martinac Laboratory
- Ion channels in the heart
- Mechanical forces

Hool Laboratory
- Cardiomyopathy
- Heart failure associated with muscular dystrophy

Smith Laboratory
- Hypertension
- Pharmacology

4

Molecular, Structural and Computational Biology

Giannoulatou Laboratory
- Bioinformatics
- Cardio genomics
- DNA analysis

Stewart Laboratory
- Protein structure
- Cryo-electron microscopy

Wong Laboratory
- Gene regulation
- Genome evolution
- Genomics and Bioinformatics

5

Vascular Biology

Stocker Laboratory
- Atherosclerosis
- Heart attack
- Stroke

6

Victor Chang Cardiac Research Institute Innovation Centre

Prof Sally Dunwoodie
Director

Dr Adam Hill
Deputy Director

Johanna Barclay
Manager

A/Prof Mark Hodson
Metabolomics Laboratory

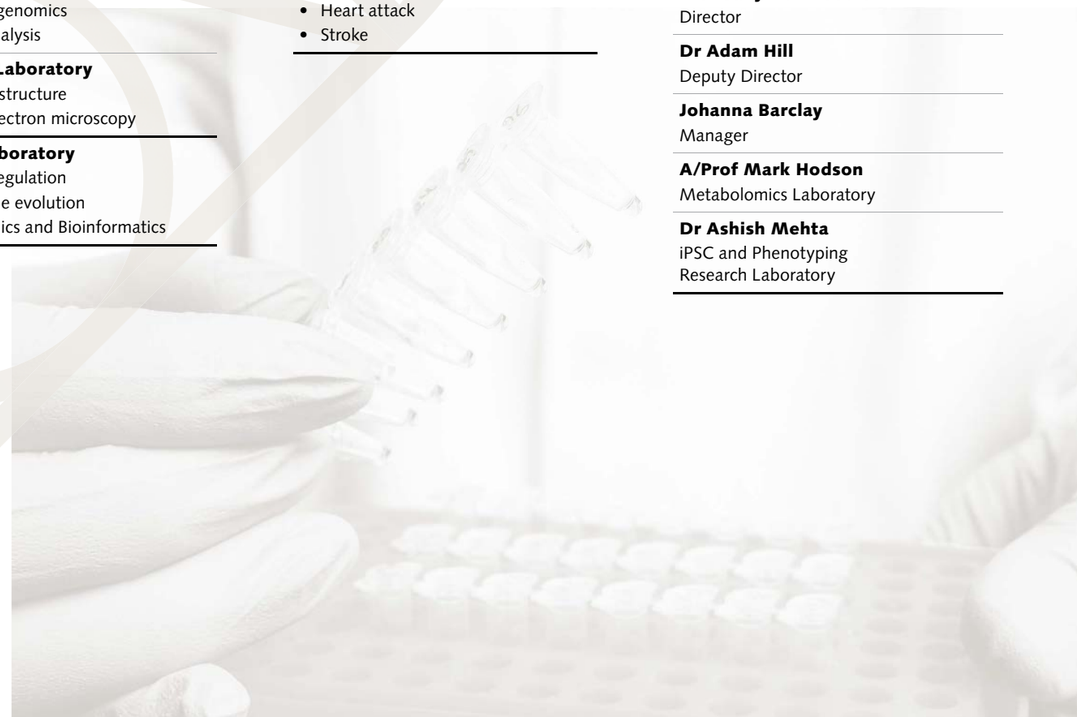
Dr Ashish Mehta
iPSC and Phenotyping Research Laboratory

Clinical Faculty

A/Prof Cameron Holloway
A/Prof Jane McCrohon
Dr James Otton
A/Prof Jacob Sevastos
A/Prof Rajesh Subbiah

Honorary Faculty

Prof Oliver Freidrich
Prof Matthias Hentze
Prof Ahsan Husain
Dr Lawrence Lee
Dr Ming Li
Prof David Martin
Prof Andras Nagy
Prof Soren-Peter Olsen
Dr W. Andrew Owens
Prof Thomas Preiss

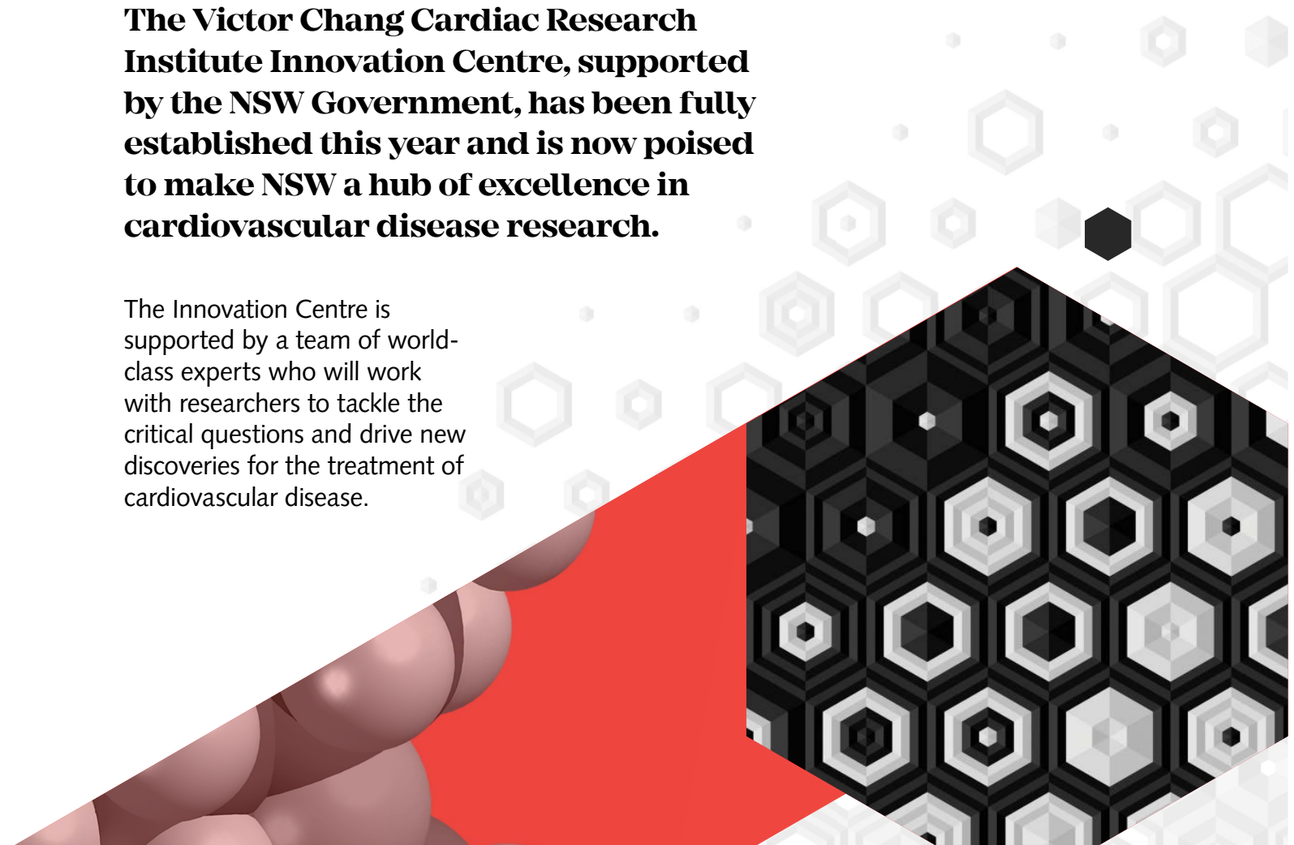


Innovation Centre

Investing in the future

The Victor Chang Cardiac Research Institute Innovation Centre, supported by the NSW Government, has been fully established this year and is now poised to make NSW a hub of excellence in cardiovascular disease research.

The Innovation Centre is supported by a team of world-class experts who will work with researchers to tackle the critical questions and drive new discoveries for the treatment of cardiovascular disease.



Preclinical Imaging Facility

Equipped with state-of-the-art PET-MRI and CT technology for assessing the structure and function of the heart in conditions such as cardiomyopathy, congenital heart disease, and myocardial-infarction cardiac damage.

Micro Imaging Facility

Specialises in 3D imaging with systems for observing living cells under a multitude of conditions.

Metabolomics Facility

Boasting cutting edge mass spectrometry systems which provide insight into the pathophysiology of cardiovascular disease. These instruments will pave the way for precision medicine.

Cardiovascular Stem Cell Production Facility

Featuring the most advanced robotics technology and stem cell expertise for scientists to study cells from hundreds of patients.

Cell Function & Screening Facility

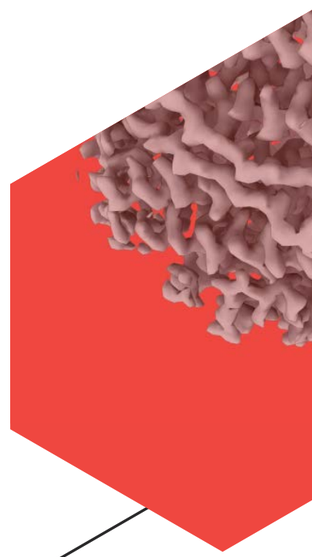
A high-tech hub that allows researchers to perform electrophysiology, cellular fluorescence and metabolism recordings, as well as cardiac cell contractility in living cells.

Clinical Imaging Facility

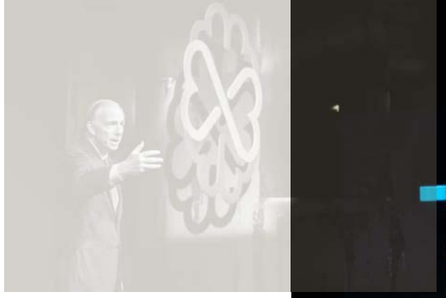
Housing Australia's first dedicated cardiac imaging research hub, at St Vincent's Hospital, Sydney.

Cryo-electron Microscopy Facility

This facility is home to one of the world's most powerful microscopes for imaging frozen, atomic-sized molecules in 3D, enabling researchers to lead the way in biological electron microscopy.



VICTOR CHANG CARDIAC RESEARCH INSTITUTE
INNOVATION CENTRE



Sohn Hearts & Minds Investment Leaders Conference

The Sohn Hearts & Minds Investment Leaders Conference returned to the Sydney Opera House after being held in Melbourne in 2018.

To accommodate overwhelming demand for tickets the conference was live streamed to the Playhouse from the Drama Theatre for the first time. Once again, this world class event enabled Australia's fund management community to hear from the biggest stars in the industry from around the world.

Hosted by comedian and mathematician Adam Spencer, the blue-chip line up of local and global fund managers shared their top investment tip with the aim of generating superior returns for medical research in Australia. The extraordinary line up of international experts was headlined by;

- Ray Dalio, Bridgewater Associates (USA)
- Marcus Bihler, Builders Union (UK)
- Robert Kapito, Blackrock (USA)
- Howard Marks, Oaktree Capital (USA)

Local masters included Hamish Douglass, Magellan; Emma Fisher, Airlie Funds Management; Jun Bei Liu, Tribeca Investment Partners; and Nick Griffiths, Munro Partners, just to name a few.

This conference once again delivered a surprise element with a special performance from Daryl Braithwaite. Sohn Hearts & Minds Investment Leaders Conference 2019 raised over $2million which was distributed amongst 11 beneficiaries which included the Victor Chang Cardiac Research Institute, MS Research Australia, Murdoch Children's Research Institute, Black Dog Institute, Charlie Teo Foundation, MND Australia, Brain Cancer Collective, JDRF Australia, Shake it Up Australia Foundation, Save the Children and Support Act Ltd.

Fundamental to the success of the conference is the continuing generous support of our major partners, the Commonwealth Bank and the Paul Ramsay Foundation for which we are extremely grateful.

Hearts and Minds Investments Limited (HM1.AX) was established and subsequently listed on the Australian Stock Exchange in November 2018 with the dual purpose of providing investors with a portfolio of outstanding investment opportunities while giving considerable funding to a range of Australian medical research institutes. The fund draws ideas from leading global fund managers, and the Victor Chang Cardiac Research Institute is very fortunate to have been selected as a beneficiary of their expertise and generosity.

The HM1 portfolio invests in the high conviction stock recommendations from the annual Sohn Hearts & Minds Investment Leaders Conference, and from a group of core managers - Caledonia Investments, Cooper Investors, Magellan Financial Group, Paradice Investment Management, Regal Funds Management and TDM Growth Partners who generously donate their services together with the brokers.

The top performing conference stocks in the 2019 portfolio were DocuSign Inc, PagSeguro and New Oriental Education, which delivered the Fund returns of 82%, 72% and 59% respectively. Overall, HM1 performed strongly in its first full year, delivering a return of approximately 32% to shareholders. This resulted in a donation of $2.1million to the Victor Chang Cardiac Research Institute for 2019.

Heart Health Checks

The Heart Health Check service, operated by the Victor Chang Cardiac Research Institute, travels right across the country testing Australians for the key modifiable risk factors of heart disease.

Features of the Heart Health Checks include;

- **On-the-spot test results in 10 minutes**
- **Staffed by qualified nurses**
- **Fully mobile and portable**

The Heart Health Checks is generously supported by HCF and IMB Community Foundation. To book the Heart Health Check service for your next community or corporate event please contact Jayne on (02) 9295 8760 or j.baric@victorchang.edu.au

2019 Results

11,036

free heart health checks conducted

4,731

people had one or more results outside of the healthy range

31%

of people tested had high cholesterol

12%

of people tested had high blood sugar

9

Qualified nurses

110

different locations

199

days of testing

Statement of Income and Expenditure

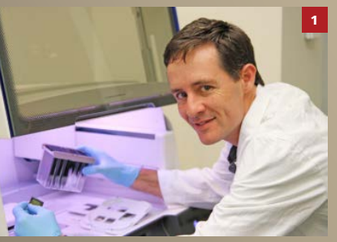
For the year ended 31 December	2019 $	2018 $
Income		
Research grants	14,360,866	13,797,156
Donations and fundraising	4,849,970	8,722,725[1]
Investment and other income	1,817,932	1,674,158
Total income	21,028,768	24,194,039
Expenses		
Research expenses	15,973,141	15,119,422
Administration expenses	6,722,409	6,264,770
Fundraising expenses	1,921,968	1,637,115
Total expenses	24,617,518	23,021,307
Operating (Deficit)/Surplus	**(3,588,750)**	**1,172,732**
Non operating income/(expenses)		
Innovation Centre grant	1,015,299	3,589,482
Depreciation on Innovation Centre equipment	(1,384,968)	(1,051,798)
Gain/(loss) on revaluation financial assets	2,632,254	(630,067)
Net (Deficit)/Surplus for the year	**(1,326,165)**	**3,080,349**

1. Donations and fundraising activities includes a major bequest in 2018.

Comparative figures have been adjusted to conform with changes in presentation for the current year.

The above is an extract from the 2019 audited Financial Statements. The extract does not include the information normally included in the financial statement. Accordingly, this extract is to be read in conjunction with the audited Financial Statements for the year ended 31 December 2019.

Achievements and Awards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Scientific Accolades

Prof Sally Dunwoodie
Top Ranked Project Grant (2018)
NHMRC

Fellow of the Australian Academy of Health and Medical Sciences

Prof Livia Hool
RT Hall Prize
Cardiac Society Australia and New Zealand

Research Achievement Award
International Society for Heart Research

Dr Chris Anthony
President's Prize
Young Investigator Award
Transplant Society of Australia and New Zealand

Dr Aude Dorison
Best Postdoc Poster
Best Pitch Prize
Stem Cells Australia Annual Retreat

Dr David Humphreys 1
Professional Bioinformatician Award
Australian Bioinformatics and Computational Biology Society

Dr Renee Johnson 2
Genetics Prize
Cardiac Society Australia and New Zealand

Dr Carus Lau
Travel Award
Lorne Conference

Dr Ralph Patrick
Best Postdoc Poster
Stem Cells Australia Annual Retreat

Dr Stacey Peters
Margaret Henderson Women in Research Fellowship
Royal Melbourne Hospital

Dr Celine Santiago
Young Investigator Travel Award
International Society for Heart Research

Dr Jeanette Villanueva 3
Best Basic Science Poster
Transplant Society of Australia and New Zealand

Dr James Walshe
Early Career Researcher Travel Scholarship
Australian Society for Biochemistry and Molecular

Dr Alexander Ward 4
Best Postdoctoral Talk
NSW ANZSCDB

Early Career Researcher Travel Scholarship
Early/Mid Career Research Award
NIH CVBE Conference

Geoff Wong
Finalist, Samuel A. Levine Young Clinical Investigator Award
American Heart Association

Sydney Cardiovascular Symposium Prizes

Dr Celine Santiago 5
Rising Star Award

Dr Chris Stanley 6
Rising Star Award

Dr Alexander Ward
Best EMCR Presentation

Dr Justin Szot 7
Best Non-Student Poster

Dr Jeanette Villanueva
Best Non-Student Poster

PhD's Awarded

Dr Ann-Kristin Altekoester 8
University of Cologne (Germany)

Dr Weiyu Chen
UNSW Sydney

Victor Chang Cardiac Research Institute Awards

Dr Kathryn Wolhuter 9
Winner
Paul Korner Seminar Series

Dr Sarah Scheuer 9
Student Prize
Paul Korner Seminar Series

Dr Amy Nicks 9
People's Choice Award
Paul Korner Seminar Series

Duane Chapman
Executive Director's Award

Fundraising Events

22 MARCH 2019

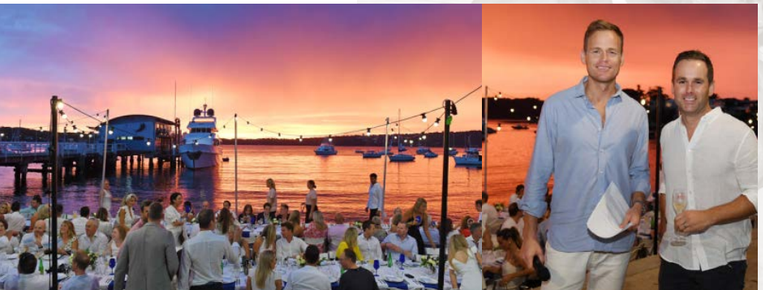
The Bay Soiree

In partnership with Watsons Bay Boutique Hotel

This event is hosted by our Young Appeals Committee, ably lead by Jonathan Henry (Chair), Joel Barbuto, Tim Barrett, James Camilleri, Marcus Chang, Daniela Elser, Vanessa Gilbert, Alex Hart, Paula Hitchcock, Laura Jayes, Caity McLoughlin, Simon Raftery, Gavin Rubinstein and Justine Schofield.

Our sincerest thanks to Fraser Short and the team at the Watsons Bay Boutique Hotel for their continuing support of this unique event.

Total raised: $130,000



The Bay Soiree hosts, Tom Williams and Alex Hart

EASTER 2019

Royal Easter Show Charity Steer Auction

Congratulations to Schute Bell Badgery Lumby on the 21st Anniversary of the Royal Easter Show Charity Steer Auction. Our sincere thanks to Paul Ferry who purchased the steer and who generously donated the proceeds to the Victor Chang Cardiac Research Institute for the 11th consecutive year. Congratulations also to the students from Murrumburrah High School who raised the 624kg Angus steer.

Total raised: $27,500

Guests at the Women Against Heart Disease Lunch

17 AUGUST 2019

Heart of the West

We are very grateful to Club Marconi for hosting the annual Heart of the West Charity Ball. Thank you to Vince Foti, President and Tony Zappia, CEO for their ongoing support of the Victor Chang Cardiac Research Institute.

Total raised: $61,000

20 JUNE 2019

Women Against Heart Disease Lunch

In partnership with Commonwealth Private Bank

The annual lunch highlights the risks of heart disease in women. We are very grateful to Liza Stern, a SCAD heart attack survivor for kindly sharing her story with our guests. A huge thanks also to our wonderful MC, Sunrise presenter Edwina Bartholomew.

Total raised: $63,000

Guests at the Women Against Heart Disease Lunch

3 NOVEMBER 2019

Des Renford Charity Gala Day

Now in its 19th year the annual Des Renford Charity Gala Day continues to be a wonderful success. Our heartfelt thanks to Michael and Vanessa Renford, Randwick City Council, event sponsors and the wonderful team of volunteers without whom the event would not be possible.

Total raised: $43,000

Players at the Glen Carling Memorial Golf Classic

20 NOVEMBER 2019

The Glen "Spiffy" Carling Memorial Golf Classic

Our warmest thanks to Gemma Carling and the Carling family for hosting the 6th charity golf day which is held in memory of Glen Carling. More than 60 keen golfers attended the event at Lakeside Golf Club Camden.

Total raised: $18,000

Supporters and Acknowledgments

Our life-saving research would not be possible without the generous commitment of our valued supporters.

These categories represent cumulative philanthropic support received over the past 10 years.

Robert M Graham Chair of Medicine, UNSW

The Douglass Family
The Simon Lee Foundation
The Lowy Family
The Oatley Family
The Ritchie Family
The Johnson Family
The Vidor Family
The Gutman Family
Mr & Mrs Jacob & Enis Mamutil
The Selig Family
Mr Matthew Grounds, AM
Mr David Gyngell
Mr Richard Elmslie & Ms Leslie Tilly
Mr & Mrs Paul & Valerie Ferry
Mr Stephen Johns
Navarra Venues
Mr John Kean, OAM

Chairman's Lab

ANZ Banking Group Ltd
Aqualand Projects
Balmoral Pastoral Pty Ltd
Chain Reaction Challenge Foundation
Citigroup
Commonwealth Bank
Consolidated Press Holdings Ltd
Crown Resorts Foundation
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NSW Government
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The Lowy Foundation
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Ritchie Family
David & Diana Ritchie
Simon Lee Foundation
Sohn Hearts & Minds Investment Leaders Conference
Westfield Holdings Limited
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The Estate of Ilze M. Baltins

Director's Lab

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The Estate of Thelma R. Tagg

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Glen Carling Golf Day
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VGI Partners Pty Ltd
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The Estate of Allan Ernest Nicolas Tackaberry
The Estate of Thaddeus S. Schbilski
The Estate of Bob Henry De Groot
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The Estate of Ralph E. Carrick
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The Estate of Jennifer Goodhew
The Estate of Margaret Knight
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The Estate of Douglas Arthur Westerland
The Estate of Rex Owen Banks
The Estate of Jane J Holland
The Estate of Moira A. Marlin
The Estate of Marjorie Grace Lawn
The Estate of Paul and Jennifer Korner
The Estate of William A. Bell
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The Estate of May Lillian Perkin
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Ord Minnett
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One of the most life-changing ways you can make a difference is to support research into heart disease.

With your help, our researchers can discover better ways of diagnosing, treating and ultimately preventing heart disease.

Donate to Australia's home of heart research today

For more information or to show your support today, please call

1300 842 867

or visit www.victorchang.edu.au

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405 Liverpool Street
Darlinghurst NSW 2010
Australia

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COVER: Changing of the Guard. Professor Bob Graham pictured with incoming Executive Director Professor Jason Kovacic

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