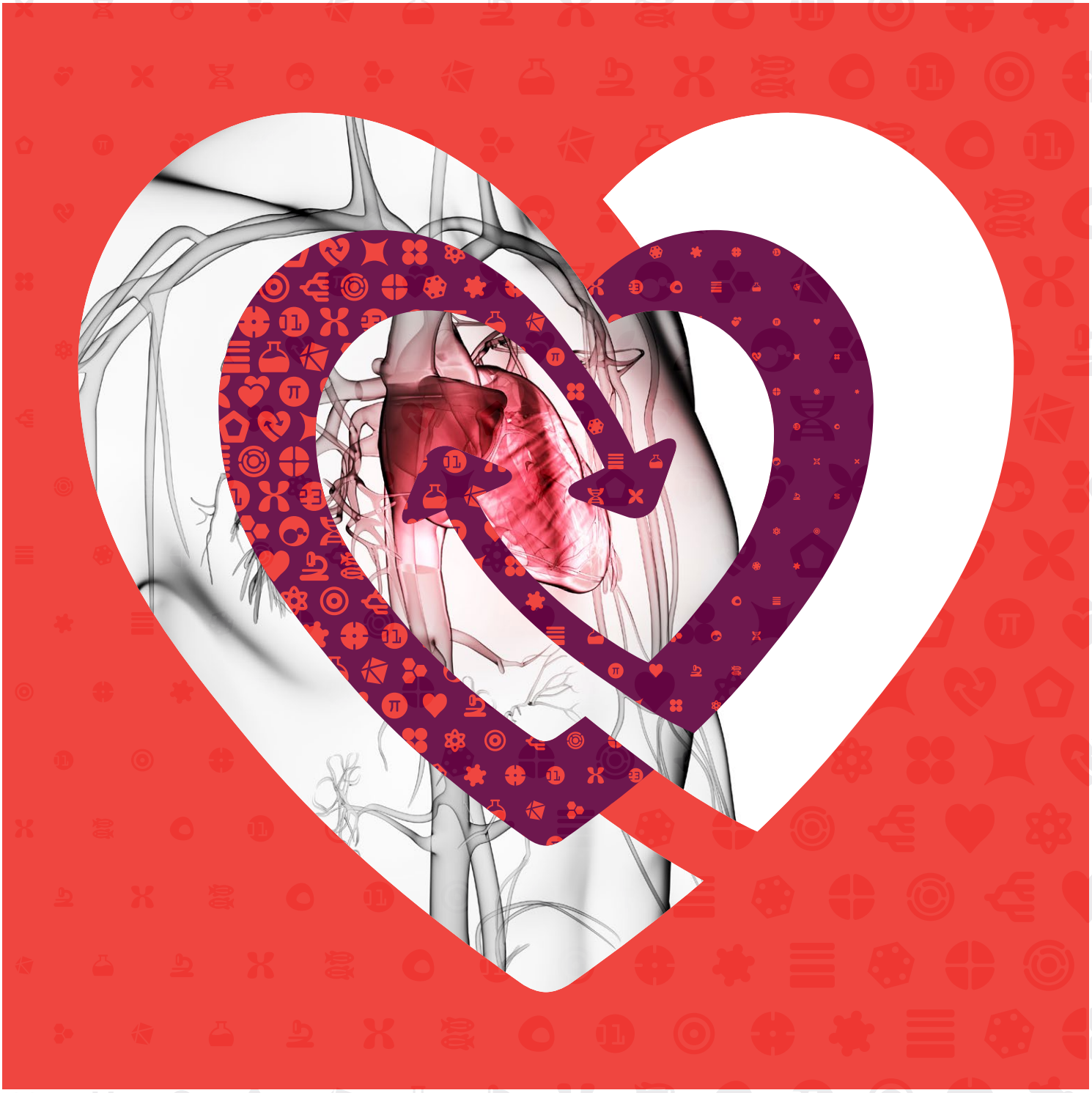
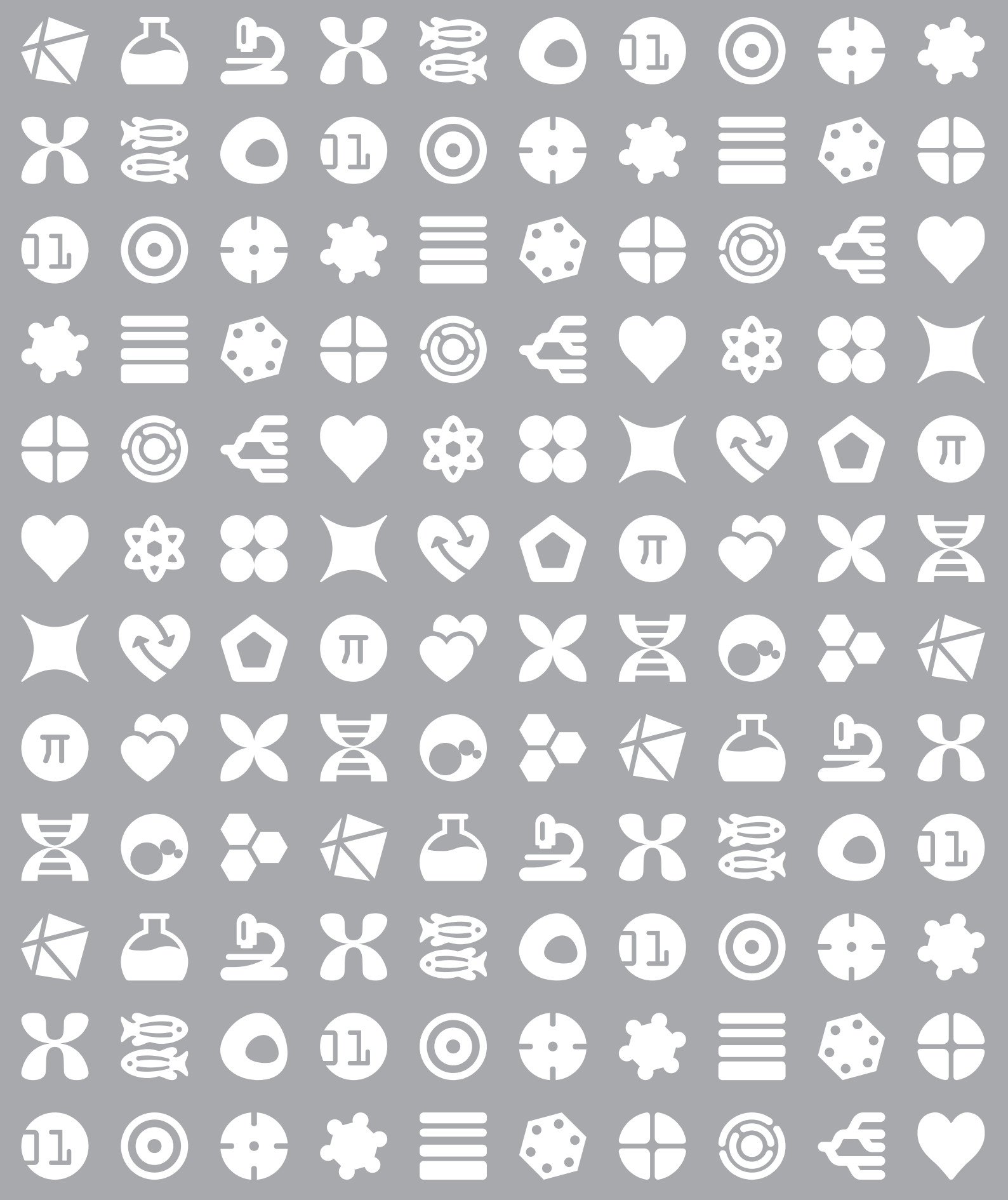


Victor Chang
Cardiac Research Institute

21 CELEBRATING 21 YEARS OF DISCOVERY 1994-2015

Annual Report 2015



The difference

How often do you look at the world with a new perspective? At the Victor Chang Cardiac Research Institute we do it everyday. It's in our DNA, our culture, our attitude, and our approach. **It's the way we see, think and feel about everything we do, that is the 'difference'.** For over 21 years, through the power of discovery, we have been able to imagine the unimaginable, revolutionising the understanding of heart disease – still the leading cause of death and disability in our society. From the legacy of legendary heart transplant surgeon Victor Chang, the Institute's team has rapidly pioneered research with a shared and life changing vision – to reduce the incidence, severity and impact of heart disease… to make a 'difference'.

Founded in 1994, the Victor Chang Cardiac Research Institute is the legacy of legendary heart transplant surgeon Dr Victor Chang. It is a not for profit, internationally recognised, medical research facility dedicated to finding cures for deadly heart conditions. Beginning with just two scientists, the institute has now grown to over 200 staff, united in a single vision – to reduce the incidence, severity and impact of heart and vascular diseases, still the leading causes of death and disability in our society.

9/10

Australians have at least one risk factor for cardiovascular disease

1/5

Australians, or 3.72 million people, are affected by heart disease

3×

Three times more women die of heart disease than breast cancer in Australia

1st ♥

The heart is the first organ to form. You don't need a brain to develop a heart!

$7.6 billion

Cardiovascular disease costs Australia around $7.6 billion in healthcare spending every year

Contents

XX

Women

Many women have different heart attack symptoms to men. Instead of chest pains, women often have nausea, indigestion and shoulder aches

75 trillion

cells receive blood from the heart

About us

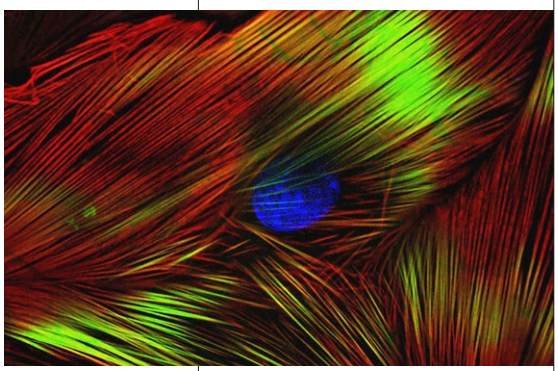
Our aspirations

To conduct the highest quality research, with an emphasis on 'molecules and mechanisms'.

- To be a world-class research facility and one of the best independent medical research institutes in Australia that contributes in a major way to the health of all people, but particularly those of Australia and South-East Asia, through research into cardiovascular diseases.
- To advance knowledge and make fundamental discoveries in cardiovascular research that can be rapidly translated into improved diagnostics, preventions and treatments, and to provide advice on health and research policy at both the federal and state levels.
- To be a leader in the adoption, application and integration of genomics, stem cell and regenerative medicine, and other cutting edge technologies and approaches, and in the training of clinicians in the interpretation of discoveries made using these technologies for improved patient management.
- To be Australia's leading institute for training in fundamental cardiovascular research and its application to clinical problem solving.

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.



World class research

The Victor Chang Cardiac Research Institute has earned its place on the global stage as one of the most respected heart research facilities in the world. Internationally recognised for the quality of its discoveries, the Victor Chang Institute is also a centre-of-excellence in cardiovascular research training, and in the rapid translation of discoveries into new diagnostics, preventions and treatments of cardiovascular disease. Our research spans from complex fundamental work using techniques such as x-ray crystallography, to innovative transplantation techniques and clinical trials.

Our research focus

- Congenital heart disease
- Arrhythmias
- Inherited heart disease
- Ischemic heart disease
- Heart failure
- Heart transplantation
- Cardiomyopathies
- Coronary artery disease
- Bacterial endocarditis

2015 statistics

200+
researchers and staff

5
research divisions

18
laboratories

9
clinical faculty based at St Vincent's Hospital

100
publications

37
public lectures

114
seminars

1,314
people toured the institute

27
awards and accolades

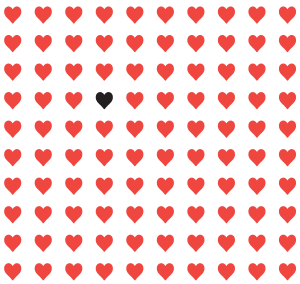
170+
international collaborators

44
ambassadors

20
scholarships

Health impact

Millions of Australians suffer from diseases of the heart or blood vessels, which can affect anyone regardless of age or gender. In addition to heart attacks and heart failure, congenital heart diseases affect 1 in every 100 children.



Risk factors

Several factors increase your risk of heart disease:

- ☐ Family history
- ☐ Age
- ☐ Smoking
- ☐ High blood pressure
- ☐ High blood cholesterol
- ☐ Diabetes
- ☐ Poor diet
- ☐ Lack of exercise
- ☐ Obesity
- ☐ Stress

21st anniversary

In 2015 the Victor Chang Cardiac Research Institute celebrated 21 years at the forefront of research into heart disease. We invite you to celebrate our 21st birthday with us by taking the time to reflect on our accomplishments, which are outlined throughout this Annual Report.

We started our journey with a bold move. On 14th February 1994, the Victor Chang Institute opened its doors to honour the memory of pioneering heart surgeon Dr Victor Chang. Over the years, the Victor Chang Institute evolved from a simple idea into one of the world's most advanced centres for research into the mechanisms and biology of heart and vascular disease.

The Victor Chang Institute would not have survived this long without the generous support of our donors, who have made a difference to the lives of thousands of people worldwide as well as contributed to improving the knowledge of humankind.

Along with our donors, the Victor Chang Institute is supported by St Vincent's Healthcare Campus, is a University of New South Wales affiliated Institute and is a National Health and Medical Research Council accredited organisation.

21 CELEBRATING 21 YEARS OF DISCOVERY 1994-2015

Through heart surgery, Dr Victor Chang was able to save hundreds of lives. But he knew that through research, he could save millions.

Our inspiration

Dr Victor Chang, AC (1936–1991)

Dr Victor Chang was one of Australia's most gifted heart surgeons, a pioneer of modern heart transplant surgery and a humanitarian.

A national hero, Victor Chang was hailed as 'the most prominent doctor in the southern hemisphere', and his revolutionary work in the field of heart transplantation had implications for cardiac patients, not only in Australia and Southeast Asia but around the globe.

Dr Chang personally saved hundreds of lives. In 1984, he led a team of surgeons who successfully performed a heart transplant on schoolgirl, Fiona Coote. At the age of 14, Fiona defied all odds to become Australia's youngest heart transplant survivor, and some 31 years later remains very well.

In that same year, Dr Chang founded the National Heart Transplant Program at St Vincent's Hospital, Sydney, which has since performed thousands of successful transplants.

Dr Chang also played a key role in developing an artificial heart valve and an artificial heart assist device.

Born in Shanghai to Australian-born Chinese parents in 1936, Victor Chang (Yam Him) came to Australia in 1953 and completed his schooling at the Christian Brothers College in Lewisham. In 1962 he graduated from Sydney University with a Bachelor of Medicine and Bachelor of Surgery.

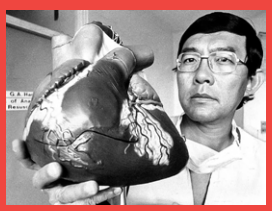
After training in cardiothoracic surgery at the Mayo Clinic (USA) and in the UK, he returned to St Vincent's Hospital. For the next two decades, he operated alongside his colleagues Dr Harry Windsor and Dr Mark Shanahan, who had performed Australia's first ever heart transplant in 1968.

In 1986, Dr Chang was awarded our country's highest honour, a Companion of the Order of Australia (AC) and in 2000, was voted Australian of the Century by the people of Australia.

A caring surgeon and humanitarian, Dr Chang was passionate about the power of discovery. He had a bold vision to establish a world-class medical research institute, knowing that while he could save hundreds of lives through surgery, he could save thousands more through research.

Victor Chang died in tragic circumstances in Sydney on 4 July 1991. He is remembered as a quiet, charming man, much loved by his patients and friends, his wife Ann and his children Vanessa, Matthew and Marcus.

The Victor Chang Cardiac Research Institute is dedicated to his memory.



▲
Dr Chang with a model of a human heart.

▲
Dr Chang with heart transplant patient, Fiona Coote.

History of the Victor Chang Cardiac Research Institute

1936

Victor Chang born in Shanghai to Australian-born Chinese parents.

1953

Victor migrates to Australia as a student at the Christian Brothers College, Sydney.

1962

Victor graduates from Sydney University with a Bachelor of Medicine, Bachelor of Surgery, becoming an intern and, later, a registrar in cardiothoracic surgery at St Vincent's Hospital, Sydney.

1968

Dr Harry Windsor and Dr Mark Shanahan perform Australia's first heart transplant at St Vincent's Hospital.

1984

The National Heart Transplant Program is founded at St Vincent's Hospital by Dr Victor Chang.

April 8th, a team of doctors led by Dr Chang, operates on 14-year-old Fiona Coote, who becomes Australia's youngest heart transplant recipient.

1986

Dr Chang awarded Australia's highest recognition, a Companion of the Order of Australia (AC).

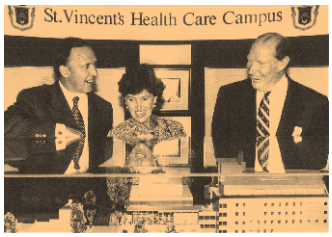
1990

Dr Victor Chang spearheads the Heart of St Vincent's Appeal. This appeal raises much-needed funds for a Cardiac Transplant Ward and Cardiac Diagnostic Unit at St Vincent's Hospital, Sydney.

1991

Victor Chang dies in tragic circumstances in Sydney on the 4th of July.

1994



The Victor Chang Cardiac Research Institute is officially opened on the 14th of February by then Prime Minister, the Hon Paul Keating MP, with Kerry Packer, AC, as Patron and Prof Robert Graham as Executive Director. It was founded, originally under the auspices of the Sisters of Charity and St Vincent's Hospital – the Sisters recognising the importance of research as fundamental to better health outcomes.

1995

The Victor Chang Cardiac Research Institute is accredited as an independent research organisation, with the Hon Neville Wran, AC, QC as its inaugural chairman.

1996

The Institute's temporary premises at the Garvan Institute of Medical Research are opened by the late Diana, Princess of Wales.

The Victor Chang Cardiac Research Institute hosts its first International Symposium on Molecular Structure, Function and Development of the Heart.

1997

Death of Diana, Princess of Wales – Victor Chang White Rose Day named in her memory.

The Victor Chang Cardiac Research Institute formally becomes affiliated with the University of New South Wales.

1998

The inaugural Princess' Lecture held in honour of the late Diana, Princess of Wales, delivered by Professor Sir Magdi Yacoub.

The Paul Korner Seminar series is established to recognise the outstanding contributions of Professor Paul Korner, a pioneer of cardiovascular research in Australia. The series is presented weekly, providing our young scientists with the opportunity to present an update of their research progress and achievements.

2000

Dr Victor Chang voted Australian of the Century by the people of Australia.

2004

Launch of the Victor Chang School Science Awards to recognise the scientific achievements of students from schools within the west, south and south west of Sydney.

2005

Her Royal Highness Crown Princess Mary of Denmark is Guest-of-Honour at The Victor Chang Royal Ball.

The Victor Chang Cardiac Research Institute mourns the death of Patron, Kerry Packer, AC.

2006

Construction commences on the nine storey Lowy Packer Building in Darlinghurst, which will become the Victor Chang Cardiac Research Institute's new home.

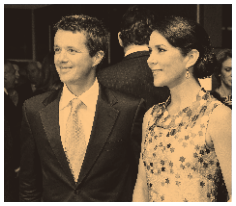
2007

Michael Renford, son of the late Des Renford, swims the English Channel to raise money for the Victor Chang Cardiac Research Institute.

The inaugural Chain Reaction charity bike ride is held to raise money for children with heart defects.

2008

Construction of the Lowy Packer Building is complete and formally opened by Her Royal Highness Crown Princess Mary of Denmark in September. Princess Mary also attends a dinner with His Royal Highness Crown Prince Frederik at the Institute.



The Hon Neville Wran retires as Chairman and becomes a Patron of the Institute.

Paceline founder, Steve Quinn, cycles across the USA to raise money for research into cardiac arrhythmias and the Victor Chang Cardiac Research Institute.

2013

Steven Lowy AM, stands down as Chairman, leaving the board after 19 years as a Director of the Institute, including the last six as Chairman. Matthew Grounds is appointed as Chairman of the Board.

2014

The Hon Neville Wran dies, aged 87.

Fiona Coote celebrates 30 years since her life saving heart transplant performed by Dr Victor Chang.

2015

21 CELEBRATING 21 YEARS OF DISCOVERY 1994-2015

The Victor Chang Cardiac Research Institute celebrates 21 years of discoveries.

Celebrating 21 years of innovation and discovery

Over the past two decades, the Victor Chang Cardiac Research Institute has made a multitude of major advances, many revolutionising our understanding of disease causation, mechanisms and medical treatments. Here are just a few examples of what we have achieved.

2015

Our scientists discover how to limit the damage after a heart attack, which could help the 45,000 Australians who suffer a heart attack each year.

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.

2013

Researchers have found that obesity and diabetes during pregnancy can cause children to develop metabolic problems later in life.

2013

For the first time, our scientists show the importance of a single gene (Nkx2-5) in forming the large vessels of the heart.

2010

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

2009

The Victor Chang Cardiac Research Institute develops a unique preservation solution to protect transplant hearts for up to eight hours. Previously four hours was the maximum time.

2009

Researchers discover that a poorly functioning placenta during pregnancy can affect kidney development of an unborn child.

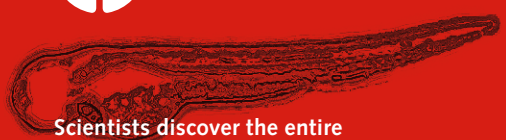
2002

We find that a new drug treatment can slow the progression of pulmonary arterial hypertension – a serious and progressive disease.

2000

We discover that without both copies of a single gene mutation, the heart cannot grow during development in the womb, but if only one is defective, it can result in a heart defect, such as a hole-in-the-heart.

1999



Scientists discover the entire cellular machinery underlying growth and enlargement of skeletal muscle.

2014

Our professors are involved in the world first transplantation of a heart that had stopped beating, saving the lives of patients with severe heart failure.

2014

In another world first, our scientists develop a faster more reliable way of diagnosing patients at risk of sudden cardiac death.

2014

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

2012

Our researchers make a landmark discovery that shows for the first time how 'nature' and 'nurture' interact to cause birth defects.

2011

Our scientists identify and characterise a new population of stem cells in the adult heart.

2011

Our team demonstrates how the potassium channels that carry electricity around the heart open and close, controlling heartbeats.

2007

Our breakthrough discovery demonstrates that certain types of congenital heart defects occur at a much earlier stage in the development of a baby than ever expected.

2006

Scientists show that the diet of pregnant mothers can affect the health of their children and even their grandchildren.

2004

For the first time the Victor Chang Institute proves diseases can be caused not only by a defective gene (mutation), but by an inherited defect in the expression of a gene (an epi-mutation).

1998

Researchers at the Victor Chang Institute participate in a major international trial that provides definitive proof that statins lower cholesterol and prevent death.

1997

Scientists develop a non-invasive test to predict those at risk of stroke from a clot in the heart.

1994

Groundbreaking research reveals an enzyme previously only associated with clotting, has many functions and, uniquely, can also regulate how vigorously our heart can beat.

Chairman's Report

In its 21st year, the Victor Chang Cardiac Research Institute has certainly earned its place on the global stage as one of the world's most respected heart research facilities. Internationally recognised for the quality of its researchers and their discoveries, the Victor Chang Institute is also renowned as a centre-of-excellence in cardiovascular research and training and in the translation of these discoveries into life saving outcomes for all Australians.

This reputation is a testament to the Institute's team of scientists and researchers and in particular to the senior scientific leadership group. Led by Professor Bob Graham, these professionals form an extremely tight knit group and inspire each other's work every day.

Another successful year for the Institute

In the past year, our researchers have been involved in some extraordinary ground breaking discoveries including a way to protect the heart in patients who have experienced a heart attack and discovering the master gene which causes the heart to progressively enlarge – the biggest breakthrough in cardiomyopathy research in years.

The Institute's focus on babies born with heart defects continues to expand with the Institute leading Australia's largest genome sequencing initiative in congenital heart disease.

Indeed, as noted in Bob's report, on just about every measure, our researchers have achieved incredible success in 2015 for those 4 million Australians affected by cardiovascular disease.

However, these ground breaking and life saving discoveries in medical research take time, perseverance and funding. And the funding challenge, unfortunately, is not getting any easier.

Thanks to the benefits of medical research, including the work that is being undertaken at the Institute, death rates from cardiovascular disease have dropped by a massive 80% since the 1960's, saving over 140,000 lives each year.

◀ Executive Director Prof Bob Graham (left), Chairman Matthew Grounds

Credit: Wolter Peeters / Fairfax Syndication

Greater investment in cardiovascular research required

With Commonwealth Government funding at historic lows and the nation falling behind the rest of the world in terms of investing in medical research, urgent action is required to re-establish Australia's pre-eminence in this extremely important sector of Australia's economy.

To put this in context, this past year, only 13.7% of all project grants submitted were funded by the National Health and Medical Research Council. This is its lowest level on record. This comes at a time when the quality of medical research being undertaken across Australia is truly world class and the threat of losing some of our scientists to other countries and vocations is becoming the reality.

The Commonwealth Government's recently established Medical Research Future Fund (MRFF) cannot come soon enough. It is critically important that the Government delivers on its promise to ensure that the Fund is fully capitalised by no later than 2019-20 in order to bring Federal Government funding of medical research more in line with other OECD countries.

The case for greater investment into cardiovascular research is a fairly simple one.

Cardiovascular disease, which includes heart, stroke and vascular disease not only affects more than 22% of all Australians it is also still the leading cause of death and the most common cause of birth defects in Australia. It is also the most expensive disease, costing approximately $7.6 billion a year or approximately 12% of Australia's healthcare spending.

Thanks to the benefits of medical research, including the work that is being undertaken at the Institute, death rates from cardiovascular disease have dropped by a massive 80% since the 1960's, saving over 140,000 lives each year. Importantly, babies born with congenital heart disease are living longer and healthier lives as a direct result of focused medical research carried out at the Victor Chang Institute.

Moreover, recent advancements in technology have made it possible to increase the pace and scope of discovery for our researchers including in the area of genomics. But this technology requires further investment if we are to remain at the forefront of this type of research globally.

Supporting the Victor Chang Cardiac Research Institute will help all Australians

So the case is a strong one: more investment in research into cardiovascular disease and equipping our world class scientists with the very best technology at the Victor Chang Institute will provide significant benefits to the Australian community and is critical to providing better patient outcomes and lowering the long term cost of healthcare.

Vote of thanks to our supporters, the Board and our staff

I would like to acknowledge the many individuals and organisations who contribute to our success. As a not-for-profit organisation, the Victor Chang Institute is fortunate to enjoy the support of many in the community and we are tremendously grateful for the goodwill that makes the Institute's work possible.

As reported last year, given the Commonwealth Government funding challenges for medical research in general, the Victor Chang Institute has become increasingly dependent upon the generosity of our longstanding donors and new supporters. In 2015, Commonwealth Government funding covered only 38% of our total operating expenses compared to 55% only three years ago.

So in essence, in order to ensure that the Institute's great work and successful discoveries continue, we need to significantly increase our fundraising revenue by threefold to support our important research programs.

On this note I would like to acknowledge and thank all of our many dedicated donors for their continued support and generosity throughout the year. Our direct marketing campaigns and other community fundraising activities not only raised awareness of the Institute's work but also provided an important source of regular donations. In addition we received a number of significant bequests which were used to invest in our research programs. I am particularly grateful to these supporters for their long term vision for the Institute's research programs.

At our 21st celebration at the Town Hall we were delighted to honour Mimi Wong, co-founder and Chairman of the Golden Group, as Ambassador of the Victor Chang Institute in recognition of her generous and continued support.

In order to ensure that the Victor Chang Institute's great work and successful discoveries continue, we need to significantly increase our fundraising revenue by threefold to support our important research programs.

Also celebrating his 21st year at the Victor Chang Institute is our founding Executive Director, Professor Bob Graham. We all continue to be inspired by Bob. He is a caring clinician, a world renowned research scientist (publishing this year in the world's top biomedical journal, *Cell*). He is a true leader, successfully fostering the development of so many young scientists in the last 21 years at the Victor Chang Institute. Bob has built a truly world class team of senior scientists that work so collaboratively with each other and other leading research institutions around the world.

I would also like to acknowledge our Board members for their support and enormous commitment to the Victor Chang Institute. In particular I would like to acknowledge the work of the Chairs of our various Committees (David Craig, Finance and Risk; Louise Di Francesco, Appeals; Jill Margo, Media and Communications) together with Jennifer Doubell who has provided great guidance to the Board in relation to our renewed fundraising efforts. I would also like to extend a very warm welcome to Peter Allen from Scentre Group who joined the Board of Directors in September 2015.

I thank the Sisters of Charity and the Trustees of Mary Aikenhead Ministries for their continued support, friendship and guidance. I would also like to acknowledge our Precinct Partners: St Vincent's Hospital and the Garvan Institute of Medical Research. Together we are addressing every major contemporary disease that affects our society.

To the researchers, staff and scientists we continue to be in awe of your achievements and we thank you for your focus and dedication. We look forward to carrying on Dr Victor Chang's legacy in this world leading Australian medical research organisation.

Matthew Grounds
CHAIRMAN

Executive Director's Report

21 years of the Victor Chang Cardiac Research Institute

In 2015 the Victor Chang Cardiac Research Institute celebrated its 21st Birthday – a wonderful milestone that we are immensely proud of. For more than two decades we have been at the forefront of heart research, attracting world class scientists who continue to contribute very meaningfully to advances in the diagnostics, preventions, and treatments of cardiovascular diseases. Over this time, the Victor Chang Institute has also prided itself in providing excellence in research training, recognising scholastic achievements in science at school, and providing a cardiovascular risk factor screening program to over 30,000 Australians. We hope you agree that these are certainly contributions to celebrate!

Our 21st anniversary has encouraged us to look back at all we've achieved, but it also makes us consider what the future holds going forward. We are on the cusp of a really exciting time in heart research. Advances in technology are allowing us to address problems in a more sophisticated way than ever before, while computational power helps us analyse our research at faster rates and in more detail than was previously thought possible. The era of genomics is finally here, but to counter that, we are in this frustrating situation where we are cash strapped.

In an effort to secure more funding from the Federal Government and our primary funding body, a coalition of Australia's best heart researchers has formed the Australian Cardiovascular Alliance (ACvA). Launched in November 2015, the ACvA unites every major heart research operation across Australia and will act as an umbrella organisation to ensure the sector receives the funding it so desperately needs.

The outcomes of the National Health and Medical Research Council (NHMRC) grant applications this year were grim. Funding by the nation's major provider of biomedical research grants is in rapid decline, and is at the lowest rate in the 75-year history of the NHMRC. But despite this, the Victor Chang Institute has performed better than every other medical research institute in Australia bar one, with a 26.3% application success rate – considerably higher than the 16.8% success rate for the whole of Australia. The outstanding work of our Professors Sally Dunwoodie and Boris Martinac were both recognised with substantial Project Grants, while Dr Daniela Stock and Professor Roland Stocker were successful in the renewal of their NHMRC Research Fellowships. Our youngest faculty member, Dr Joshua Ho was granted a Career Development Fellowship for his incredible research in bioinformatics.

> The only way to bring a stop to this pandemic is through research. Without research we can't discover cures… But we know only too well that we cannot find cures for heart disease alone.

Many of our other scientists received awards and honours this year. Here are just a few highlights:

- Professor Jamie Vandenberg was elected to Fellowship of the Australian Academy of Health and Medical Science.
- Professor Peter Macdonald was honoured with the Ministerial Award for Cardiovascular Research Excellence – the absolute highest recognition a heart researcher can achieve.
- For their inspiring work, Dr Eleni Giannoulatou and Dr Nicola Smith have been promoted to Group Leaders in our Molecular, Structural and Computational Biology and Molecular Cardiology and Biophysics Divisions, respectively.
- The hard work of Professors Boris Martinac and Richard Harvey was also recognised with two sizeable ARC Discovery grants.
- Dr Louis Wang and Dr Yoshitaka Nakayama were selected to attend the 65th Meeting of Nobel Laureates in Lindau, Germany.
- Dr Charles Cox received the Young Biophysicist Award 2015 from the Australian Society of Biophysics.

The quality of our research continues to go from strength to strength. In 2015 I am proud to say we made a number of significant discoveries that brought us a step closer to creating a world without heart disease.

Scientists from Professor Richard Harvey's laboratory discovered how to limit the damage to the heart after a heart attack. In collaboration with researchers from the Weizmann Institute, the team found a way to stimulate muscle cell growth in the heart, which could help the 45,000 Australians who suffer a heart attack each year.

Professor Diane Fatkin was involved in the biggest breakthrough in cardiomyopathy research in more than 15 years, with scientists discovering a master gene which causes the heart to progressively enlarge.

Dedicating her life's work to helping babies born with heart conditions, Professor Sally Dunwoodie continues to lead the country's largest genome sequencing initiative in congenital heart disease.

On top of that, in 2015 the Victor Chang School Science Awards program recognised more students than ever before. 209 outstanding Year 11 students from nine councils across NSW received the award for excelling in science. The award has been developed to foster and encourage an interest among secondary school students, and the recipients demonstrated the highest level of educational achievement, innovation, and creativity in their science class.

While I am very proud of everything the Victor Chang Institute has achieved in 2015, there is still so much more work to be done!

The fact is, heart disease is killing people! We're losing more than 43,000 lives every year to this horrendous illness. That's more than the number of Australian lives lost in the whole of World War II. And it's happening every single year. That's not to mention the huge burden it places on our hospital system and our economy.

The only way to bring a stop to this pandemic is through research. Without research we can't discover preventions and cures. But we can't discover these without funding. It's that simple.

The overwhelming support we receive from our generous donors continues to amaze me and I cannot say thank you enough. But we are more heavily dependent on your support than ever before. I want you to know that we treasure every single bit of support, no matter how big or small. Special thanks also to the Sisters of Charity, the Trustees of Mary Aikenhead Ministries, the Chang family, St Vincent's hospital, our Chairman, Matthew Grounds, our fantastic Board and Appeals Committees, our patrons (Ann Chang and Steven Lowy AM), ambassadors and our collaborators near and far. We know only too well that we cannot find cures for heart disease alone.

Professor Robert M. Graham AO
EXECUTIVE DIRECTOR

Trustee's Message

The Trustees of Mary Aikenhead Ministries acknowledge the heroic service of the Sisters of Charity of Australia in the establishment of education, health, research and welfare ministries in New South Wales, Tasmania, Victoria, Queensland and the Australian Capital Territory and their unwavering commitment to the disadvantaged and marginalised.

The Trustees, Sr Helen Clarke RSC, Dr Tessa Ho, Emeritus Professor Gabrielle McMullen AM, Michele Hugonnet, David Robinson and David Alcock, have the privilege to be the stewards of ministries established by the Australian Sisters.

The Trustees of Mary Aikenhead Ministries congratulate the Victor Chang Cardiac Research Institute on its many achievements this year, which are detailed in this Annual Report. Worthy of specific mention are:

1. Victor Chang Institute scientists discover a way to limit the damage to the heart after a heart attack, which could help 45,000 Australians who suffer a heart attack each year.
2. Scientists discover a faster, cheaper and more efficient way to grow millions of heart cells out of the body.
3. In a world first, Victor Chang researchers develop a better test to help diagnose patients with long QT syndrome.

The health research ministry is a ministry of hope – that heart disease and its effects on people will be continually reduced as a result of the skill and expertise of the wonderful researchers and staff of the Victor Chang Institute.

We express our gratitude to the Chair and Board Directors, the Institute Director, staff and research students for their contributions during the past year and look forward to the continuance of groundbreaking medical research.

On behalf of the Trustees of Mary Aikenhead Ministries, I am pleased to commend to you the 2015 Annual Report of the Victor Chang Cardiac Research Institute.

David Robinson
CHAIRPERSON
ON BEHALF OF THE TRUSTEES
OF MARY AIKENHEAD MINISTRIES

MARY AIKENHEAD MINISTRIES

Organisational structure

Trustees

Mary Aikenhead Ministries

CHAIR
David Robinson

Scientific Advisory Board

Victor Chang Cardiac Research Institute

CHAIRMAN
Matthew Grounds

DEPUTY CHAIRMAN
David Craig

Affiliations

University of New South Wales

St Vincent's Health Australia

Board Committees

Finance and Risk

CHAIR
David Craig

Appeals

CHAIR
Louise Di Francesco

Media and Communications

CHAIR
Jill Margo AM

EXECUTIVE DIRECTOR
Prof Robert Graham AO

DEPUTY DIRECTORS
Prof Richard Harvey
Prof Jamie Vandenberg

Research Divisions

Cardiac Physiology and Transplantation

DIVISION HEAD
Prof Michael Feneley AM

Developmental and Stem Cell Biology

DIVISION HEAD
Prof Richard Harvey

Molecular Cardiology and Biophysics

DIVISION HEAD
Prof Robert Graham AO

Molecular, Structural and Computational Biology

DIVISION HEAD
Dr Daniela Stock

Vascular Biology

DIVISION HEAD
Prof Roland Stocker

Clinical Faculty

CHIEF OPERATING OFFICER
Janina Jancu

DIRECTOR OF FUND DEVELOPMENT
Ariane Gallop

Administration and Core Facilities

Finance
Human Resources
Information Technology
Policy
Essential services

Fund Development

Media and Communications
Philanthropy
Direct Marketing
Health Check Booth

Board of Directors

The successful operations of the Victor Chang Cardiac Research Institute are heavily reliant on the loyalty, drive and vision provided by the Board of Directors, led by Mr Matthew Grounds, and subsidiary committees.

Matthew Grounds

CHAIRMAN BCOM, LLB (HONS)

Mr Grounds is currently Chief Executive Officer of UBS Australasia (since May 2008) and Head of Corporate Client Solutions, Asia Pacific. Prior to being appointed as Head of Corporate Client Solutions in November 2012, Matthew held the position of Joint Global Head of Investment Banking.

Mr Grounds is a member of the UBS Asia Pacific Management Committee, the UBS Investment Bank Global Executive Committee and a Group Managing Director. With more than 20 years investment banking experience, he is one of Australia's leading corporate advisers and has been responsible for a number of landmark transactions for major Australian and international companies.

Mr Grounds is also a member of the University of New South Wales Council, a Director of the Australian Business and Community Network Council and Director of the UBS Foundation. He graduated from the University of New South Wales and holds a degree in Commerce (Finance Major) and Law.

David Craig

DEPUTY CHAIRMAN BEC, FCA, GAICD

Mr Craig joined the Board in 2007 and took over as Chair of the Institute's Finance & Risk Committee in 2012. Since 2006 he has been the Chief Financial Officer of the Commonwealth Bank of Australia. Mr Craig has over 30 years of experience in financial management, strategy, mergers and acquisitions. His previous roles include: Chief Financial Officer for Australand, Global Transition Finance Leader for IBM Business Consulting Service, Global Chief Financial Officer of PwC Consulting, and Chief Operations Officer and for 15 years Senior Audit Partner of PricewaterhouseCoopers Australasia.

Mr Craig is a Director of the Financial Executives Institute of Australia and has also served as a Director of Australian Gas Light Company.

Professor Robert M Graham

AO, FAA, MBBS (HONS), MD, FRACP, FACP, FAHA, FAHMS

Professor Graham is Executive Director of the Victor Chang Cardiac Research Institute, and a member of its Finance & Risk, Appeals, and Media and Communications Committees. He is the Des Renford Professor of Medicine, and Professor of Biotechnology and Biomolecular Science, University of New South Wales, and Professor (adjunct) of Physiology and Biophysics, Case Western Reserve University School of Medicine, Cleveland, Ohio. He is a Fellow of the Australian Academy of Science and the Australian Academy of Health & Medical Sciences, and foreign member, Royal Danish Academy of Sciences and Letters. He is a member of the American Association for Clinical Research, the American Society of Clinical Investigation and the American Heart Association, and a Life Member, Heart Foundation of Australia.

Peter Allen

We are excited to welcome Mr Allen to our board. Peter Allen is an Executive Director and Chief Executive Officer of Scentre Group. He has more than 20 years of global experience in senior financial, property and commercial roles.

Prior to the establishment of Scentre Group, Mr Allen was an executive Director of Westfield Holdings Limited, Westfield Group's Chief Financial Officer and a non-executive Director of Westfield Retail Trust. Mr Allen worked for Citibank in Melbourne, New York and London before joining Westfield in 1996 as Director for Business Development. From 1998 to 2004 he was based in London as Westfield's CEO of United Kingdom/ Europe and was responsible for establishing Westfield's presence in the United Kingdom. He is on the Board of the Kolling Foundation and is a member of the President's Council of the Art Gallery of NSW. Mr Allen is an Associate Member of the Australian Property Institute (AAPI).

Professor Terry Campbell

AM, MD, DPHIL, FRACP

Professor Campbell joined the Board in 2013. He is the Head of the Department of Medicine at St Vincent's Hospital, and Deputy Dean of Medicine, University of New South Wales. From 2003 to 2009, he served as Deputy Director of the Institute alongside Professor Richard Harvey. He also served as President of the Cardiac Society of Australia and New Zealand from 2000 to 2002. Professor Campbell's research work has encompassed both laboratory research and clinical cardiology. He has published over 100 peer-reviewed papers in international journals, and has held competitive research funding from both the National Health & Medical Research Council and National Heart Foundation. In 2003, he was appointed as a Member of the Order of Australia (AM).

Louise Di Francesco

Mrs Di Francesco joined the Board in 2010 and is the Chair of its Appeals Committee. Mrs Di Francesco has worked in the media industry for more than 30 years, initially as a journalist, and for the past 22 years in media and corporate communications. She is a specialist in all areas of corporate media management, public relations, issues management and crisis management, and has worked on campaigns for AAPT, CeBIT, Mercedes Australian Fashion Week, Alterian, Carbon Planet, Australand, Lend Lease, Multiplex, Colliers, Landcom and James Fairfax.

Jennifer Doubell

MSC, MA, BA, DIP SOC STUDS, DIP CRIM, CFRE

Mrs Doubell joined the Board in 2014. She has worked in the not-for-profit sector for more than 30 years, initially as a social worker and criminologist, and for the past 24 years in development and fundraising.

Mrs Doubell is currently the Executive Director of the Peter MacCallum Cancer Foundation. Previous roles include National Fundraising Director at the Heart Foundation, Director of Development and External Affairs at the University of Sydney and at the Australian Graduate School of Management, and Group Manager, at the Wesley Mission, Sydney. In total across her various senior management positions in a number of organisations she has helped raise in excess of $380 million. She is the recipient of many industry awards for her work.

Professor Leslie Field
AM, FAA, DSC, PHD, BSC

Professor Field joined the Board in 2009. He was appointed to his current position as Vice-President and Deputy Vice-Chancellor (Research) at the University of New South Wales in 2005. His main areas of research are organometallic chemistry, catalysis and NMR spectroscopy. He is the author of more than 200 scientific papers and 4 text books. He is the recipient of the Rennie Medal (1983); The Edgeworth David Medal (1986); The Organic Chemistry Medal (1992); the Centenary of Federation Medal (2003) and the RACI Leighton Medal (2010). He was elected as a Fellow of the Australian Academy of Science in 1996 and appointed as a Member of the Order of Australia in 2011 for his services to Chemistry and to Higher Education. In 2013, he was appointed Secretary for Science Policy with the AAS and is a member of the Council of the AAS.

Angelos Frangopoulos
BA(COMM) MCAE, HONDA CSTURT, GAICD, JP

Mr Frangopoulos joined the Board in 2009 and is a member of its Media and Communications Committee. He is the CEO of Australian News Channel Pty Ltd, the owner and operator of Sky News Australia and Sky News New Zealand. Mr Frangopoulos is the Chairman of the Australia Day Council of NSW, Pro-Chancellor, Sydney for Charles Sturt University, Chairman of the Advisory Board of Macquarie University's Centre for Media History, a Director of the Australian Subscription Television and Radio Association and a Board Member of the Walkley Foundation.

Sr Anthea Groves
RSC, OAM, RN LHA DIP. OF NURSING ADMINISTRATION

Sr Anthea has been a member of the Board since 2003. She is a member of the congregation of the Sisters of Charity and is Patient Liaison Officer at St Vincent's Hospital, Sydney. Sr Anthea is a Director of the Sisters of Charity Foundation.

John Kean
OAM, FCA, FAICD

Mr Kean has been a member of the Board since 2003, is a Life Member of the Institute and was the Chair of the Institute's Finance & Risk Committee until retiring from this position in 2012. He acts as an Independent Business Advisor and holds directorships in various businesses involved in finance, trade, primary production, property and healthcare. In addition to serving as a Director of the Victor Chang Cardiac Research Institute, he was an inaugural member of its Appeals Committee.

Jill Margo
AM, BA (HONS)

Ms Margo joined the Board in 2008 and is the Chair of the Institute's Media and Communications Committee. She is the health editor of The Australian Financial Review. She has won numerous international and national media awards, including two Walkleys and a Churchill Fellowship. In 2006, Ms Margo was awarded an Order of Australia for services to journalism and cancer. She holds a BA (Honours) in English literature, and is a best-selling author and biographer.

Dr Gary Weiss
LLB (HONS), LLM, JSD

Dr Weiss joined the Board in 2009 and is a member of its Finance & Risk Committee. He holds the degrees of LL.B (Hons) and LL.M (with dist.), as well as a Doctor of Juridical Science (JSD) degree from Cornell University, New York. Dr Weiss is Chairman of Clearview Wealth Ltd and Secure Parking Pty Ltd, an Executive Director of Ariadne Australia Limited and a Director of several other organisations, including Premier Investments Limited, Ridley Corporation Ltd, Pro-Pac Packaging Ltd and The Centre for Independent Studies.

Real life stories of survival

There is nothing more rewarding than watching a patient recover and lead a happier, healthier life. It's the reason we do what we do every day at the Victor Chang Institute – to help people.

As soon as little Lara was born she needed open heart surgery. The size of a walnut, her tiny heart is on the wrong side of her body and one of her valves did not form properly. She also has a hole in the wall of her heart which was the first thing surgeons tried to fix. The intricate operation lasted almost six hours, and for Lara's loving parents the wait was long and terrifying. Thankfully the surgery went well, but doctors still have absolutely no idea why Lara was born with congenital heart disease. Scientists at the Victor Chang Institute are trying to discover the cause, but it's complicated and time consuming research.

We were told her condition was severe and very complex. It was very confronting and I wouldn't wish it on anyone.

Kirsteen Martin, Lara's mother

34 year old Jamie Donaldson had been training for his first half marathon for weeks. When the big day came he was ready to go, cheered along by his wife and their children. But Jamie collapsed just past the finish line. St John's Ambulance volunteers rushed to him and tried to jolt his heart back to life. Jamie was clinically dead for six minutes, but he is one of the lucky ones. It took weeks in hospital before he was diagnosed with an underlying heart condition known as long QT syndrome, a heart rhythm disorder that is usually only discovered during an autopsy. At the Victor Chang Institute we have two laboratories dedicated to finding cures and improving treatments for this deadly disease.

As soon as I stopped running I realised something was definitely wrong. I grabbed onto the fence as I knew I was going to collapse. It was an eerie feeling.

Jamie Donaldson

When Julie was born she was diagnosed with congenital heart disease and given 3 months to live. Against the odds, Julie survived. She had open heart surgery twice as a child. As she grew older, Julie refused to let her damaged heart rule her life. She was warned it would not be wise to have children as her heart could not withstand the pressure, but Julie and her husband wanted to be parents. Her first pregnancy went well and she gave birth to a gorgeous son. During the next pregnancy a healthy baby boy was born, but Julie's heart failed. Two more open heart surgeries later, Julie takes each day of her life as a special gift – made possible by advances in heart research.

I feel incredibly lucky I reached 21 and now I'm going to reach 60. If it hadn't been for the surgeons and medical researchers I'm not sure if I would have pulled through.

Julie Ovens

Research divisions

Cardiac Physiology and Transplantation

Developmental and Stem Cell Biology

Molecular, Structural and Computational Biology

Molecular Cardiology and Biophysics

Vascular Biology

Cardiac Physiology and Transplantation

Headed by Professor Michael Feneley, the Cardiac Physiology and Transplantation Division comprises five groups that take diverse and complementary approaches to heart disease, heart failure and transplantation.

Feneley Laboratory

Headed by
Prof Michael Feneley, AM

Key research areas
- Pressure overload hypertrophy
- Cardiomyopathies
- Ischemic heart disease
- Heart attacks

Professor Michael Feneley is a distinguished cardiologist with an international reputation in clinical echocardiography. He investigates how efficiently the heart pumps both in patients and experimentally. His research aims to understand the mechanisms of heart muscle thickening (hypertrophy) and failure.

The dangers of a big heart

Cardiac hypertrophy is a major risk factor for premature death and disability. It is caused by the heart having to work hard to pump blood against an increased load, as occurs with high blood pressure (hypertension) and with certain heart valve disorders.

Prof Feneley (centre) with Jane Yu and Scott Kesteven

50%
of people who develop heart failure die within five years of diagnosis, but early diagnosis and treatment can improve the quality and length of life

Prof Peter Macdonald

Macdonald Laboratory

Headed by
Prof Peter Macdonald

Key research areas
- Heart transplantation
- Donor heart preservation
- New heart failure treatments

Did you know?
Previously surgeons had just four hours to transplant a heart. Now, doctors have as much as fourteen hours to complete the intricate procedure.

World first transplant

Professor Peter Macdonald and his team are leading a new era in heart transplantation, responsible for the most significant advance in this field in the last 30 years.

In a world first breakthrough, Professor Macdonald and Associate Professor Kumud Dhital from St Vincent's Hospital revitalised a heart that had stopped beating for up to 20 minutes.

The donor heart was supplied with blood and oxygen using a mechanical device and a unique preservation solution which took our researchers more than a decade to perfect.

It's anticipated that an extra 30 transplants will be performed per year in Australia and many more around the world using this innovative technique. Which means more lives will be saved and more families spared the burden of a relative waiting on the transplant list.

O'Rourke Laboratory

Headed by
Prof Michael O'Rourke

Key research area

- The damaging effects of ageing on the heart

With more than 50 years of experience in cardiovascular medicine and research, Professor Michael O'Rourke AM, and his team, analyse the effects of ageing on the heart and blood vessels.

They have shown that as you age the blood vessels become thicker, stiffer and less elastic. As a result, there is less 'give' in your vessels so the blood pressure increases markedly as the heart ejects blood.

This places an increased load on the heart so it has to work harder to pump blood around the body, which can lead to the thickening of heart muscle and heart failure.

This is the most common cause of death and disability in Australia, and accounts for most cases of cardiac failure, renal failure, and cerebrovascular disease.

Prof Michael O'Rourke

Basically I keep patients alive for days, weeks, months and even years while they are waiting for transplant surgery, and then after their surgery, the team and I care for them for the rest of their lives.

Prof Anne Keogh

40-50%
of people over the age of 65 have high blood pressure

Prof Anne Keogh

Keogh Laboratory

Headed by
Prof Anne Keogh, AM

Key research areas

- Pulmonary hypertension
- Heart failure
- Immunosuppression

Professor Anne Keogh worked alongside Dr Victor Chang in the St Vincent's Heart Transplant Unit back in 1986, and was among the first to join the team at the Victor Chang Cardiac Research Institute when it was established in 1994.

Professor Keogh is a Senior Heart Transplant Cardiologist at St Vincent's Hospital, Sydney and spends much of her time caring for patients with severe heart problems.

Professor Keogh's research aims to find the best treatment tailored to suit each individual patient with heart failure, through drug therapy, synchronised pacing and ventricular assist devices.

Did you know?
Professor Keogh has sometimes lent a helping hand to Taronga Zoo for heart check-ups on chimpanzees, orangutans and gorillas. She has been a trustee of Medical Advances Without Animals since 2006.

Muller Laboratory

Headed by
Prof David Muller

Key research areas
- Structural heart disease
- Valvular heart problems

Surgeons replace valve of beating heart

Professor David Muller is among a team of surgeons from St Vincent's Hospital who performed a pioneering procedure on a patient with a leaky mitral heart valve.

Instead of stopping the heart from beating and using a bypass machine, the patient's heart was still contracting while doctors repaired the damage.

An incision was made between the ribs, and then an artificial valve shaped like a flower, was implanted inside the faulty valve. In the past, the patient would have required open heart surgery.

This ground breaking, less-invasive procedure took just over an hour and the patient has made a full recovery.

Professor David Muller has been a Laboratory Head in the Cardiac Physiology and Transplantation Division at the Victor Chang Cardiac Research Institute since 1996.

Prof David Muller

1.4 million
people are prevented from living a full life because of disability caused by heart disease

Hopefully, many other critically ill patients, who previously would have been too sick to have heart surgery, will now have an option for treatment.

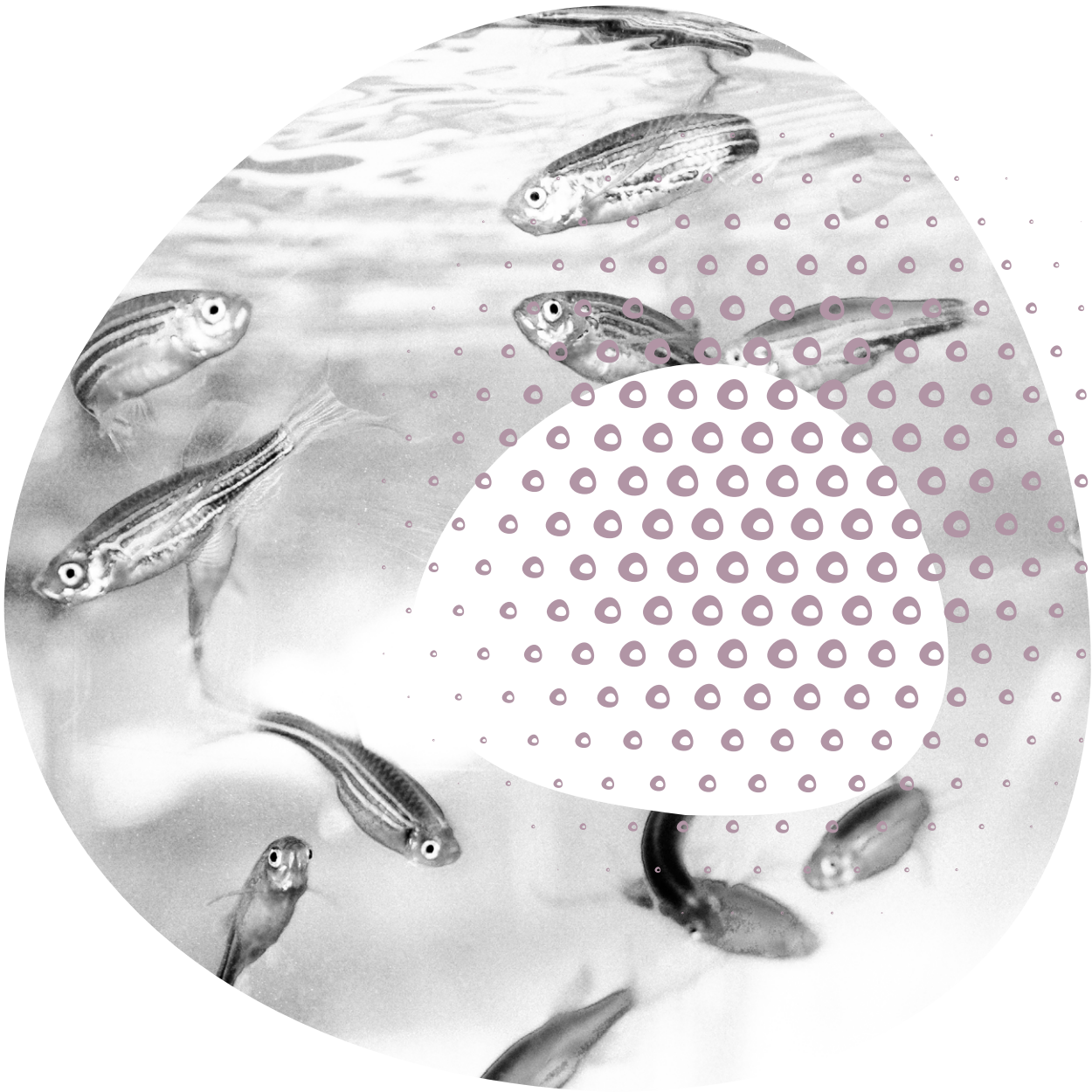
Prof David Muller

Clinical Faculty

A/Prof Kumud Dhital
Prof Chris Hayward
A/Prof Cameron Holloway
A/Prof Andrew Jabbour
Dr Paul Jansz
A/Prof Jane McCrohon
Dr James Otton
A/Prof Jacob Sevastos
A/Prof Phillip Spratt
A/Prof Rajesh Subbiah

Honorary Faculty

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



Developmental and Stem Cell Biology

Headed by Professor Richard Harvey, this division aims to understand the molecular basis of inherited birth defects, the identification and characterisation of adult cardiac stem cells and the genetic pathways controlling cardiac regeneration.

Did you know?
Many millions of heart muscle cells are lost after a heart attack.

Harvey Laboratory

Headed by
Prof Richard Harvey

Key research areas
- Heart development
- Congenital heart disease
- Cardiac stem cells and regeneration

How does the heart form in the embryo?

Deputy Director Professor Richard Harvey and his laboratory study how the heart forms in the embryo and the mechanisms of heart repair in the adult.

The team is seeking to understand how gene defects cause heart defects, and how this information can be used to help families with congenital heart disease.

The laboratory also studies how the adult heart compensates for wear and tear after a lifetime of mechanical activity, and how it repairs itself after an injury such as a heart attack.

"I find it amazing that we know so little about the most common type of birth defect in both Australia and around the world."

Prof Sally Dunwoodie

30
babies undergo life saving heart surgery in Australia every week

Dunwoodie Laboratory

Headed by
Prof Sally Dunwoodie

Key research areas
- Congenital heart disease
- Embryonic development

Congenital heart disease is the most common cause of birth defect in Australia. But despite this doctors have absolutely no idea why 80% of cases occur. Not enough research has been done into what causes heart defects and consequently, most parents are given zero explanation as to why their baby was born with a heart problem.

World renowned scientist, Professor Sally Dunwoodie has dedicated her life's research to understanding the causes of congenital heart disease and is trying to identify the gene in each baby that is not working properly.

In the last decade the Dunwoodie laboratory has already discovered a number of genes that cause defects and diagnostic genetic tests are now available as a direct result of its research findings.

Harvey Laboratory

Prof Dunwoodie and some of her colleagues

Kikuchi Laboratory

Kikuchi Laboratory

Headed by
Dr Kazu Kikuchi

Key research areas

- Heart muscle regeneration
- Heart failure

Something fishy!

Believe it or not, humans are very similar to zebrafish. Our organs develop in similar ways and almost 70 percent of our disease -causing genes are related to those found in the tiny freshwater fish.

The Kikuchi Laboratory uses zebrafish to study heart muscle regeneration. In humans the heart does not regenerate after it is damaged.

By contrast, zebrafish and other vertebrates like the salamander, are known to naturally regenerate heart muscle with little scar formation after injury. The Kikuchi Laboratory has a long-term objective of finding out how this type of regeneration might be used to repair damaged human hearts.

38,000
zebrafish call the Victor Chang Cardiac Research Institute home!

I became inspired to work in heart research when I was a medical student in Japan. I was seeing patients who were suffering from heart disease, and I couldn't help noticing how badly they struggled to recover.

Dr Kazu Kikuchi

Did you know?

Zebrafish embryos are transparent and develop rapidly outside the body, making them very easy to study!

Molecular Cardiology and Biophysics

The Molecular Cardiology and Biophysics Division, headed by Professor Robert Graham, aims to understand both the molecular signalling pathways that operate within the heart and the molecular basis of inherited genetic heart diseases including cardiomyopathies and arrhythmia syndromes. The division consists of six laboratories.

Did you know?
Dilated cardiomyopathy occurs when the heart muscle becomes enlarged and weakened.

Graham Laboratory

Headed by
Prof Bob Graham
Executive Director

Key research areas
- Cardiac regeneration
- Heart failure
- Hypertension

100 Years of dogma out the window

Overturning more than a century of scientific theory, our researchers have discovered that heart muscle cells retain the ability to replicate long after birth.

For more than 100 years scientists believed the heart, much like the brain, stops being able to make new muscle cells either immediately before or soon after birth, limiting the organ's ability to repair itself after injury.

But groundbreaking research, led by Executive Director, Professor Bob Graham and his colleagues in the US, proved that heart muscle cells undergo an intense 24 hour 'burst' of division in preadolescence, enhancing the ability of the heart to recover.

> The implications of our findings could be huge. It may give us a significant window of opportunity to repair the hearts of babies born with heart defects, or even to reactivate heart muscle cells damaged after a heart attack.
>
> **Prof Bob Graham**

Fatkin Laboratory

Headed by
Prof Diane Fatkin

Key research areas
- Dilated cardiomyopathy
- Atrial fibrillation
- Inherited heart disease

On the hunt for faulty genes

The Fatkin Laboratory focuses on two of the most common types of heart problems; dilated cardiomyopathy and atrial fibrillation. Led by Professor Diane Fatkin, her team of researchers is trying to find the faulty genes that cause inherited heart diseases and work out how these gene changes affect heart function.

Research in the Fatkin Laboratory is taking a whole new direction. Thanks to our colleagues at the Garvan Institute of Medical Research, our scientists now have access to a multimillion dollar Gene Machine which is revolutionising the way they conduct research.

Graham Laboratory

Fatkin Laboratory

Vandenberg Laboratory

Headed by
Prof Jamie Vandenberg

Key research areas
- Inherited arrhythmias
- Electrical activity in the heart

In an incredible breakthrough, scientists at the Victor Chang Institute can now better detect underlying heart rhythm disorders.

Until now, experts have struggled to predict why young and otherwise healthy people will simply drop dead without any warning. But that could soon change. The Vandenberg and Hill Laboratories have worked together to discover a better way to diagnose patients suffering from long QT syndrome.

By combining genetic and laboratory studies, computer predictions and detailed analysis of patient electrocardiograms, our researchers are developing more accurate diagnostic tests and better algorithms for predicting the risk of sudden death. The team has already tested more than 200 patients with greater than 90% accuracy.

40
Australians die because of a heart rhythm disorder everyday

By understanding why the same disease affects people differently, the right treatment can be given to the right patients.

Dr Adam Hill

Hill Laboratory

Headed by
Dr Adam Hill

Key research areas
- Drug induced arrhythmias
- Computational cardiology

After being promoted to Laboratory Head at the Victor Chang Institute in 2015, Dr Adam Hill was also handpicked to help overhaul aspects of the world's pharmaceutical guidelines.

Before any new medication is released onto the market it undergoes a series of tests to check the drug is safe for patients to take, and to ensure it will not induce a potentially fatal arrhythmia. There is widespread belief that the current guidelines are too stringent – meaning many potentially safe therapeutics never reach the market.

Dr Hill is using a suite of approaches driven by cutting edge high performance computing to help revolutionise the guidelines for heart risk assessment, enabling new medications to reach more patients in need.

Prof Vandenberg (left) and his colleagues

Members of the Hill Laboratory

Prof Martinac with some of his collaborators

Martinac Laboratory

Headed by
Prof Boris Martinac

Key research areas

- Ion channels in the heart
- Mechanical forces

The flow of electricity in the heart is controlled by a series of channels. These channels open and close so that sodium, potassium, calcium and other ions can move through the cell membrane.

We currently have a limited understanding of the role these ion channels play in causing heart and cardiovascular disease. Professor Martinac and his team hope to change that.

The Martinac Laboratory is trying to understand what happens when heart cells are stretched, for example during heart failure, or when a patient has high blood pressure.

Professor Martinac's research has already disproved 30 years of scientific belief regarding the mechanical properties of a cell membrane. Watch this space!

I get a real buzz out of collaborating with other research organisations and seeing the results of clinical trials. This is the most rewarding aspect of my work.

Prof Livia Hool

Hool Laboratory

Headed by
Prof Livia Hool

Key research areas

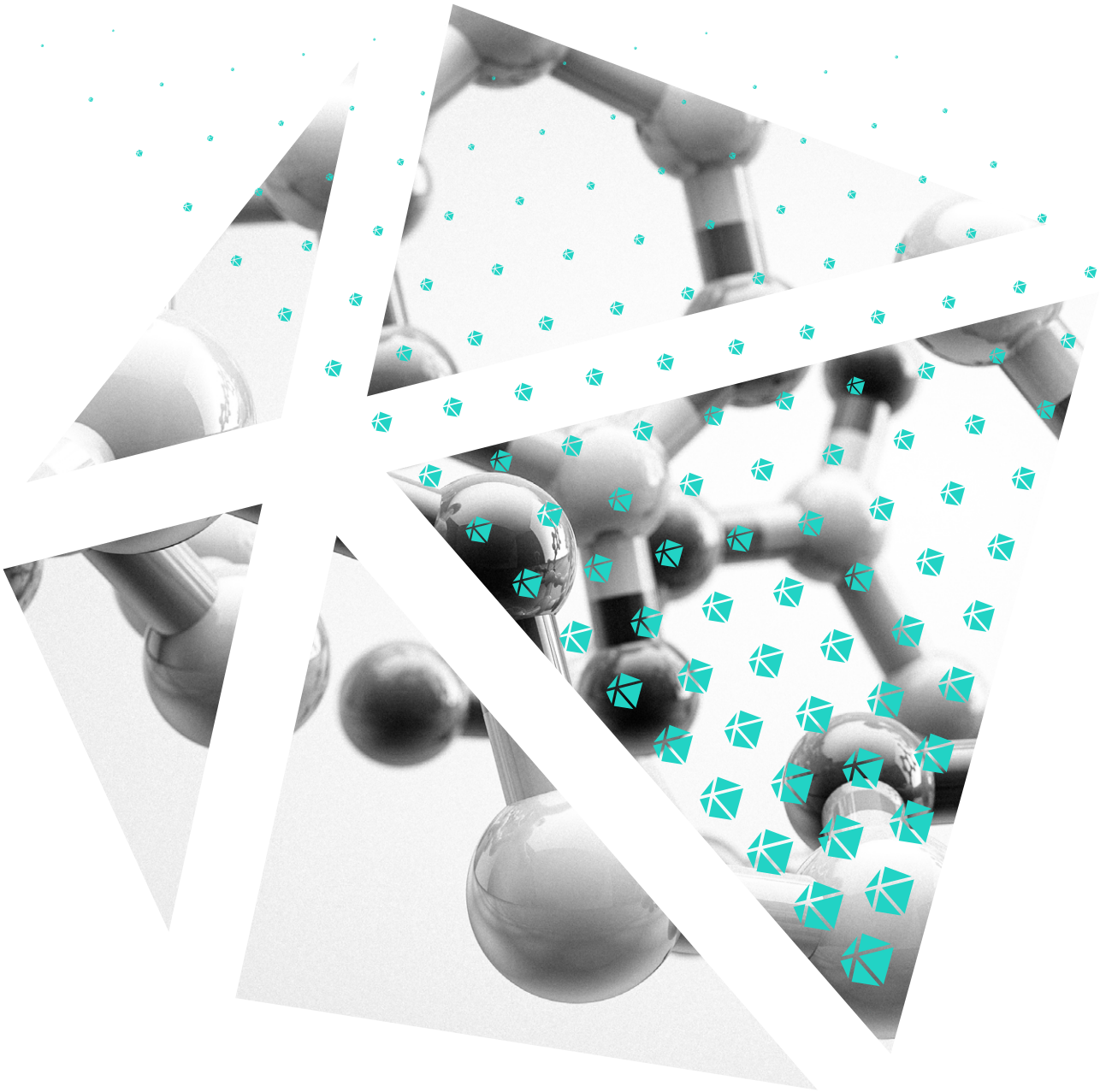
- Cardiomyopathy
- Heart failure associated with muscular dystrophy

Professor Livia Hool decided to pursue a career in heart research after observing how quickly heart attack patients deteriorated to heart failure and death in the Coronary Care Unit at Royal North Shore Hospital.

Now an expert in electrophysiology, Prof Hool leads a team of nine talented researchers who are investigating the effects of calcium and free radicals on heart function.

Did you know?
Measuring calcium build-up in the arteries could give doctors a better indicator of the likelihood of heart attack and stroke.

Based at The University of Western Australia, Professor Livia Hool joined the Victor Chang Cardiac Research Institute in 2013. Her appointment is the initial phase of the Institute's plans to give back to the west coast community and to enhance cardiovascular research in WA.



Molecular, Structural and Computational Biology

This division seeks to understand the function of the heart in health and disease at the molecular level, and to understand the mechanisms of gene regulation. This is crucial for better diagnosis, drug design and treatment of disease.

Stock Laboratory

Headed by
Prof Daniela Stock

Key research areas
- Protein structures
- X-ray crystallography

X-ray vision: zooming in on protein structures

Proteins are the building blocks for all living cells. Dr Daniela Stock and her team use X-ray crystallography to determine the precise structure of proteins on the smallest possible scale.

One protein of particular interest is an enzyme that provides energy for all cells and is manufactured inside tiny organelles called mitochondria.

For any real breakthroughs in repairing damaged hearts or even better, to prevent damage, we need to understand these processes in molecular detail.

Dr Stock and some of her colleagues

10.8 million
adults are either overweight or obese in Australia

Suter Laboratory

Suter Laboratory

Headed by
A/Prof Cath Suter

Key research areas
- Epigenetics
- Parental obesity

Did you know?
The DNA in your cells is shaped like a tightly coiled spiral. If you stretched out all of the DNA in your body, end to end, it would reach further than the moon and back again!

Obesity is written in our genes

A baby's health has long been considered a mother's responsibility as soon as she falls pregnant. By contrast, there has been very little (if any) attention on the impact of a father's health even before conception. Researchers from the Suter Laboratory have found that regardless the health of their mothers, children of obese fathers appear predisposed to metabolic disease. Male offspring also transmit their predisposition onto further generations and perpetuate metabolic disease via a process called epigenetics.

Discovering the basis of epigenetic inheritance will be key to reducing future incidents. It will inform better preconception and prenatal care for mothers and fathers alike. This would completely dispel long-held beliefs about a child's health being a mother's responsibility alone.

Ho Laboratory

Ho Laboratory

Headed by
Dr Joshua Ho

Key research areas
- Bioinformatics
- Mass analysis of human genomic data
- Inherited heart disease

Bioinformatics is the application of computer science, mathematics and statistics to understand how complex biological systems work. We can now solve previously unthinkable biological questions by analysing a large amount of genetic data using cutting-edge computational methods, such as fast database search engines, artificial intelligence, computational linguistics, and cloud computing technology.

The needle in the haystack

The Victor Chang Cardiac Research Institute now has access to state of the art gene sequencing technology which enables our researchers to look at a patient's entire genetic make-up and find mutations that cause heart diseases. Nonetheless, sifting through 6 billion characters in a human genome to pinpoint the disease-causing mutations is like finding a needle in a haystack.

Did you know?

Analysing a whole genome sequencing dataset using a standard desktop computer will take up to a week. Using highly parallelised cloud computing technology, the same task can be completed in a matter of hours.

Through bioinformatics, research and discoveries will become far cheaper, less time consuming and more powerful.

Dr Joshua Ho

20,000+
genes are in the human body

Lee Laboratory

Headed by
Dr Lawrence Lee

Key research areas
- Synthetic biology
- Molecular motors
- DNA self-assembly

Lee Laboratory team

At the end of 2015 we said a heartfelt goodbye to Dr Lawrence Lee and his hard working team, after eight years at the Victor Chang Cardiac Research Institute.

Their cutting edge research into synthetic biology is highly complex. Working on a nano scale, the scientists build DNA machines that are thousands of times smaller than a grain of sand.

The Lee Laboratory aims to imitate Mother Nature with the hope of developing a fresh generation of vaccines and new diagnostic tools to detect diseases caused by viral and bacterial pathogens.

The team has already had enormous success, becoming the first Australians to win the 'BioMod' championship at Harvard University. Dr Lee also published 13 papers while at the Victor Chang Institute, including five in prestigious Nature Journals.

Vascular Biology

The aim of the Vascular Biology Program is to better understand the process called atherosclerosis, or hardening of blood vessels. Atherosclerosis is the single biggest cause of heart attacks, stroke and death in Australia. This program studies how the disease can be inhibited.

Stocker Laboratory

Headed by
Prof Roland Stocker

Key research areas
- Atherosclerosis
- Heart attack
- Stroke

A silent killer

Professor Roland Stocker and his team of researchers are trying to work out what goes wrong in the blood vessels, how they become diseased and how the process of atherosclerosis can be stopped.

Atherosclerosis is caused by a build-up of fatty deposits, cholesterol and plaque on the inside of the arteries due to high blood pressure, high cholesterol and smoking. It leads to life threatening blockages in arteries and puts blood flow at risk – without you ever feeling a thing.

The deadly disease can slowly, secretly ravage your heart undetected, often leading to heart attack and stroke.

> Most cardiovascular disease is caused by a fault in the pipes of your heart. To do its job effectively in pumping blood around the body, the heart needs the blood vessels to be in good condition too.
>
> **Prof Roland Stocker**

Did you know?
Atherosclerosis is the biggest cause of heart attack, stroke and death in Australia.

340,000+
Australians are estimated to have had a heart attack at some stage in their lives

Statement of income and expenditure

For the year ended 31 December	2015 $	2014 $
Income		
Grants	12,279,723	12,270,564
Donations and fundraising	5,414,514	5,061,592
Investment and other income	1,487,543	1,767,410
Total income	19,181,780	19,099,566
Expenses		
Research expenses	15,021,732	14,725,785
Administration expenses	5,825,034	5,739,681
Fundraising expenses[1]	1,140,293	764,183
Total expenses	21,987,059	21,229,649
(Deficit) before non operating income	**(2,805,279)**	**(2,130,083)**
Non operating income		
Unrealised (loss)/gain on investment revaluation to market	(198,626)	889,278
Net (deficit) for the year	**(3,003,905)**	**(1,240,805)**

1. Fundraising expenses are funded from investment income, so that 100% of donations are used for research

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

The above is an extract from the 2015 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 2015.

Fundraising

Women unite against heart disease

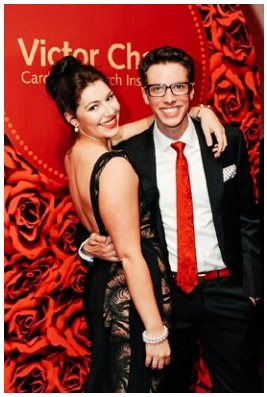
In May 2015, the Victor Chang Cardiac Research Institute hosted the Women Against Heart Disease Luncheon in memory of Monica O'Loughlin. Held in partnership with the Commonwealth Bank's Women in Focus, it was a wonderful event with almost 300 guests attending to show their support for women's heart health. Guests heard from a talented panel including keynote speaker Professor Kerryn Phelps, Master of Ceremonies Amanda Keller and world-renowned Professor Sally Dunwoodie, who highlighted the vital role women play in science. The lunch raised $70,000 – a wonderful outcome for scientists at the Victor Chang Institute.

One link in a chain reaction

Chain Reaction NSW is the ultimate corporate cycling challenge raising money for sick children with heart defects. In March 2015 a team of business executives swapped their work suits for lycra to take on a gruelling but breathtaking 1,000 km ride across New Zealand's South Island. The ride raised an astounding $450,000 for lifesaving research which will help heal the hearts of sick babies.

Thank you!

A big thank you to all of our other fundraisers who are helping us find a cure for heart disease! The Victor Chang Institute was lucky enough to be chosen as the beneficiary for all kinds of events – big and small. From fun runs and trivia nights, to golf events and family fun days, we know that every contribution brings us closer to a healthier future… And for that we will always be very grateful.



The Heart Beat Ball

In September 2015, the inaugural Victor Chang Heart Beat Ball was held in spectacular style at the majestic Sydney Town Hall, which was illuminated in a red glow especially for the occasion. From the 'human' red carpet to the welcoming trumpet players, and the luxurious Laurent Perrier Champagne Bar – the Heart Beat Ball was a brilliant success! Thanks to the overwhelming generosity of our guests, half a million dollars was raised on the night. These vital funds will help scientists continue to find cures for childhood heart disease. Our elegant MC Sandra Sully was also integral to the success of the evening.

Barefoot on the beach

The inaugural Bay Soiree charity dinner took place on Watsons Bay Beach as the sun set over Sydney Harbour. Hosted by the Victor Chang Young Appeals Committee and Watsons Bay Boutique Hotel, the event was a lavish seafood feast held under the stars. Well known Australian performer Todd McKenney was the MC and the first event was a great hit amongst the young crowd. The dinner raised $45,000 for the Victor Chang Scholarship Program, designed to support students undertaking a Doctorate of Philosophy.

A day on the green

The 18th annual Victor Chang Charity Golf Day was a healthy, fun-filled day. 40 players across 12 teams participated in the event, which was held at the prestigious St Michael's Golf Course, ranked one of the best in Australia! The day was generously sponsored by Scentre Group, Westfield and raised money to help keep Victor Chang scientists at the forefront of heart research. Executive Director of the Victor Chang Institute, Professor Robert Graham and his team took home first place!

The Victor Chang Health Check Booth

Keeping Australian hearts pumping

The Victor Chang Health Check Booth travels the length and breadth of the nation, testing Australians for key heart disease risk factors by checking their blood pressure, blood cholesterol and blood sugar levels.

Staffed by qualified nurses, 2015 was another milestone year for the Health Check Booth. Since its inception we have now tested over 36,000 people Australia wide and visited 94 locations across four states.

The Health Check Booth is generously supported by HCF, IMB Community Foundation and many other corporate partners.

To book the Victor Chang Health Check Booth for your next corporate or public event, please contact Jayne Baric on **(02) 9295 8760** or **j.baric@victorchang.edu.au**

2015 statistics

184
testing days across Australia

4
states and a multitude of NSW regional locations visited

55
people tested per day on average

122
record number of individuals tested in one day

10,077
individual tests carried out

3,283
or **33%** had one or more results outside of ideal range, recommended to visit GP

727
or **7%** had high glucose/blood sugar levels

884
or **9%** of participants had high blood pressure

3,193
or **32%** had high cholesterol

6,981
participants did not know their cholesterol levels

Supporters and acknowledgments

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Special thanks also to

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Glen Carling Memorial Golf Day Committee
Heart Kids NSW
NSW Government
Paceline
Randwick City Council
Schute Bell Badgery Lumby

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Design by The Garden Agency