The Victor Chang Cardiac Research Institute

13th International Symposium

in conjunction with the 2011 Princesses' Lecture by

Martin Chalfie

"Imaging:

from cells to the heart"

Thursday 1st - Saturday 3rd December

Victor Chang
Cardiac Research Institute

St Vincents
& Mater Health
Sydney

Victor Chang Cardiac Research Institute

13th International Symposium

"Imaging: from cells to the heart"

PROGRAMME

Thursday 1 Dec

16:00-16:30 **Public Forum – Open for entry**

NAB Auditorium, Level 2 Garvan Building

16:30-16:45 **Opening Address**

Professor Les Field Deputy Vice-Chancellor (Research), UNSW

16:45-18:00 ***2011 Princesses' Lecture***

Chair: Bob Graham

Martin Chalfie Columbia University, Biological Sciences, USA

"*Neuronal differentiation and mechanosensory transduction in C. elegans*"

Friday 2 Dec

08:00-08:45 **Registration**

NAB Auditorium, Level 2 Garvan Building

8:45-09:00 ***Official Opening Address***

Chair: Jamie Vandenberg

The Hon Jillian Skinner MP

NSW Minister for Health and Minister for Medical Research

Session One **NEW FRONTIERS IN MICROSCOPY**

NAB Auditorium, Level 2 Garvan Building

Chair: Daniela Stock

09:00-09:45 **Keynote Speaker:**

Brad Amos MRC Laboratory of Molecular Biology, Cambridge, UK

"Confocal imaging of whole vertebrate embryos or brain regions with subcellular detail"

09:45-10:15 **Christian Soeller** University of Auckland, NZ

"High resolution fluorescence imaging illuminates mechanisms of cardiac EC coupling"

10:15-10:45 **Kazu Kikuchi** Victor Chang Cardiac Research Institute, Sydney

"Genetic fate mapping analysis during cardiac regeneration"

10.45 – 11.15 **MORNING TEA**

Session Two **FROM CELLS TO ORGANISMS**

NAB Auditorium, Level 2 Garvan Building

Chair: Richard Harvey

11:15-11:45 **Tri Phan** Garvan Institute of Medical Research, Sydney

"Intravital two-photon photoconversion for single cell fate mapping"

11:45-12:15 **Mike Roberts** Princess Alexandra Hospital, Brisbane, QLD

"Imaging drug disposition in ex vivo and in vivo skin and liver"

12:15-12:45 **Karlheinz Peter** Baker IDI, Melbourne, VIC

"Targeted molecular imaging in cardiovascular disease"

12.45- 14.00 **LUNCH**

Session Three **MR SPECTROSCOPY AND IMAGING**

NAB Auditorium, Level 2 Garvan Building

Chair: Jamie Vandenberg

14:00-14:30 **Cameron Holloway** University of Oxford, Oxford, UK

"Clinical Cardiac Magnetic Resonance Spectroscopy"

14:30-15:00 **Stuart Grieve** University of Sydney, Sydney

"Cardiac magnetic resonance imaging of VCAM-1: upregulation in myocardial ischemia-reperfusion injury"

15:00-15:30 **Sally Dunwoodie** Victor Chang Cardiac Research Institute, Sydney

"Imaging models of congenital heart disease"

15.30- 16.00 **AFTERNOON TEA**

Session Four **ASSESSMENT OF THE LEFT VENTRICLE**

NAB Auditorium, Level 2 Garvan Building

Chair: Jane McCrohon

16:00-16:45 **James Moon** The Heart Hospital, London, UK

"CMR with contrast - from Infarct to Interstitium"

16:45-17:15 **Diane Fatkin** Victor Chang Cardiac Research Institute, Sydney

"Mouse models of heart failure and their assessment"

17:15-18:00 **Rory Hachamovitch** The Cleveland Clinic, Ohio, USA

"Applying stress imaging in clinical practice: the rise and fall of risk stratification"

18:00-18:10 **Concluding remarks**

Michael Feneley Victor Chang Cardiac Research Institute, Sydney

18:15-19:15 **Cocktails and Imaging competition**

Lowy Packer Building, Level 4, 405 Liverpool St, Darlinghurst

Saturday 3 Dec

08:30-08:50 **Registration**

NAB Auditorium, Level 2 Garvan Building

Session One **LATEST DEVELOPMENTS IN CLINICAL IMAGING**

NAB Auditorium, Level 2 Garvan Building

Chair: Jane McCrohon

09:00-09:25 **Joe Suttie** University of Oxford, Oxford, UK

"Advanced Cardiovascular Magnetic Resonance Imaging and Spectroscopy in the Failing Heart"

09:25-09:50 **David Prior** St Vincent's Hospital, Melbourne, VIC

"Latest developments in cardiac ultrasound"

09:50-10:15	**Liza Thomas** Liverpool Hospital, Sydney, NSW *"The emerging tale of a forgotten chamber"*
10:15-10:40	**Rory Hachamovitch** The Cleveland Clinic, Ohio, USA *"What's New in Nuclear Cardiology and CT: An Outcomes Research-Based Perspective"*
10.40 – 11.00	**MORNING TEA**
Session Two	**CLINICAL CASES** *NAB Auditorium, Level 2 Garvan Building* *Chair: Christopher Hayward*
11:00-11:20	**Joe Suttie** University of Oxford, Oxford, UK
11:20-11:40	**James Moon** The Heart Hospital, London, UK
11:40-12:00	**David Prior** St Vincent's Hospital, Melbourne, VIC
12:00-12:20	**Liza Thomas** Liverpool Hospital, Sydney, NSW
12:20-12:40	**Rory Hachamovitch** The Cleveland Clinic, Ohio, USA

The Princesses' Lecture Series

In honour of the Princess of Wales and the Crown Princess of Denmark, the Victor Chang Cardiac Research Institute (VCCRI) has established the Princesses' Lecture Series.

Diana, Princess of Wales

On October 31 1996, Diana, The Princess of Wales, was the Guest-of-Honour at a Gala Fundraising Dinner for the VCCRI. In preparation for her visit, the Princess specifically requested the opportunity to have time to meet with patients and to hear of the research being undertaken at the Institute. She had a longstanding interest in heart disease and regularly visited heart patients in England.

During her visit, the Princess also officially opened the VCCRI's new premises.

After her tragic and untimely death in August 1997, the VCCRI initiated The Princess' Lecture Series in her honour.

Crown Princess Mary of Denmark

The Crown Princess of Denmark, Princess Mary, visited the VCCRI in 2004. She toured the Institute and met with some of the scientists who are leading the way in global cardiac research. The Princess was also the Guest-of-Honour at a Gala Fundraising Dinner later that evening.

In recognition of her support of the VCCRI and its work, the Princess was bestowed with the title of "Honorary Life Governor". Her support was honoured with inclusion in the annual Princesses' Lecture Series.

On September 3rd 2008, the VCCRI's new premises in the Lowy Packer Building were officially opened by the Princess.

Princesses' Lecturers

2011 Dr Martin Chalfie, William R Kenan Jr. Professor, Columbia UniversitY, New York, USA
Title: *Neuronal Differentiation and Mechanosensory Transduction in C. elegans*

2010 Dr Matthias Hentze, Professor and Associate Director, European Molecular Biology Laboratory, Germany
Title: *Translational control by miRNAs and RNA-binding proteins*

2009 Dr Andreas Zeiher, Head, Cardiology Division, University of Frankfurt, Germany
Title: *Regeneration therapies for the failing heart*

2008 Dr Richard Henderson, MRC Laboratory of Molecular Biology, Cambridge, UK
Title: *Structural changes underlying function in 7-helix membrane proteins including GPCRs*

2007 Dr Michael Sanguinetti, Professor of Physiology, University of Utah, USA
Title: *Calcium Channelopathies: long and short QT syndromes*

2006 Professor Elizabeth Nabel, Director, National Heart, Blood and Lung Institute, NIH USA
Title: *Laminopathies, Hutchinson-Gilford Progeria Syndrome, and the profound vascular smooth muscle cell phenotype in the clinical disease*

2005 Professor Sydney Brenner, Distinguished Professor (Nobel Laureate), The Salk Institute for Biological Studies, USA
Title: *Humanity's genes*

2004 Dr Jon Seidman, Professor and Howard Hughes Investigator, Department of Genetics, Harvard Medical School, Boston, USA
Title: *Cardiomyopathy in mice and men*

2003 Dr Ruben Abagyan, Professor, Department of Molecular Biology, The Scripps Research Institute, USA
Title: *Computational structural genomics and GPCRs*

2002 Dr Donald Engelman, Professor of Molecular Biology, Biophysics and Biochemistry, Yale University, USA and Member, National Academy of Sciences (USA)
Title: *Implications for function and evolution*

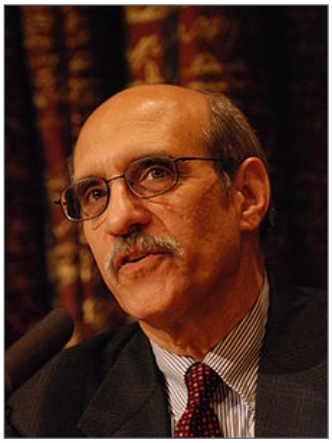
2000 Dr David Owen, MRC Technology, London, UK
Title: *The future of research and biotech development - the MRC perspective*

1999 Dr Eric Olson, Professor and Chairman, Department of Molecular Biology, The University of Texas South-Western Medical Centre at Dallas, Texas and Member, National Academy of Sciences USA
Title: *Dissecting the cellular circuitry for cardiac growth and disease*

1998 Professor Sir Magdi Yacoub, FRS, KB, Head, Department of Cardiothoracic Surgery, Imperial College University, London
Title: *Past triumphs, future challenges: cardiovascular medicine at the turn of the millennium*

Princesses' Lecture 2011

Dr Martin Chalfie



The Nobel Prize has several rules which often leave great work unrecognised. It is not awarded posthumously, for example, and there can only be three recipients for each category.

Thus in 2008 the vital contribution of Douglas Prasher was overlooked by the committee, but not by the recipients.

In 1992 Prasher, a researcher at the Woods Hole Oceanographic Institution in Massachusetts, isolated the gene that caused green fluorescent protein (GFP) to glow. Sadly his discovery only came at the end of three years of funding by the American Cancer Society and he currently does not even work in the science field, but he freely gave the gene to both Martin Chalfie and Roger Tsien, both of whom invited him to the ceremony to thank him.

Chalfie used the gene to demonstrate the value of GFP as a luminous genetic tag for various biological phenomena by colouring six individual cells in the transparent roundworm *Caenorhabditis elegans* with GFP. He correctly guessed that, unlike most forms of bioluminescence, GFP required no additional enzyme to create light by chemical reaction. His lab uses the simple nematode to investigate aspects of nerve cell development and function.

Chalfie's interest in GFP was sparked by a 1988 seminar by Paul Brehm about bioluminescent organisms and he has since published over 200 papers on the subject, including the highly-regarded Green Fluorescent Protein as a Marker for Gene Expression, co-written in 1994 with others including Prasher.

Martin Chalfie was born in Chicago in January 1947 and went to Harvard in 1965. He initially intended to study mathematics but soon switched to biochemistry, although he admits to having doubts about his ability and hedged his career bets with studies in law, theatre and Russian literature.

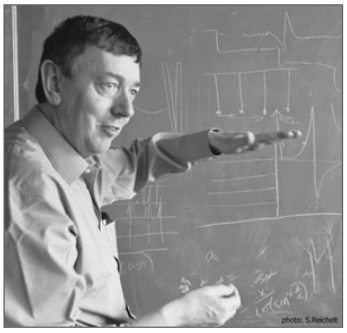
After graduating in 1969 he took several part-time jobs, including teaching and selling couture for his parents' dressmaking company before joining a research lab at Yale in 1971. His success there, including his first publication, encouraged him to return to Harvard where he gained his Ph.D under Robert Pelman in 1977.

He performed post-doctoral research on *C. elegans* at the Laboratory of Molecular Biology in Cambridge, England, with Sydney Brenner and John Sulston (2002 laureates). In 1982 Chalfie joined the faculty of Columbia University in New York where he performed his Nobel-winning work, aided by his wife and colleague Tulle Hazelrigg. Hazelrigg was among the first to attach GFP to other proteins, allowing scientists to watch where individual proteins go within a cell simply by watching for the tell-tale green spark.

Chalfie was elected to the National Academy of Sciences in 2004 but another telling accolade was the Harold S Ulen trophy he received as captain of the Harvard swimming team for his 'leadership, sportsmanship and team cooperation' – qualities he displayed by freely passing on his work to other researchers, just as he had received the baton from Douglas Prasher.

Friday Session One: New frontiers in microscopy

Brad Amos



Dr Brad Amos joined the MRC Laboratory of Molecular Biology in Cambridge, UK as a Group Leader in 1981 and together with John White developed confocal microscopy into a practical instrument. He then went on to show its potential using fluorescent stained biological samples and has won numerous awards as a result such as the Royal Microscopical Society's Honorary Fellowship in 2010. An Honorary Fellowship is the highest honour that the Society can bestow on an individual, and this award recognises the contributions made by Brad to light microscopy in general and his pioneering contribution to confocal microscopy in particular.

His current research focuses on designing a new macro objective lens with an unusually high ratio of numerical aperture to magnification. The significance of this lens is that it will make it possible to form a highly detailed image of a large specimen such as a whole embryo or a lump of tissue removed for medical purposes. He is also developing confocal and multiphoton laser scanning microscopes incorporating the new lens.

Christian Soeller

A/Prof Christian Soeller is the principal investigator in the Biophysics and Biophotonics group within the department of physiology at the University of Auckland, New Zealand. His research focuses on the use of photonics to illuminate basic biomedical questions.

A key interest is the detailed biophysical mechanism of cardiac excitation-contraction coupling and its relationship to cardiac contractility. The approach is quantitative whenever possible and uses mathematical modelling as a way to formulate hypotheses in a rigorous way to test if observations are compatible with suggested mechanisms.

New insight in physiology (and biology in general) often results from the availability of new technologies to probe cell systems. A large thrust of his work is therefore directed at developing novel ways to visualize structure and function at ever increasing spatial and temporal resolution.

Recently he started a fruitful interdisciplinary collaboration with colleagues from chemistry and engineering that led to the creation of the Polymer Electronics Research Center (PERC) at the University of Auckland. A major goal is to construct biosensors with increased sensitivity and selectivity from self-assembled nanostructures. A variety of electrical and photonics readout methodologies is used to allow interfacing with modern microelectronics.

Kazu Kikuchi

Dr Kazu Kikuchi joined the VCCRI as a laboratory head earlier this year. He studies the cellular and molecular mechanisms of cardiac muscle regeneration using zebrafish. Unlike humans, zebrafish can naturally restore lost heart muscle after injury, providing a model to understand mechanisms of myocardial regeneration. With genetic and molecular tools available, he studies how myocardial regeneration is blocked or enhanced in zebrafish to find new insights for repairing damaged muscle in the human heart.

Friday Session Two: From cells to organisms

Session sponsored by: life technologies™

Tri Phan

Dr Tri Phan graduated from medicine at the University of Sydney and trained in Clinical Immunology and Immunopathology at the Royal Prince Alfred Hospital. He established a B cell receptor knock-in mouse model to study B cell responses to self and foreign antigens for his PhD with Professor Tony Basten and Dr Robert Brink at the Centenary Institute. His interest in defining the microenvironmental contexts and spatiotemporal dynamics of immune responses lead him to post-doctoral studies with Professor Jason Cyster at the Howard Hughes Medical Institute, University of California, San Francisco. Tri is currently at the Garvan Institute where he has established an intravital two-photon microscope facility and focuses on the use of localised photochemistry to track and map cell fates in vivo.

Michael Roberts

Dr Mike Roberts is an NHMRC Senior Principal Research Fellow, Professor of Clinical Pharmacology & Therapeutics in the School of Medicine at The University of Queensland (UQ) and Professor of Therapeutics & Pharmaceutical Science at the University of South Australia (UniSA). Mike is also Director of the Therapeutics Research Centre (TRC), which he established at UQ in 1989, to support his major interests of topical drug delivery, pharmacokinetics and quality use of medicines. In 2009, a new initiative led to expansion of the TRC, with the establishment of a second branch at UniSA. Research staff and students in the TRC now have a unique opportunity to access facilities and expertise on both campuses. There are strong clinical ties, with the Centre located at the Princess Alexandra Hospital in Brisbane and the Queen Elizabeth Hospital in Adelaide. Particular research interests in the TRC include: topical drug delivery (skin, eye), imaging and modelling, drug ADMET, pharmacokinetics, liver and pancreas, natural therapeutics, burns and sepsis studies and health services delivery.

Karlheinz Peter

Dr Karlheinz Peter is in the Atherothrombosis and Vascular laboratory at the Baker IDI, Melbourne. Heart attack is a sudden catastrophic event in the lives of many people in our community. The direct cost of coronary heart disease in Australia is the largest of any single cardiovascular condition, at $1.76 billion, or 28.6 per cent, of all costs associated with heart disease. Stroke is the second largest at $1.08 billion, or 16.5 per cent. It is the single most common cause of death in Australia and is most commonly manifest as angina, heart attack or sudden death. For a growing number of elderly Australians, atherosclerosis, the development of plaques, fatty deposits in blood vessel walls, and its complications – such as coronary heart disease and stroke – will be the major health care problem in terms of mortality, reduction in quality of life, and cost to the public health system.

The Atherothrombosis and Vascular laboratory's research interests address these problems in a range of ways: from the investigation of those cells that play an important role in plaque development to the study of nutritional approaches that might prevent atherosclerosis and even the prevention and reversal of cholesterol accumulation in blood vessels.

Dr Karlheinz Peter hopes to address these public health concerns from a number of angles, including working towards the design of a new class of "intelligent" drugs. These will prevent clotting, or dissolve clots that have caused a heart attack or stroke without the excessive bleeding complications that are a feature of currently available drugs. The laboratory is also working towards the identification of biomarkers (such as elevated levels of certain proteins in the blood) which, when added to existing knowledge of family history and lifestyle risk, help predict coronary plaque rupture.

Friday Session Three: MR spectroscopy and imaging

Session sponsored by: PHILIPS sense and simplicity

Cameron Holloway

Dr Cameron Holloway is an Honorary Consultant Cardiologist at the John Radcliffe and Horton Hospitals in Oxfordshire, Senior Clinical Research Fellow at the University of Oxford Centre for Clinical Magnetic Resonance Research (OCRM) and Lecturer at the University of Oxford Medical school. He specialises in non-invasive cardiac imaging, particularly cardiovascular magnetic resonance, and his clinical and research interests are in cardiac magnetic resonance imaging and spectroscopy. His medical degree was from Monash University in Melbourne before undertaking physician training in the UK and Australia. He completed cardiology training at St Vincent's Hospital in Sydney and a cardiac MR fellowship at the John Radcliffe Hospital in Oxford. His PhD and post-doctoral research at the University of Oxford has focused on investigating the mechanisms of heart failure using cardiac magnetic resonance spectroscopy.

Stuart Grieve

Dr Stuart Grieve completed his DPhil at Oxford University, UK in 2000 on rapid Magnetic Resonance Imaging (MRI) techniques. Since then he has worked in applications of MRI in both neuroimaging and cardiac imaging in combination with his clinical training. Current cardiac research involves novel applications of diffusion tensor imaging in the myocardium, high resolution embryo imaging and molecular imaging in animal models of ischaemia-reperfusion. His current neuroimaging focus is on depression through the iSPOT-D trial, a study of 2016 participants of treatment response in Major Depressive Disorder, and normal brain development and cognition. He is a member of the Sydney Medical School, the Brain Dynamics Center and the School of Molecular Bioscience at Sydney University and is currently working in the Department of Radiology at Royal Prince Alfred Hospital. He currently holds 2 NHMRC research grants and has over 50 peer-reviewed publications.

Sally Dunwoodie

Prof Sally Dunwoodie heads the Embryology Laboratory at the Victor Chang Cardiac Research Institute (VCCRI), and is a Professor (conjoint) in the Faculty of Medicine at the University of New South Wales. She gained a PhD in 1993 researching the genetics of muscle development, at the Children's Medical Research Institute and University of Sydney. She next undertook postdoctoral training in the Mammalian Development Unit at the National Institute for Medical Research, in London, UK. There she identified novel genes active during mouse embryo development, which she and others have shown are essential for normal developmental processes. In 2000, Sally returned to Australia to take up a faculty position at the VCCRI. In 2003 Sally was awarded the inaugural Pfizer Foundation Australia Senior Research Fellowship, and currently holds a NHMRC Senior Research Fellowship. In 2008 Sally was awarded the Australian and New Zealand Society of Cell and Developmental Biology's inaugural Young Investigator Award. Sally's research goals are to define molecular and cellular interactions that orchestrate mammalian development through a mechanistic understanding of genetic and environmental interactions, and how they impact upon the developing form and function of the mammalian embryo. In particular her research focuses on development of the heart and vasculature, the placenta, and the role that Notch signalling plays in somite and vertebral column formation.

Friday Session Four: Assessment of the left ventricle

Session sponsored by: UNITED A STAR ALLIANCE MEMBER

James Moon

Dr James Moon set up and leads the Heart Hospital Imaging Centre, London, where the major research and clinical focus is cardiac MRI and the myocardium. James trained at Cambridge and Oxford. His MD, 'myocardial tissue characterization by CMR' was conducted at Royal Brompton hospital. This year was the first anniversary of the dedicated unit, and they performed 2454 scans, mainly of heart muscle disease patients. The current research team consists of 5 research fellows and currently has more than £1 million in active research grants.

James with his team has published more than 80 papers, mainly on cardiac MRI. Recent publications include "Equilibrium Contrast CMR for the measurement of diffuse fibrosis", and "the prognostic impact of CMR". Dr Moon co-founded 'London CMR' a group of around 60 meeting quarterly for CMR lectures, and case review. He is a board member of the international society, SCMR and the web editor of www.scmr.org, founder of www.training.scmr.org and www.scmr.org/forum together, the leading internet source of information and training on CMR. Dr Moon lives in the south of England with his wife Lorraine and young children.

Diane Fatkin

A/Prof Diane Fatkin is head of the Sr Bernice Research Program in Inherited Heart Diseases, Victor Chang Cardiac Research Institute, with appointments as Honorary Medical Officer in the Cardiology Department, St Vincent's Hospital, and Associate Professor in the Faculties of Medicine and Science, University of New South Wales. Her research is focussed on the clinical management and molecular genetics of inherited cardiomyopathies, in particular, familial dilated cardiomyopathy, cardiac conduction defects and atrial fibrillation.

Rory Hachamovitch, MD, M.Sc

Dr Rory Hachamovitch completed his undergraduate education at Columbia College of Columbia University, US and medical school at the Albert Einstein College of Medicine where he graduated with distinction in research in cardiology. He completed his internal medicine residency at Cedars-Sinai Medical Center in Los Angeles and his cardiovascular disease fellowship at Beth Israel Hospital in Boston before returning to Cedars-Sinai Medical Center to complete his nuclear cardiology fellowship. Dr Hachamovitch also completed a Master of Science in Epidemiology at the Harvard School of

Public Health. He has been the Director of Nuclear Cardiology at New York Hospital/Cornell Medical Center and the University of Southern California. He is currently a Staff Cardiologist, in the Section of Cardiovascular Imaging, Department of Cardiovascular Medicine, in the Heart and Vascular Institute of the Cleveland Clinic.

Dr Hachamovitch is widely regarded as a leading authority in the areas of validation of new technology and cardiovascular imaging outcomes research. He has published widely in this area, with a particular focus on prognostic applications of testing, post-test resource utilization, and the cost-effectiveness of cardiovascular imaging. He has received a number of awards including the prestigious Hermann Blumgart Award, awarded by the Society of Nuclear Medicine for research achievement and contributions to the science of nuclear cardiology.

Saturday Session One: Latest developments in clinical imaging

Session sponsored by: SIEMENS

Joe Suttie

Dr Joseph Suttie is a clinical cardiologist and Nuffield Fellow in Medicine at the Department of Cardiovascular Medicine, Oxford. He completed his medical degree at the UNSW and clinical training at St Vincent's Hospital, Sydney. His is currently co-investigator on several heart failure therapies using cardiovascular magnetic resonance (CMR) endpoints. His post-doctoral research involves developing high (3T) and ultrahigh field (7 T) CMR techniques for the non-invasive quantification of 4D flow, myocardial energetics, steatosis, disarray and fibrosis in a range of cardiomyopathies.

David Prior

Associate Professor David Prior is Director of Non-invasive Cardiac Imaging at St Vincent's Hospital, Melbourne and Head of the Cardiology & Heart Failure Outpatient Clinics. In addition he is an Associate Professor with the University of Melbourne and a Clinical Research Fellow at the St Vincent's Institute.

His advanced cardiology training was undertaken at the Alfred Hospital and included training in Heart Failure and Transplantation. He then completed a PhD at the Baker Heart Research Institute and Alfred Hospital examining abnormal vascular function in heart failure. After undertaking an Advanced Fellowship in Echocardiography at The Cleveland Clinic between 1998 and 2000, Dr Prior returned to Melbourne in 2000 to take up a position at St Vincent's Hospital. Major clinical and research interests are in echocardiography, pulmonary hypertension, sports cardiology and heart failure management.

Liza Thomas

Dr Liza Thomas is a senior staff specialist and Conjoint Associate Professor at Liverpool Hospital/UNSW, Sydney. She was the recipient of the NHMRC Gustav Nossal award for her PhD studies on imaging and atrial dynamics and function. She has pursued this area of research that has resulted in several abstracts and publications. Dr Thomas supervises several PhD, masters and ILP students and is the Cardiovascular co-ordinator for the NSW Fabry and Amyloidosis groups. Her long term goal is to pursue academic cardiovascular imaging.

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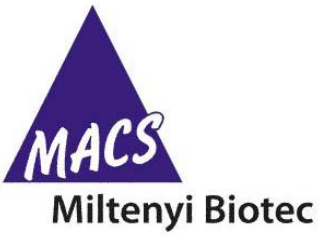
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