

20 YEARS

Empowering Science and Innovation







MESSAGE FROM THE MINISTER

20 YEARS OF INSPIRING INNOVATION

Victoria is home to some of the world's leading scientists, clinicians, developers and student researchers who are changing lives around the globe.

For two decades we have been supporting Victorian-led research through the Victoria Prize for Science and Innovation (Victoria Prize) and the Victoria Fellowship.

From the first recipient of the Victoria Prize in 1998 Mr Andrew Martin to Professor Graeme Clark whose research was behind the cochlear implant, to Dr Peter Colman and his breakthrough work in anti-influenza viral drugs and last year's recipients Professor Min Gu, Professor Jamie Rossjohn and Professor James McCluskey, these prestigious awards have helped our state's innovators take their research further.

I am proud that our state is home to such a large cohort of world-leading researchers and people who are improving the health outcomes and everyday lives for people around the globe.

The Victorian Government has been proud to partner with **veski** for the Victoria Prize for Science and Innovation and the Victoria Fellowships to support our outstanding leaders in science and their contributions to the global community since 2013.

The Victoria Prize for Science and Innovation provides two \$50,000 individual awards for work in the life sciences and the physical sciences. The 12 Victoria Fellowships, valued at \$18,000 each, also support researchers in science, engineering and technology, who are in the early stages of their career and would benefit from an international study mission.

These programs play a key role in the research, development and trial of new technologies that will boost the global competitiveness of our local companies as well as encourage the world's leading brands to invest here, creating more jobs for Victorians.

I'd also like to take this opportunity to thank other Victoria Prize and Victoria Fellowship supporters over the past 20 years including the Jack & Robert Smorgon Families Foundation, and the Australian French Association for Science and Technology.

The innovation ecosystem we've created here in Victoria will continue to play a critical role in the state's future and pave the way for new opportunities for business and industry, both throughout Australia and the world.

Congratulations to this year's Victoria Prize recipients and Fellows who will be offered global opportunities and shine a light on Victoria's world-leading research capabilities. Thank you for your unwavering dedication to your work and for improving lives across the globe.

Philip Dalidakis MP Minister for Small Business, Innovation and Trade



VICTORIA PRIZE FOR SCIENCE & INNOVATION

Physical Sciences



Professor Maria Forsyth

Professor Maria Forsyth has been awarded the 2017 Victoria Prize in recognition of her trail-blazing contributions to the development of advanced electrolyte materials for electrochemical devices.

For more than 25 years, Professor Forsyth has pioneered the discovery, fundamental understanding and application of ionic materials, long before they were recognised as a unique scientific field. Developing a deeper understanding of the structure and dynamics of these fascinating materials, she has also demonstrated their use in energy devices such as light metal batteries, fuel cells and photoelectrochemical solar cells where these materials are key to improving safety and high temperature performance.

Nearly a decade before the first International Congress on Ionic Liquids, Maria published and patented research on room temperature molten salts, and in the late 1990s she discovered, in collaboration with Professor Doug MacFarlane at Monash University, the ion conductive properties of organic ionic plastic crystals.

Her vision and research achievements have led to the establishment of a world-class facility in Geelong that could one day power the next wave of electric vehicles. The BatTRI-Hub – a collaboration between Deakin University and CSIRO – began operating in 2016 as a facility to develop the next generation of 'beyond lithium' battery technologies. The facility also allows NMR imaging to be applied to the study of electrochemical processes such as corrosion and battery discharge, with the potential to make ground-breaking advances in understanding of the molecular-level operation of these devices.

Along with a small group of international colleagues, Maria established the annual International Sodium Battery Conference in 2014 and hosted the third Conference in Geelong in 2016.

Professor Forsyth's work has led to many other awards including the Corrosion Medal (2013), Eureka Prize Finalist (2013), and election to the Australian Academy of Science (2015). In 2016 she was awarded the Galileo Galilei Award at the International Symposium on Polymer Electrolytes and in 2017 she was inducted as a Fellow of the International Society of Electrochemistry (ISE).

VICTORIA PRIZE FOR SCIENCE & INNOVATION

Life Sciences

Professors Jane Visvader and Geoffrey Lindeman

Professors Jane Visvader and Geoffrey Lindeman have been awarded the 2017 Victoria Prize in recognition of their legacy for cancer research activities in Australia and their ongoing efforts to translate basic discoveries to the clinic.

In 1997, Professors Visvader and Lindeman were recruited to Victoria from Boston to establish a new Breast Cancer Laboratory at the Walter and Eliza Hall Institute as part of the Victorian Breast Cancer Research Consortium.

The initiatives arising from the establishment of their laboratory, which required a shift in their research focus to breast cancer and the introduction of new technologies and models within the institute, created a legacy for cancer research activities in Australia.

Discoveries made by the pair and their team have altered the way breast cancer is viewed by researchers. They have pioneered a new field of research in breast cancer, related to breast stem cell biology, and their group's work has laid a framework for ongoing efforts to translate basic discoveries to the clinic. These discoveries are poised to deliver improved breast cancer outcomes for women today and for generations to follow.

Victoria's research community continues to benefit from their complementary skills. Jane trained as a molecular and cellular biologist and initially obtained her PhD in plant molecular biology, while Geoffrey trained as a medical oncologist before undertaking a PhD in the haematopoietic field, gaining expertise in mouse models.

Since 1998, they have worked closely as a team, acquiring new expertise in breast cancer research. In parallel, Geoffrey has facilitated the establishment of a Tissue Bank and Familial Cancer Centre with direct engagement with their laboratory research program. His joint sessional appointment at the Royal Melbourne Hospital and the Peter MacCallum Cancer Centre has also ensured direct links to the clinic for the team and through his clinical trial activities, the team has gained direct access to clinical trial experts and has established highlevel links to the pharmaceutical industry.

Jane and Geoffrey have received numerous awards, both individually and jointly, including the 2016 Ramaciotti Medal for Excellence in Biomedical Research.





Physical Sciences



Dr Tessa Charles

University of Melbourne

Particle accelerator technology first developed for high-energy particle physics is now being used for cancer therapy. Whilst their objectives are distinct, the accelerator technology is very similar. This study mission to MAX IV Laboratory in Sweden and to CERN in Switzerland will allow Dr Charles to develop expertise in nonlinear accelerator physics. At MAX IV, she will test a new method of beam diagnostics and gain first-hand experience of beam manipulation and control. At CERN, she will work alongside renowned accelerator experts and gain a better understanding of advanced modelling techniques used in particle collider simulations. This fellowship will allow her to leverage the modelling techniques developed for high-energy particle colliders, and improve the accelerator technology that impact our everyday lives.



Dr Ludovic Dumée

Deakin University

Titania (TiO2) has a unique combination of properties enabling a wide range of applications in the catalysis, bio-medical and separation area. Furthermore, this naturally occurring photocatalytic active material can dearade organics when activated with ultraviolet (UV) light. The application of TiO2 in anti-corrosion films and biomedical devices in the 1990s led to the development of smart coating materials nowadays commercially used to treat effluents which cannot be remediated with polymeric membranes. Dr Dumée will visit the Institut Européen des Membranes, which is one of the world's leading research organisations for the design of advanced membrane materials, and perform patterned lithography by Atomic Layer Deposition (ALD) on pre-formed TNT membranes, developed at Deakin University.

VICTORIA FELLOWSHIPS

Physical Sciences



Dr Farhad Farokhi

University of Melbourne

The use of networked devices, such as smart phones and wearable aadaets, for the monitoring and control of large-scale infrastructure, such as intelligent transportation systems, can improve the efficiency of existing infrastructure in Victoria. This study mission will address key challenges including the potential infiltration by hackers and develop a framework to inform the design of transport systems involving crowdsourced sensing and actuation, with emphasis on system security and user privacy. Dr Farokhi will visit ETH Zurich, Swiss Federal Institute of Technology: EPFL, École Polvtechnique Fédérale de Lausanne, Delft University of Technology, Scania Research and Development and KTH Royal Institute of Technology and collaborate with leading researchers to progress implementation of intelligent transportation systems in Victoria.



Dr Simon Illingworth

Transportation accounts for approximately 23 per cent of carbon emissions worldwide. Reducing this is a key objective around the world and a priority for Victoria. One way is to reduce the aerodynamic drag of transport vehicles such as cars, ships and aircraft. The aim of this project is to combine expertise at the University of Melbourne and at TU Berlin to develop control strategies for fluids that are both systematic and practical. The aim is to make feedback control of fluids genuinely feasible. This is crucial if flow control is to meet its potential to improve fluid flows and reduce emissions in Victoria and around the world. The study mission at TU Berlin would allow Dr Illingworth to make important progress towards this validation

Physical Sciences



Dr Jianzhen Ou

RMIT University

Gastrointestinal (GI) tract disorders and diseases affect at least half the population. Unfortunately, current diagnostic methods are limited and are generally inconclusive, can be invasive, need specialist administration and/or are time consumina. Indigestible capsules integrated with pH measurement and camera systems can provide non-invasive and direct diagnostic information but they are limited to acidity measurements and visual features of the gut, respectively. This study mission will focus on adding the capability of sensing intestinal metabolites into the Human Gas Sensina Capsule for improving the variety and accuracy of diagnostic information related to the health state of the human gut. Dr Ou will also establish a research and development partnership with Boston Scientific Corporation which is a world leading manufacturer in medical devices



Dr Haoran Ren RMIT University

To meet the ever-increasing demand for managing enormous amounts of data in the big data era, optical multiplexina—a technique processing multiple information channels encoded in physical dimensions of light in parallel—has plaved an indispensable role in optical technology. The grand objective of this study mission is to develop an entirely new concept of massive nanoplasmonic Anaular Momentum (AM) multiplexing through the discovery of an integrated digitalised Huygens phase plate capable of nearfield wavefront engineering of an array of plasmonic AM fields excited from a large number of AM-carrying information channels. His study mission will allow him to travel to which France and collaborate with the Centre de Recherche sur l'Hétéro-Epitaxie et ses Applications at Université Côte d'Azur

VICTORIA FELLOWSHIPS

Life Sciences



Dr Kim Allison

University of Melbourne

Obesity is one of the biggest challenges facing Australia's healthcare system, and is a risk factor for many chronic diseases. This fellowship will inform future solution-driven interventions and create opportunities for further international collaboration. Dr Allison will spend time with leading researchers in the UK, USA and the Netherlands to understand the training programs they have designed to deliver effective and sustainable behavioural change strategies for weight-loss. Through this visit, she aims to foster professional collaborations to ensure the latest advances abroad reach Victoria and Australia She will also present her own research into the barriers to the delivery and reception of weight-loss interventions in Australia at the World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases in Krakow, Poland,



Jane Hawkey

University of Melbourne

High throughput sequencing has transformed our understanding of bacteria. Cuttina-edae techniques in molecular biology, which precisely alter bacterial aenomes, have enabled the investigation of the impacts of the loss of certain genes on the ability of the bacteria to continue to cause disease. Ms Hawkey will visit leading institutes in the field of bacterial genomics including the Wellcome Trust Sanaer Institute and the Cambridae University Department of Medicine at Addenbrookes Hospital. She will receive training in the development of world first techniques aimed at exploring the complex relationship between bacterial cells and elements of the human immune system and learn how to analyse the high throughput data generated from these experiments, including sequencing, imaging and immune cell responses.

Life Sciences



Dr Erin McAllum

Florey Institute of Neuroscience and Mental Health

Neurodegenerative diseases such as dementia and Parkinson's disease are ultimately caused by brain cell death, but the reasons brain cells die remain unclear. With more than 100,000 Victorians living with dementia, which is projected to rise to more than 280,000 in the next 30 years in the absence of new treatments, it represents an unprecedented social and economic burden. Dr McAllum will travel to France to use cutting-edge chemical imaging technologies to understand the role metals play in protein aggregation in brain tissue, and the potential for preventative treatments. This project will generate the most comprehensive understanding of the relationship between metals and protein aggregates to date and transfer this knowledge back to Victoria and integrate it into our current chemical imaging platforms.



Dr Jennifer Payne

Monash University

Since WW2, antibiotics have defended us from bacterial infection. But the rise of the modern, antibiotic-resistant "superbua" means we are, once again, vulnerable to bacterial infections. Unless new treatments become available, the death toll from antibiotic-resistant bacteria is predicted to overtake cancer by 2050. Dr Payne's research focuses on developing innovative antibiotic strategies that combine different mechanisms of action into one molecule. This study mission will allow Dr Payne to present her research at an international conference and visit Harvard Medical School, formalising her collaboration with researchers working on cuttingedge microfluidic technique for monitoring immune cell migration - crucial to Dr Payne's research. Mastering this technique will further Victoria's development of these vital new treatments

VICTORIA FELLOWSHIPS

Life Sciences



Samantha Rowbotham

Monash University

Determining whether a child's injuries have resulted from an accident or abuse is still one of the laraest diagnostic dilemmas in medico-legal investigations in Victoria and around the world. With more than 15,000 Australian children physically assaulted each year, this is a growing concern. Ms Rowbotham's study mission aims to strengthen the medicolegal evidence base for cases of suspected child abuse by establishing a Paediatric Skeletal Trauma (PaST) database and exploring the question of whether facture patterns from unintentional short falls and physical abuse can be differentiated from each other The mission will involve collection of data at three world-leading medico-legal laboratories, and training in a key tool to analyse the skeletal trauma in the cases used for this research



Dr Phillip Ward Monash University

Whether watching a movie or trying to solve a complex problem, parts of the brain spontaneously need more energy than others. These short-term bursts of energy are supplied by the blood stream and regulated by a system called neurovascular couplina, which is thought to break down as the brain ages. Dr Ward will study new techniques at the Cardiff University Brain Research Imaging Centre (CUBRIC) to measure how the blood vessels respond to changes in brain function, whilst also measuring the amount of oxygen being metabolised. His study mission will help him acquire the knowledge and skills required to bring MR-based oxygen and bloodflow imaging into PET-MR research in Victoria. He will also visit the world first high-field PET-MR being developed at Forschungszentrum Jülich

2017 VICTORIA PRIZE FOR SCIENCE & INNOVATION AND VICTORIA FELLOWSHIPS

20 YEARS OF EMPOWERING SCIENCE & INNOVATION

Victoria Prize for Science & Innovation

Created in 1998, the annual Victoria Prize for Science & Innovation and Victoria Fellowships program supports and recognises outstanding Victorian scientific research and innovation.

The prestigious \$50,000 Victoria Prize is currently awarded to two outstanding Victorian researchers (one in life sciences, one in physical sciences) whose discovery or innovation, or potential discovery or innovation, has significantly advanced knowledge or has provided commercial or other benefits to the community. The Victoria Prize for Science & Innovation honours the life-long commitment and achievements of the recipients.

Victoria Fellowships

The Victoria Fellowships encourage innovation and the commercial application of research among researchers in the early stages of their careers. Up to 12 researchers will be awarded up to \$18,000 each to undertake overseas study missions offering Victoria Fellows the opportunity to broaden their experience, develop international networks and better understand where their activities fit into the local and international scene. A Victoria Fellowship also provides an opportunity to develop commercial ideas.

Australian French Association for Science and Technology (AFAS) Associate Award

Victoria Fellowship applicants planning to study in France are eligible to apply for an AFAS Associate Award. AFAS Associate Awards support study missions to France, in conjunction with the Victoria Fellowship, and aim to facilitate science and technology innovations that are mutually beneficial.

PREVIOUS RECIPIENTS OF THE VICTORIA PRIZE FOR SCIENCE & INNOVATION

Year Recipient

- 2016 Professor Min Gu Professors Jamie Rossjohn & James McCluskey
- 2015 Professor Calum Drummond Professor John Hopper AM
- 2014 Professor Frank Caruso Professor Ashley Bush
- 2013 Professor Lloyd Hollenberg Professor Alan Cowman
- 2012 Professor Ana Deletic Professor Terence (Terry) Speed
- 2011 Professor Andreas Strasser
- 2010 Associate Professor Voytek Gutowski
- 2009 Professor Murray Esler AM
- 2008 Professor Peter Colman AC
- 2007 Professor Colin Masters AO
- 2006 Professor David Solomon AM
- 2005 Professor Eric Reynolds AO
- 2004 Professor Keith Nugent
- 2003 Professor David Vaux AO
- 2002 Professor David Boger
- 2001 Dr Roger Francey & Dr Paul Steele
- 2000 Professor Donald Metcalf AC
- 1999 Professor Graeme Clark AC
- 1998 Mr Andrew Martin

Research Area

(Physical) Nanophotonics (Life) Infection and immunity

(Physical) Chemistry (Life) Disease prevention

(Physical) Nanomedicines (Life) Translational neuroscience

(Physical) Quantum sensing technology (Life) Malaria research

(Physical) Storm water management (Life) Bioinformatics

Cancer cell research and apoptosis

- Manufacturing technology
- Cardiovascular neuroscience A new class of anti-influenza viral drugs
- Alzheimer's disease pathways
- Polymer chemistry

Remineralisation of dental caries

- Quantitative phase imaging
- Programmed cell death apoptosis
- Fluid mechanics
- Greenhouse gas monitoring
- Haematology
- Hearing solutions: Cochlear implants
- Digital microwave radio systems

PREVIOUS RECIPIENTS OF THE VICTORIA FELLOWSHIPS 1998 - 2016

Year Recipient 1998 Angela Corrie Mitchell Lennard 1998 1998 Cait MacPhee Mitchell Shaw 1998 Joseph Sofra 1998 1998 Ross Waller 1999 Katrina Allen 1999 Fraser Cameron Paul Dietze 1999 1999 Sacha Dopheide Liza Maimone 1999 Colin Nexhip 1999 2000 Johanna Barry 2000 Leonid Churilov 2000 Christopher Fluke 2000 Michael Halford 2000 Agnes Ho Anthony Ladson 2000 2001 Wayne Burton 2001 Phillip Crothers 2001 Paul Cullen

- 2001 Suhasini Kulkarni2001 Fiona Sofra
- 2001 Wenyi Wang

Year Recipient 2002 Tracey Bessell Danielle Forster 2002 2002 Minh Nguyen Rachael Prince 2002 2002 Gary Rosengarten 2002 Cindy Yap 2003 Dan Billing 2003 Sandra Haukka Tanya Medley 2003 2003 Arnan Mitchell 2003 Tam Vuong 2003 Bartek Wydrowski 2004 Daniel Scott 2004 Tamara Boyd 2004 Serryn Eagleson 2004 Richard Barber Micah Atkin 2004 2004 Flora Wong 2005 Flame Burgmann 2005 Thanh Tam Chau

- 2005 Erika Cretney
- 2005 Whitney Macdonald2005 Hayley Newton
- 2005 John Papandriopoulos

business.vic.gov.au/support-for-your-business/awards/victoria-prize-for-science-andinnovation or business.vic.gov.au/support-for-your-business/awards/victoria-fellowships



Year Recipient		
2006	Bryan Fry	
2006	Hadi Lioe	
2006	Tabbara Mohammad	
2006	Paul Stoddart	
2006	Fleur Tynan	
2006	Nicole van de Weerden	
2007	Bryony Coleman	
2007	Luke Connal	
2007	Simon Craig	
2007	Hussein Jama	
2007	Erinna Lee	
2007	Andrew Walter	
2008	David Forrester	
2008	Amy Richards	
2008	lan Majewski	
2008	Adrian Orifici	
2008	Steven Pas	
2008	Zhejun Pan	
2009	Ming Chen	
2009	Chi Pok Cheung	
2009	Joanne Devlin	
2009	Sally Gras	
2009	Julianne Halley	
2009	Martin Leahy	

Year Recipient		
2010	Suzanne Ftouni	
2010	Matthew Hill	
2010	Baohua Jia	
2010	Michelle Ma	
2010	Denise Miles	
2010	Sant-Rayn Pasricha	
2011	Liang Chen	
2011	Mandy de Souza	
2011	Darren Hutchinson	
2011	Brett Paterson	
2011	Jaclyn Pearson	
2011	Jean-Pierre Veder	
2012	David Ascher	
2012	Emma Burrows	
2012	Peter De Cruz	
2012	William Gee	
2012	Mohsen Kalantari	
2012	Everson Kandare	
2012	Rachel Kilmister	
2012	Colin Scholes	
2012	Sharath Sriram	
2012	Dion Stub	
2012	Nicholas Tobias	

2012

Hai Vu

PREVIOUS RECIPIENTS OF THE VICTORIA FELLOWSHIPS 1998 - 2016

Year	Recipient
2013	Meenakshi Arora
2013	Nishar Hameed
2013	Bradley Ladewig
2013	Xiangping Li
2013	Timothy Rawling
2013	Jin Zhang
2013	Anil Kumar Asthana
2013	Ross Clark
2013	Natasha Holmes
2013	Simon James
2013	Arthur Nasis
2013	Jennifer Pilgrim
2014	Timothy Crouch
2014	David McCarthy
2014	Peter Macreadie
2014	Tobias Horrocks
2014	Greg Knowles
2014	Heather Nuske
2014	Freya Thomas
2014	Zongsong Gan
2014	Megan Rees
2014	Jacqueline Flynn
2014	Udani Ratnayake
2015	Lauren Nicole Ayton

Year Recipient 2015 Daniel Gomez Ke Wang 2015 Madhu Bhaskaran 2015 Danielle Ingle 2015 Jodie McClelland 2015 Nisa Salim 2015 Alex Schenk 2015 2015 Janine Trevillyan Daniel Corp 2015 2015 Severine Lamon Ada Wing Chi Yan 2015 2016 Ravichandar Barbarao Tamar Greaves 2016 Christian Gunawan 2016 Hamish McWilliam 2016 Paola Vaz 2016 Ryan DeCruz 2016 Subashani Maniam 2016 2016 George Wang Sarah Baines 2016 2016 Thushara Perera 2016 Kang Liang Peng-Wang (George) Chen 2016

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OTHER VICTORIAN FELLOWSHIP AND AWARD PROGRAMS

Premier's Award for Health and Medical Research

The Premier's Award for Health and Medical Research recognises achievement by Victoria's early career health and medical researchers. The award is open to PhD students or recently completed postgraduates whose research has or is being undertaken in a Victorian research institution in a field of health and medical research. Next year will see the 24th year of the award.

veski innovation fellowships

The **veski** innovation fellowships bring Australian expatriates and leading researchers, with outstanding skills in science and innovative technology, typically in the top five percent of their respective fields, to Victoria.

Since 2004, **veski** has awarded 26 fellowships to scientists and researchers working across a range of basic, applied and clinical research fields from modern health issues such as cancer, dengue and obesity to innovative studies into nanotechnology and organic semiconductors.

Applications are sought from globally competitive individuals in the field of biotechnology, biomedical, advanced manufacturing including food science and bioengineering, environmental and energy technologies, or the enabling sciences and technologies.

veski.org.au/vif