THE MAWA TRUST
DEVELOPING ALTERNATIVES TO ANIMAL RESEARCH

2016 & 2017
GRANTS, FELLOWSHIPS, SCHOLARSHIPS, BURSARIES, SPONSORSHIPS & PRIZES AWARDED BY MAWA

In addition to previous MAWA awards to scholars and scientists at universities and research institutions throughout Australia who are continuing their research, further MAWA awards were granted in 2016 and 2017.

MAWA RESEARCH & DEVELOPMENT GRANTS

🏆 **Prof Steven Petrou, Dr Ben Rollo and Dr Geza Berecki**, Ion Channels and Human Diseases Laboratory, The Florey Institute of Neuroscience and Mental Health, VIC.

Discovering new treatments for severe childhood epilepsy using human cell-based modelling to remove the dependence on animal models and animal feeder cell support systems.
In this study patient derived induced pluripotent stem cells will be generated and maintained using human feeder cells with defined extracellular matrix molecules. These patient derived cortical neurons (which give rise to epilepsy in children) referred to as "epilepsy in a dish" models are expected to be superior to animal models for testing innovative new drugs, and for monitoring the way neurons respond to answer important biological questions in neurogenetic disease research.

🏆 **Prof Antony Burgess AC, A/Prof Peter Gibbs and Dr Tracy Putoczki**, Structural Biology and Personalized Medicine Division and Inflammation Division, The Walter and Eliza Hall Institute of Medical Research (WEHI), Royal Melbourne Hospital and Western Hospital, and The University of Melbourne, (UoM), VIC.

Developing human colon and pancreatic cancer organoids to replace the use of animals for anti-cancer drug testing.
Researchers will use their combined skills to integrate cancer genetic analyses and the growth of cancer tissues (organoids) from bowel and pancreatic cancer patients to predict the drug sensitivity of each patient's tumour, and to show that organoid cultures can replace patient derived animal xenografts for screening anti-cancer drug options.

🏆 **Prof Michelle Coote, Prof Shin-Ho Chung, Dr Rong Chen and Prof Yingliang Wu,** Computer Aided Chemical Design, Research School of Chemistry, Computational Biophysics Group, Research School of Biology, The Australian National University (ANU), ACT and Biomolecular Information and Engineering, College of Life Sciences, Wuhan University, China.

Elucidating the mechanisms of potassium channel block by novel local anaesthetics designed in silico: evaluation of the design of potential pharmaceutical compounds without the use of animals.
With the advent of powerful supercomputers and advances in theoretical biophysics and computational chemistry it has now become possible to design, screen, and further optimize chemical compounds using computer modelling which obviates the need to rely on animal testing.

🏆 **Prof Simon Hawke, Dr Anna Zinger, Prof Georges Grau,** Vascular Immunology Unit, Department of Pathology, School of Medical Sciences, The University of Sydney (USYD), NSW.

Trans-endothelial migration of leucocytes of multiple sclerosis patients across an in vitro blood-brain barrier model
A human cell co-culture system to replace animal models in infectious diseases research to increase understanding of the fine mechanisms of MS and for research into immuno-inflammatory mechanisms involved in other neuro-inflammatory illnesses.

MAWA RESEARCH & DEVELOPMENT GRANTS

🏆 **Prof Paul Smith, Dr Rachael Li, & Prof Quinghua Quin,** Trauma and Orthopaedic Research Unit, Department of Surgery, The Canberra Hospital, ANU Medical School, Department of Immunology and Genetics, The John Curtin School of Medical Research, and Research School of Engineering and Computer Sciences, The Australian National University, (ANU), ACT

Osteomics: A breakthrough integrated research system using mathematical and computational methods to replace animal models of human bone disease and bone repair.
This project will address a fundamental question of how different sets of genes interact among multiple systems in bone metabolism and will advance treatment of bone diseases thus removing the need for an animal model.

🏆 **Prof Mark Cook, Prof Thomas Knoesche, Prof Iven Mareels and Dr Andre Peterson,** Centre for Clinical Neurosciences, St Vincent's Hospital Melbourne and Department of Electrical & Electronic Engineering and Department of Neurology, The University of Melbourne, VIC and The Max Planck Institute, Leipzig, Germany.

A novel multi-disciplinary approach to investigate epilepsy from a neuronal modelling perspective as a viable replacement to the use of animal models.
This research will increase understanding of the causes of seizures, and how seizures start and end, without having to utilise animals which are genetically modified to have seizures or to use animals which have seizures induced via electrical and/or chemical means.

🏆 **A/Prof Paul Witting, Drs Belal Chami, Greg Sutherland & XiaoSuo Wang, & Ms Priscilla Youssef,** Charles Perkins Centre, The University of Sydney (USYD), NSW.

Assessing protein level and distribution in Alzheimer's disease-affected human brains using matrix assisted laser desorption/ionization (MALDI) imaging mass spectrometry: A methodology to image proteins in tissue without animal-derived antibodies.
This technique can analyse intact tissue specimens and does not result in the destruction of the tissue being analysed. Findings from this study will encourage scientists to use this animal-free method to advance understanding of Alzheimer's disease pathogenesis in humans.

🏆 **Dr Megan O'Mara and Dr Michael Thomas,** Biomolecular Simulation and Dynamics Research Group, Research School of Chemistry, The Australian National University (ANU), ACT

Understanding the role of cellular oxidation in Aβ peptide transport and amyloid formation in pre-clinical Alzheimer's disease using molecular modelling as an alternative to animal studies.
Researchers will develop state-of-the art computer simulations to model how oxidised fats in the brain may prevent the clearance of Aβ peptides, allowing them to accumulate and form amyloid plaques. This work will provide critical insights into the first steps in the formation of Alzheimer's disease. It is hoped that this information can be used in the future design of drugs that can combat the early stages of Alzheimer's disease, rather than just managing the symptoms.

🏆 **Drs Raymond Wong, Sandy Hung, Elaine Sanij and Bryony Nayagam and A/Profs Alice Pebay and Alex Hewitt,** Centre for Eye Research Australia (CERA), Ophthalmology, Department of Surgery, The University of Melbourne and The Peter MacCallum Cancer Centre, VIC.

Immortalised human stem cell derived-retinal ganglion cells as a new tool for optic nerve research to reduce or replace the use of animals for optic nerve research.
This technique will provide an alternative to current experimental mouse, rat and non-human primate models for optic neuropathies which include crush injury, elevated intraocular pressure and laser photocoagulation induced damage to the optic nerve.

🏆 **Dr Sean Lal, Dr Amy Li and Prof Cris dos Remedios,** Sydney Medical School and the Department of Anatomy & Histology, The University of Sydney, NSW.

Developing experimental alternatives to animal models using human heart tissue.
The development of new methods whereby human heart tissue, both from donor and diseased hearts, can be cryopreserved and then utilised for experiments that examine DNA and protein function simultaneously. Researchers will collaborate with tissue banks worldwide to ascertain the best methods for harvesting, preserving and maintaining high quality human heart tissue, which can be used for human models of cardiovascular disease.

MAWA RESEARCH FELLOWSHIPS

🏆 **Dr Ben Rollo as MAWA Florey Fellow,** Ion Channels and Human Diseases Laboratory, <u>The Florey Institute of Neuroscience and Mental Health</u> and <u>Murdoch Children's Research Institute</u>, VIC.

Establishing a human *in vitro* cell-based model of epilepsy to remove the dependence on animal models and improve patient outcomes. It is envisaged that these human cell models will prove to be superior to rodent models, which is critical to reduce the reliance of animal models for neurogenetic disease research.

🏆 **Dr Michael Thomas as MAWA ANU Fellow,** Biomolecular Simulation and Dynamics Research Group, Research School of Chemistry, <u>The Australian National University</u> (ANU), ACT

Investigating the molecular interactions that underpin the initiation and progression of Alzheimer's disease by establishing computational methods that could then be appropriated for the study of other neurodegenerative disorders. The adoption of these methodologies will ultimately reduce the need for animal experimentation.

🏆 **Dr Margaret Lee as MAWA WEHI Fellow,** Structural Biology and Personalized Medicine Division, <u>The Walter and Eliza Hall Institute of Medical Research</u> (WEHI), VIC

Developing human colon and pancreatic cancer organoids to improve processes for selecting drugs for cancer treatment, increase the rate of discovery of new cancer drugs and replace experiments currently requiring tissue from patient tumours to be grown in animals.

🏆 **Dr Andre Peterson as MAWA UoM Fellow,** Centre for Clinical Neurosciences, <u>St Vincent's Hospital</u> Melbourne and Department of Electrical & Electronic Engineering and Department of Neurology, <u>The University of Melbourne</u> (UoM), VIC.

Developing a novel multi-disciplinary approach to investigate epilepsy from a neuronal modelling perspective combined with voluntary human data as a viable replacement to the use of animal models in neuroscience.

🏆 **De Belal Chami as MAWA USYD Fellow,** Charles Perkins Centre, Bosch Institute Mass Spectrometry Facility and Department of Pathology, <u>The University of Sydney</u> (USYD), and <u>The Kolling Institute</u>, NSW

Assessing protein level and distribution in Alzheimer's disease-affected human brains using matrix assisted laser desorption/ionization (MALDI) imaging mass spectrometry as a method to image proteins in tissue without the need for animal-derived antibodies.

🏆 **Dr Raymond Wong as MAWA CERA UoM Fellow, Centre for Eye Research Australia** (CERA), Ophthalmology, Department of Surgery, <u>The University of Melbourne</u> and <u>The Peter MacCallum Cancer Centre</u>, VIC.

Developing immortalised human stem cell derived-retinal ganglion cells as a new tool for optic nerve research to replace the use of animals in this field, including current experimental animal models for optic neuropathies.

MAWA DOCTORAL RESEARCH SCHOLARSHIPS

🏆 **Mr Adam Dymke,** Department of Applied Physics, Faculty of Applied Science, <u>RMIT University</u>, VIC.

Developing predictive methods for computationally modelling the binding of therapeutic peptides to ion channel targets to allow predictions of new treatments for a range of neurological, cardiac and muscular disorders and to advance animal-free drug development.

MAWA MASTERS RESEARCH SCHOLARSHIPS

🏆 **Mr Beau Brooker**, School of Chemistry, Physics and Mechanical Engineering, Faculty of Science and Engineering, <u>Queensland University of Technology</u>, QLD.

Developing validated biomechanical models to replace large animal studies in spine research. This study will employ experimental testing methods (human cadaveric) to measure the mechanical stress in tissues within the human spine so that virtual spine models can replace the need for biomechanical testing in living pigs, sheep and cattle subjected to injury and then a range of spinal fusion technologies.

MAWA HONOURS RESEARCH SCHOLARSHIPS

🏆 **Mr Joshua Fraser,** Department of Biotechnology, Faculty of Science, RMIT University, VIC.

Developing a yeast model for the study of mechanisms involved in overcoming toxic effects associated with the production of amyloid beta peptide in Alzheimer's disease to replace the use of transgenic animals engineered to have early onset Alzheimer's disease and to suffer from serious neuron disease.

MAWA INTERNATIONAL CONFERENCE BURSARIES

🏆 **A/Prof Ian Macreadie, Department of Biotechnology,** Faculty of Science, RMIT University, VIC.

12th Alzheimer's Association International Conference, Copenhagen, Denmark.

MAWA DOMESTIC CONFERENCE BURSARIES

🏆 **Dr Andre Peterson**, Department of Electrical & Electronic Engineering and Department of Neurology, The University of Melbourne (UoM), VIC.

The Joint Australian Physiological Society (AusPS) and the Australian Society for Biophysics (ASB) Annual Scientific Meeting, University of South Australia, SA

MAWA YOUNG SCIENTIST TRAVEL GRANTS

🏆 **Ms Signe Christensen,** Institute for Molecular Bioscience, The University of Queensland, QLD.

The Joint 19th International Union of Pure and Applied Biophysics (IUPAB) and 11th European Biophysical Societies' Association (EBSA) Congress, Edinburgh, Scotland.

MAWA SPONSORSHIPS OF CONFERENCES

🏆 **The Joint Australian Physiological Society (AusPS) and The Australian Society for Biophysics (ASB) Annual Scientific Meeting,** University of South Australia, SA.

Sponsorship of Alternatives to the Use of Animals in Medical Research Symposium and travel grant.

🏆 **The Joint 19th International Union of Pure and Applied Biophysics (IUPAB) and 11th European Biophysical Societies' Association (EBSA) Congress,** Edinburgh, Scotland.

Sponsorship of Alternatives to the Use of Animals in Medical Research Symposium, travel grants and prize for best thesis presentation of their alternatives work out of ten finalist PhD students and Post-Docs (2-3 years post PhD).

MAWA SPONSORSHIPS OF INTERNATIONAL SPEAKERS

🏆 **Professor Robert French,** The Hotchkiss Brain Institute**,** and The University of Calgary, Canada.

International Keynote Speaker for the Joint Australian Physiological Society (AusPS) and the Australian Society for Biophysics (ASB) Annual Scientific Meeting, Symposium: Alternative Approaches to the Use of Animals in Physiology and Biophysics, University of South Australia, SA.

MAWA AMBASSADORS

🏆 **Ms Emelie Flood,** Doctoral Scholar, RMIT University**, Dr Andre Peterson,** Postdoctoral Researcher, St Vincent's Hospital and Department of Neurology, University of Melbourne VIC, and **Dr Amy Holmes,** School of Pharmacy and Medical Sciences, University of South Australia and the Basil Hetzel Institute, SA were invited to take on MAWA Ambassadorial roles and to join MAWA's network of representatives.

MAWA Ambassadors represented the Trust and presented at a variety of events throughout 2016 and 2017, including university careers nights, a range of conferences, seminars and symposiums, plus events organised by other not-for-profit foundations, funding bodies, charities, and both Australian and state government departments.

MAWA CONFERENCE PRIZES

🏆 **MAWA Prize for Best Thesis Presentation by Young Scientist**

Alternatives Symposium. The Joint 19th International Union of Pure and Applied Biophysics (IUPAB) and 11th European Biophysical Societies' Association (EBSA) Congress, Edinburgh, Scotland.