

# EXTERNAL INCOME

## Central Nervous System Stability and Degeneration

ARC Centre of Excellence in Vision Science. Trevor David Lamb, **Jonathan Stone**, Mandyam V. Srinivasan, 2005-2010. \$11,000,000. See Visual Science for further details.

Stone J and Valter K. Oxygen toxicity as a factor in retinal degenerations: genetic and environmental mechanisms. Retina Australia, \$30,000.

Stone J and Valter K. Oxygen toxicity as a factor in retinal degenerations: genetic and environmental mechanisms, NH&MRC, \$89,550.

Provis JM. Zeiss dual channel laser scanning pascal confocal microscope, Ramaciotti Foundation, \$25,000.

Provis JM. Confocal microscopy - Zeiss 'Pascal' LSM (partial funding), ARC Centre of Excellence in Vision Science, \$55,575.

Stone J. ERG Recording Apparatus, ARC Centre of Excellence in Vision Science, \$11,900.

Valter K. Microtome, ARC Centre of Excellence in Vision Science, \$28,530.

Provis JM. Bioanalyzer, ARC Centre of Excellence in Vision Science, \$45,471.

Provis JM. Dissecting microscope, ARC Centre of Excellence in Vision Science, \$19,120.

Provis JM. Tissue processor and embedding station, ARC Centre of Excellence in Vision Science, \$78,320.

Stone J. Programmable visual stimulator and accessories, ARC Centre of Excellence in Vision Science, \$37,518.

Shin-Ho C. Theoretical Studies on the Dynamics of Ion Permeation Across Membrane Channels. NH&MRC, \$253,350.

## Comparative Genomics

Delbridge M. Origin and evolution of genes on the human X chromosome. ARC, 2004-2006, \$300,000.

Graves JAM (Director) with Prof. MB Renfree, University of Melbourne, Prof. DW Cooper, Macquarie University and Prof. T Speed, Walter and Eliza Hall Institute. ARC Centre for Kangaroo Genomics. ARC, 2003-2007, \$3,300,000.

Graves JAM with Dr S Sarre and Prof. A Georges, University of Canberra. Sex in dragons: The molecular basis of genetic and environmental sex determination. ARC, 2004-2006, \$600,000.

Graves JAM. Platypus - Physical Map Construction. Washington University School of Medicine, \$US20,000.

Graves JAM and Alsop A with Tasmanian Department of Primary Industries, Water and Environment. Devil Facial Tumour Disease: Cytogenetics clues to its origin and transmission. ARC Linkage, 2006-2008, \$119,000.

## Environmental Biology

Badger M, Pogson BJ, Osmond CB, Jones DA, Williamson RE, **Evans JR**, Von Caemmerer S, Nicotra AB, Linde C, Mathesius U, Ball MC, **Farquhar GD**, **Masle J**, Furbank RG, Ayliffe MA, Bonnet DG, Condon T, White RG, Munns RE and Larkin PJ. Plant Phenomics Imaging and Analysis Facility. ARC LIEF Grant, \$553,000.

Brocks J, **Farquhar GD**, Grice K, Haese RR and Shalliker R. A highly sensitive mass spectrometer for trace analysis of biomarker molecules to study changes in

recent and ancient environments. ARC LIEF Grant, 2006, \$390,700.

Dewar RL, plus 50 co-authors including **Farquhar GD**. Complex Open Systems Network (COSNet). ARC Network Grant, 2004-2009, \$1,500,000.

Evans JR. Interactions with elevated CO<sub>2</sub>. CRC for Greenhouse Accounting, \$125,000.

Farquhar GD. Gary Comer Mentor Award (Abrupt Climate Change). 2004-2009, \$US550,000.

Farquhar GD. Oxygen-18 in water, carbon dioxide, and organic matter: a tool for linking plant biological processes, hydrology and climate change. ARC Discovery Grant, 2005-2007, \$400,000.

Farquhar GD with Dr G Tcherkez, Université Paris Sud XI. Investigation of root respiratory function using carbon stable isotopes. DEST ISL FAST Grant. 2006-2007, \$10,000.

Farquhar GD with Dr E Krull, CSIRO Land and Water. Soil organic carbon sequestration in recently "thickened" woodlands: How much carbon at what depth and for how long? AINSE Grant, 2006, \$17,052.

Godwin I, **Farquhar GD**, **Masle J**, Easton A, and Scott A. Combining molecular plant physiology and breeding to improve canola (*Brassica napus*) performance in dry environments. ARC Linkage Grant, 2004-2008, \$430,000.

Hill RS, plus 50 co-authors including **Farquhar GD**. Discovering the past and present to shape the future: networking environmental sciences for understanding and managing Australian biodiversity. ARC Network Grant, 2005-2008, \$1,500,000.

Kirschbaum MUF. Modelling carbon and nitrogen dynamics following land-use change. CRC for Greenhouse Accounting, \$120,000.

Masle J. Genetic controls of root impedance and drought signalling in wheat. Grains Research and Development Corporation Gene Program, 2005-2008, \$777,759.

Masle J. Genetic diversity in the ERECTA family: a tool to improve drought resistance and water-use efficiency. DEST ISL FAST Grant, 2006-2008, \$14,000.

Pitman A, plus 50 co-authors including **Farquhar GD and Roderick ML**. The Australian Climate System Network. ARC Network Grant, 2004-2009, \$1,950,000.

Westoby M, plus 50 co-authors including **Farquhar GD and Roderick ML**. Australia-New Zealand Research Network for Vegetation Function. ARC Network Grant, 2004-2009, \$2,500,000.

## Ecosystem Dynamics

Ball MC. Global change in the sub-Antarctic: temperature response of vascular plant species from Macquarie and Heard Islands. ARC Discovery Grant, 2004-2006, \$240,000.

Roderick ML. An experimental pan evaporimeter at Canberra Airport. CRC for Greenhouse Accounting, \$100,000.

Schortemeyer M and Ball MC. Photosynthesis of subantarctic plants as affected by leaf and canopy temperature variation. Australian Antarctic Division, logistic support, 2005-2006, \$520,500.

Skotnicki ML. Biodiversity, biogeography, reproduction and conservation of the Macquarie Island orchid *Nematocerus (Corybas) dienema*. Australian Antarctic Division, logistic support, \$82,000.

Skotnicki ML with Dr PM Selkirk. Conservation of plant biodiversity in Antarctica – a genetic approach. Australian Antarctic Division, logistic support, \$27,910 plus \$164,000.

Skotnicki ML with Dr PM Selkirk. Investigation of plant virus biodiversity in antarctic terrestrial

plants. Australian Antarctic Division, logistic support, \$8,000 plus \$82,000.

Westoby M, plus 50 co-authors including Ball MC and Roderick ML. Australia-New Zealand Research Network for Vegetation Function. ARC Network Grant, 2004-2008, \$2,500,000.

## Genomic Interactions

Bauer WD, Mathesius U and Rolfe BG. AHL signalling in *Sinorhizobium meliloti* and its effects on AHL signal mimic compounds from its host *Medicago truncatula*. USDA Cooperative Research Grant Program, 2005-2007, \$US 210,000.

Rolfe BG, Gresshof PM, Rose RJ and Singh M. ARC Centre of Excellence for Integrative Legume Research, 2002-2006, \$19,000,000.

Rolfe BG. Industry Development grant from the ACT Government's Knowledge Fund for "Development of Strategic Mass Spectrometry Capacity in the ACT", 2004-2006, \$120,000.

## Molecular Genetics and Evolution

Arnell R. Embryological and molecular basis of Zic2 function. NH&MRC, \$212,000.

Arnell R. Zic gene function during development of the embryonic midline. Sylvia and Charles Viertel Charitable Foundation Senior Fellowship, \$195,000.

Ball EE. Review of Australian Institute of Marine Science program in environmental change and impacts. Australian Institute of Marine Science, Townsville, \$4,000.

Campbell HD, Cowin A and Powell B. Child Health Research Institute, Adelaide, NHMRC Project Grant, \$161,750.

Campbell H. ARC APAI Studentship with TGR Biosciences, Adelaide, \$28,000.

Saint R and Murray M. Analysis of Rho GTPase signalling pathways in an epithelial to mesenchymal transition during development of the mesoderm. NH&MRC Project Grant, \$134,250.

Saint R, Ball EE, Campbell H and Maleszka R. ARC Special Research Centre for the Molecular Genetics of Development (jointly with the University of Adelaide) 2000-2008, \$500,000.

## Molecular Plant Physiology

Prof. JP Conroy, University of Western Sydney, **von Caemmerer S and Paul MJ**. Regulation of photosynthesis by phosphorus in Australian C<sub>3</sub> and C<sub>4</sub> grasses. ARC discovery grant, 2004-2006, \$210,000.

von Caemmerer S. Stomatal function in transgenic plants with altered guard cell metabolism. ARC Discovery Grant, 2004-2006, \$240,000.

Badger MR and Price GD with Dr TW Lane, SANDIA National Laboratories, USA. The structure and function of cyanobacterial carboxysome multi-protein complexes and their role in carbon sequestration in cyanobacteria. ARC Discovery Grant, 2004-2006. \$240,000.

Badger MR and Dr B Pogson, Faculty of Science, with J Whelan, S Smith, Prof. I Small and H Millar, University of Western Australia, and D Day, University of Sydney. The ARC Centre of Excellence in Plant Energy Biology. ARC Centres of Excellence Grant, 2005-2010. \$12,500,000.

Price GD (CI) and Woodger FJ (APD). "Active bicarbonate transporters from cyanobacteria: Physiological properties, genetic regulation and introduction into plants for crop improvement". ARC Discovery Grant, 2005-2007, \$310,000.

Price GD and Badger MR. "Nano-molecular structure and function of

protein mini-compartments known as carboxysomes". ARC Discovery Grant, 2007-2009, \$263,000.

Whitney SM. Practical strategies for engineering photosynthetic protein complexes, such as the CO<sub>2</sub>-fixing enzyme, Rubisco, with subunits encoded in different subcellular compartments. ARC Fellowship. 2004-2008, \$515,000.

Whitney SM. A novel strategy for engineering both subunits of the CO<sub>2</sub>-fixing enzyme, Rubisco, in higher plant chloroplasts. RSBS Biotechnology Research Centre grant. 2006-2007, \$118,000.

JM Whelan, S Smith, ID Small, AH Millar, University of Western Australia, DA Day, University of Sydney, MR Badger, BJ Pogson. ARC Centre of Excellence - In Plant Energy Biology CE0561495, 2006-2011, \$12,500,000.

## Photobioenergetics

Chow WS. Shanghai Institute of Plant Physiology and Ecology Travel Award, \$4,000.

Chow WS with Prof. J Barber, Department of Biological Sciences, Imperial College, London. Disorder as a novel determinant of photosynthetic structure and function. ARC Discovery Grant, 2006-2008, \$265,000.

Chow WS with Dr B Pogson, School of Biochemistry and Molecular Biology, and Prof. PM Mullineaux, Department of Biological Sciences, University of Essex. Elucidating the interactions between drought tolerance and photoprotection in plants. ARC Discovery Grant, 2006-2008. \$469,000.

Hillier W, Krausz ER, Wydrzynski T, Debus RJ, Boussac A and Sugiura M. The mechanism of water splitting in photosynthesis. ARC Discovery Grant, 2007-2009, \$290,000.

McConnel I. Travel award to attend Combio, Brisbane, \$570.

Williamson A. Travel award to attend an international photobiology conference in Japan, \$2500.

Wydrzynski T. Humbolt University Berlin, SFB 429 Travel Award, \$820.

Wydrzynski T. Molecular engineering of light-activated proteins. Max Planck Institute for Bioinorganic Chemistry, SFB 663 Grant, \$9,830.

Wydrzynski T with Prof. PL Dutton, Department of Biochemistry and Biophysics, University of Pennsylvania, USA. Design and synthesis of photoactive peptides based on photosynthetic reaction centres. ARC Discovery Grant, 2004-2006, \$214,780.

Wydrzynski T with Prof. GC Dismukes, Department of Chemistry, Princeton University, and Prof. VV Klimov, Institute for Basic Biological Problems, Russian Academy of Science. The origin of oxygen on earth - the innovation and evolution of photosynthetic water oxidation. Human Frontier Science Program grant, 2003-2006, total \$US1,050,000 (total ANU share \$AUD 537,500).

## Plant Cell Biology

Collings DA. Molecular and cellular characterisations of the cortical actin cytoskeleton in the plant *Arabidopsis thaliana*. ARC Discovery grant and Research Fellowship, 2002-2007, \$465,468.

Hardham AR. Biogenesis of secretory organelles and the function of adhesins secreted during the establishment of plant disease. ARC Discovery Grant, 2005-2007, \$280,000.

Hardham AR and W Shan. Gene silencing as a tool for functional analysis of *Phytophthora nicotianae* genes to evaluate fungicide mode of action in oomycetes. Bayer CropScience, 2005-2006, \$101,093.

John PCL and Perotti E. Embryo development and fertility. Consortium of Commercial Companies including; Limagrain,

Syngenta, Dupont/Pioneer and CIMMYT, \$330,000.

Jones DA. Testing transgenic cotton carrying the *I-2* resistance gene for resistance to *Fusarium* wilt. Cotton Research and Development Corporation, 2006-2008, \$165,118.

Jones DA. Travel support for the development of an international collaboration. CRC for Tropical Plant Protection, \$1,155.

Jones DA. Stipend and operating expenses for PhD student, Lim GTT. CRC for Tropical Plant Protection, 2006-2007, \$59,559.

Lim GTT. Attendance at the 8<sup>th</sup> International Congress of Plant Molecular Biology. CRC for Tropical Plant Protection, \$1,100.

Williamson RE. Discovery of new genes for plant cellulose biosynthesis and improved fibre production. Bayer CropScience, 2005-2006, \$120,000.

Williamson RE. The cellulose synthase complex of the *Arabidopsis* primary cell wall. ARC Discovery Grant, 2005-2007, \$235,000.

Williamson RE with Dr S Kalyanasundarem, Department of Engineering. Predicting cell wall mechanics from structure in a materials engineering approach to plant growth. ARC Discovery Grant, 2006-2008, \$229,000.

Williamson RE and Hocart CH. Tailoring cellulose properties by manipulating cellulose synthesis. ARC Linkage Grant in association with Bayer CropScience, 2006-2009, \$646,029.

## Visual Science

ARC Centre of Excellence in Vision Science. Trevor David Lamb, Jonathan Stone, Mandyam V. Srinivasan, Michael Robert Ibbotson, Mark Edwards, Andrew Charles James, Teddy Lee Maddess, Ian George Morgan, Jan Marie Provis, Krisztina Valter-Kocsi, Jochen Georg Ullrich Zeil, Shao-wu Zhang, Dap-Yi Yu, Stephen John

Cringle, David Ian Vaney, Bogdan Dreher, Silvia Bisti, and Peter Ian Corke, 2005–2010, \$11,000,000.

Barron AB, Maleszka R and Robinson GE. Neuromodulation of reward directed behaviour. NIH, National Institute on Drug Abuse, Cutting Edge Biological Research Award DA-019864, \$100,000.

Barron AB, with Prof. Mercer, Otago University, NZ. Identification and localisation of neurochemical receptors in the honey bee brain Human Frontiers Science Program Organisation, Short term fellowship, \$8,000.

Garratt MA, Lambert A, Fraser D and Srinivasan MV. Rapid prototyping of vision sensors for micro-UAV flight control and surveillance. Strategic Research Initiative, ADFA, UNSW \$75,000.

Hemmi JM, Zimmer UR and Zeil J. To flee or not to flee: surviving on incomplete information. ARC Discovery Grant, 2005–2007, \$270,000.

Ibbotson MR, Dreher B, Wang C, Solomon S and James AJ. Integration of information by cells in mammalian visual cortices: role of feedforward and feedback inputs. NHMRC Project Grant, 2006–2009, \$280,000.

Jarvis R, Kotagiri R, Venkatesh S and Srinivasan MV. Perceptive and Intelligent Machines. ARC Centre Grant, 2003–2007, Srinivasan component, \$446,470

Maddess T. Royalty income to RSBS, \$96,694.

Maddess T and James AC. NHMRC Development Grant 410201, \$113,487.

Maddess T and James AC. Large Commercial Ready Grant with Seeing Machines, \$4,200,000.

Peters RA and Zeil J. Moving to be seen: a comprehensive analysis of movement-based signal design. ARC Discovery Grant, 2005–2007, \$250,000.

Srinivasan MV, Ibbotson M and Chahl JS. Biologically inspired strategies, algorithms and hardware for visual guidance of autonomous helicopters. US Army Research Office Grant, 2003–2007, \$545,000.

Srinivasan MV. Inaugural Australian Federation Fellowship award, 2002–2006, \$1,250,000.

Srinivasan MV, Reinhard J, Claudianos C, Mathesius U, Behm C, Warr C, Trowell S and Rickards R. Olfactory pattern recognition in insects and nematodes, CSIRO Flagship Collaborative Research Cluster Grant, \$2,076,950.

Srinivasan MV and Ibbotson MR. How do bees orchestrate smooth landings? ARC Discovery Grant, 2005–2007, \$290,000.

Srinivasan MV. Biorobotics Initiative. Australian National University and ACT Government, 2005–2007, \$360,000.

Srinivasan MV. Visually Guided Terrain Following and Landing in UAVs: Reflective Surfaces for Optimal Measurement of Optic Flow. US Office of Naval Research Grant 2005–2006, \$160,000.

Srinivasan MV, Reinhard J and Claudianos C. Principles of Olfactory Processing in Insects. CSIRO Flagship Cluster Grant, 2006–2008, \$875,000.

Srinivasan MV. Target Tracking and Interception by Aggressive Honeybees. US Air Force Office of Scientific Research Grant, 2007–2009, \$250,000.

Stange G. The temporal resolution of flight attitude control in dragonflies and locusts: lessons for the design of flapping-wing MAVs. Grant no FA4869–06–1–0059, Asian Office of Aerospace Research and Development, \$US49,000.

Venkatesh S, West GA, Srinivasan MV, Tan T and Lazarescu MM. Surveillance Systems for the Transport Industry. ARC Linkage Grant, Srinivasan component, 2005–2008, \$160,000.

Walcott B. NIH subcontract with University at Stony Brook.

Mechanisms of fluid flow in lacrimal glands, \$25,000.

Wiles J *et al.* Navigating through real and conceptual spaces. ARC/NHMRC Thinking Systems Programme, 2006–2010, Srinivasan component, \$132,000.

Zeil J and Ball M with Dr K Bryceson, Assoc. Prof. S Collin, Dr N Duke, Prof. O Hoegh-Guldberg, Assoc. Prof. J Marshall, Prof. J Pettigrew, Dr SR Phinn and Prof. D Vaney. Administering Organisation: The University of Queensland. Vision and remote sensing: using nature's technology to examine the health of The Great Barrier Reef and Moreton Bay. ARC Linkage Grant, 2002–2006, \$887,000.

Zhang SW, Srinivasan MV and Sato K. Higher cognitive functions emerging from a small brain. ARC Discovery Grant, 2004–2006, \$585,000.

Zhang SW, Srinivasan MV and Ribi W. Learning and memory in the honeybee: task-dependent brain development. International Linkage, 2005–2006, \$7,000.

Zhang SW, Srinivasan MV and Ibbotson M. Visual cognition in honeybee navigation. 2006, \$50,000.

## Electron Microscopy Unit

External Use of ANUEMU Facilities

GeoScience Australia \$13874  
CSIRO \$8492  
Australian Universities \$1055  
Overseas Universities \$2500  
Commercial \$3700  
Sales of value-added consumables \$8890.  
Miscellaneous: \$514  
Total \$38,511 for external use.

Stone J. Clive and Vera Ramaciotti Foundation equipment grant towards Advanced Light Microscopy, \$25,000.