

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

Provis JM, Madigan MC and Conway RM. Microarray analysis of gene expression in developing human retina. Ophthalmic Research Institute of Australia, \$30,000.

Stone J and Prof. D-Y Yu. Oxygen metabolism and therapy in the P23H rat model of photoreceptor degeneration. Retina Australia, \$30,000.

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.

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.

Tsend-Ayush E and Gruetzner F. Small is beautiful: Did gene-rich regions of mammal chromosomes evolve from microchromosomes? ARC, 2004-

2006, \$345,000.

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

Environmental Biology

Evans JR. Co-operative Research Centre for Greenhouse Accounting Interactions with elevated CO₂, \$125,000.

Farquhar GD. Gary Comer Mentor Award (Abrupt Climate Change). 2004-2007, \$US330,000.

Farquhar GD, Andrews J, Stuart-Williams H, Kane H. Using the fractionation of hydrogen and carbon isotopes to analyse the mechanism of the primary processes of photosynthesis. ARC Discovery Grant, 2003-2005, \$360,000.

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.

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

Kirschbaum MUF. Modelling carbon and nitrogen dynamics following land-use change. CRC for Greenhouse Accounting, \$76,000.

Masle J. Genetic controls of root impedance and drought signalling in wheat. Grains Research and Development Corporation Gene Program, 2005-2008, \$760,000.

Masle J. Gene expression induced by root mechanical impedance in wheat. Grains Research and Development Corporation Functional Genomic Program, 2000-

2005. \$1,200,000.

Masle J and Farquhar GD. Genetic manipulation of transpiration efficiency in plants. Biogemma Grant, 2003-2005. \$188,000.

Roderick ML and Farquhar GD. Agro-ecological implications of change to the terrestrial water balance. 2005. \$50,000.

Ecosystem Dynamics

Ball MC. Interactive effects of elevated CO₂ and temperature stress on carbon sequestration. CRC for Greenhouse Accounting, \$50,000.

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.

Barnes B, Roderick ML. The development of a mathematical framework for scaling of small scale processes up to larger spatial (e.g. continental) and temporal scales for carbon accounting. CRC for Greenhouse Accounting, \$45,000.

Davies ID. Project planning workshop for the Public Interest in Energy Research project. Santa Barbara California, USA, \$3,500.

Davies ID. Vulnerability of Ecosystem Services to Land Use Change in Traditional Agricultural Landscapes (European VISTA project). Grenoble, France, \$5000.

Davies ID. Long-term movement of Fynbos and succulent Karoo biomes of Southern Africa. Kirstenbosch Research Centre, Cape Town, \$4000.

Davies ID. Fire model inter-comparison study, Waterton Alberta, Canada, \$2000.

Donohue RJ. Attendance at the Sir Mark Oliphant Conference on Thresholds and Pattern Dynamics in Climate Driven Systems, Perth,

University of Western Australia. ARC ESS Network – Terrestrial Node, \$600.

Marshall JN, Hoegh-Guldberg O, Dennison WC, Phinn SR, Pettigrew JD, DI Vaney, Collin SP, Bryceson K, Zeil J and Ball MC. 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, \$626,000.

Pitman A, plus 50 co-authors including ML Roderick, Australian Climate System Network. ARC Network Grant, 2004-2008, \$1,950,000.

Roderick ML. Participation in Sir Mark Oliphant Conference, Perth, University of Western Australia, \$2500.

Roderick ML with GD Farquhar. Agro-ecological implications of change to the terrestrial water balance. Land & Water Australia, \$50,000.

Roxburgh SH. Integrative Modelling and Decision Support Tools. CRC for Greenhouse Accounting, \$123,900.

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

Westoby M, plus 50 co-authors including MC Ball, ML Roderick, 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

Ball EE with DJ Miller, James Cook University. ARC Discovery Grant, Differential expression and functional analysis of genes controlling metamorphosis and early neurogenesis of a model lower animal, the coral *Acropora* \$65,000 for 2005 (\$32,500 to ANU).

Campbell HD. NH&MRC Project Grant, with Child Health Research Institute, Adelaide, \$161,750 pa.

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

Saint R, 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 pa.

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 pa.

Molecular Plant Physiology

Andrews TJ with Dr J Gready, John Curtin School of Medical Research, Prof. G Otting, Research School of Chemistry and the Rio Tinto Company. Why is the photosynthetic CO₂-fixing enzyme, Rubisco, so inefficient? Dissection of the catalytic chemistry by computational simulation and experimental testing. ARC Linkage Project, 2003-2005, \$660,000.

Andrews TJ. Can efficient algal variants of the photosynthetic CO₂-fixing enzyme, Rubisco, be folded and assembled in functional forms in higher-plant plastids? ARC Discovery

Project, 2003-2005. \$495,000.

Badger MR. Identification of transcription factor genes involved in the regulation of aspects of photosynthetic capacity in plants. ARC Discovery Grant, 2003-2005. \$285,000.

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. Identifying genes controlling the regulatory and metabolic interactions between the energy organelles of the leaf. ARC Discovery Grant, 2006-2008, \$375,000.

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

Badger MR, Jones DA, Williamson RE, Evans JR, von Caemmerer S, Ball MC, Masle J, and Farquhar GD, with Pogson BJ, Mathesius U, Osmond CB, Nicotra A and Linde C (Faculty of Science) and Furbank RT, Ayliffe M, Bonnett DG, Condon T, White RG, Munns RE and Larkin PJ (CSIRO Plant Industry). Plant Phenomics Imaging and Analysis Facility. ARC Linkage Infrastructure Equipment Grant (LIEF), \$553,000.

Farquhar GD, Andrews TJ, Stuart-Williams H and Kane HJ. Using the fractionation of hydrogen and carbon isotopes to analyse the mechanisms of the primary processes of photosynthesis. ARC Discovery Project, 2003-2005. \$360,000.

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.

Prof. JP Conroy, University of Western Sydney, von Caemmerer S and Paul MJ. Regulation of photosynthesis by phosphorus in Australian C₃ and C₄ 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.

Photobioenergetics

Anderson JM. Newnham College, University of Cambridge, \$3000.

Chow WS with Prof. J Barber, Department of Biological Sciences, Imperial College, London. ARC Discovery Grant, 2006–2008, \$265,000.

Chow WS with Dr B Pogson, School of Biochemistry and Molecular Biology. Mechanisms of photoprotection in plants—a genomics and photophysical approach. ARC Discovery Grant, 2003–2005, \$330,000.

Chow WS with Dr B Pogson & Dr J Rossel, School of Biochemistry and Molecular Biology, and Prof. PM Mullineaux, Department of Biological Sciences, University of Essex. ARC Discovery Grant, 2006–2008. \$469,000.

Fernández-Velasco J and Chow WS. Biotechnology Research Centre, 2004–2005, \$98,000.

Hillier W and Wydrzynski T. Protein-Based Fourier Transform Infrared (FTIR) Spectroscopy. ANU – major equipment funding 2005, \$131,000.

Razeghifard R and 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, \$210,000.

Wallace B. Protein engineering to design minimalist models of

the redox proteins involved in photosynthetic electron transfer reactions. Biotechnology Research Centre, 2004–2005, \$30,000.

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, \$US1,050,000.

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. *Phytophthora* pathogenicity genes. CRC for Tropical Plant Protection, 2001–2005, \$458,150.

Hardham AR. Inhibition of plant pathogen adhesion and virulence by single chain recombinant antibodies. Hermon Slade Foundation, 2003–2005, \$57,366.

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. Embryo development and fertility. Consortium of Commercial Companies including; Limagrain, Syngenta and Dupont/Pioneer. 2002–2005, \$495,000; ARC Linkage grant, 2002–2005, \$211,194; CIMMYT, 2002–2005, \$475,000.

Jones DA and Lim G. Isolation of the tomato *I-3* gene for resistance to *Fusarium oxysporum* pv. *lycopersici*. CRC for Tropical Plant Protection,

2002–2005, \$126,000.

Jones DA and Wang G. Visiting Fellowship. CRC for Tropical Plant Protection, 2004–2005, \$5,000.

Paeper C. *Phytophthora* molecular genetics network. Travel support, 2005, \$2,900.

Williamson RE, Collings DA and Wasteney GO. The shape of plants; discovering factors that control morphology by organizing the cytoskeleton. ARC Discovery Grant, 2002–2005, \$411,000.

Williamson RE. *CesA* genes of *Arabidopsis*. ARC Discovery Grant, 2002–2005, \$180,000.

Williamson RE. Discovery of new genes for plant cellulose biosynthesis. ARC Linkage Project with Bayer Cropscience, 2002–2005, \$1,082,000.

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

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 Zeil**, **Shao-wu Zhang**, Dao-Yi Yu, Stephen John Cringle, David Ian Vaney, Bogdan Dreher, Silvia Bisti, Peter Ian Corke, 2005–2010. \$11,000,000.

Barron A. Identification and localisation of neurochemical receptors in the honey bee microbrain. Humans Frontiers Science Program Short Term Fellowship, \$10,000.

Barron A, Maleszka R and Robinson GE. Neuromodulation of reward director behaviour. NIH National Institute on Drug Abuse, Cutting Edge Biological Research Award, 2006–2007, \$200,000.

Garrat 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 and Clifford CWG. Using contextual effects to test theories of coding in visual cortex. NHMRC, \$190,000.

Ibbotson MR. Yerkes Regional Primate Center, Atlanta. Direct support of collaborative research into the responses of MST neurons in the macaque visual cortex, \$60,000.

Ibbotson MR, Srinivasan MV and Chahl J. Biologically inspired strategies, algorithms and hardware for visual guidance of autonomous helicopters. Project A: Investigation of visually guided landing in honeybees, \$241,674.

Jarvis R, Kotagiri R, Venkatesh S and Srinivasan MV. Perceptive and Intelligent Machines. ARC Centre Grant, 2003-2007, \$5.625 Million, (ANU share: \$ 446,470).

Maleszka R with B Oldryod. The genetics of social regulation of reproduction in honey bees. ARC Discovery Grant, 2003-2005, \$560,000.

Maleszka R. Biotechnology Research Centre, \$80,000.

Maddess T. Royalties income to RSBS, \$89,902.

Morgan IG with Mitchell P, Smith W and Rose K. The Sydney Myopia Study: Prevalence and risk factors for myopia and other eye conditions in school-age children. NH&MRC, 2003-2005, \$564,000.

Morgan IG with Megaw P. Molecular analysis of eye growth control. ACT Health, \$30,000.

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, 2003-2006, \$575,000.

Srinivasan MV. Inaugural Australian Federation Fellowship Award, 2002-2006, \$1.25M.

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

Srinivasan MV, Ibbotson MR and Schröter U. ARC, Neural mechanisms underlying visual control of flight in honeybees, \$72,000.

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, \$887000.

Electron Microscopy Unit

External Use of ANUEMU facilities:

Workshops \$1350
GeoScience Australia \$9224
Australian Universities \$1120
Overseas Universities \$2227
Commercial Under \$4,000: \$6,350
Government under \$4,000 \$3,925
Miscellaneous under \$4,000: \$3,624

Totalling \$27,820 for external use.

Research Grants

Stange G, Chahl JS, Stowe S, Ibbotson M. AFOSR International Research Initiative Grant. A Biomimetic Algorithm for Flight Stabilization in Airborne Vehicles, Based on Dragonfly Ocellar Vision. 2002-2005, \$420,000.

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