

Annual Report
2010

ASP Network for Parasitology



Introduction

2010 WAS AN EXTRAORDINARILY BUSY YEAR FOR THE NETWORK FOR PARASITOLOGY.

This was the first year of a two year commitment by the Australian Society for Parasitology Inc. (ASP) to continue to fund the Network to allow the successful initiatives established over the previous 5 years – most particularly the Research Exchange, Training and Travel Scheme and the Outreach Activities – to continue. Consequently, there were many new administrative arrangements to be made, a new contract between the ASP and the University of Technology, Sydney to be agreed and implemented, and a suite of strategic decisions to be made (as part of the ASP's wider Strategic Planning). Add to this the search for additional funding to make the Network more sustainable longer term plus our involvement in ICOPA XII, and it's easy to see why 2010 was so busy.

Research from previous Researcher Exchange, Training and Travel Awards – more than 70% of which have gone directly to young researchers – continued to bear fruit in 2010 with 406 quality research papers being published in internationally recognised, peer-reviewed journals. More broadly, parasitology research in Australia continued to flourish in 2010, increasing our publication rate by over 20%, with many millions of dollars worth of grants awarded, and some very high honours coming the way of several Network Participants.

2010 saw the continuation of the Network's Mentoring Scheme, whereby early career researchers are given the opportunity to arrange mentoring partnerships with senior parasitology researchers to discuss their personal career aspirations and development and seek advice on annual and longer-term goals and career planning. Several young parasitologists benefitted from this scheme in 2010.

The Network Outreach activities were again very strong, in conjunction with ICOPA XII; *Parasites in Focus* was on display, first at GTAC, where a series of school workshops were run, receiving outstanding feedback, and then at ICOPA XII itself. A series of other public events including a Breakfast event held for 100 business leaders in Melbourne (BioMelbourne Network) where a number of talks were presented on parasitology and biotechnology by Dr



Professor Nick Smith, Convenor,
ASP Network for Parasitology.

Debra Woods (Pfizer Animal Health), Professor Simon Croft (London School of Hygiene and Tropical Diseases) and Dr Wayne Best (Epichem), within the theme The road less travelled: Commercialising niche and neglected diseases and an evening event at the Melbourne Recital Centre "Melbourne Conversations: Climate Change, New Diseases and Parasites - What will it mean for Melbourne?" on Tuesday 17 August 2010. The Melbourne Conversations event was hosted by Dr Graham Mitchell (Chief Scientist, Victorian Government) and featured expert panellists Professor Anne Kelso AO (Director, WHO Collaborating Centre for Reference and Research on Influenza, Melbourne), Professor Kevin D Lafferty (Marine Ecologist, University of California, Santa Barbara, USA), Sir Gustav Nossal AC CBE (Professor Emeritus, The University of Melbourne), Dr Haylee Weaver (Australian National University), and Ms Natasha Mitchell (Science Journalist and Broadcaster, ABC Radio National) who was the moderator. This event was attended by 250 people. Media attention was extraordinary throughout ICOPA XII, with 16 articles, interviews, and televised stories resulting. This was a wonderful showcase for Australian Parasitology.

Parasites in Focus continued to travel the country, being

Introduction cont.

exhibited in Wollongong, Launceston, Devonport, Melbourne and Wagga Wagga in 2010. The exhibit now boasts four totally interactive exhibits as well as the 26 spectacular photos and images, which were featured in *Cosmos* in 2009.

The success of the Network is due to the energy, time and commitment of every participant but several deserve special thanks for their efforts in 2010. First, the Researcher Exchange, Training and Travel Assessment Committee had an exceptionally hard job in 2010, with a huge number of quality applications to consider and limited funding to dispense. My thanks to Una Ryan (Chair), Andrew Thompson, Geoff McFadden, Malcolm Jones, Jake Baum, Rowena Martin, Kate Hutson, Brendan McMorran and Deb Holt. Second, the Outreach activities held in conjunction with ICOPA XII were exceptional; my thanks to Graham Mitchell, Anne Kelso, Gus Nossal, Natasha Mitchell (ABC), Haylee Weaver, Ian Beveridge, Marshall Lightowlers, David Piedrafito and, most particularly, Tony Chiovitti (GTAC) for their energy, enthusiasm and input. Finally, special thanks to Lisa Jones, who coordinated the Outreach activities at ICOPA XII and throughout the year, published the Network Newsletter and generally ensured the Network operated at the very highest levels of professionalism. Her efforts in 2010 were exceptional.



Professor Nick Smith

Convenor, ASP Network for Parasitology



Cover

The image on the cover of this Annual Report shows Associate Professor Catherine Hill of Purdue University with an engorged deer tick sitting on her fingertip. Dr Hill was a speaker at the 2007 Network conference in Canberra. Image used with the permission of Purdue University.

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Summary of Goals and Objectives

A SUMMARY OF THE OVERALL GOALS AND OBJECTIVES, PROGRAMS AND RESEARCH PRIORITIES AND ANY CHANGES TO THESE THAT MAY HAVE OCCURRED DURING THE PAST YEAR

Objectives

The mission of the Network for Parasitology is to:

- focus and enhance Australia's fundamental, strategic and applied parasitology research capabilities to understand parasitism, parasite biology and parasitic disease; and
- to use that understanding to discover and develop sustainable control strategies to improve and maintain the health and well-being of humans and animals.

The Network aims to:

- organize, support and raise funds for conferences, workshops and meetings for scientists, industry representatives, end-users (e.g. farmers, veterinarians, wildlife experts), government representatives and community groups, including participation by international experts;
- foster and finance exchange of staff between national and international research institutions to maximise access to key infrastructure, equipment, expertise and supervision and to encourage the growth of new collaborative relationships;
- provide mentoring, training and grant writing support for young investigators.

Contribution to the National Research Priorities

Participants in the Network for Parasitology contribute to all four of Australia's stated research priorities (see publication lists in the appendices to this report):

[1] AN ENVIRONMENTALLY SUSTAINABLE AUSTRALIA.

By assessing the susceptibility to, and monitoring the prevalence of, parasitic disease in wildlife the Network will generate new information that will assist in the management of terrestrial and marine ecosystems. The specific objectives of the Network are to enhance and focus Australia's parasitology research effort in order to:

- assess parasite diversity in Australian fauna; and
- ensure the sustainability of wildlife and ecosystem health.

[2] PROMOTING AND MAINTAINING GOOD HEALTH.

The young and the elderly are the most susceptible to parasitic diseases, both in the developed and the developing world. To address this, the Network will focus on the development of new vaccines and treatments for local and global populations and the creation of new technologies to monitor and prevent contamination of waterways with infectious stages of zoonotic parasites (a key source of disease). The specific objectives of the Network are to enhance and focus Australia's parasitology research effort to:

- better understand host-parasite relationships; and
- discover and develop sustainable parasite control strategies.

[3] FRONTIER TECHNOLOGIES.

A central goal of the Network is the development of new tools and information resources in the battle against parasitic diseases. The specific objectives of the Network are to enhance and focus Australia's parasitology research effort to:

- discover and develop molecular and bioinformatics tools for studying parasite biology; and
- discover and develop anti-parasite vaccines and therapies.

[4] SAFEGUARDING AUSTRALIA.

Surveillance of our border areas and neighbours for exotic,

Summary cont.

emerging and re-emerging parasitic diseases, as well as monitoring of endemic parasites is a key priority. The specific objectives of the Network are to enhance and focus Australia's parasitology research effort to:

- better understand the epidemiology and transmission dynamics of parasites; and
- discover and develop better surveillance systems.

Governance

The Network Convenor and Communications and Strategic Planning Coordinator report directly to the ASP Council and are responsible for implementing the strategies and initiatives agreed with Council. The Network has a specific committee for assessing Researcher Exchange, Training and Travel Awards:

Prof. Una Ryan (Chair; Murdoch University); Lisa Jones (Communications and Strategic Planning Coordinator; Executive Officer); Prof. Nick Smith (Convenor, James Cook University); Prof. Geoff McFadden (University of Melbourne); Prof. Andrew Thompson (Murdoch University), Dr Rowena Martin (Australian National University), Dr Malcolm Jones (Queensland Institute of Medical Research and The University of Queensland), Dr Brendan McMorran (Menzies Institute, Tasmania), Dr Kate Hutson (James Cook University), Dr Jake Baum (Walter and Eliza Hall Institute of Medical Research) and Dr Deborah Holt (Menzies School, Darwin).

Below: Melbourne Convention Centre, venue for ICOPA XII



Progress on Initiatives

Website and Newsletter

The ASP website is administered by Dr Jason Mulvenna with assistance from Lisa Jones to manage content and the address is www.parasite.org.au. The ASP Annual Conference website is www.parasite.org.au/arcnet and administered by Lisa Jones. The ASP Newsletter was published four times in 2010 keeping ASP Members up-to-date on developments and opportunities afforded by the ASP, the ASP Network and achievements of ASP members. Newsletters can be downloaded from the ASP website

Scientific Conferences and Workshops

The annual meeting of the Australian Society for Parasitology Inc. was incorporated into the XIIth International Congress of Parasitology (ICOPA), held at the Melbourne Convention Centre, 15-20 August 2010 which attracted 1734 International and Australian delegates. The theme of the congress was Understanding the global impact of parasites-from genomes to function and disease and an exciting scientific program was developed that provided a dynamic platform for the vibrant and fruitful exchange of new findings, research questions and state-of-the-art techniques. A diversity of themes was covered and 1,987 abstracts were received spanning an enormous range of topics within the parasitology field.

Delegates at ICOPA XII



Researcher Exchange, Training and Travel Awards

In 2010, the ASP Network for Parasitology funded 15 new Researcher Exchange, Training and Travel Awards.

JD Smyth Travel Award winners

Ashlie Hartigan, The University of Sydney, for a Researcher Exchange to The Academy of Sciences, Institute of Parasitology in Ceske Budejovice, Czech Republic for her research into the lifecycles and biology of myxozoan parasites that threaten frog species.

Rowan Ikin, (UTS) for a Researcher Exchange visit to Dr Mike Grigg, Chief of the Molecular Parasitology Unit and the National Institute of Allergy and Infectious Diseases at the National Institutes of Health in Bethesda, Maryland, USA for research to take advantage of his expertise, technologies and facilities to yield important, fundamental insight into how helminths regulate inflammatory responses in the intestine.

Simone Reynolds, Queensland Institute of Medical Research, for a Researcher Exchange to visit Anna Blom Research Group, Lund University, Department of Laboratory Medicine, Malmö, Sweden and International Summer School on Pathogen-Host Interplay hosted by the Centre for Infection Biology & Immunity, at the Humboldt University, Berlin, Germany.

Network Researcher Exchange, Training and Travel Award winners

Jan Slapeta, The University of Sydney, for travel by Dr. Giselle Walker, University of Cambridge, UK to The University of Sydney, to study the ultrastructure of the Chromera, a model for apicomplexan organelles.

Hamish McWilliam, Monash University, for a Researcher Exchange to Don McManus's laboratory at the Queensland Institute of Medical Research to identify stage-specific proteins critical to the survival of *Schistosoma japonicum*.

Progress on Initiatives cont.

Natalie Spillman, Australian National University, for a Researcher Exchange to Alex Maier's laboratory at the Department of Biochemistry at La Trobe University, Melbourne for research to determine the sub-cellular localisation of important transport proteins of *Plasmodium*.

Caroline Lin Lin Chua, (University of Melbourne) for a Researcher Exchange to Papua New Guinea Institute of Medical Research (PNGIMR), Madang, Papua New Guinea from 23 March 2010 – 1 November 2010 for malaria research and training with the microscopy unit at PNGIMR, Madang.

Rachael McGeorge, (QIMR) for a Researcher Exchange with Prof Ben Dunn at the University of Florida, USA to generate recombinant plasmepsin IX and to begin the process of obtaining a crystal structure for this enzyme.

Nicole Kirchhoff, (Australian Maritime College, University of Tasmania) for a Researcher Exchange to travel to the USA to visit Dr Barbara Block at the Tuna Research and Conservation Centre in Monterey Bay, California to study blood fluke *Cardicola* forestry in southern bluefin tuna.

Catherine Gordon, (QIMR) for a Researcher Exchange for workshops and fieldwork at the National Institute of Parasitic Diseases, Chinese Centre for Disease Control and Prevention, Shanghai, China and the Research Institute of Tropical Medicine, Manila, Philippines for schistosomiasis research.

Joel Barrett, (UTS) to attend the Parasitology and Tropical Medicine Masterclass, Melbourne, August 2010 to gain practical experience in the preparation of stained smears for the diagnosis of gastrointestinal parasites.

Christopher Peatey, (QIMR) for a Researcher Exchange to La Trobe CoE for Coherent XRay Science to help the characterisation of two proteins for his malaria research.

Rosa Marchetti, Australian National University for Researcher Exchanges to La Trobe University, Melbourne and University of Technology, Sydney.

Lesley Warner, South Australian Museum for a Researcher Exchange to the Natural History Museum, London, UK to

study international collections of Australian Acanthocephala from fish, to network with curators of helminths in European Museums, and to mentor a young Australian scientist.

Crystal Kelehear, The University of Sydney for a Researcher Exchange to the Mendonca Lab at Auburn University, Alabama, USA, to learn new techniques from a leading lab, in the fields of amphibian immunology/parasitology.



Yerkera image courtesy of Malcolm Jones, Queensland Institute of Medical Research and the University of Queensland

Progress on Initiatives cont.

CASE STUDY 1:



Natalie Spillman (pictured above) is a PhD Student from the Research School of Biology at The Australian National University. Natalie won a Network Travel Award for a 3- week Researcher Exchange to Dr Alex Maier's laboratory at the Department of Biochemistry, La Trobe University, Melbourne in May 2010 for her Plasmodium research and talks to Lisa Jones about her Exchange.

Natalie, tell us about your research.

"I'm interested in the 48 hour red blood cell stage of the malaria lifecycle and one of our interests in the Kirk lab is trying to understand the basic physiology of the parasite. The major focus of my research is the regulation of sodium in the malaria parasite, *Plasmodium falciparum*. By the time it matures there is a high concentration of sodium outside of the parasite. I'm looking at what transporters are involved in maintaining low sodium levels within the parasite. We think the way that *Plasmodium* regulates sodium is different to how human cells do it, and if it is using a different transporter it could be a potential new drug target," Natalie said.

"One transporter that may be a candidate for sodium efflux is the sodium/hydrogen exchanger or PfNHE. Although I am interested in the physiological role of PfNHE, the recent finding that it is linked to resistance to the antimalarial drug, quinine, has made sodium regulation an even more exciting and topical subject," Natalie said.

What did you do during your Researcher Exchange?

"My Researcher Exchange was part of a larger collaboration between the Tilley and Maier labs at La Trobe, and the Saliba and Kirk labs at The Australian National University. One aspect of the collaboration is to look at the role of PfNHE in the malaria parasite. We are using several approaches to investigate the function of PfNHE. First, if I can work out the subcellular localisation of PfNHE, it will complement the functional characteristics I have determined using a sodium-sensitive, fluorescent dye. If that works out, I can examine whether overexpression or knockdown causes a shift in sensitivity to quinine or affects sodium regulation by the parasite," Natalie said.

"Alex Maier has expertise in cloning and I wanted to get experience in molecular techniques. I worked in Alex's lab at the Department of Biochemistry at La Trobe University for 3 weeks in May/June this year. During this time I started constructing vectors to transfect parasites for my experiments," Natalie said.

"I am also interested in ion regulation in the invasive parasite stage, the merozoite, and last year on a previous Network Researcher Exchange I worked with Nick Klonis, also at La Trobe to learn the technique of flow cytometry. This technique enables me to specifically study small groups of cells within a whole population. Isolating pure preparations of merozoites is tricky, but using flow cytometry I can just focus on the population of small merozoites and ignore other contaminating cell types," Natalie said.

Natalie, what were the outcomes of your Network Travel Award?

"During the exchange, I learnt many molecular biology techniques used in cloning and transfection. I made some initial progress towards all four of my research goals and will now be able to follow this up at ANU. Most importantly, I learnt some troubleshooting skills to use, which will undoubtedly increase my chances of success to clone a tricky AT-rich 6kb gene!"

Natalie, what did you enjoy about your Network Travel Award?

Progress on Initiatives cont.

"I really enjoyed the opportunity to talk to other group leaders and postdocs at La Trobe, both about my research and also regarding careers advice and my future in Parasitology," Natalie said.

"And I gave a talk about "Sodium regulation and glycolysis in the malaria parasite" to members of the La Trobe Parasitology community. I presented some of my PhD work so far, including new, previously un-presented work, which elicited much discussion. I hope to follow up on several points discussed," Natalie said.

"I am now in the third year of my PhD – I can see a story forming and a body of research is coming together and the Network Researcher Exchange has helped this process," Natalie said.

"I encourage other students to incorporate travel to another laboratory into their studies; the experience gives you exposure to different techniques and ways of approaching a problem. Visiting another lab also revived some of my motivation to persevere with my experiments and I was inspired upon my return home. I have kept in touch with both Nick and Alex at La Trobe. We discuss both positive results and problems I'm encountering – they are both enthusiastic and it is good to talk to others about your research career."

OzEMalaR Researcher Exchange, Training and Travel Award winners

In 2010, the Australia-European Malaria Research Network, OzEMalaR, funded 9 new Researcher Exchange, Training and Travel Awards.

Melanie Rug, (Walter and Eliza Hall Institute) for her Researcher Exchange collaboration with Drs. Marek Cyrklaff and Freddy Frischknecht at University of Heidelberg.

Gaetan Burgio, (Menzies Research Institute Tasmania) for a Researcher Exchange to visit the Malaria biology and genetics unit, (Pr Robert Menard), Pasteur Institute Paris: from the 8th to the 19th of November 2010; to attend a Bioinformatic and genomics of *Plasmodium falciparum* workshop: 22-23 November 2010, Paris Museum National d'Histoire Naturelle; and visit Division of Parasitology (Jean Langhorne's group), National Institute for Medical Research,

London, UK.

Fiona Angrisano, (Walter and Eliza Hall Institute) for a Researcher Exchange for training and research at Imperial College, London with Prof Robert Sinden.

Justin Boddey, (Walter & Eliza Hall Institute of Medical Research) for a Researcher Exchange to undertake a short research project in Dr. Maria Mota's laboratory Institute of Molecular Medicine, Lisbon, Portugal.

Julia Cutts, (Walter and Eliza Hall Institute) for her Researcher Exchange to attend Malaria Experimental Genetics Training Course (Wellcome Trust), and grant writing retreat at the Laboratory of Prof. Andy Waters, Wellcome Trust Centre for Molecular Parasitology.

Sarah Charnaud, (The Burnet Institute) for a Researcher Exchange to visit the Lingelbach Laboratory, Philipps Universität, Marburg, Germany.

Philippe Boeuf, (University of Melbourne) for a Researcher Exchange to visit the Centre for Medical Parasitology, Copenhagen, Denmark.

Ben Woodcroft, (University of Melbourne) for a Researcher Exchange to visit the Voss group, Swiss Tropical and Public Health Institute.

Ellen Nisbet, (University of South Australia) for a Researcher Exchange to attend the 2011 Malaria Experimental Genetics Advanced Course run by the Wellcome Trust in Hinxton.

CASE STUDY 2:

Justin Boddey is at the Walter and Eliza Hall Institute of Medical Research (WEHI) and his research focuses predominantly on *Plasmodium falciparum*, the causative agent of the most severe form of malaria in humans.

Malaria causes 1 million deaths per year and much suffering for people living in tropical and subtropical regions of the world. Justin's main aim is to understand how this parasite survives in humans and the mechanisms it uses to commandeer host cells to evade immune responses, as this knowledge may help identify new treatments or a vaccine. These are urgently needed. For the past 5 years Justin has studied how the malaria parasite renovates the red blood cell so it can survive within it. He spoke to Lisa Jones about

Progress on Initiatives cont.

this.

"The parasite makes proteins that directly modify the infected red blood cell. These proteins have an export signature, a five amino acid "barcode", that the parasite recognises and uses to sort the proteins into the red blood cell," said Justin. "I've been looking at this export signal at a molecular level and asking, why are the five amino acids there in all of these proteins – what do they do? It turns out the "barcode" is a proteolytic cleavage site that is recognised by a parasite enzyme that cuts it in half. This reveals a stub that directs the proteins into an export pathway and, if you block the cleavage, you block the export. We are therefore trying to make new compounds that block the cleaving enzyme, called Plasmepsin V, and jam up the export pathway so the parasite dies," he said.



Justin (pictured above) was awarded an OzeMalaR Travel Award in 2010 to investigate if the same export pathway is used during the liver-stage of malaria. He travelled to Lisbon for a researcher exchange with Dr. Maria Mota at the Institute of Molecular Medicine, Lisbon. He reports on his experiences below.

"My researcher exchange in Maria's laboratory was incredibly rewarding. From the moment I arrived I felt very welcome and was quickly aware that every resource had been made available to me. This included working closely with a number of talented post-docs that would give of their own time to teach me. This made an enormous impression on me and I knew I was in the right place to learn about the liver-stages of malaria," Justin said.

"The lab really has a culture of excellence and I was immersed in it every day. No amount of literature can substitute for that, or convey the volume of information in

the time frame. I learned so much and it will really help us to continue this research program back in Melbourne, at WEHI," Justin said.

"We wanted to answer some basic but fundamentally important questions about protein export during the liver-stage. The preliminary data confirms an earlier report that the export pathway between erythrocytes and hepatocytes looks the same. The previous study looked at the circumsporozoite protein whereas we have looked at members of the export pathway itself. Naturally, more evidence is required to prove it conclusively, but if it pans out, it's incredibly exciting. It will have important implications for how hepatocytes are commandeered and how we might stop that from happening. We also screened mutant parasites for their ability to develop through the liver-stage in mice in an attempt to identify proteins that are essential for this process. This work identified some candidate proteins, which is also very exciting. In the future we want to immunise with the mutants," said Justin.

"Sometimes weak parasites can be detected in the liver and cleared by the immune system, which primes the host for future infections. This would destroy the parasites before they could cause the clinical blood-stage of disease," he said.

Justin also attended an EVIMalaR Cluster meeting that was held within the Institute in Lisbon. "This forum covered the latest unpublished research in malaria and provided the opportunity to meet a variety of scientists from around Europe, some of whom I had never previously met. It was a great opportunity to discuss future collaborations," Justin said.

"The work in Lisbon was a large collaboration between a number of very generous laboratories and I am indebted to each of them for their generosity. Three months is not a long time, and careful research moves slowly, so much of this work will continue for some time. I am especially grateful to Dr. Mota for hosting me and making me feel so welcome. I sincerely hope we continue to work together in the longer-term. I also sincerely thank all the people that stopped their own work to offer advice or assistance. Collectively, I thank people from the Institute for Molecular Medicine in Lisbon, the Leiden University Medical Center in Amsterdam, and Deakin University, the Burnet Institute and the Walter and Eliza Hall Institute for Medical Research here in Melbourne," Justin said. "And of course, OzEMalaR."

Achievements and Outputs

THE ACHIEVEMENTS OF THE RESEARCH NETWORK, NETWORK PARTICIPANT CONTRIBUTIONS TO THE RESEARCH NETWORK AND OTHER OUTPUTS ACHIEVED RESULTING FROM THE USE OF THE FUNDS, INCLUDING ANY ADVANCES IN KNOWLEDGE, RELEVANT PUBLICATIONS, OR INTERNATIONAL COLLABORATION.

Progress and the development of national and international collaborative research through the Network Researcher Exchange, Training and Travel Awards are summarised above.

Publications

ASP Network for Parasitology Participants published 406 articles in journals or books during 2010. These are listed in Appendix 1, at the end of this report, under the National Research Priority that best describes the major theme of each paper. By presenting this list of publications, the ASP Network does not mean to claim undue credit for their production; rather, the list serves as a summary of the research activity of ASP Members, and as a benchmark for reporting and assessing the impact of the Network in subsequent years. The list is also a very useful reference source about and for Australia's parasitology research community.

Network Participants reported 12 publications arising directly from work carried out under Network Researcher Exchange, Training and Travel Awards in 2007

Adisa A, Frankland S, Rug M, Jackson K, Maier AG, Walsh P, Lithgow T, Klonis N, Gilson PR, Cowman AF, Tilley L. Re-assessing the locations of components of the classical vesicle-mediated trafficking machinery in transfected

Plasmodium falciparum. *Int J Parasitol*. 37: 1127-41

Golenser J, McQuillan J, Hee L, Mitchell AJ, Hunt NH. Conventional and experimental treatment of cerebral malaria. *Int. J. Parasitol*. 36: 583-593

Golenser J, Waknine JH, Krugliak M, Hunt NH, Grau GE. Current perspectives on the mechanism of action of artemisinins. *Int. J. Parasitol*. 36: 1427-1441

Henry RI, Martin RE, Howitt SM, Kirk K. Localisation of a candidate anion transporter to the surface of the malaria parasite. *Biochem Biophys Res Commun*. 16: 288-91

Hunt NH, Golenser J, Chan-Ling T, Parekh S, Rae C, Potter S, Medana IM, Miu J, Ball HJ. Immunopathogenesis of cerebral malaria. *Int. J. Parasitol*. 36: 569-582

Jackson KE, Spielmann T, Hanssen E, Adisa A, Separovic F, Dixon MW, Trenholme KR, Hawthorne PL, Gardiner DL, Gilberger T, Tilley L. Selective permeabilization of the host cell membrane of *Plasmodium falciparum*-infected red blood cells with streptolysin O and equinatoxin II. *Biochem J*. 403: 167-75

Krause DR, Gatton ML, Frankland S, Eisen DP, Good MF, Tilley L, Cheng Q. Characterization of the antibody response against *Plasmodium falciparum* erythrocyte membrane protein 1 in human volunteers. *Infect Immun*. 75: 5967-73

Mounsey, K.E, Dent, J.A, Holt, D.C, McCarthy, J., Currie, B.J. and Walton, S.F. Molecular characterization of a pH-gated chloride channel from *Sarcoptes scabiei*. *Invertebrate Neuroscience*, 7: 149- 56

Proellocks NI, Kovacevic S, Ferguson DJP, Kats LM, Morahan BJ, Black CG, Waller KL, Coppel RL. *Plasmodium falciparum* Pf34, a novel GPI-anchored rhoptry protein found in detergent resistant microdomains IJP 37: 1233-41

Spielmann T, Hawthorne PL, Dixon MW, Hannemann M, Klotz K, Kemp DJ, Klonis N, Tilley L, Trenholme KR, Gardiner DL. A cluster of ring stage-specific genes linked to a locus implicated in cytoadherence in *Plasmodium falciparum* codes for PEXEL-negative and PEXEL-positive proteins exported into the host cell. *Mol Biol Cell*. 17: 3613-24

Sutherland CJ, Drakeley CJ, Schellenberg D. How is childhood development of immunity to *Plasmodium falciparum* enhanced by certain antimalarial interventions? *Malar J*. 6: 161

Achievements and Outputs cont.

Tilley L, Sougrat R, Lithgow T, Hanssen E. The twists and turns of Maurer's cleft trafficking in *P. falciparum*-infected erythrocytes. *Traffic* 9: 187-97

Network Participants reported 22 publications arising directly from work carried out under Network Researcher Exchange, Training and Travel Awards in 2008

Baum J., Tonkin C.J., Paul A., Smith B.J., Richard D., Pollard T.D., Cowman A.F. Formin regulation of actin polymerisation during malaria parasite invasion of the erythrocyte. *Cell Host and Microbe* 3:188-198.

Burger M., Barnes T., Adlard R. Wildlife as reservoirs for parasites infecting commercial species: host specificity and redescription of *Kudoa amamiensis* from teleost fish in Australia. *Journal of Fish Diseases* 31:835-844.

Caccio S., Ryan U. Molecular epidemiology of giardiasis. *Molecular and Biochemical Parasitology* 160:75-80.

Dixon M.W.A, Thompson J., Gardiner D.L, Trenholme K.R. Sex In *Plasmodium* – A sign of Commitment. *Trends in Parasitology* 24:168-75.

Dow G.S., Chen Y., Andrews K.T., Caridha D., Gerena L., Gettayacamin M., Johnson J., Li Q., Melendez V., Obaldia N. 3rd, Tran T.N., Kozikowski A.P. Antimalarial activity of phenylthiazolyl-bearing hydroxamate-based histone deacetylase inhibitors. *Antimicrobial Agents and Chemotherapy* 52:3467-77

Fenner A.L., Bull C.M. The impact of nematode parasites on the behaviour of an Australian lizard, the gidgee skink *Egernia stokesii*. *Ecological Research* 23: 897-903

Fenner A.L., Warner L., Bull C.M. *Pharyngodon wandillahensis* n.sp. (Nematoda: Pharyngodonidae) from the endangered pygmy bluetongue lizard *Tiliqua adelaidensis* Peters, 1863 (Sauria: Scincidae), South Australia, Australia. *Comparative Parasitology* 75: 69-75

Godfrey S.S., Bull C.M., Nelson N.J. Seasonal and spatial dynamics of ectoparasite infestation of a threatened reptile, the tuatara (*Sphenodon punctatus*) (Reptilia: Sphenodontia). *Medical and Veterinary Entomology* 22: 374-385

Guzinski J., Saint K.M., Gardner M.G., Donnellan S.C., Bull

C.M. Development of microsatellite markers and analysis of their inheritance in the Australian reptile tick, *Bothriocroton hydrosauri* *Molecular Ecology Resources* 8: 443-445

Hanssen, E., Hawthorne, P., Dixon, M., Trenholme, K., Spielmann, T., Gardiner, D.L., Tilley, L. Targeted mutagenesis of the ring exported protein-1 of *Plasmodium falciparum* disrupts the architecture of Maurer's cleft organelles. *Molecular Microbiology* 69: 938-953.

Hanssen, E., Sougrat, R., Frankland, S., Deed, S., Klonis, N., Lippincott-Schwartz, J. and Tilley, L. Electron tomography of the Maurer's cleft organelles of *Plasmodium falciparum*-infected erythrocytes reveals novel structural features. *Molecular Microbiology* 67 : 703-718

Jones M.K., Bong S.H., Green K.M., Holmes P., Duke M., Loukas A., McManus D.P. Correlative and dynamic imaging of the hatching biology of *Schistosoma japonicum* from eggs prepared by high pressure freezing. *PLoS Neglected Tropical Diseases* 2: e334.

Lowther J., Robinson M.W., Donnelly S.M., Xu W., Stack C.M., Matthews J.M., Dalton J.P. The importance of pH in regulating the function of *Fasciola hepatica* cathepsin L1 cysteine protease. *PLoS Neglected Tropical Diseases* 3: e369

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Achievements and Outputs cont.

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Achievements and Outputs cont.

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Grants

Research grants awarded to ASP members in 2010 are listed in Appendix 2 at the end of this report, as a benchmarking record, without claiming undue influence of the ASP Network in the success of the applications. In 2010, Australia's parasitologists secured more than \$25 million in new research grant funding from a diverse array of funding agencies, both at home and abroad.

Internationalisation of Research

HOW THE RESEARCH NETWORK HAS FACILITATED THE INTERNATIONALISATION OF RESEARCH AND INTERNATIONAL LINKAGES — LINKS TO INTERNATIONAL NETWORKS.

At the **"Molecular Approaches to Malaria"** meeting in Lorne, Victoria, in early February, 2008, Professor Smith, representing the Network, and Professor Artur Scherf, the Director of BioMalPar, signed a formal Memorandum of Understanding between the Network and the EU Network of Excellence for the Biology and Pathology of Malaria (*BioMalPar*) to facilitate and enhance future interactions and

explore co-funding opportunities. The MoU formalised the excellent relationship that already exists between the two Networks.

As a result, the Australian malaria research community were included on a European Union FP7 Network of Excellence application, along with the European malaria research community, to seek a second iteration of *BioMalPar*, to be known as *EVIMalaR - a European Virtual Institute for Malaria Research*.

On 25 February 2010 The NHMRC - European Union (EU) Collaborative Research Grants scheme supporting Australian participation in leading international collaborative research under FP7 were announced. One of these was awarded to **Geoff McFadden** (The University of Melbourne), **Kevin Saliba** (Australian National University) and colleagues who were successful in their project grant application for **Australia - Europe Malaria Research Cooperation - OzEMalaR** and were awarded \$830,000 over 5 years.

Malaria is a global problem with no single solution. A large, but sometimes disjointed, research community is addressing the problem, but more collaboration is vital. OzEMalaR will link 34 Australian labs with 47 European, African & Indian malaria researchers. Funding will enable exchange of modern technologies by supporting early career researchers (PhD and postdocs) from Australia to work and be trained in top European labs. European trainees will work and be trained by Australian malariologists using reciprocal EU support.

Geoff said, "I anticipate that we will be able to fund collaborative exchanges of Australian malaria research laboratory members into EviMalaR laboratories shortly. The process will work in a very similar manner to the research exchanges funded by the ARC/NHMRC Research Network for Parasitology."

Significant Contributions and Outputs for 2010

2010 WAS AN EXCEPTIONAL YEAR FOR WELL-DESERVED RECOGNITION OF SOME OF AUSTRALIA'S PARASITOLOGY STARS.

The 2010 recipient of The Bancroft-Mackerras Medal was **Leann Tilley** (La Trobe University). The Bancroft-Mackerras Medal for Excellence allows the Australian Society for Parasitology to recognise outstanding contributions of its members to the science of Parasitology. The Medal commemorates the contribution of the Bancroft-Mackerras dynasty to the development of the discipline of parasitology in Australia from the 1860s to 1960s. Leann is the first female to win the award (see highlighted article).

2010 saw two outstanding scientists made Fellows of the ASP: **Malcolm Jones** (The University of Queensland and Queensland Institute of Medical Research) (see interview below) and **Robin Gasser** (The University of Melbourne).

The World Federation of Parasitologists recognised **Prof John Sprent's** significant achievements by awarding him a WFP Distinguished Parasitologist Award. This is a most notable award, which recognises John's substantial career in parasitology. On behalf of the ASP, Mal Jones hosted a ceremony in Brisbane in late September to celebrate Prof Sprent's career and present the award. As part of the ceremony Mal played a recording of David Heath's speech given at the ICOPA XII closing ceremony and then read the ASP citation for this award.

David Heath, WFP Distinguished Parasitologist, and life member of ASP, wrote to congratulate John. "On behalf of Prof J D Smyth and the parasitological team that he assembled in the Zoology Department, ANU, I congratulate John on this award. I remember the early days of the ASP when John and Desmond and Warwick and Hugh Gordon and Madeleine Angel *et al.* got together to found the Nicholas Society."

The ASP also recognized three of its young rising-stars by awarding them a JD Smyth Award: **Rowan Ikin**, (University of Technology, Sydney), **Ashlie Hartigan** (The University of Sydney) and **Simone Reynolds** (Queensland Institute of Medical Research)

The Society also recognized the research achievements

of several outstanding students and early career researchers with 2010 ASP, ICOPA Committee and Molecular Microbiology Awards at ICOPA XII: ASP Early Career Researcher Awards went to **Philippe Boeuf** (The University of Melbourne) and to **Stephanie Godfrey** (Flinders University); ASP Prizes for the Best Student Oral Presentations to **Lee Yeoh** (The University of Melbourne) and to **Kate Richards** (La Trobe University); Molecular Microbiology Prize for the Best Overall Poster went to **Rowan Ikin** (University of Technology, Sydney); ASP Best Student Posters went to **Tegan Dolstra** (Australian National University) and **Alison Knight** (Australian National University); ICOPA Committee Open Poster Prizes went to ASP Student Members, **Rama Jayaraj** (Menzies School of Health Research, NT) and **Alana Zakrzewski** (University of Technology, Sydney).

The ASP also recognized three excellent international colleagues with ASP 2010 International Invited Lectureships:

Prof. Dominique Soldati-Favre (University of Geneva, Switzerland) an internationally recognised expert on the cell biology of *Toxoplasma*.

Dr Simon Jones, (Fisheries and Oceans Canada, Pacific Biological Station, Nanaimo, Canada) a leading fish health researcher; and

Prof. Carlos Carmona (Parasite Biology Unit, Dept. of Cellular and Molecular Biology, School of Sciences, University of the Republic, Uruguay), a leader in veterinary parasitology.

Andrew Thompson (Murdoch University) was elected as a Fellow of the Linnean Society of London, the world's oldest active biological society, founded in 1788.

Alan Cowman (Walter and Eliza Hall Institute of Medical Research) who was awarded the 2010 Howard Taylor Ricketts Award by the University of Chicago. The award recognises outstanding accomplishment in the field of medical sciences. "It was a very nice surprise and a great honour to join a list that includes such stellar scientists," Alan said.

Don McManus (Queensland Institute of Medical Research) was made an Honorary Member of the American Society of Tropical Medicine and Hygiene, in recognition of "outstanding accomplishment by an individual not an American citizen who has made eminent contributions to

Significant Contributions cont.

some phase of tropical medicine and hygiene". It is awarded only after careful consideration by the Honorary Membership Committee and unanimous approval by ASTM Council.

Rowena Martin (Australian National University and The University of Melbourne) was awarded a L'Oreal Australia For Women in Science Fellowship and was also awarded the inaugural Macquarie University Eureka Prize for Early Career Research at the 2010 Australian Museum Eureka Prizes for her, "Mechanisms of Drug Resistance in the Malaria Parasite" research. Read more about Rowena's Eureka prize: <http://eureka.australianmuseum.net.au/eurekaprize/early-career-research>

Alex Maier (La Trobe University), was a finalist for the Australian Museum Eureka Prize 2010 Scientific Research: Research and Innovation for his malaria research, "Undoing Malaria's Molecular Velcro".

Researchers from the Menzies School of Health Research won several prestigious awards in 2010 for their ground-breaking work on leishmaniasis in marsupial populations in the top-end. The Northern Territory's Chief Minister's Research and Innovation Award. The Menzies *Leishmania* Project Team (which includes **Annette Dougall, Deb Holt and Shelley Walton**) won the Northern Territory's Chief Minister's Research and Innovation Award and Tropical Knowledge Awards for their work in identifying the insect that spreads *Leishmania* in Australia, while **Kate Mounsey** won the inaugural Northern Territory Young Tall Poppy award, for her scabies research.

"It is wonderful to see this ground-breaking research suitably recognized with the Chief Ministers' Award" Professor Jonathan Carapetis, Director of Menzies School of Health Research, said "Identifying the vector that can spread this potentially lethal infection is an essential first step to understanding how it can be controlled, in order to ensure that Australia doesn't see the widespread devastation in animals or even humans that *Leishmania* has caused in other continents." Professor Carapetis also paid tribute to Dr Mounsey. "The Young Tall Poppy is a national program that, each year, recognises in every State and Territory a young person who is both a researcher of the highest calibre, and who spreads the good word about science to a wide audience. Kate is a wonderful young woman who is the embodiment of those characteristics. Her research into scabies is providing essential information to help our efforts to control this important disease in Aboriginal communities."

Other Society members were also recognized in the Tall Poppy Awards: **Rowena Martin** (Australian National University, ACT Young Tall Poppy Scientist Award); **Chris Tonkin** (Walter and Eliza Hall Institute of Medical Research, Victorian Young Tall Poppy of the Year); and **Justin Boddey** (Victorian Young Tall Poppy Scientist Award).

Aaron Jex (the University of Melbourne) received an NHMRC Achievement Award for his work on helminth parasites.

Matthew Dixon (LaTrobe University) who was awarded a Young Investigator Award at the 35th Lorne Protein

Alistair Craig, Lisa Jones, Robin Anders, Anthony Holder, Marshall Lightowlers, Louis Schofield and Celine Barnardos at ICOPA XII.



Significant Contributions cont.

Conference on Protein Structure and Function for his talk on, "Disruption of the *Plasmodium falciparum* virulence complex". The Bancroft family made great contribution

Leann Tilley wins 2010 Bancroft-Mackerras Medal

The Bancroft family made a great contribution to Australian science, studying public health, insect-borne disease and parasitology amongst many other areas of medical and biological science. They were devoted to studying parasites, including blood parasites. Joseph Bancroft and his son, Thomas, practiced medicine in Queensland in addition

Professor Leann Tilley



to their scientific pursuits. Joseph's daughter, Josephine Bancroft, was the first member of their family to have a professional career as a scientist and she married fellow scientist, Ian Mackerras.

Leann feels a special kinship with the Bancrofts and Mackerras. She quotes L Doherty (Med. J. Aust., 1978, 2: 560-3, 591-4): "Josephine and Ian Mackerras were using microscopes to good effect to study parasites. During their University years Ian and Jo often fished off North Head, making smears from the heart blood of their catches. They carried the fish home after sailing, and one cooked them, while the other stained the smears. After supper they would settle down at their microscopes, and search the smears for Haematozoa."

Leann's passion is a modern day version of this – she works with high end imaging equipment and specialist technology to study the malaria parasite, *Plasmodium falciparum*, the most deadly human parasite with approximately 300 million cases per year and a million deaths per year, mostly in children under the age of 5.

Leann studied Biochemistry at the University of Melbourne, and did her PhD on red blood cells. Working on malaria was an obvious progression after working on red blood cells and Leann collaborated with Robin Anders who was initially based at the Walter and Eliza Hall Institute of Medical Research. Together with Mick Foley, they were interested in the interaction of the parasite with the red blood cell cytoskeleton. After working in Sydney and doing post doctoral work overseas, Leann moved to La Trobe University and is Deputy Director of the ARC Centre of Excellence for Coherent X-Ray Science and Director of Research for the La Trobe Institute for Molecular Science. Mick and Robin also moved to La Trobe and the three have continued their collaborative work.

Leann says she has always been interested in science, but also enjoys visual arts and she feels like she brings the two together in her imaging work on the malaria parasite. Leann says she really enjoys the collaborative aspect of physicists and biologists talking to each other and generating new ideas and approaches to look at an important biological question as stated by Richard Feynman, Nobel prize winning American physicist in a talk at an American Physical Society meeting on December 29th 1959, "It is very easy to answer many of these fundamental biological questions; you just look at the thing!"

Significant Contributions cont.

Leann says she is thrilled with what she is able to see using the new imaging methods and sees it as a new approach for looking at, and understanding parasites. "It is like having a molecular paintbox," says Leann. "Molecular beacons and fluorescent probes can paint different parts of the cell and show how the organelles interact with each other and their environment."

Leann's research looks at protein trafficking – specifically, the trafficking of proteins to the outside of the red blood cell membrane, which is what causes the disease pathology of malaria. The exomembrane system is bizarre and very different from other trafficking systems. Leann says that, "Once a parasite gets inside a red blood cell it starts renovating; it starts from scratch as there is nothing inside and it needs to have a way of moving proteins around. This is where the Maurer's clefts come in. They are like an extracellular Golgi apparatus."

Initially scientists thought that Maurer's clefts were a continuous structure that can move things from the parasite all the way to the red blood cell surface but Leann says that, "When you look using the latest, most sophisticated imaging techniques you see that it's not a continuous structure at all. It looks more like some sort of vesicle-mediated trafficking system."

Another thing that Leann would like to do is to start applying these fantastic imaging technologies to study antimalarial drug resistance. Leann says it is critically important to preserve the antimalarial drugs that we have and, therefore, critical to understand why the parasites are becoming resistant. Drug resistance to chloroquine began emerging around the world in the 1980s and, now, artemisinin resistance has emerged in the same areas near the Cambodian border. Leann says that, "If artemisinin resistance takes hold, it will be a major step backwards in the fight to eliminate malaria."

Leann is the first female to be awarded the Bancroft-Mackerras Medal and is a great role model for women in science. Leann said, "It's exciting times for women in science with Liz Blackburn winning the Nobel Prize in Physiology or Medicine in 2009 this year and Suzanne Corey, who was director of the Walter and Eliza Hall Institute of Medical Research from 1996 until 2009 about to become the first elected woman president of the Australian Academy of Science. There are good women in high level positions supportive of other women's career and research directions."

Being awarded the Bancroft-Mackerras Medal makes Leann feel most proud. "It is a good feeling to be acknowledged for your life time of research work. It always feels like things are going slowly, like you're pushing a rock up a mountain. I'm very excited and pleased – it is a wonderful thing and I feel honoured to be included in such a great group of people – it's a real boost to be recognised this way." Leann's award attracted a lot of publicity (eg, The Age Education section featured Leann <http://www.theage.com.au/national/education/thinking-smallhas-its-reward20100906-14xrf.html>) and this is great for malaria and parasitology research, more generally. And, as Leann says, "Awards like the Bancroft-Mackerras Medal inspire people around you; so many people are genuinely pleased! I am very proud to be recognised for doing something I've always enjoyed doing."

ASP Fellow Malcolm Jones

Associate Professor Malcolm Jones (pictured below) from The University of Queensland and the Queensland Institute of Medical Research was made a



Significant Contributions cont.

Fellow of the Australian Society for Parasitology Inc. at the XIIth International Congress of Parasitology at the Melbourne Convention Centre on 19 August 2010. Malcolm Jones talks to Lisa Jones about his research career and how he became interested in parasitology.

Tell us how you become involved in parasitology research?

In his first year of University (at The University of Queensland), Mal had John Sprent as a lecturer who was, at that time in his 60's, nearing retirement but still "With a real passion for parasites," says Mal. "And, he led a department full of inspirational characters, like John Pearson and Colin Dobson," Mal said.

Mal did his PhD under John Pearson, a parasite zoologist who insisted on careful examination - "Old school parasitology," Mal said. During his PhD, Mal studied a group of tapeworms that lived in frogs and reptiles. "I noticed something strange about the early development of these tapeworms and looked further in more detail using electron microscopy. Having EM skills made me employable and for the next 10-15 years I worked in EM areas."

Mal did a post-doc at QIMR on measles virus followed by EM roles at Macquarie University and UQ, during which time he kept some of his parasite research going. Whilst working at UQ, Mal collaborated with Don McManus, who Mal describes as "championing schistosomiasis research". From there, he found a role at QIMR and, ultimately, permanency and an Associate Professorship in the UQ vet school that allows him to keep his research at QIMR going too.

What interests you about working in this area?

Mal and his research team are particularly interested in the surface of the schistosome.

"We want to find out how they can keep their surface, how they provide it with nutrients, salt, and so on, and what the functions of the surface are."

Mal says lots of his work still comes back to microscopy. "Although we look at the cell biology and the molecular biology of schistosomes, we're finding that microscopy is more important than ever and we get to use some really interesting, new microscopy techniques."

"The deeper we delve, the more we realise, we really know so little about schistosomes," Mal said. "One question that

really bothers me is around vaccines against this parasite - will a vaccine ever work? You don't get good protective immunity against schistosomes, so how and why should a vaccine work?"

How do you see your research developing in the future?

"I'm fascinated by the biology of the surface lining - the tegument - of flatworms like schistosomes. How do they keep renewing that surface, but keep it intact. There must be some really interesting molecules involved in anchoring and holding surface and transporter proteins taking nutrients and more from that surface to the inside of the parasite. The tegument is one cell covering the entire worm; It's a structure unlike anything outside of flatworms so is the transport system unique to schistosomes? Does it provide a unique service? If so, maybe we can develop unique drug and vaccine targets."

Tell me about your involvement with the ASP?

Mal joined the ASP as a first year PhD student in 1982 and went to his first ASP conference that year, held in Marysville, Victoria and organised by Ian Beveridge. "It was a delightful conference," Mal said, "lots of fun."

"When I joined, I thought that the ASP were a very personable bunch, a small society who met the needs of its members - lots of people who were dotty about parasites." Mal was delighted that, at the forefront of the society, was real support for young scientists. "The Society strove to encourage and support young scientists into parasite research," said Mal, "and it still does - I really like that the Society provides funding for students to attend conferences and gives travel grants and awards. I like the strong sense of history and relevance to Australian development. It is also full of pretty nice people, and still lots of fun!" Mal said.

How does it feel to be made an ASP Fellow?

"I'm absolutely delighted!" Mal said of being made an ASP Fellow. "I hold the Society very dear, and have been more and more committed to it over the years. I feel humbled and honoured and feel I am in the company of special people who are also Fellows, especially being made a Fellow at the same time as Robin Gasser - I was very excited to be in that company." He said.

"The Society has been very good to me; helped me develop my career, offered comradery and support across the

Significant Contributions cont.

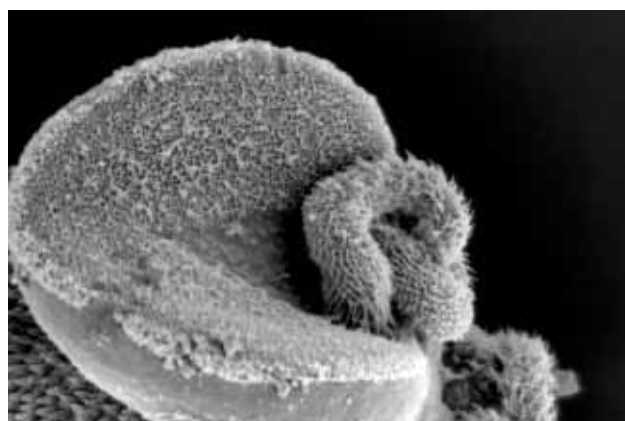
country.”

Tell me about the highlight of your science career so far?

“This may sound funny but do you remember the ‘10 things you don’t know about parasites’ session at the 2006 ASP & Network Conference in the Gold Coast? To prepare for my bit of that, I was investigating, and trying to answer the question, how do eggs get out of their host? I ended up putting together a nice paper on the bizarre hatching mechanism of *Schistosoma japonicum*. A quirky bit of science that is not going to conquer the world but did get published in PLoS Neglected Tropical Diseases” (2008; Vol2 p344 “Correlative images and dynamic hatching of *Schistosoma japonicum*).

And, really, that sums Mal up – a thoughtful, unpretentious, self-deprecating scientist of the highest quality. The parasitologist’s parasitologist. In the future, Mal wants to do more travelling, and would love to do some teaching in developing nations and in endemic areas, working on a practical level, offering basic training, working with researchers and students teaching them how to do basic research on schistosomiasis.

It was such a pleasure to interview Mal, and to hear his wonderful insights into parasitology and the ASP.



Images

Top: White Spot Organism, seen here, is caused by an infestation of the ciliated protozoan Cryptocaryon irritans. Image courtesy of Malcolm Jones and Dr Alistair Dove, The University of Queensland

Middle: This is a tapeworm called Rhinebothrium. It lives in the intestine of sharks and rays on the Great Barrier Reef. It attaches to the intestine using the leaf-like suckers you can see here, landing on the gut's surface just like a lunar module lands on the moon. Image courtesy of Clinton Chambers, The University of Queensland

Bottom: Prochristianella, a tapeworm of fish, has spiny tentacles – seen in close-up here – that are pushed into the fish's intestine to hold it in place. Image courtesy of Malcolm Jones, Queensland Institute of Medical Research and The University of Queensland

Media and Outreach

IN 2010, OUR ASP MEMBERS ENGAGED IN NUMEROUS OUTREACH ACTIVITIES THAT HIGHLIGHTED THEIR RESEARCH

The audience was widespread, including school students, visitors to our zoos and museums, teachers, national and international health professionals and rural Australian communities. ASP scientists recognise the important role they can play in communicating to the wider community with the aim to stimulate more interest in science and health.

Outreach Presentations and Activities

ASP members were involved in many outreach presentations and activities across Australia during 2010. Public lectures and outreach activities help the Australian Society for Parasitology meet one of its aims in promoting Australia as a centre for parasitic research. Utilising these opportunities to showcase the hard work of Australian parasitologists is a perfect way to engage a curious public.

It was recognised by the organising committee and ASP that a conference of the magnitude of ICOPA XII provided an opportunity for parasitology to be promoted to a wider audience. With this in mind a number of outreach activities were held to inform the general public about research with a particular emphasis on parasites. The outreach events were very well attended by the general public and both the events and programs were highly successful. Activities included a free public lecture and forum held at the Melbourne Recital Centre on Tuesday 17 August;

"Melbourne Conversations: Climate Change, New Diseases and Parasites - What will it mean for Melbourne?". This event was hosted by Dr Graham Mitchell (Chief Scientist, Victorian Government) and featured expert panellists Professor Anne Kelso AO (Director, WHO Collaborating Centre for Reference and Research on Influenza, Melbourne), Professor Kevin D Lafferty (Marine Ecologist, University of California, Santa Barbara, USA), Sir

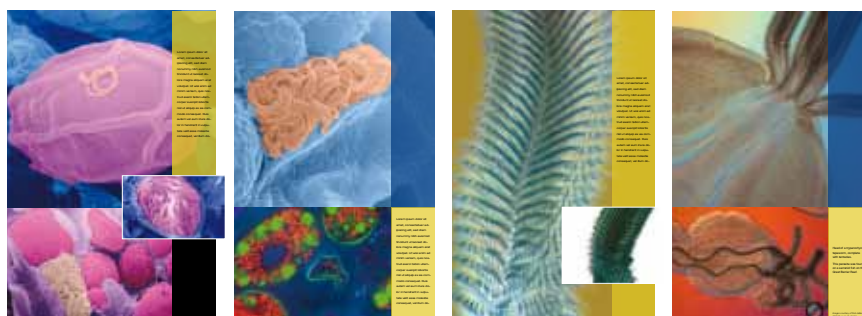
Gustav Nossal AC CBE (Professor Emeritus, The University of Melbourne), Dr Haylee Weaver (Research School of Biology, Australian National University, Canberra), and Ms Natasha Mitchell (Science Journalist and Broadcaster, ABC Radio National) who was the moderator. This event was attended by 250 people.

Also, on the morning of the 17 August, a breakfast was held for 100 business leaders in Melbourne (**BioMelbourne Network**) where a number of talks were presented on parasitology and biotechnology by Dr Debra Woods (Pfizer Animal Health), Professor Simon Croft (London School of Hygiene and Tropical Diseases) and Dr Wayne Best (Epichem), within the theme The road less travelled: Commercialising niche and neglected diseases. The ICOPA XII outreach program also included the ASP SCHOOLS PROGRAM - Art, Science and Parasites.

ASP Schools Program - Art, Science and Parasites

The Art of the Bodysnatchers Competition. A competition was held to design a cover featuring a parasite for the International Journal for Parasitology. Students were encouraged to Draw/ paint/ design or computer generate their version of a parasite luscious-looking lice, heinous hydatids, tenacious tapeworms, or your own abstract parasitic interpretation. The winner was Natalya Rojeinikova from John Monash Science School in Victoria and she was chosen based on the artistic merits, originality, and demonstrated research of her chosen parasite: she received a \$1000 prize. The design will be printed on the IJP journal cover later this

Parasites in Focus posters



Media and Outreach cont.

year. Three entrants also received certificates of participation and an ICOPA t-shirt in recognition of their efforts.

Parasites in Focus Online Quiz. The ICOPA XII Outreach team published an online Parasites in Focus quiz which encouraged entrants to research the answers to multiple choice questions in the area of parasitology. There were 43 entries from around Australia and the winner with a perfect score was Amarisa Wangpen from Rossmoyne Senior High School in Western Australia. Amarisa received an I-Pod and a Certificate for her achievement.

Parasites in Focus - The Exhibition. Activities for secondary students from Victorian schools at the Gene Technology Access Centre (GTAC) was also organised and included seminars from some of the ICOPA. Plenary speakers who talked about parasitology and parasitic diseases as well as hands on work looking at some of the more common and dramatic parasites of the world.



Lisa Jones and Nick Smith at "Science Meets Parliament", Old Parliament House, Canberra, February 2010

The Parasites in Focus hands-on exhibition, featuring the extraordinary world of the parasite, was on display at GTAC, The University High School, Parkville, Melbourne from Saturday 7 Thursday 12 August 2010. Teachers were invited to a special evening viewing of the exhibition on Monday 9 August.

An exciting one-day student workshop at GTAC was

launched by Marshall Lightowlers (The University of Melbourne). Tony Chiovitti (GTAC) prepared an outstanding program of wet lab exercises, quizzes, and interactive exercises for over 100 Victorian school students. Ian Beveridge (The University of Melbourne) gave expert advice for the microscopy workshop. GTAC ran a full day program in which students investigated a number of aspects including how liver flukes find their host snails. They also examined the larvae of the bot fly and used DNA testing to identify Plasmodium species. Students visited Parasites in Focus and had to hunt for clues amongst the parasites on show to answer the following question: What proportion of animal species are parasites?

The Parasites in Focus exhibition was showcased at ICOPA XII and featured twenty six superb photographic prints showing the amazing microscopic world of the parasite accompanied by four hands-on parasite exhibits. Visitors competed in the parasite game show "Who's my host?" and explored lots of different parasites found in Australia and around the world using "The microscopic world of parasites", "Look closer at parasites", and "Parasitic lifecycles" exhibits. Visitors also viewed the stunning animations of the life cycle of the malaria parasite by BAFTA and renowned Emmy award winning biomedical animator Drew Berry, on the lifecycle exhibit.

Workshops and Exhibitions

'Parasites in Focus' hands-on exhibition

In 2010 Parasites in Focus travelled from the **Wollongong** Science Centre (NSW) to **Tasmania** to Imaginarium in Devonport and to The University of Tasmania and had nearly 1000 visitors prior to travelling to **Melbourne** as part of the international parasitology conference. Parasites in Focus was on display at the Exhibition Centre during ICOPA XII for delegates to enjoy and after featuring at GTAC and ICOPA XII this exhibition moved to the Museum of the Riverina, **Wagga Wagga**, NSW.

Parasites in Focus has entertained more than 200,000 Australian school students and general public visitors at 13 venues in every state and territory across Australia since 2007.

Media and Outreach cont.

ASP Member Outreach Presentations and Activities

In total ASP members were involved in over 35 outreach presentations and activities across Australia during 2010. Public lectures and outreach activities help the ASP Network for Parasitology meet one of its aims in promoting Australia as a centre for parasitic research. Utilising these opportunities to showcase the hard work of Australian parasitologists is a perfect way to engage a curious public. In addition to those activities associated with ICOPA XII and "Parasites in Focus" the following outreach activities by ASP members took place in 2010:

Brown Besier, Department of Agriculture and Food Western Australia

- Public lecture in a seminar facilitated by the Chief Scientist, WA: Great Southern, Great Science, Albany WA (July 2010): "A new approach to sheep worm management."

Christian Engwerda, QIMR

- Participant in the Spotlighting Careers in Indigenous Health and Science Programme at QIMR involving the hosting of students in my laboratory for 2 days.
- Assisted in the planning and execution of scientific projects with year 6 & 7 students at New Farm State School for the 2010 STEM convention.
- Conducted basic science demonstrations to prep children at New Farm state school to encourage an interest in science.

David Jenkins, CSU Wagga Wagga

- Invited to Paris in October 2020 as a member of an OIE *Ad Hoc* Group on Zoonotic Parasites to draft guidelines for echinococcus, hydatidosis, trichinellosis, and porcine cysticercosis management "on farm" to manage risks to human health.

Parasitologists at the South Australian Museum & University of Adelaide

- Opening of the Biodiversity Gallery at the South Australian Museum in February 2010 which includes a

concept case about Parasites and Parasitism.

- Learning Focus: Parasites. Guest presenter to South Australian Museum's Volunteer Forum (#7), Biodiversity Gallery, 25th September 2010.

Deborah Holt, Menzies

- In-service Presentation, Royal Darwin Hospital: Emergency Department. Latest research in scabies. June 2010
- Community Presentation to visiting high school at Menzies for Science Week. August 2010.

Jan Šlapeta, University of Sydney

- Taronga ZOO, Education Centre, March 2010

Terry Spithill, CSU Wagga Wagga and research staff from the school

- Parasites in Focus, Museum of the Riverina, Wagga Wagga public and school events associated with the exhibition.

Alexander Maier, La Trobe University

- Finalist Eureka Prize for Scientific Research 2010, Australian Museum.

Rowena Martin, ANU

- Public lecture at the Australian Museum, Sydney, 18/08/2010 following Australian Museum *Eureka* Prize for Early Career Research.
- L'Oréal Girls in Science Schools Forum, WEHI Melbourne, 25/08/2010 following L'Oréal Australia *For Women In Science* Fellowship
- L'Oréal For Women in Science video <http://www.youtube.com/watch?v=5Eo3J5IXHcc>
- Public lecture at the Australian Academy of Science Open Day, The Shine Dome, 25/09/2010.
- Public talk on 17/11/2010 at Government House, Canberra to an audience which included their Excellencies, the Governor-General and Mr Michael Bryce, the Honourable Mike Kelly AM, MP, and Ken Wyatt, AM.

Media and Outreach cont.

- The *51st Boyer Lectures* series presented by Prof. Glyn Davis AC, Vice-Chancellor and Principal of the University of Melbourne, and broadcast on ABC Radio National. Lecture 3 (titled: Research! A Mere Excuse for Idleness) focused on malaria research in Australia and briefly mentioned our work on drug resistance in the malaria parasite, 28/11/2010. http://mpegmedia.abc.net.au/rn/podcast/2010/11/bls_20101128.mp3

John Reeder, Burnet Institute

- Invited speaker, NH&MRC workshop: Global Health; addressing the needs of the Asia-Pacific region, Canberra.

Jacob Baum, WEHI

- Speaker at Middle Years "Speed Science" Symposium. Melbourne Museum, VIC, Australia. July 2010.

Alex Loukas, JCU

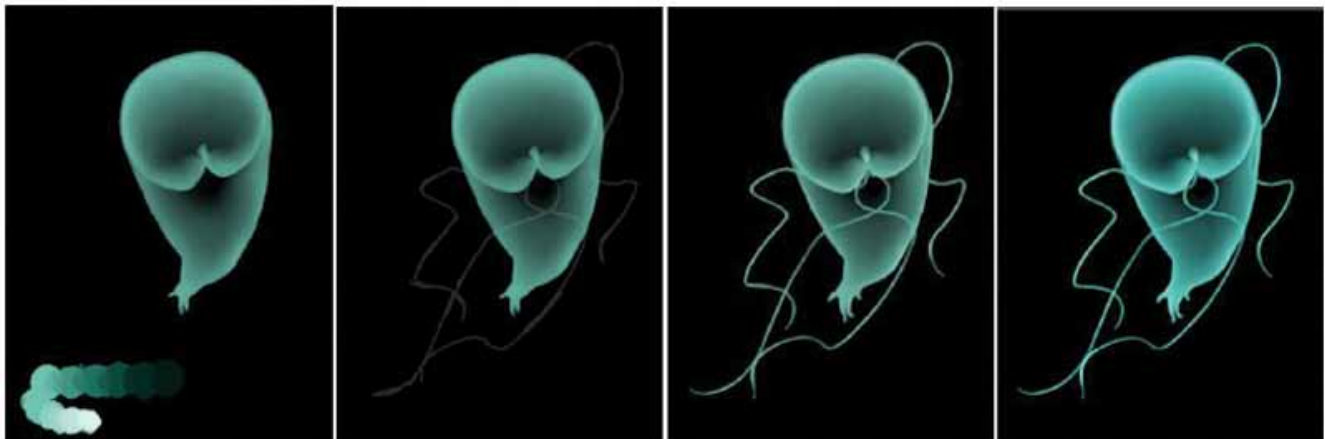
- The wonderful world of worms. JCU inaugural professorial public lecture. Hilton Hotel, Cairns, QLD

Leann Tilley, La Trobe University

Communication to the wider community:

- The Department of Biochemistry at LTU runs a school outreach program designed by Francesca Calati, winner of the 2007 Prime Minister's Prize for Excellence in Science Teaching in Secondary Schools. Leann has given a number of presentations to students as part of this program. She worked with Ms Calati to develop a project in which students have generated footage for a "video-documentary" describing the basics of X-ray imaging giving some examples of what you can do with X-rays and how X-ray imaging is employed by different members of the CXS group. About 50 students have participated over a period of 18 months in collating information and generating and editing video footage of Leann and other CXS members. A smaller group of Year 10 students from St Helena Secondary College were presented with the challenge of creating a short documentary film on X-rays and how they can be used. Their film, *Röntgen: A Bright Spark*, was the winner of the 2010 Eureka Sleek Geeks Science Prize. A joint La Trobe/ CXS-organised CXS Video Launch & Cocktail Party was held 16th December 2010 at the National Gallery of Victoria. <http://www.latrobe.edu.au/news/articles/2010/article/sleek-geeks-eureka-prize>

The Art of the Bodysnatchers Competition. Natalya Roujeinikova's sketches for her winning design.



Media and Outreach cont.

James McCarthy, QIMR

- Host High School students for work experience attachments in my laboratory.
- Host vacation summer student from the University of Queensland.

Simon Foote, Menzies Institute

- Presented a talk to Tiwi Island College on genetics.

David Blair, JCU

- ASM and ACTM Parasitology and Tropical Medicine Masterclass, Melbourne, 14-15 August 2010.

Ian Beveridge, University of Melbourne

- ICOPA Outreach program - Parasitology for high school students, held at the Gene Technology Access Centre (GTAC), University High School, Melbourne, August, 2010.

Alyssa Barry, Burnet Institute

- Guest speaker, Biology Teachers Network, Melbourne

Media Reports

In total, 80 stories promoting parasitology and research achievements of ASP members were reported in the media in 2010 on radio, online, TV interviews and newspaper articles.

Media coverage before, during, and after ICOPA XII

One media alert was sent in May 2010 and circulated to international media contacts.

SBS World Radio

SBS Radio World liaised with the ASP media team supporting ICOPA XII and subsequently SBS World Radio reporters conducted 26 interviews with international and local speakers and delegates attending ICOPA XII. Interviews were conducted in the native language of each speaker

and included the following languages: Italian, Spanish, Thai, Danish, Dutch, French, Czech, and Polish. From these interviews the following seven PODCASTS have been published on the SBS websites:

1. <http://www.sbs.com.au/yourlanguage/czech/highlight/page/id/104822/t/Prof.-Tom-Scholz-Intriguing-world-of-parasites/in/english>
2. <http://www.sbs.com.au/yourlanguage/czech/highlight/page/id/104827/t/Dr.-Zden-k-Franta-Ticks-gut-key-to-solve-borreliosis/in/english>
3. <http://www.sbs.com.au/yourlanguage/czech/highlight/page/id/104627/t/Prof-Tom-Scholz-on-ICOPA-in-Melbourne/in/english>
4. <http://www.sbs.com.au/yourlanguage/czech/highlight/page/id/105297/t/Dr.-Jan-Slapeta-We-owe-our-existence-to-parasites/in/english>
5. <http://www.sbs.com.au/yourlanguage/danish/highlight/page/id/107827/t/The-danger-of-malaria-in-pregnancy/in/english>
6. <http://www.sbs.com.au/yourlanguage/danish/highlight/page/id/107822/t/Fish-xan-and-should-be-vaccinated-says-professor/in/english>
7. <http://www.sbs.com.au/yourlanguage/dutch/highlight/page/id/106657/t/International-Symposium-Genetics-of-Industrial-Microorganisms/in/language>

Prior to and during ICOPA XII seven media releases were written by the ICOPA Media team and distributed via AAP Medianet to selected print, radio and TV journalists via both email and fax.

The following media releases were distributed with associated media coverage detailed:

1. (Parasites in Focus at GTAC) Victorian school students hooked by parasites distributed 9 August 2010
 2. The politics of parasites: what is the price on fixing disease? distributed 10 August 2010
- ABC Canberra radio drive-time interviewed Graham Mitchell following this media release SBS News Radio interviewed Jonathan Carapetis, Alan Cowman, Louis

Media and Outreach cont.

Schofield and Sir Gus Nossal following this media release

3. New combination treatment to combat malaria resistance in Southeast Asia distributed 16 August 2010 SBS News
PODCAST 16 August 2010,

- <http://www.sbs.com.au/podcasts/naca/worldview/episode/105112/Malaria-treatment-offers-new-hope>

4. Chagas disease in Australia distributed 16 August 2010

5. How will global climate change affect parasites?
distributed 17 August 2010

- Climate change, new diseases and parasites. Hosted by Natasha Mitchell was published on SLOW TV <http://www.themonthly.com.au/climate-change-new-diseases-and-parasites-hosted-natasha-mitchell-2687>
- Kevin Lafferty was interviewed by ABCRadio National News and broadcast on 17 August
- Natasha Mitchell interviewed Kevin Lafferty for a special report on Climate Change and Parasites Climate change,
- New diseases and parasites was recorded by New Tang Dynasty Television and interviews conducted with Sir Gus Nossal and Kevin Lafferty

Climate Change Concerns New Diseases and Parasites – NTDTV.com. http://english.ntdtv.com/ntdtv_en/news_asia/2011-05-30/climate-change-concerns-new-diseases-and-parasites.html

6. \$20 million global network to tackle malaria distributed 18 August 2010

7. Ahead of the head lice game no more itches and scratchies? Distributed 18 August 2010

8. New global atlas will transform deworming programmes distributed by Snell Communications Ltd, London, UK on 17 August 2010

9. 19 August 2010 The Medical News Scientists produce atlas of worm infection prevalence, distribution throughout Africa <http://www.newsmedical.net/news/20100819/Scientists-produce-atlas-of-worm-infection-prevalence-distribution-throughout-Africa.aspx>

Publications and Post-Conference Publicity

Knowledge Transfer activities stimulated by ICOPA are planned to continue. Parasites in Focus will continue its travelling roadshow around Australia. This will be used to educate school children on parasites and the diseases they can cause.

Media highlights from our ASP members include:

David Jenkins, Charles Sturt University, Wagga Wagga gave 9 radio interviews (listed below) and was invited to Paris in October 2020 as a member of an OIE Ad Hoc Group on Zoonotic Parasites to draft guidelines for echinococcus, hydatidosis, trichinellosis, and porcine cysticercosis management “on farm” to manage risks to human health

- ABC Radio South Coast FM on the Sunshine Coast (John Stokes). Dingoes in urban areas, hydatid transmission risk to humans
- ABC central West (Angela Owens) Parasites in rural dogs
- ABC Riverina (Anne Delany) Parasites in rural dogs
- ABC Bush Telegraph (Kieren McLeonard) Parasites in rural dogs
- ABC (Michael Cathcart) Parasites in rural dogs
- ABC Canberra (Sarina Locke) hydatids dingoes wildlife and parasites in rural dogs
- ABC Regional Victoria (Will Ockenden) Parasites in rural dogs
- ABC Riverina ASP Parasitology Exhibition in Wagga Wagga
- ABC Gippsland Bounty on wild dogs and foxes

Parasitologists at the South Australian Museum & University of Adelaide

- Facilitated a Channel 10 episode of *Scope* on Parasites that included a segment about Marine Parasites filmed in my laboratory at The University of Adelaide. Program aired on 25th September 2010.

Media and Outreach cont.

- Interview with Sonya Feldhoff on the Drive Show, 891 ABC Adelaide about stingrays and spines in relation to a local stingray spining on 23rd November 2010.

Deborah Holt, Menzies

- ABC local radio Darwin 105.7: Live interview - "Saturday Scientist" segment. Biting midges as a possible vector of Leishmania in Australia
- ABC radio news Darwin and Central Australia (3 editions): Recorded interview. December 2010

Alexander Maier, La Trobe University

- Finalist Eureka Prize for Scientific Research 2010, Australian Museum; this nomination facilitated several media contacts with the local and German press.

Rowena Martin, ANU

- Canberra academics among finalists for top science prize. *The Canberra Times*, 23/07/2010. Topic: Finalist for the Australian Museum *Eureka Prize for Early Career Research*.
- Radio interview: ABC 666 - 22/07/2010; Presenter: Genevieve Jacobs; Duration: 6.35. Topic: Finalist for the Australian Museum *Eureka Prize for Early Career Research*.
- Eureka moment. *The Canberra Times*, 18/08/10. Topic: Australian Museum *Eureka Prize for Early Career Research*.
- Eureka moment for malaria breakthrough. Jill Rowbotham, *The Australian*, 18/08/10. Topic: Australian Museum *Eureka Prize for Early Career Research*. <http://www.theaustralian.com.au/higher-education/eureka-moment-for-malaria-breakthrough/story-e6frgcjx-1225906504294>
- Territory scientists score hat trick at Eureka awards. Ryan Young, *The Canberra Times*, 18/08/10. Topic: Australian Museum *Eureka Prize for Early Career Research*.
- Radio interview: ABC 666 - 18/08/2010; Presenter: Alex Sloan; Duration: 4.34. Topic: Australian Museum *Eureka Prize for Early Career Research*.

- Best science and nature photos awarded. *Australian Geographic*, 19/08/2010. Topic: Australian Museum *Eureka Prize for Early Career Research*. <http://www.australiangeographic.com.au/journal/eureka-science-photography-prize.htm>
- L'Oréal *For Women in Science* video [YouTube] <http://www.youtube.com/watch?v=5Eo3J5IXHcc>
- Malaria researcher honoured. Adam Carey, *The Age*, 25/08/10. Topic: L'Oréal Australia *For Women In Science Fellowship*. <http://www.smh.com.au/national/malaria-researcher-honoured-20100824-13qcs.html>
- ANU researcher recognised for malaria parasite science. Natasha Rudra, *The Canberra Times*, 25/08/10. Topic: L'Oréal Australia *For Women In Science Fellowship*. <http://www.canberratimes.com.au/news/local/news/general/anu-scientists-malaria-research-a-winner/1922500.aspx>
- Malaria researcher honoured. *WA Today.com.au*, 25/08/2010. Topic: L'Oréal Australia *For Women In Science Fellowship*. <http://www.canberratimes.com.au/news/local/news/general/anu-scientists-malaria-research-a-winner/1922500.aspx>
- Carbon emissions researcher captures prize. Jill Rowbotham, *The Australian*, 25/08/10. Topic: L'Oréal Australia *For Women In Science Fellowship*. <http://www.theaustralian.com.au/higher-education/carbon-emissions-researcher-captures-prize/story-e6frgcjx-1225909564429>
- Radio interview: 2CC News - 25/08/2010; News Director: Paris Lord; Duration: 0.33. Topic: L'Oréal Australia *For Women In Science Fellowship*.
- Radio interview: ABC 666 - 25/08/2010; Presenter: Genevieve Jacobs; Duration: 3.52. Topic: L'Oréal Australia *For Women In Science Fellowship*.
- Researcher cracks chloroquine's demise. Donald Hook, *PNG Attitude*, 27/08/2010. Topic: Australian Museum *Eureka Prize for Early Career Research* and L'Oréal Australia *For Women In Science Fellowship*. http://asopa.typepad.com/asopa_people/2010/08/researcher-cracks-chloroquines-demise.html
- TV interview: WIN Canberra 6:30 PM News - 30/08/2010; Presenter: Jessica Good; Duration: 1.54. Topic: Australian Museum *Eureka Prize for Early Career Research* and

Media and Outreach cont.

L'Oréal Australia *For Women In Science* Fellowship.

- Scientists cut through. Natasha Rudra, *The Canberra Times*, 15/09/10. Topic: Australian Museum Eureka Prize for Early Career Research, L'Oréal Australia *For Women In Science* Fellowship, and ACT Young Tall Poppy Science Award.
- Radio: 2CC 5:30 PM News - 15/09/2010; News Director: Paris Lord; Duration: 0.48. Topic: ACT Young Tall Poppy Science Award.
- Radio: 2CC 8:00 AM News - 15/09/2010; News Director: Paris Lord; Duration: 0.45. Topic: ACT Young Tall Poppy Science Award.
- The 51st Boyer Lectures series presented by Prof. Glyn Davis AC, Vice-Chancellor and Principal of the University of Melbourne, and broadcast on ABC Radio National. Lecture 3 (titled: Research! A Mere Excuse for Idleness) focused on malaria research in Australia and briefly mentioned our work on drug resistance in the malaria parasite, 28/11/2010. http://mpegmedia.abc.net.au/rn/podcast/2010/11/bls_20101128.mp3

Leann Tilley, La Trobe University

- The Australian Higher Education section, Apr 28, 2010. Jill Rowbotham interview on Super Science Fellowship. "Researchers probe the depths of deadly parasite". Photo of Leann and Jesse Clarke. <http://www.theaustralian.com.au/higher-education/researchers-probe-the-depths-of-deadly-parasite/story-e6frgcjx-1225859017717>
- Press Release July 29, 2010: Seamless Science: From High School to Post-doctoral Research Lab. 'Sleek Geeks' film highlights new approach to learning science. <http://www.latrobe.edu.au/news/articles/2010/article/sleek-geeks-eureka-prize>
- 'Eureka!' A new way of learning. La Trobe University Bulletin. August 26, 2010.
- The Age, Education, September 7, 2010. "Thinking small has its reward". Sarah-Jane Collins <http://www.theage.com.au/national/education/thinking-small-has-its-reward-20100906-14xrf.html>
- Interview with Lindy Burns, ABC 774. Malaria research and Bancroft-Mackerras medal. September 9, 2010.

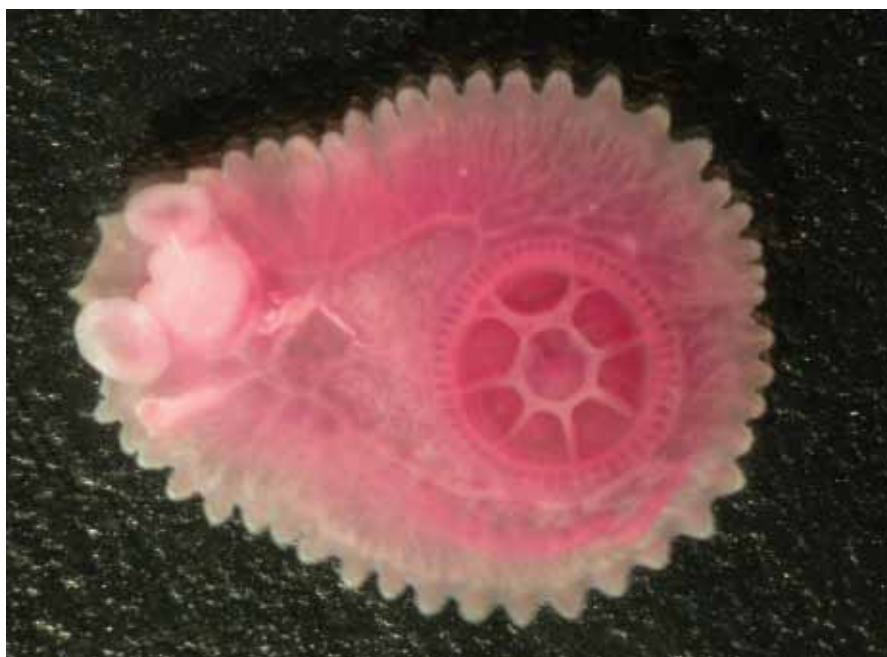
- "'Super Science' to beat the parasite". La Trobe University Bulletin. Spring-2010 <http://www.latrobe.edu.au/bulletin/spring-2010/research/super-science>
- Australian Life Scientist, Sept 2010 (Fiona Wylie). (report of interview with Trevor Smith and Leann Tilley about Super-Resolution Microscopy). "The Light Frontier" http://www.lifescientist.com.au/article/361396/australian_life_scientist_september_october_edition_now/
- In a media release entitled "Victorian Researchers to Improve Disease Management" on 25 Oct 2010, Senator the Hon Kim Carr announced that 'Researchers at La Trobe University will use a \$750,000 grant to study malarial disease transmission with a view to preventing the millions of malaria related deaths each year,' <http://minister.innovation.gov.au/Carr/Pages/VICTORIANRESEARCHSTOIMPROVEDISEASEMANAGEMENT.aspx>
- La Trobe UniNews 8 November, 2010 "La Trobe Health Researchers gain major funding awards" <https://intranet.latrobe.edu.au/uninews/publications/view/2605>
- Malaria research from Tilley lab mentioned in Glynn Davis' 2010 Boyer Lecture "The Republic of Learning" <http://www.abc.net.au/rn/boyerlectures/stories/2010/3034852.htm#transcript>
- Synergy, Summer 2011. Bulletin of the La Trobe University Faculty of Science Technology & Engineering. Women in Science. The article describes Leann Tilley work under the headline "Women are leading the way in research at La Trobe University".

Nigel Beebe, University of Queensland

- Sept 2010 in the Radio National AM Program with an interview on recent developments on mosquito olfaction

Contribution to the National Benefit

The contribution of ASP Network for Parasitology to Australia's fundamental, strategic and applied research effort is evident in the quantity and quality of publications listed in Appendix 1 for the research priorities identified at the point of origin of the Network to address Australia's National Research Priorities. With regard the Network more directly, 2010 has been a year where national and international collaboration has been strongly fostered by the Network through its Researcher Exchange, Training and Travel Fund and through the continuation of formal links with international networks in Europe and North America. Additionally, the Network has created substantial training and networking opportunities for research students and early career researchers, again through the Researcher Exchange, Training and Travel Fund. Young researchers are publishing their research undertaken on Network funding and winning grants and fellowships, either as spin-offs of research undertaken under the Network Researcher Exchange, Training and Travel Award scheme or as a result of linkages forged at Network-sponsored events. Fostering the exposure, profile and opportunities of young researchers is seen as key to the future of parasitology research in Australia and is, therefore, a high priority for the ASP Network.



Capsaloides magnaspinosus is a parasite that lives in the nostrils of the striped marlin fish, off Nelson Bay, NSW. When photographed, this worm was alive and wriggling and its natural colour is pink. Can you see the suckers it uses to grab on to its host? Images courtesy of Bronwen Cribb, Centre for Microscopy & Microanalysis, University of Queensland & Ian Whittington, Monogenean Research Laboratory, South Australian Museum.

Activities and Strategies for 2011

Future Planning

In July 2009, the Australian Society for Parasitology Inc., in the absence of continuing ARC and NHMRC funding for Research Networks, took the momentous decision to take over funding of the ASP Network for Parasitology for, at least, the next 2 years. Network staff will be retained and, in addition to managing and administering Network Researcher Exchange Travel Award Scheme, JD Smyth grants, ASP Student Travel Awards and the ASP Invited Lectureship Grants, and raising the awareness of Australian parasitology with the general public through the development of outreach initiatives, the Network will be able to further the strategic development of Australian parasitology research, helping to implement the ASP's Strategic Plan.

Statistical Snapshot 2010

Number of active members

- Australian Society for Parasitology Incorporated (ASP) had 467 financial members

Number of ECRs funded to do various activities

- 100 ASP Student Members (including research students) were given funding assistance to attend ICOPA XII via the ASP Student Conference Travel Grant Scheme.
- 15 members (representing 14 ECR's) were awarded ASP Network Researcher Exchange, Training and Travel awards in 2010.
- 9 ECRs (including research students) were awarded OzEMalaR Network Researcher Exchange, Training and Travel awards in 2010.

Number of workshops, conferences or seminars conducted

- One conference – ICOPA XII, attended by 1734 researchers

Number of visits by international researchers to Australia

- The ASP funded 3 international visitors to Australia (as invited lecturers to ICOPA XII).
- In total, 48 international visitors spent time in Australian parasitology groups during 2010 – they came from the UK (11), the USA (9), Czech Republic (2), Germany (4), Belgium (1), France (1), Israel (1), Thailand (2), Papua New Guinea(1), South Korea (1), Indonesia (2), Spain(2), Brazil (2), South Africa (5), Kenya (1), Denmark (1), Sudan (1), Uruguay (1).

Number of outreach activities including public lectures (or other forms of engagement with people outside the research community including schools, industry and government agencies)

- There were 80 reports in the media involving Network scientists in 2010 and 37 documented outreach activities where Network scientists presented to, or engaged with, the general public and/or specific community groups about their research work.

Number of publications produced

- 406 printed publications

Number of universities receiving funding

- ASP Members from 19 universities / institutions were effectively funded to attend ICOPA XII via the ASP Student Member Conference Grant scheme.
- ASP Members from 13 insitutions received support from the ASP Network Researcher Exchange, Training and Travel Fund and the OzEMalaR Researcher Exchange, Training and Travel Fund

Website

The URL of the ASP Network's web site
<http://www.parasite.org.au>

ASP Membership

A Achtman

Walter & Eliza Hall Institute
Member

R Adlard

Queensland Museum
Member

E Aitken

University Of Melbourne
Student Member

G Allerton

Merial Australia Pty Ltd
Member

C Alvarez

University of Melbourne
Student Member

G Anderson

Virbac (Australia) Pty Limited
Member

K Andrews

Griffith University
Member

R Andrews

Khon Kaen University
Member

F Angrisano

Walter and Eliza Hall Institute of
Medical Research
Student Member

B Angus

Life Member

B Anthony

Queensland Institute of Medical
Research
Member

S Apte

Queensland Institute of Medical
Research
Member

J Arundel

Fellow

A Ash

Murdoch University
State Rep, WA

A Asher

Macquarie University
Student Member

V Avery

Griffith University
Member

J Bailey

Novartis Animal Health
Member

G Banik

University of Technology, Sydney
Student Member

S Barber

University of Melbourne
Member

I Barker

University of Guelph
Life Member

S Barker

University of Queensland
Member

T Barnes

University of Queensland
State Rep, QLD

L Barnett

CQ University
Student Member

J Barratt

University of Technology, Sydney
Student Member

A Barry

Burnet Institute
Member

D Barton

South Australian Museum
Member

N Barton

Life Member

J Baum

Walter and Eliza Hall Institute of
Medical Research
Member

J Beeson

Walter and Eliza Hall Institute of
Medical Research
Member

C Behm

Australian National University
Fellow

E Bennet

Member

B Besier

Department of Agriculture & Food
WA
Member

I Beveridge

University of Melbourne
Fellow

F Bieri

Queensland Institute of Medical
Research
Student Member

P Blackburn

SARDI & University of New England
Student Member

D Blair

James Cook University
Fellow

J Boddey

Walter and Eliza Hall Institute of
Medical Research
Member

ASP membership cont.

P Boeuf

University of Melbourne
Member

J Boray

Fellow

A Botero Gomez

Murdoch University
Student Member

N Bott

SARDI
Member

V Bowles

University of Melbourne
Member

M Boyle

Burnet Institute
Member

R Bradbury

University of Tasmania
Member

A Brazenor

James Cook University
Student Member

P Brindley

George Washington University
Member

Y Brockwell

Charles Sturt University
Member

P Brook-Carter

Monash University
Member

G Brown

University of Melbourne
Member

J Browne

Melbourne Museum
Student Member

C Bryant

Fellow

M Bryant

Queensland Museum
Member

H Bullen

Burnet Institute
Student Member

T Burger

University of Queensland
Student Member

G Burgio

Menzies Research Institute
Member

M Burke

Monash University
Member

G Busch

Von Berky Veterinary Services
Member

A Butcher

SA Pathology - Microbiology and
Infectious Diseases
Member

B Callow

Fellow

S Cameron

CSIRO Ecosystem Sciences
Member

B Campbell

Member

N Campbell

Life Member

L Cannon

Fellow

C Cantacessi

University of Melbourne
Member

S Catalano

University of Adelaide
Student Member

J Chan

Burnet Institute
Student Member

X Chan

Australian National University
Student Member

S Charnaud

Burnet Institute
Student Member

R Chevis

Member

N Chilton

University of Saskatchewan
Member

C Chua

University of Melbourne
Student Member

C Chuah

Queensland Institute of Medical
Research
Student Member

S Cobbold

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2010 ASP Network Budget Report

INCOME

Carry-forward from Participating Organisations (2005-09)	\$73,094
ASP Gift	\$85,000
OzeMalaR contribution	\$18,182
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TOTAL	\$176,276

EXENDITURE

Salaries and on-costs	\$108,784
Removals and Relocations (incl. Parasites in Focus)	\$17,966
Researcher Exchange Awards	\$22,596
Conference Organisation	\$5,062
Office costs (including exhibit development)	\$22,885
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TOTAL	\$177,293

Appendix 1

PUBLICATIONS BY PARTICIPANTS OF THE ASP NETWORK FOR PARASITOLOGY IN 2010

[1] AN ENVIRONMENTALLY SUSTAINABLE AUSTRALIA

- Appelbee AJ, Thompson RC, Measures LM, Olson ME. *Giardia* and *Cryptosporidium* in harp and hooded seals from the Gulf of St. Lawrence, Canada. *Vet Parasitol.* 2010 Oct 11;173(1-2):19-23
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- Beveridge, I. & Durette-Desset, M.-C. Two new species of *Filarinema Moennig*, 1929 (Nematoda: Trichostrongylina) parasitic in macropodid marsupials. *Transactions of the Royal Society of South Australia* 134: 164-171.
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- Deveney M.R. & Whittington I.D. Three new species of *Benedenia* Diesing, 1858 from the Great Barrier Reef, Australia with a key to species of the genus. *Zootaxa* 2348: 1-22.
- Fazenda, I., Gasser, R.B., Carvalho, L. & Beveridge, I. Resurrection and redescription of *Globocephaloides wallabiae* Johnston et Mawson, 1939 (Nematoda: Trichostrongyloidea) from macropodid marsupials in north-eastern Australia. *Acta Parasitologica* 55: 138-143
- Garnick, S.W., Elgar, M.A., Beveridge, I. & Coulson, G. Foraging efficiency and parasite risk in eastern grey kangaroos (*Macropus giganteus*). *Behavioral Ecology* 21: 129-137
- Gleeson RJ, Bennett MB, Adlard RD. First taxonomic description of multivalvulidan myxosporean parasites from elasmobranchs: *Kudoa hemiscylli* n.sp. and *Kudoa carcharhini* n.sp. (Myxosporea: Multivalvulidae). *Parasitology.* 2010 Nov;137(13):1885-98.
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Appendix 2

IN 2010, AUSTRALIA'S PARASITOLOGISTS SECURED MORE THAN \$25 MILLION IN NEW RESEARCH GRANT FUNDING FROM A DIVERSE ARRAY OF FUNDING AGENCIES, BOTH AT HOME AND ABROAD:

Australian Fellowship

Prof Michael Good
Griffith University

Australian Professorial Fellow

Leann Tilley
LaTrobe University

NHMRC Senior Fellowships

Prof Marshall Lightowlers, PRF
University of Melbourne

Prof Don McManus, SPRF,
Queensland Institute of Medical Research

Dr Louis Schofield, PRF
Walter and Eliza Hall Institute of Medical Research

QEI Fellows

Dr Giel van Dooren
The University of Melbourne,

Dr Justin Boddey
Walter and Eliza Hall Institute of Medical Research,

NHMRC Career Development Fellowships

Dr Justin Boddey
Walter and Eliza Hall Institute of Medical Research

Dr Tania de Koning-Ward
Deakin University

Dr Jason Mulvenna
James Cook University,

NHMRC Training (Postdoctoral) Fellowships

Dr Adele Lehane
Australian National University
Overseas Based Biomedical Fellowship

Dr Matthew Dixon
La Trobe University
Australian Based Biomedical Fellowship

Dr Lev Kats
Monash University
Overseas Based Biomedical Fellowship

Dr Najju Ranjit
James Cook University,
Overseas Based Biomedical Fellowship

Rhodes Scholarship

Rhea Longley
Menzies Research Institute, Tasmania

NHMRC – European Union Collaborative Research Grants

Prof Geoff McFadden (The University of Melbourne)
Dr Kevin Saliba (Australian National University) and colleagues
Australia – Europe Malaria Research Cooperation – OzEMaR.

Dr Stuart Ralph (University of Melbourne)
Targeting Protein Synthesis in the Apicoplast and Cytoplasm of *Plasmodium*

Appendix 2 cont.

NHMRC Program Grant

Professors Alan Cowman, Brendan Crabb, Terence Speed, Geoff McFadden, Louis Schofield, James Beeson
Walter and Eliza Hall Institute of Medical Research, Burnet Institute, University of Melbourne
Interaction of malaria parasites with the host: disease, pathogenesis and control

NHMRC Project Grants

Dr Alyssa Barry, Prof John Reeder, Mr Livingstone Tavul
Burnet Institute
Var gene diversity and naturally acquired immunity to malaria

Dr Justin Boddey, Dr Anthony Hodder, Dr Brian Smith
Walter and Eliza Hall Institute of Medical Research
Function and inhibition of Plasmeprin V in targeting malaria virulence proteins

Dr Philippe Boeuf, Prof Stephen Rogerson, Prof Lars Hviid
The University of Melbourne
Functional assays of immunity to malaria in pregnant women

Dr Archie Clements, Dr Kate Halton, Dr Darren Gray, Dr Jaun Antonio Solon
The University of QLD
From maps to efficient multiparasite control in the Philippines

Prof Ross Coppel, Dr Casilda Black
Monash University
Functional studies on two essential rhoptry proteins of the malaria parasite

Prof Alan Cowman, Dr Melanie Rug
Walter and Eliza Hall Institute of Medical Research
Export of PfEMP1, the major virulence protein of *P. falciparum*, to the parasite infected erythrocyte surface

Prof Timothy Davis, Dr Ivo Mueller, Prof Peter Siba
The University of WA
Exploring resistance of *Plasmodium vivax* to antimalarial drugs: a retrospective and prospective study

Dr Michael Duffy, Dr Anthony Papenfuss, Prof Thor Theander, Prof Stephen Rogerson, Prof Graham Brown
The University of Melbourne
Identifying malaria PfEMP1 proteins that elicit antibodies associated with protection from cerebral malaria

Dr Walter Fairlie, A/Prof Bernd Kalinna
The University of Melbourne
Targeting Bcl-2 pathways in parasites

A/Prof Andreas Hofmann, Griffith University, and A/Prof Malcolm Jones, The University of QLD,
Roles of annexins in schistosome surface homeostasis and host-parasite interactions

A/Prof Bernd Kalinna, Prof Robin Gasser, The University of Melbourne
Somatic gene trapping in *Schistosoma mansoni*: the key to functional analysis?

Dr Rowena Martin
Australian National University
Interactions between the malaria parasite's chloroquine resistance transporter and antimalarial drugs

Prof Malcolm McConville, Dr Vladimir Likic
The University of Melbourne
Metabolomic analysis of *Leishmania* parasites; identifying metabolic pathways required for pathogenesis

Prof Malcolm McConville, Dr Stuart Ralph
The University of Melbourne
Metabolomic analysis of *Plasmodium falciparum* and mode of action of antimalarial compounds

Dr Bronwyn O'Brien, Dr Sheila Donnelly, Prof John Dalton, Dr Mark Robinson, Prof Ann Simpson
University of Technology, Sydney
Prevention of beta cell destruction in type 1 diabetes by immunotherapy using parasite derived molecules.

Prof John Reeder, Dr Alyssa Barry, Dr Ivo Mueller, Prof Peter Siba
Burnet Institute
Population genomics of *Plasmodium vivax* in Papua New Guinea

Appendix 2 cont.

DIISR International Science Linkages

Prof Nick Smith, James Cook University and **Dr Fabien Brossier**, INRA, France,

The role of proteases of the parasite, *Eimeria*, in the dissemination of the disease, poultry coccidiosis

ARC Linkage Grant

Prof Susan A Charman, Prof Richard C Thompson, Dr Martine Keenan, Dr Wayne M Best, Dr Andrea Khong, Dr Eric Chatelain

University of Melbourne and Murdoch University, in partnership with Drugs for Neglected Diseases Initiative and Epichem Pty Ltd
Rational design of new drug candidates for the treatment of *Trypanosoma cruzi* infection

ARC Discovery Project Grants

Prof Justin N Marshall, Dr Karen L Cheney, Dr Shelby Temple, A/Prof Thomas H Cribb, The University of Queensland

The functions of reef fish colour patterns: how did the coral trout get its spots?"

Prof Christopher M Bull, Dr David M Gordon,

The Flinders University of South Australia
Parasite transmission through social networks in the pygmy bluetongue lizard

Prof Leann Tilley, Dr Matthew W Dixon, LaTrobe University

Probing sexual transformation of the human malaria parasite, *Plasmodium falciparum*

Dr Michael F Duffy, Dr Anthony T Papenfuss, Prof Graham V Brown, Asst Prof Zbynek Bozdech, Asst Prof Michael S Kobor,

The University of Melbourne
Are alternative histones important regulators of transcription in *Plasmodium falciparum*?

A/Prof JeanPierre Y Scheerlinck, Dr Aaron R Jex, Prof Min Hu,

The University of Melbourne
Evaluating host-parasite interplay in individual tissues

Dr Giel G van Dooren, Prof Geoffrey McFadden

The University of Melbourne
Biogenesis of the relict plastid of Apicomplexan parasites: the role of a dynamin-related protein in apicoplast division

Dr Justin A Boddey,

Walter and Eliza Hall Institute of Medical Research.
Understanding how Plasmeprin V directs export of malaria virulence proteins to the host cell

ARC Super Science Fellowship Grant

Dr Andrew Peele and Prof Leann Tilley

La Trobe University
Nanoimaging the cellular architecture of the malaria parasite, *Plasmodium falciparum*

ARC LIEF Grants

Prof Paul F Alewood, Prof Richard J Lewis, Prof Glenn F King, Prof David J Craik, Prof Kirill Alexandrov, Dr Jason P Mulvenna, Prof Alan G Baxter, Prof Alex C Loukas, Prof David J Miller

The University of Queensland, James Cook University
High-throughput, high resolution protein-peptide sequencing and quantification facility

A/Prof Robert D Trengove, Dr Alan J Lymbery, Dr Matthew J Sharman, Prof Richard C Thompson, Prof Michael G Jones, Prof Svend P Klinken, Prof Steven M Smith, A/Prof Simon W Lewis

Murdoch University, Curtin University of Technology, Edith Cowan University, The University of Western Australia
Small biological molecule tissue imaging mass spectrometry facility for Western Australia for spatial metabolomics and lipidomics

Appendix 2 cont.

Bill & Melinda Gates Grand Challenges Grant

Prof Simon Foote, Dr Brendan McMorran and Dr Gaetan Burgio

Menzies Research Institute, Tasmania
Novel genes that provide resistance against malaria infection.

Wellcome Trust

Alyssa Barry,
Burnet Institute

To study two of the six known human malaria parasites.

Ric Price,

Menzies Institute of Medical Research,
Optimising antimalarial therapies in an area coendemic for *vivax* and *falciparum* malaria

Chris Engwerda, Trapani, J, Whisstock, J, Denny, B, Spicer, J, QLD Institute of Medical Research

SDDI Interim Funding Grant CRC for Sheep Industry Research

Brown Besier,

Department of Agriculture, WA
Improved parasite management

Brown Besier,

Department of Agriculture, WA
Wormboss website

Fisheries Research and Development Council

Ian Whittington, A.P. Shinn & J. Bron,
SA Museum and University of Adelaide,
Assessment of *in situ* monitoring techniques and life history parameters for monogenean skin and gill parasites

Merial Ltd

Jan Slapeta,

University of Sydney,
Fleas of dogs and cats in Australia

National Institute of Health, USA

P. Hotez, D. Diemert, J. Bethony, **Alex Loukas,** R. Middaugh.

James Cook University,
Development of Sm-TSP-2 schistosomiasis vaccine

Netherlands Foreign Ministry

P. Hotez, D. Diemert, J. Bethony, **Alex Loukas,**
James Cook University,

Development of the Na-GST_1 and Na-APR-1 hookworm vaccines

L'Oreal Australia

Rowena Martin,

Australian National University,
What is the normal physiological role of the malaria parasite's chloroquine resistance transporter?

QLD Government - Smart State Futures Grant

P Schaeffer, S Vasudevan, J Golledge, J Zhang, **Alex Maier,**
N Ketheesan, N Dixon,

Latrobe University,
Universal Ultrasensitive Diagnostics Platform Alliance