



Annual Report
2012



Introduction

I AM DELIGHTED TO PRESENT TO YOU THE 2012 ANNUAL REPORT FOR THE AUSTRALIAN SOCIETY FOR PARASITOLOGY INC., WHICH HAS BEEN PREPARED BY OUR ASP NETWORK TEAM, LISA JONES AND NICK SMITH.

The ASP continued to offer Researcher Exchange, Training and Travel Awards and its Mentorship Scheme in 2012. Additionally, scientific exchange opportunities for malaria researchers were provided via the OzeMalaR Researcher Exchange Scheme, which was administered by the tireless and inspiring, Lisa Jones, through the ASP Network. These small grants have proven ability to influence the careers of our young researchers and it is a thrill to see that, in 2012, several past recipients won fellowships or grants to fund their research work.

In 2012, the ASP continued to implement its Strategic Plan, most notably, launching a second spin-off journal from *The International Journal for Parasitology – IJP:PAW*, which will focus on Parasites and Wildlife. And parasitology research in Australia continued to flourish, with over 470 research papers published in 2012, more than 50 million dollars worth of grants awarded, and various honours bestowed on ASP Members.

The success of the ASP is due to the energy, time and commitment of every Member but several deserve special thanks for their efforts in 2011.

First, the Council of the Society, all of who work enthusiastically on behalf of all members. My thanks to Kathy Andrews (Treasurer), Rob Adlard (Executive Secretary), Robin Gasser (president-Elect), Richard Allen (ACT rep.), Lesley Warner (SA Rep.), Colin Stack (NSW rep.), Melanie Leef (Tasmania rep.), Jutta Marfult (NT rep.), Neil Young (Victorian rep.) Terry Miller QLD rep.), Alan Lymbery (WA rep.), Chris Peatey (Incorporatio Secretary), Roger Prichard (Bancroft-Mackerras Medal Convenor), Jason Mulvenna



ASP President, Denise Doolan

(Webmaster), Alex Loukas (IJP Editor), Kevin Saliba & Andrew Kotze (IJP:DDR Editors), Andy Thompson (IJP:PAW Editor), Haylee Weaver (Archivist), Nick Smith (Network Convenor) and Lisa Jones (Newsletter Editor and Network Communications Coordinator).

Second, the Researcher Exchange, Training and Travel Assessment Committee had an exceptionally hard job in 2012, with a huge number of quality applications to consider and limited funding to dispense. Thanks to Una Ryan (Chair), Andrew Thompson, Geoff McFadden, Malcolm Jones, Jake Baum, Rowena Martin, Kate Hutson, Brendan McMorran, Deb Holt and, of course, Nick Smith and Lisa Jones. We also thank the OzeMalaR Researcher Exchange Assessment Committee: Geoff McFadden, Denise Doolan, Ric Price, Chris Engwerda, Dominique Soldati-Favre, Andy Waters, Kevin Saliba, Klaus Lingelbach and, again, Nick Smith and Lisa Jones.

Introduction cont.

The Launceston2012 Parasitology Conference was, again, a highlight of the year, attended by over 160 delegates. The ASP is grateful to our conference organising committee, Brendan McMorran, Barbara Nowak, Gaetan Burgio, Melanie Leef, Nick Smith and Lisa Jones. The Society is also extremely thankful to Jason Mulvenna and Terry Miller, Rowena Martin and Kate Hutson for organising hugely successful training workshops on "Bioinformatics and Phylogeny", "How to Prepare a Great CV" and "How to Get Ready for a Conference and Networking", respectively, in Launceston in July. And, finally, thankyou to Lisa Jones, Ian Beveridge, Andy Thompson and Greg Woods for a thoroughly entertaining and informative Public Event in Launceston in July, 2012 – Parasite Encounters in the Wild – which enthralled members of the local public and conference delegates alike. This event was supported by a grant from the Inspiring Australia initiative. This grant, secured by Lisa Jones and Nick Smith, from the Commonwealth Government is helping the ASP further its outreach and public education ambitions, facilitating the staging of events and workshops across Australia in 2012, 2013 and 2014.

Denise Doolan
President of the ASP



Cover

ASP Student Member Marina Tai is a postgraduate student at The University of Adelaide, School of Animal and Veterinary Sciences, studying wildlife parasitology. She is pictured here enjoying an outing to Trowunna Wildlife Park during the 2012 ASP Conference in Tasmania.

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ASP Network

THE MISSION OF THE ASP 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 ASP, through its Network aims to:

- organise and fund 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

ASP Members contribute to all four of Australia's stated research priorities (see the publication lists in Appendix 1 of this annual 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 ASP 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



ASP Network cont.

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 ASP 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 ASP 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, emerging and re-emerging parasitic diseases, as well as monitoring of endemic parasites is a key priority. The specific objectives of the ASP 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 ASP 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 ASP 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, University of Tasmania), Dr Kate Hutson (James Cook University), Dr Jake Baum (Walter and Eliza Hall Institute of Medical Research) and Dr Deb Holt (Menzies School, Darwin).



*This page and previous
Scenes from the Launceston 2012 Conference*

Progress on Initiatives

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

Website and Newsletter

The ASP website is administered by Dr Jason Mulvenna and Lisa Jones and the address is www.parasite.org.au. An important addition to the website in 2012 was the Pugh Parasitology Collection of images for research and education. The ASP Annual Conference website is www.parasite.org.au/arcnet and is administered by Lisa Jones. The ASP Newsletter was published four times in 2012, 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.

ASP Annual Conference

The 2012 annual meeting of the Australian Society for Parasitology Inc. was held at Country Club Tasmania, 2-5 July 2012 and attracted 212 International and Australian delegates. The meeting was a great success with 163 registered delegates attending, enjoying the unique, collegial atmosphere of a fully residential conference with several innovations in the program enabling ample time for networking and plotting future collaborations.

The program was typically multidisciplinary and included the following themes and invited speakers:

Elsevier Lectures

David Sacks (National Institutes of Health, USA), IJP Lecturer
Geoff McFadden (University of Melbourne), IJP:DDR Lecturer

Marine Parasitology

Stewart Johnson (Department of Fisheries and Oceans Canada)
Brian Jones (WA Fisheries)
Barbara Nowak (University of Tasmania)
Terry Miller (Queensland Museum)

Malaria

James Beeson (Macfarlane Burnet Institute)
Brendan McMorrin (University of Tasmania)
Jennifer Reiman (Griffith University)

Fasciola (sponsored by Virbac)

Carlos Carmona (Instituto de Hygiene, Uruguay)
Terry Spithill (LaTrobe University)
Grace Mulcahy (University College Dublin)

New Technologies

Simon Foote (Macquarie University)
Stuart Ralph (University of Melbourne)

A free public event, *Parasite Encounters in the Wild*, was held on Monday 2nd July at 6pm and audience numbers approximated 200. Presenters were **Greg Woods** (University of Tasmania), **Ian Beveridge** (University of Melbourne) and **Andy Thompson** (Murdoch University). In parallel, a "Parasitology Workshop for Kids" was held, so that local children (and children of conference delegates!) could get a taste for parasitology, science and wildlife.

For the second time this year in conjunction with the ASP conference, an ASP Workshop was held, this time at the Launceston Campus of the University of Tasmania. This workshop was offered to students and early career researchers (ECRs). The theme was *Bioinformatics and Phylogeny* and participants have reported that both workshops were a wonderful learning opportunity, exceptionally well run (by **Jason Mulvenna** [QIMR] and **Terry Miller** [QLD Museum]) and great fun. Additionally, students and ECRs were extremely fortunate to have **Rowena Martin** (ANU) and **Kate Hutson** (JCU) run career development workshops on "How to prepare a great CV" and How to get yourself ready for conferences and networking", respectively – both extremely well attended, enjoyable, practical and informative workshops.

Progress on Initiatives cont.



Molecular Approaches to Malaria Conference

The 4th Molecular Approaches to Malaria Meeting was held from 19 - 23 February 2012, at the Mantra Erskine Beach Resort, Lorne, Australia. MAM2012 was a huge success, attended by nearly 400 researchers from across the world. Scientific presentations focussed on the latest developments in malaria research, covering the spectrum in molecular advances from protein structure and single molecule imaging, cell biology and pathogenesis, right through to host immunity, systems biology and the latest developments in drug discovery/resistance and vaccines – all with an emphasis on cutting edge molecular approaches. The two focused workshops on systems approaches to malaria research, drug discovery, and strategies towards the development of a complete *in vitro* parasite lifecycle were very popular as was the Early Career Researcher Breakfast event.

Northern Australia Malaria Symposium

The 2nd Northern Australia Malaria Symposium took place on Monday 23 April 2012 and was supported by Queensland Institute for Medical Research, Queensland Tropical Health Alliance and the Australian Society for Parasitology Inc. Following the scientific program, a free public forum on malaria was held featuring Prof Tom Burkot,

orchestrator of the Vector Control Development Network, from James Cook University.

Researcher Exchange, Training and Travel Awards

In 2012, 27 Network or OzeMalaR Researcher Exchange, Training and Travel Awards were provided, most going to students or ECRs for visits to overseas laboratories and training courses:

Maya Olshina, PhD Student, Walter and Eliza Hall Institute, Department of Medical Biology, University of Melbourne, for a Researcher Exchange to visit Kovar Lab, Cummings Life Science Centre, University of Chicago West Campus;

Luz Adriana Botero Gomez, PhD student, Murdoch University for a Researcher Exchange to Department of Microbiology and Molecular Genetics, The Hebrew University-Hadassah Medical School, Jerusalem, Israel;

Alexander Brazenor, PhD student James Cook University for a Researcher Exchange to Whittington Laboratory, University of Adelaide/SA Museum;

Above
MAM2012, Lorne

Progress on Initiatives cont.

Hong You, Research Officer, QIMR for a Researcher Exchange to Yerkes National Primate Research Centre, Emory University, USA;

Barbara Nowak, NCMCRS University of Tasmania for a Parasitic diseases in fish mariculture workshop University of Tasmania;

Clare Smith, University of Tasmania/ Menzies Research Institute Tasmania for a researcher exchange to investigate the role of host enzymes in the liver-stage of malarial infection in the laboratory of Maria Mota, Malaria Unit, Institute of Molecular Medicine, University of Lisbon;

Melanie Shears, PhD candidate, McFadden Laboratory, The School of Botany, The University of Melbourne for the Metabolomics of Protozoan Parasites Workshop, University of Glasgow and Strathclyde University;

Cyrille Botté, Research Fellow, McFadden Laboratory, The School of Botany The University of Melbourne, for the Metabolomics of Protozoan Parasites Workshop, University of Glasgow and Strathclyde University;

Ghizal Siddiqui, PhD student, Monash University, Cooke Laboratory, for a researcher exchange to the laboratory of Leicester University, Tobin Laboratory to gain technical expertise;

James Pham (Bio21 Institute, The University of Melbourne) for a Researcher Exchange to Hou Laboratory, Philadelphia and to attend Biology of Parasitism, Marine Biological Laboratories;

Leigh Schulte (QIMR) for a Researcher Exchange to laboratory of Dr Conor Caffrey, University of California San Francisco;

Catherine Gordon (QIMR) for a Researcher Exchange to Pontifical Catholic University of Rio Grande do Sul (PUCRS), Porto Alegre, Brazil;

Severine Navarro (James Cook University) for Researcher

Exchanges to TWINCORE Zentrum fur Experimentelle und Klinische Infektionsforschung in Hannover, Germany, for animal lymph node transplantation and an Exchange to the Laboratory for Infectious Diseases, Autoimmunity and Allergies INSERM 924 at the Institut de Pharmacologie Moléculaire et Cellulaire in Sophia Antipolis, France, for Invasive Plethysmography training;

Pravin Rajasekaran (Infection and Immunity Division, Walter & Eliza Hall Institute) for a Researcher Exchange to visit Professor Robert Menard at Pasteur Institute, Paris, France;

Michelle Boyle (Burnet Institute) for a Researcher Exchange to visit Kenya Medical Research Institute, Peter Bull to use plasma samples available in Kilifi to investigate the role of complement in humoral immunity targeting P.falciparum infected RBCs (pRBCs) and develop assays to measure complement fixation by antibodies;

Dr Simon Apté, (QIMR, Molecular Vaccinology) to attend Cyto2012, Workshop - Malaria Cytometry in Leipzig Germany and then a Researcher Exchange to National Institute for Medical Research, Mill Hill, London; Prof. Jean Langhorne's Laboratory to help the host immune response to infection, in particular the role of CD4+T cells;

Uyen To Nguyen (Research School of Biology, The Australian National University) for a Researcher Exchange to visit Odile PUJALON Institut Pasteur, Molecular Parasite Immunology Unit, Dept of Parasitology and Mycology to learn protocols and techniques in tissue culture and in the manipulation of isolated perfused human spleens and micro-beads systems and then conduct the perfusion experiments with human spleen;

Brioni Moore, Postdoctoral Research Scientist The University of Western Australia, based at the Vector Borne Disease Unit, Papua New Guinea Institute of Medical Research to attend 31st European Course in Tropical Epidemiology (ECTE) at Barcelona Institute for Global Health (ISGlobal) and the Barcelona Centre for International Health Research (CRESIB) in Barcelona, Spain;

Felicity Smout, PhD student, James Cook University for a Researcher Exchange to visit Murdoch University School of

Progress on Initiatives cont.

Veterinary and Biomedical Sciences Parasitology Section, Western Australia.

Michael Smout, Postdoctoral Scientist, James Cook University, for a Researcher Exchange to Belo Horizonte (Brazil) in Jeff Bethony's Lab testing STH treatment trial samples (four weeks) and San Diego (USA) obtaining parasite samples from Ray Kaplan (University Georgia);

Hayley Bullen, PhD student, The Burnet Institute, Crabb/Gilson laboratory for a Researcher Exchange to visit University of Geneva, Soldati-Favre laboratory;

Dr Sarah Auburn, Menzies School of Health Research, Darwin, Crabb/Gilson laboratory for a Researcher Exchange to visit Wellcome Trust Sanger Institute, Cambridge, UK April 4th- 13th 2012 Sequenom genotyping in Plasmodium isolates and to attend a workshop at University of Leipzig, Leipzig, Germany March 17th- April 1st 2012 Programming for Evolutionary Biology;

Charlie Jennison, PhD student, Walter and Eliza Hall Institute, Barry laboratory for a Researcher Exchange to visit Sanger Institute, UK, Matt Berriman and Sutherland laboratory, LSHTM;

Dr Philippe Boeuf, Research Fellow, The University of Melbourne for a Researcher Exchange to visit Pr Hviid's laboratory (Surface team), Centre for Medical Parasitology, Copenhagen, Denmark;

Dr Sarah Erickson, The Walter and Eliza Hall Institute of Medical Research, Cowman laboratory, for a Researcher Exchange to visit Imperial College London, Dr. Robert Sinden Laboratory, Centre for Clinical Malaria Studies, Nijmegen, The Netherlands, Laboratory of Dr. Robert Sauerwein, Leiden Malaria Research Group, Leiden, The Netherlands Dr. Chris J. Janse Laboratory, University of Glasgow, Scotland, Dr. Lisa Ranford-Cartwright Laboratory;

Chaitali Dekiwadia, PhD, Postdoc Research Officer, Laboratory of Dr. Stuart Ralph, Department of Biochemistry and Molecular Biology, The University of Melbourne for a Researcher Exchange to visit Dr. Friedrich Frischknecht Universitätsklinikum Heidelberg Dept. Fur Infektiologie,

Parasitologie Heidelberg, Germany to gain practical and theoretical experience in cryoelectron tomography, a method that is expertly practiced in EviMalar Laboratories at the University of Heidelberg;

Carla Proietti, PhD, Post-doctoral fellow, Molecular Vaccinology Laboratory (Doolan Laboratory), Queensland Institute of Medical Research for a Researcher Exchange to visit the Laboratory of Professor Chris Newbold, Weatherall Institute of Molecular Medicine, University of Oxford, UK, and Wellcome Trust Workshop "Working with Parasite Database Resources", Wellcome Trust Sanger Institute (WTSI), Hinxton, UK.

ASP Student Conference Travel Grant

The following 65 ASP students were awarded 2012 ASP Student Conference Travel Grants:

Harshanie Abeywardena, Amanda Ash, Gouri Banik, Kawthar Barkat, Dylan Hamilton, Adriana Gomez, Alex Brazenor, Mariana Brizuela, Julie Burel, Alice Butterworth, Timothy Cameron, Sarah Catalano, Sarah Charnaud, Vanida Choomuenwai, Candy Chuah, Stewart Dick, Timothy Elliott, Brendan Elsworth, Samantha Emery, Gillian Fisher, Christie Foster, Laura Gonzalez, Catherine Gordon, Andreas Greth, Katherine Harvey, Alison Hillman, Elinor Hortle, Hong Huang, Fran Jones, Wan Koh, Melanie Koinari, Heng Leow, Yee Leow, Melissa Martin, Rachael McGeorge, Hamish McWilliam, Adebayo Molehin, Hugh Murray, Catarina do Carmo Norte dos Santos, David Pattinson, Amanda Peers-Adams, Sarah Preston, Shiwanthi Ranasinghe, Sashika Richards, William Ritchie, Ranbir Sarai, Leigh Schulte, Sophie Schussek, Philippa Sharman, Yunliang Shi, Clare Smith, Felicity Smout, Yasmin Sultana, Robert Summers, Dulangi Sumnadasa, Marina Hsiang Hua Tai, Uli Terheggen, Erick Tjhin, Hayley Toet, Alejandro Trujillo, Hoai Dinh Truong, Grennady Wirjanata, Caroline Wohlfeil, Rina Wong, and Amanda Worth.

Progress on Initiatives cont.

CASE STUDY 1: HONG YOU

Hong You graduated in 2010 with a PhD from her research on *Schistosoma japonicum* vaccine (IJP, August 2012) and won an NHMRC Fellowship and ASP Network for Parasitology Researcher Exchange Travel Award. Hong You talks to Lisa Jones about her research.

Hong You tell us the story about your work on *Schistosoma japonicum* vaccine?

My research is focusing on characterization and vaccine efficacy of *Schistosoma japonicum* insulin receptors. My previous studies suggest that host insulin is essential for schistosome growth, development and maturation. Schistosomes exploit host hormones and nutrients for their survival; indeed, schistosomes consume their dry weight of glucose every 5 hours. We found *S. japonicum* insulin receptors (SjIRs), can bind human insulin, which is postulated to result in downstream signal transduction which modulates schistosome glucose uptake. Encouragingly, in murine vaccine/challenge experiments, vaccination of mice with SjIRs resulted in consistently significant reduction in faecal eggs (56-67%), stunting of adult worms (12-42%), reduction in liver granuloma density and reduction in the numbers of mature intestinal eggs. Based on the fact that schistosome eggs are responsible for both pathology and disease transmission, a vaccine targeting parasite fecundity within the definitive host and/or egg viability, is an entirely relevant vaccine approach.

Your IJP publication reports your results from vaccine development work. Tell us what happens next in this vaccine research?

As now recognised, bovines are the major animal reservoir host for *S. japonicum* in China, being responsible for up to

90% of environmental egg contamination. A mathematical model of schistosome transmission has predicted that schistosome vaccines capable of reducing water buffaloes' fecal egg output by 45%, alone or in conjunction with praziquantel treatment, will lead to a significant reduction in transmission of schistosomiasis. The development of a vaccine based on rSjIRs as a transmission blocking vaccine for preventing transmission of zoonotic schistosomiasis targeting bovines is feasible. My next aim is to do vaccine / challenge against *S. japonicum* infection in water buffalo in China or Philippines as in the Chinese setting.

You have recently won a Peter Doherty - Australian Biomedical Fellowship "Identifying Genes Associated with Parasitism, and Novel Drug and Vaccine Targets?" what will you be doing as part of your Fellowship?

My previous research showing that the host-parasite interaction involves very important pathways enabling parasites to survive in their mammalian hosts. In this project, through the use of bioinformatic methods, I will focus on the initial *in silico* identification of gene functions and pathways important in the host-parasite interaction and aims to reveal novel potential drug and vaccine targets against schistosomes.



Progress on Initiatives cont.

You have also recently won an ASP Network for Parasitology Researcher Exchange Travel Award for a trip to Prof. Francois Villinger's laboratory at Yerkes National Primate Research Centre, Emory University, Atlanta, USA, tell us about this trip?

I have finished the exchange trips. I visited Prof. Francois Villinger's laboratory twice this year during 1 June -22 June which was supported by ACVD (Australian Center for vaccine development) and 4 Nov to 16 Dec which was supported by an ASP Network for Parasitology Travel Award.

The reason for the travel was for me to visit Prof. Francois Villinger's laboratory to conduct research. The primary research interests of the Villinger laboratory focus on infectious diseases and immune responses to pathogens, including immunopathological mechanisms and the exploration of protective vaccines. Importantly, the technologies they are using in their current projects are highly relevant and complementary with my own interests in immunology and vaccinology.

I also under took some bench work in Villinger Lab including reconstruction *S. japonicum* insulin receptors into pMT vectors for further expression of the secreted recombinant protein in the S2 cell system. There are great features in this insect expression system including higher protein yields than mammalian systems, easy high-density cell culture, and non-lytic expression for reduced degradation. This technique will be very useful in my future protein and vaccine work. The aims of the proposed travel also included: To investigate the immune response of mouse co-infected with HIV/ Schistosoma by identifying of unique chemokine/cytokine biomarker signatures for schistosoma/HIV mono-infections vs. co-infection. To investigate the cytokine analysis (such as ELISPOT, proliferation assays) generated by *S. japonicum* insulin receptors which I have shown are encouraging vaccine candidates. During my visit, I was able to speak with each member of the Villinger team on a one-on-one basis, gaining valuable tips for investigating further the immune

response generated by *S. japonicum* insulin receptors which I have shown are encouraging vaccine candidates. I received a lot of good suggestions for future work including how to undertake ELISPOT, proliferation assays for cytokine analysis in my future planned animal studies.

We wish Hong You all the best during her Fellowship and look forward to hearing about how her research progresses.

* Hong You, Geoffrey Gobert , Mary Duke , Wenbao Zhang, Malcolm Jones and Donald McManus Queensland Institute of Medical Research (QIMR) and Yuesheng Li, Hunan Institute of Parasitic Diseases, Yueyang, China and QIMR, published their article "The insulin receptor is a transmission blocking veterinary vaccine target for zoonotic Schistosoma japonicum" in the August 2012 edition of International Journal for Parasitology (42:09). Hong You graduated with a PhD from this research in 2010.

This publication can be downloaded from <http://www.sciencedirect.com/science/article/pii/S0020751912001543>

Progress on Initiatives cont.

CASE STUDY 2: KENYAN WORKSHOP

Four Australian parasitologists join a Fish Parasitology workshop in Kenya.

The ASP and the University of Queensland sponsored four parasitologists, Tom Cribb, Ian Beveridge, Rob Adlard and Bob Lester to join a Fish Parasitology workshop on Lake Victoria, part of a proposal developed with the Kenya Marine and Fisheries Research Institute (KMFRI) to build capacity in Kenya in fish parasitology and fish health. On February 5th we met with other participants from France, Congo and Kenya in Kisumu. It was not possible to use the facilities at the KMFRI research station so Dr Obiero, Executive Director of Osienala (Friends of Lake Victoria), offered us facilities and discount accommodation at his Mbita Tourist Hotel.

Fish for examination were caught by local fishermen in small gaff-rigged boats, parasitological methods demonstrated and parasites stored for further analysis. Of the parasites found, an unusual digenetic from the urinary bladder of catfish has become the focus of a local project, Dr Scholtz, Czech Republic, has expressed great interest in the cestodes, and identification of parasites possibly valuable for separating stocks of Nile perch is underway. Monogenean and haematological results will be available shortly. Mr Caleb Ogwai, the KMFRI parasitologist, has since applied to Ausaid for a Ph.D. scholarship to study fish parasitology under Dr Cribb at the University of Queensland.

KMFRI staff keen to learn about fish parasites and aquatic disease were interviewed (by RJGL) in Mombasa and Kisumu. Two, Wilson and Abwao, conformed to the desired attributes for scholarship applicants specified by the Kenyan government and have since applied to Ausaid for master's scholarships for postgraduate work in fish health and related areas at the University of Queensland and the University of Tasmania. They were not permitted to join the workshop apparently because sufficient Kenya funds were not available. Before leaving for Kenya, we received a request that the workshop be rescheduled but this was not an option available to us.

Prof Aloo, Chair of KMFRI, has since requested Memoranda

of Understanding (MOUs) be established between KMFRI, Moi University and the University of Queensland for training in fish parasitology and fish health and this is being followed up. Prof Okeyo, Director of VIRED (Victoria Institute for Research on Environment and Development, Kisumu), is also very interested in developing a capability in fish parasitology and fish health assessment. He has prepared a long MOU between VIRED and UQ which is currently under review by the UQ Legal Office. An MOU in fish parasitology has also been proposed between Moi University and the University of Johannesburg through Prof Annemarie Oldewage who had originally hoped to be a participant in the workshop.

Because of financial and other obstacles in Kenya, the workshop was smaller than planned. Old hands shrug their shoulders and say by way of explanation, 'Welcome to Africa'. Tony Blair claims that 'Africa is on the move' (CEO Summit Africa, 19 March, 2012). From our experience, two steps forward are followed by one step back. With the ASP support, fish parasitology in Kenya is at least one step further along.



Progress on Initiatives cont.

Images from Kenya

Previous page: Tom Cribb and Ian Beveridge on the shore of Lake Victoria 'spreading the word' to locals.

This page: participants in the workshop, Caleb Ogwai (Kenya) and Fidel Bukiinga (Republic of Congo) purchasing fish for dissection from the local Mbita fishermen who are just landing their catch.



Significant Contributions and Highlights for 2012

2012 WAS ANOTHER YEAR OF RECONITION FOR AUSTRALIA'S PARASITOLOGY STARS.

2012 saw an outstanding scientist, **Malcolm McConville**, of The University of Melbourne, awarded the ASP's Bancroft Mackerras Medal at the Launceston Conference for his pioneering work on parasite metabolomics. This is the most prestigious award presented by the Society and recognises outstanding contributions to the science of parasitology, particularly over the last 5 years. At the same meeting, **Christina Spy**, of the Australian National University, received the John Frederick Adrian Sprent Prize for her thesis entitled, "Targeting the utilisation of pantothenate by the malaria parasite Plasmodium falciparum." This prize is awarded to a member of the ASP who has written an outstanding PhD thesis in parasitology during the previous 3 years. And, again at its annual meeting, the ASP recognised the lifetime achievements in research on anaerobic protozoa of two of its finest scientists, **Jacqui and Peter Upcroft**, of the Queensland Institute of Medical Research, by making them Fellows of the Society.

The ASP recognised three of its young rising-stars by awarding them a JD Smyth Award: James Pham (University of Melbourne), Leigh Schulte (Queensland Institute of Medical Research) and Maya Olshina (Walter and Eliza Hall Institute of Medical Research).

The Society also recognised the research achievements of several outstanding students and early career researchers at its 2012 conference: **Wan Koh**, Murdoch University, won best Student Poster prize for "The replication of Cryptosporidium parvum in artificial Pseudomonas aeruginosa biofilm systems"; **Elinor Horte**, Menzies Research Institute, University of Tasmania, won best ASP Student Oral Poster presentation for "Investigating New Host Factors Involved in Malaria Resistance"; **Nicole Kirchhoff**, University of Tasmania, won best Student Oral Presentation for "Current research on blood fluke *Cardicola forsteri* infection of farmed southern bluefin tuna" (and was chosen for Fresh Science 2012); and **Michael Smout**, James Cook University, won best Early Career Researcher Presentation for "A granulin growth factor secreted by the carcinogenic liver fluke, *Opisthorchis viverrini*, and the role it plays in carcinogenesis."

The ASP also recognised three international colleagues with ASP 2012 International Invited Lectureships:

Prof. Grace Mulcahy (University College Dublin, Ireland), an internationally recognised expert on veterinary parasites;

Prof. David Sacks, (National Institutes of Health, USA), a leading Leishmania biologist;

Prof. Carlos Carmona (University of the Republic, Montevideo, Uruguay), a leader in research on helminths.

Other ASP Members honoured in 2012 included:

Ian Beveridge (University of Melbourne), who was made an Honorary Member of the World Association for the Advancement of Veterinary Parasitology, an honour conferred only on persons who have contributed in a distinguished manner to the advancement of veterinary parasitology internationally, and Ian was also awarded the Distinguished Service Award of the Wildlife Disease Association at their international meeting in Lyon, France in July;

Brian Cooke (Monash University), who won the 2012 Hemorheology and Microcirculation Award from the International Society for Clinical Haemorheology, which was presented to him at the 7th International Conference on Hemorheology and the 14th International Congress on Biorheology, held July 4-7, 2012 in Istanbul, for his work on "Parasitic infections of red blood cells";

Alan Cowman of WEHI, who was named a Howard Hughes Medical Institute Senior International Research Scholar, his fourth award from the institute;

Alex Loukas (James Cook University), who received a Fulbright Senior Scholarship;

Cinzia Cantacessi (James Cook University), awarded The University of Melbourne Chancellor's Prize for Excellence in a PhD Thesis (which she completed at The University of Melbourne);

Susan Charman (Monash University) and colleagues, who were awarded the Medicines for Malaria Venture Drug Discovery Project of the Year 2012, awarded to the project team from University of Cape Town, Monash University and Swiss Tropical and Public Health Institute for the discovery of the preclinical antimalarial candidate, MMV390048;

Significant Contributions cont.

Michelle Power (Macquarie University), awarded the Macquarie University 2012 Vice Chancellors Teaching Award (Early Career), the Macquarie University Faculty of Science 2012 Excellence in Teaching Award, and the 2012 Huw Smith Award for Excellence in Research, Teaching and Communication of Cryptosporidium and/or Giardia.

Shokoofeh Shamsi (Charles Sturt University), who was awarded a Fresh Science Scholarship;

Nick Anstey (Menzies School of Health Research), co-opted as a member of the World Health Organisation's Technical Expert Group on Malaria Chemotherapy and Reviewer for WHO's "Management of Severe Malaria - a Practical Handbook, 2012";

Robin Gasser (University of Melbourne), who won an Alexander von Humboldt Professorial Research Prize, and an Ian Clunies Ross Memorial Award (from the Australian and New Zealand College of Veterinary Scientists);

Alex Maier (ANU), awarded the Top Supervisor Award of the Australian National University, 2012;

Chris Tonkin (WEHI), winner of the Australian Society for Biochemistry and Molecular Biology BioPlatforms Award 2012;

Barbara Nowak (University of Tasmania), who won a 2012 B-HERT Best Research and Development Collaboration Honourable Mention for the project, "Maintaining SBT High Health Status – understanding SBT parasites and



Above Alan Cowman, Howard Hughes Medical Institute Senior International Research Scholar. Image courtesy of WEHI.

Significant Contributions cont.

investigating ways to mitigate their influence on SBT production";

Jake Baum (WEHI), winner of the City of Paris, Senior Researcher in Paris Award.

In a challenging funding environment, ASP members enjoyed some great successes in 2012, winning 63 new research grants and fellowships, securing over \$50 million of funding, from a diverse array of funding agencies, both at home and abroad. These are presented as Appendix 2.

With over 470 publications involving Australian parasitologists in 2011 (see Appendix 1), there were innumerable highlights. However, at least a few deserve special mention. First, biodiversity was a strong theme with Australian contributions to two very important papers:

Tom Cribb was part of an impressive team that produced an even more impressive documentation of "The magnitude of global marine species diversity" (*Curr Biol*. 2012 Dec 4;22(23):2189-202); and **Geoff McFadden** was, likewise, part of a large international team that added significantly to our knowledge about the evolution of nucleomorphs in diverse eukaryotic cells (*Nature*. 2012 Dec 6;492(7427):59-65), a topic increasingly pertinent to the biology of apicomplexan parasites. Important advances were made in the discovery of novel targets and drugs for control of parasitic disease, with significant contributions coming from **Ariel Achtman, Sandra Pilat-Carotta, Louis Schofield** and team (*Sci Transl Med*. 2012 May 23;4(135):135ra64) and **Susan and Bill Charman** and collaborators (*Proc Natl Acad Sci U S A*. 2012 Oct 16;109(42):16823-8; *Proc Natl Acad Sci U S A*. 2012 Sep 25;109(39):15936-41), including the discovery of a class of drugs that can potentially attack the tissue-cyst stage of *Toxoplasma gondii*, a developmental form of parasite that has resisted chemotherapy until now. The discovery of the mechanism that enables platelets to recognise Plasmodium-infected red blood cells and kill the parasite within by **Brendan McMorran, Laura Wieczorski, Karen Drysdale, Jo-Anne Chan, Hong Ming Huang, Clare Smith, Chalachew Mitiku, James Beeson, Gaetan Burgio** and **Simon Foote** (*Science*. 2012 Dec 7;338(6112):1348-51) was a major immunological advance that may also indicate why some people are susceptible to malaria. At the same time, **Ivo Mueller** and colleagues gave us a powerful new way to analyse malaria parasite transmission, human susceptibility to infection and disease, and the efficacy of any new control strategies (*Proc Natl Acad Sci U S A*. 2012 Jun 19;109(25):10030-5).

And, the unveiling of the genome sequence of *Schistosoma haematobium* by **Neil Young, Aaron Jex, Cinzia Cantacessi, Andreas Hofman, Bronwyn Campbell, Robin Gasser** and colleagues (*Nat Genet*. 2012 Jan 15;44(2):221-5) gave us a crucial new tool for understanding the biology of schistosomes at a fundamental level and for the discovery of new targets to attack with drugs and vaccines.

Marshall Lightowlers and his team from The University of Melbourne featured in NHMRC's "Ten of the Best Research Projects 2012" publication with his story entitled, "Breaking the life cycle: stopping the transmission of parasitic disease."

Finally, a major highlight for the ASP in 2012 was the launch of a spin-off journal from The International Journal for Parasitology – International Journal for Parasitology: Parasites and Wildlife. This was a direct result of yet another idea discussed at the ASP's Strategic Planning Workshop in February, 2010, that has already became a reality.

IJP:PAW was launched at the Wildlife Diseases Association Conference in Lyon at the end of July. The mandate of this journal is to publish the results of original research on parasites of all wildlife, invertebrate and vertebrate. This includes free-ranging, wild populations, as well as captive wildlife, semi-domesticated species and farmed populations of recently domesticated or wild-captured species. Andy Thompson and Lydden Polley are Co-Chief Editors for IJP:PAW. The rationale behind this journal, as noted by Andy, is that unless the aetiological agent(s) of disease are of zoonotic significance, impact on livestock or in zoo animals, they are not covered by more general veterinary parasitology journals and, thus, there appears to be a real need for a journal in this space.

More information about the scope of articles accepted for submission are available at <http://www.journals.elsevier.com/international-journal-for-parasitology-parasites-and-wildlife/>. Article submissions for IJP:PAW can be made at <http://ees.elsevier.com/ijppaw/>.

The following leading scientists make up the editorial board of IJP:PAW:

- **Amanda Ash**, Murdoch University, Murdoch, WA
- **Ian Beveridge**, University of Melbourne, Parkville, VIC
- **Mike Bull**, Flinders University, Adelaide, SA

Significant Contributions cont.

- **Neil Chilton**, University of Saskatchewan, Saskatchewan, SK, Canada
- **Doug Colwell**, Agriculture and Agri-Food Canada (AAFC), Lethbridge, AB, Canada
- **Thomas Cribb**, University of Queensland, Brisbane, QLD
- **Vanessa Ezenwa**, University of Georgia, Athens, GA, USA
- **Mark Forbes**, Carleton University, Ottawa, ON, Canada
- **Alvin Gajadhar**, Canadian Food Inspection Agency (CFIA), Saskatchewan, SK, Canada
- **Cam Goater**, University of Lethbridge, Lethbridge, AB, Canada
- **Stephanie Godfrey**, Murdoch University, Murdoch, WA
- **Russel Hobbs**, Murdoch University, Murdoch, WA
- **Eric Hoberg**, U.S. Department of Agriculture (USDA), Maryland, MD, USA
- **Emily Jenkins**, University of Saskatchewan, Saskatchewan, SK, Canada
- **Damian Joly**, Wildlife Conservation Society, Nanaimo, BC, Canada
- **Susan Kutz**, University of Calgary, Calgary, AB, Canada
- **Alan Lymbery**, Murdoch University, Murdoch, WA
- **David Marcogliese**, Environment Canada, Montreal, QC, Canada
- **Hamish McCallum**, Griffith University, Nathan, QLD, Australia
- **Lena Measures**, Fisheries and Oceans Canada, Mont Joli, QC, Canada
- **Andrei Mihalca**, University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania
- **Eric Morgan**, University of Bristol, Bristol, UK
- **Antti Oksanen**, University of Helsinki, Helsinki, Finland
- **Robert Poulin**, University of Otago, Dunedin, New Zealand
- **Annapaola Rizzoli**, Fondazione Edmund Mach, S. Michele all'Adige (Trento), Italy
- **Marie-Pierre Ryser-Degiorgis**, Universität Bern, Bern, Switzerland
- **Tony Sainsbury**, Zoological Society of London, London, UK
- **Lee Skerratt**, James Cook University, Townsville, QLD
- **Jan Šlapeta**, University of Sydney, Camden, NSW
- **Nico Smit**, North West University, Potchefstroom, South Africa
- **Andrew Smith**, Chevron Australia Pty Ltd, Perth, WA
- **David Spratt**, CSIRO (The Commonwealth Scientific and Industrial Research Organization), Canberra, ACT
- **Sam Telford**, Tufts University, North Grafton, MA, USA
- **David Thielges**, Nederlands Instituut voor Onderzoek der Zee (NIOZ), Den Burg, Netherlands
- **Daniel Tompkins**, Landcare Research, Dunedin, New Zealand
- **Michael Yabsley**, University of Georgia, Athens, GA, USA



Significant Contributions cont.

CASE STUDY 3 CINZIA CANTACESSI

Dr Cinzia Cantacessi is a postdoctoral researcher at the Queensland Tropical Health Alliance Research Laboratory, James Cook University (Cairns). It has been a big year for Cinzia, being awarded The University of Melbourne Chancellor's Prize for Excellence in a PhD Thesis and an NHMRC Peter Doherty - Australian Biomedical Fellowship for her research on "Hookworm proteins as novel anti-inflammatory therapeutics". Cinzia speaks to Lisa Jones about her career, her research and her recent successes.

Robin Gasser, who collaborated with Professor Otranto. Cinzia found her PhD a great experience. Her PhD started out as a diagnostics project but, because bioinformatics was experiencing a boom in veterinary and parasitology research, she embraced this new technology, with Robin's blessing, and stunning success followed.

Cinzia looked at molecular pathways of nematodes, focusing particularly on differences between different life cycle stages and adult males and females. She was a novice at bioinformatics, which proved to be an advantage, because it led her to develop a pipeline workflow for researchers not familiar with bioinformatics. "Researchers can use this software workflow for other parasites, it is applicable to other organisms," explained Cinzia. "And, from a drug development perspective, sequencing and bioinformatics has a future using these technologies because it helps to find new targets for drugs and understanding molecular biology" said Cinzia.

Cinzia published 10 papers before submitting her PhD and contributed to 20-30 other papers as a co-author; she finished her PhD in 3 years with over 50 publications and



also presented at International conferences. In recognition of this, in October 2012, Cinzia was awarded The University of Melbourne Chancellor's Prize for Excellence in a PhD Thesis, a prestigious, annual award recognising the University's high-achieving graduate researchers. Cinzia was thrilled to have won the award and gives credit to her supervisors and colleagues.

Cinzia says of her achievement, "I was extremely honored to be nominated for the award, let alone to have won such

Significant Contributions cont.

a prestigious prize. My first thoughts on hearing I had won were of my PhD supervisor and the people I worked with at Melbourne. It was such a great opportunity to have worked with such wonderful people."

Cinzia's ultimate aim is to go into field and her move to James Cook University, Cairns is one step closer to that goal. Cinzia met Professor Alex Loukas (James Cook University) and felt he had a great innovative approach to his research developing vaccine candidates and translation into field work. And, she believed her bioinformatics skills could help.

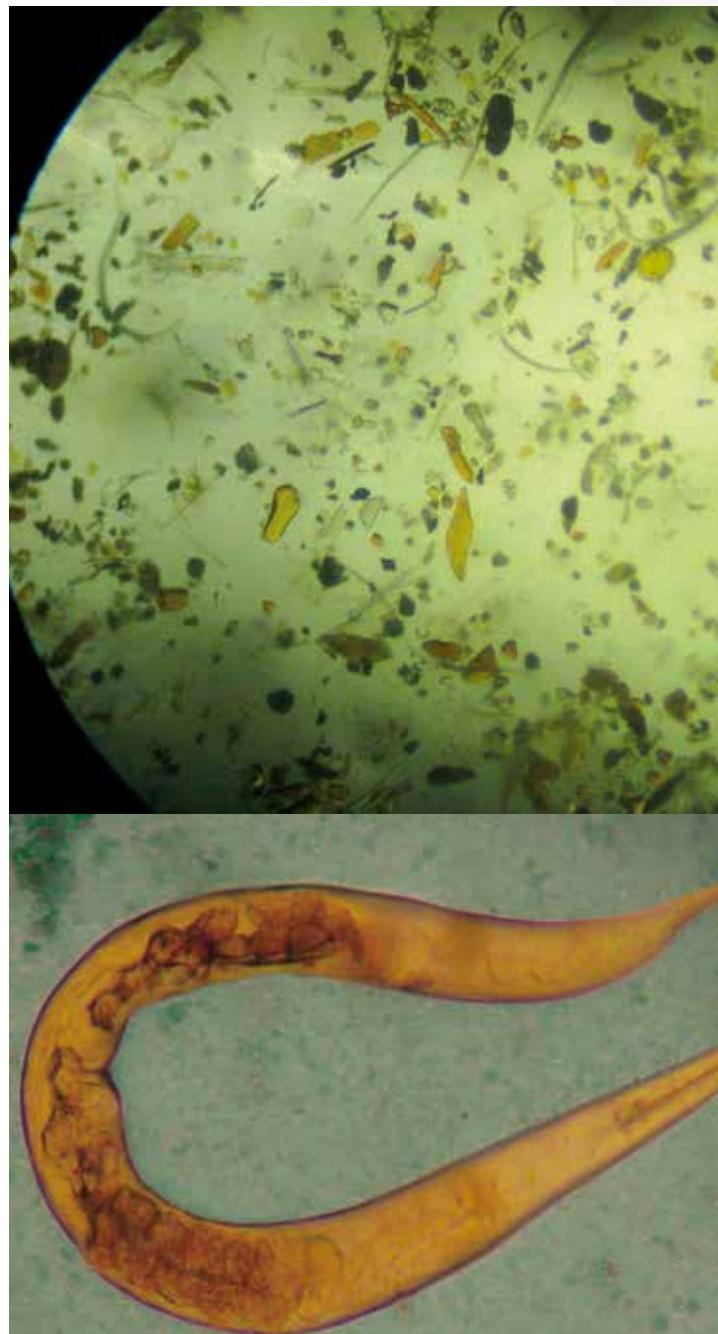
At JCU, Cinzia is analysing anti-inflammatory molecules from hookworms to see how they interact with their host and investigating what gene expression changes occur in a mouse model upon injection of these molecules.

"I want to know what is the how hookworm molecules doing that is causing suppression of allergic and autoimmune diseases like asthma, Crohn's, IBD and coeliac disease," Cinzia explained.

Cinzia was recently awarded an NHMRC ECR Peter Doherty - Australian Biomedical Fellowship "Hookworm proteins as novel anti-inflammatory therapeutics" for 4 years to look at interactions between hookworm molecules with the ultimate aim to translate to therapies for allergic diseases. She is collaborating with Associate Professor Andreas Hoffman (Griffith University, Eskitis Institute) and Professor Domenico Otranto (Bari University, Italy).

Cinzia would like to be an academic with a leadership role, and lecture to veterinary science students. She is looking for opportunities to work on partnership projects with drug companies to make the most out of the new technologies used for screening to find candidate drug targets.

We wish Cinzia well for the future and look forward to hearing more about her parasitology work.



Above Larval Roundworm. Images copyright 2007, Julie Balen, Queensland Institute of Medical Research

Significant Contributions cont.

CASE STUDY 4 IVO MUELLER

A new technique that accurately determines the risk of infants in endemic countries developing clinical malaria could provide a valuable tool for evaluating new malaria prevention strategies and vaccines.

The technique could even help to understand how anti-malarial vaccine and treatment strategies act to reduce malaria, say researchers from the Walter and Eliza Hall Institute, Swiss Tropical and Public Health Institute, University of Basel and the Papua New Guinea Institute of Medical Research.

Professor Ivo Mueller from the Walter and Eliza Hall Institute said the research team discovered that the number of new malaria parasites that infants acquire over time is strongly linked to the risk that the child will develop clinical disease.

"It was very clear that infection with new and genetically different malaria parasites was the single biggest factor in determining the risk of an infant becoming sick from malaria, more than any other factor including age, the use of bed nets or the risk of transmission in the area. We were actually surprised by how clear the correlation was," Professor Mueller said.

The molecular technique to genetically differentiate *Plasmodium falciparum* parasites was developed by Dr Ingrid Felger at the Department of Medical Parasitology and Infection Biology, Swiss Tropical and Public Health Institute, Switzerland. Professor Terry Speed from the Walter and Eliza Hall Institute's Bioinformatics division helped to develop mathematical algorithms to process the data.

Dr Felger said the researchers used high-throughput screening to determine the number of genetically-distinct *Plasmodium falciparum* malaria parasites that acquired by Papua New Guinean children aged one to four over a period of 16 months. The research was published today in the journal *Proceedings of the National Academy of Sciences of the United States of America*.



"This new research tool is elegantly simple but very powerful, and easily applicable in many circumstances, without a high level of technology or training," Dr Felger said. "We think it could have profound applications. This technology will be particularly useful for assessing ideal vaccine candidates for preventing malaria, help to develop better ways of performing future human trials of new potential malaria vaccines, and identifying the mechanism of action for existing vaccines and treatments."

Each year more than 250 million people worldwide contract malaria, and up to one million people die. Malaria is particularly dangerous for children under five and pregnant women. *Plasmodium falciparum* is the most lethal of the four *Plasmodium* species, and is responsible for most clinical disease.

Professor Mueller said the technology is already being used in the field, recently helping to explain why people with sickle-cell anaemia are less at risk of malaria infection. He said that accurately assessing the burden of malaria parasites acquired by children in countries where the disease is endemic is invaluable.

"One of our biggest problems in developing useful vaccines, treatments and preventative strategies for malaria is reliably predicting the distribution and risk of malaria at an individual level. There is huge variation in the risk of developing clinical malaria within a community or village, or within a particular age group, and we now have an accurate way to measure this," Professor Mueller said.

The research was supported by the Swiss National Science Foundation, National Institutes of Health and the Victorian Government. / Source: WEHI

Outreach

The ASP Network's Outreach efforts received a major boost in 2012 with the award of an Inspiring Australia grant from the Australian Government through the Department of Industry, Innovation, Science, Research and Tertiary Education.

Parasites in Power

The goals of Parasites in Power are to:

- Raise the understanding of, and interest in, parasites, particularly those studied by Australian researchers, and how they affect animals and humans everywhere;
- Raise the profile of parasitologists, particularly researchers in Australia, as engaging scientists who are willing and able to work with targeted local public institutions (like zoos, museums, science centres, wildlife parks and other public institutions) to promote their scientific research and parasitology more generally;
- Raise the awareness of public outreach activities as enjoyable and useful for parasitologists and the general public, promoting further, future engagement through focussed science events, activities and projects.

Parasites In Power comprises a series of free public outreach events run over 3 years to be held in Launceston, Perth and Canberra. Workshops and programs will explore what parasites are, how they can be managed and the work of parasitologists, with the aim of inspiring an interest in the sciences through parasitology and a career in science. The adaptability of our program's concept will be demonstrated by focusing on different themes for different locations:

- In Launceston (2nd July 2012), our theme was "Parasite Encounters in the Wild";
- In Perth (2013), the theme will be "Veterinary Parasites", taking advantage of the international conference (WAAVP) being held there;
- In Canberra, since it's the 50th Anniversary of the ASP, the theme will be "Australian breakthroughs in parasitology that have changed our lives."

Parasite Encounters in the Wild and The Young Parasites Science Club

Our first ASP & Inspiring Australia Public Event Parasite Encounters in the Wild was a free public event held at Country Club Tasmania, Country Club Avenue, Prospect Vale, near Launceston, Tasmania and streamed live on the internet on Monday 2nd July 2012 from 5.45 pm.

Over 100 members of the public and around 150 scientists enjoyed the first Inspiring Australia / ASP outreach event "Parasite Encounters in the Wild."

The event featured presentations and activities based around parasites and wildlife, with a special guest appearance of a Tasmanian Devil from Trowunna Wildlife Park, Mole Creek, Tasmania.

Our presenters were **Professor Greg Woods**, Menzies Institute Tasmania, **Professor Andrew Thompson**, Murdoch University, **Professor Ian Beveridge**, The University of Melbourne and **Androo Kelly** from Trowunna Wildlife Park. Lisa Jones was compere.

- *"Is Devil facial tumour disease the perfect parasite?"* Greg Woods from Menzies Research Institute Tasmania told us how this disease has developed a clever way to be transmitted and to affect the host immune system, causing its death but not before it moves to another host.
- *"What parasites do we give to wildlife?"* Are Australian wildlife more at risk of succumbing to parasites of human origin - particularly as we encroach more on wildlife habitats? Andrew Thompson from Murdoch University discussed our ideas of "One Health".
- *"Parasites: the hidden part of biodiversity."* What parasite is on Tasmania's endangered species list? Ian Beveridge from The University of Melbourne described the discoveries to make along Australian roadsides, which will help to document the biodiversity in this country.

While "Parasite Encounters in the Wild" presentations were being delivered, a workshop - the Young Parasites Science Club - took place upstairs, featuring a range of fun, hands-on science activities, Parasites in Focus quiz for older children and teenagers and a live feed of the Public Event.

Outreach cont.

The young scientists did not miss out on the Tasmanian devils - like the main audience, they too had the opportunity to meet and cuddle a Tasmanian Devil.

Promotion

This event was promoted through the following channels taking advantage of advice, contacts and networks provided by Launceston City Council, Business Events Tasmania, University of Tasmania and Menzies Research Institute Tasmania.

Event listings circulated to University of Tasmania staff through weekly e-newsletter, put up on the UTas Events calendar.

Event listings on the websites for Business Events Tasmania and Launceston City Council.

Direct emails were sent to circulate the event flyer through the following Tasmanian-based networks:

- Australian Veterinary Association, Tasmanian Division (sent it to their 116 members);
- Trowunna Wildlife Park, Mole Creek (promoted at the local post office and at Trowunna);
- Launceston City and surrounding libraries (promoted through libraries);
- Community radio station (city park radio);
- Southern Cross TV's Community Connect;
- North-West Pathology, Launceston;
- Department of Primary Industries Parks, Water and Environment, Tasmania;
- Ten different membership-based or community groups/ organisations who meet in Launceston i.e. Rotary, Wilderness Society.

Direct emails were sent to circulate the event flyer to the following schools and TAFE Colleges in and around the Launceston region:

- Launceston Church Grammar School; Launceston College;
- Newstead College;
- St Patrick's College;
- UTAS School of Architecture & Design;
- Kings Meadows High School;
- Brooks High School;
- St Finn Barr's Catholic Primary School;
- West Launceston Primary School

- John Calvin School;
- Primary Industries and Infrastructure North.

The Tasmanian Home Education Advisory Council (the homeschool network for the Launceston region) sent the flyer to a few local groups to distribute. They also put it on their website, stimulating interest from 6 local families.

The live web-streamed event was promoted across Australia through the Australian Society for Parasitology membership, Australian Veterinary Association, University of Sydney Veterinary Department staff, students and facebook page, Murdoch University Veterinary Department staff and students, Australian Society for Microbiology, Australian Science Communicators list (via Jayne Keane the Inspiring Australia representative for Queensland), sent to Science Alerts and also promoted through the Inspiring Australia team based at Questacon in Canberra.

ASP paid for two newspaper adverts in the Launceston Examiner run on the 30th June and 2nd July 2012.

Media

936 ABC Hobart interviewed Prof Greg Woods from Menzies Research Institute Tasmania on 26th June 2012. The AAP reporter in Hobart interviewed Prof Greg Woods at the public event.

Evaluation

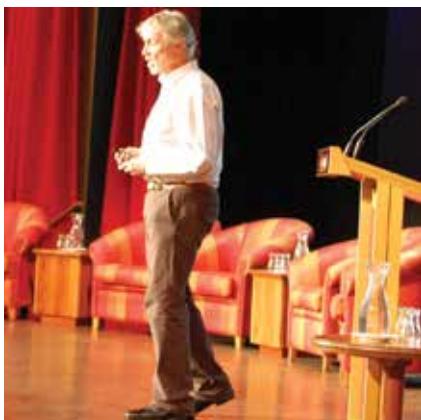
Audience statistics for "Parasite Encounters in the Wild" and "Young Parasites Science Club" were collected for face-to-face audiences (on-line audiences were also asked to participate in the evaluation).

13 participants registered to participate in "Parasite Encounters in the Wild" live webstreamed event and on the day there were 31 computers logged on watching the event. Most of the 31 participants stayed online with only 2 leaving the event (and these two had trouble with the live streaming but were able to watch the event through YouTube afterwards).

18 families from Launceston registered to participate in "Parasite Encounters in the Wild" and "Young Parasites Science Club"

On the day there were 34 participants in the "Young

Outreach cont.



The ASP & Inspiring Australia public event, *Parasite Encounters in the Wild*, and Young Pasrasites Club, Launceston, July 2012

Outreach cont.

Parasites Science Club”

There were 37 members of the public and 150 scientists attending the live version of “Parasite Encounters in the Wild” at Country Club Tasmania.

These events were marketed widely through Tasmanian-based organisations and other targeted audiences outside of Tasmania.

Audiences were emailed a post event questionnaire (see copy of email below) to complete and this was completed by 15 members of the public. (See attached survey)

Presenters and scientists who were part of the audience completed a separate survey to gain feedback regarding what worked well and what should be changed to future events. (See attached survey)

Media hits were monitored, one radio interview and two newspaper stories but none mentioned “Inspiring Australia”.

Watch Parasite Encounters in the Wild from our ASP Outreach page http://parasite.org.au/?page_id=284 or directly from our ASP YouTube channel <http://www.youtube.com/user/ASPParasiteNetwork>

Future Plans for Parasites in Power

In Perth (2013), the theme will be veterinary parasites, taking advantage of the international conference being held there. Adults will attend a Q&A pub quiz “Profs-n-pints-n-parasites” run by SciTech, where they can question (in person, via Twitter, email or sms) an expert panel on how to protect against parasites that humans, pets and livestock share; young adults will navigate their way through a series of riddles on parasites using our photographic exhibition, “Parasites in Focus”, and using PARA-SITE, our on-line parasite resource, and children will build models of parasites from dogs and cats and learn how quickly parasites spread if they don’t wash their hands! Everyone who visits Perth Zoo will discover the Hidden Zoo exhibition in the rainforest area and on Saturday 24th August zoo patrons can get “under the skin” of Australia’s parasitologists.

These events will be promoted through mailing lists and postings (electronic and physical) provided by Murdoch University, Perth Zoo and SciTech, through community groups and membership organisations, and via newspaper

advertisements.

The events will be held simultaneously with the joint conference of the Australian Society for Parasitology and the World Association for the Advancement of Veterinary Parasitology, at the Perth Convention Exhibition Centre from August 25-29, 2013 (<http://www.waavp2013perth.com/>). This will provide a unique opportunity to stage public events where Australia’s and the world’s leading experts on veterinary parasites are available to interact with the general public.

Our “Parasites in Focus” exhibition is being installed permanently at Perth Zoo and is being developed together with Perth Zoo exhibition staff. They are looking to expand the Parasite exhibition a little to include an explanation of the relationship between animals and parasites. The exhibition won’t be making direct links to the zoo animals but to Australian animals in general. The images and information will give an introduction to parasites and highlight parasites that live on Australian animals (all species including fish and not zoo specific) and interesting exotic parasites.

In Canberra (2014), since it’s the 50th Anniversary of the ASP, the theme will be “Australian breakthroughs in parasitology that have changed our lives.” In a comedic hypothetical, adults will be asked to imagine life without the advances made by our parasitologists; teens will purify and analyse DNA from parasites, a method pioneered in this country; and children will discover the parasites lurking in our water.

To ensure the sustainability of “Parasites in Power” we are producing a “toolbox” of workshop ideas and resources. This toolbox will enable scientists to run their own events, anywhere, in the future. This will be a permanent, living legacy of the “Inspiring Australia” strategy to translate and communicate parasitology research to Australians.

Special contributions

Several ASP Members put special effort into outreach in 2012

Hugh Murray, an Honours Student in the School of Chemistry and Molecular Biosciences at UQ and QIMR, describes his use of the ASP’s Parasites in Focus Exhibition

Outreach cont.

in his outreach work. Hugh is an AATSE Young Science Ambassador.

Hugh was chosen by the Australian Academy of Technical Sciences and Engineering to be a Young Science Ambassador for their Wonder of Science program in rural Queensland schools. His role was to visit schools and help students with their investigative projects for a competition later in the semester, and more generally to talk about life as a scientist. The greater aim of the program is to encourage students to study Science and Engineering at University, with a goal to address the skill shortages in those fields.

So on the 13th and 14th of August, Hugh travelled to Cairns State High School and Trinity Bay High School, also in Cairns, and spoke to students about life as a scientist, and about parasitology and his research project on scabies. He used digital images from the exhibition of malaria, worms, lice and fleas, which the students really found interesting, with a number of student commenting so afterwards. In fact, after presenting to one grade 10 Science class, Hugh was told that four of the students had asked to be able to change their senior subject choices to include Biology, which was heartening for him.

Tommy Leung, ASP Member and a keen social media advocate, recently appeared on a Google + broadcast. Appearing on an episode of the deSTEMber Hangout on Air called Living with Body-Snatchers, Tommy introduced his audience to parasites and "their hidden world of biological drama and intrigue."

The broadcast is available at: <https://www.youtube.com/watch?v=zmxahj51RS0>

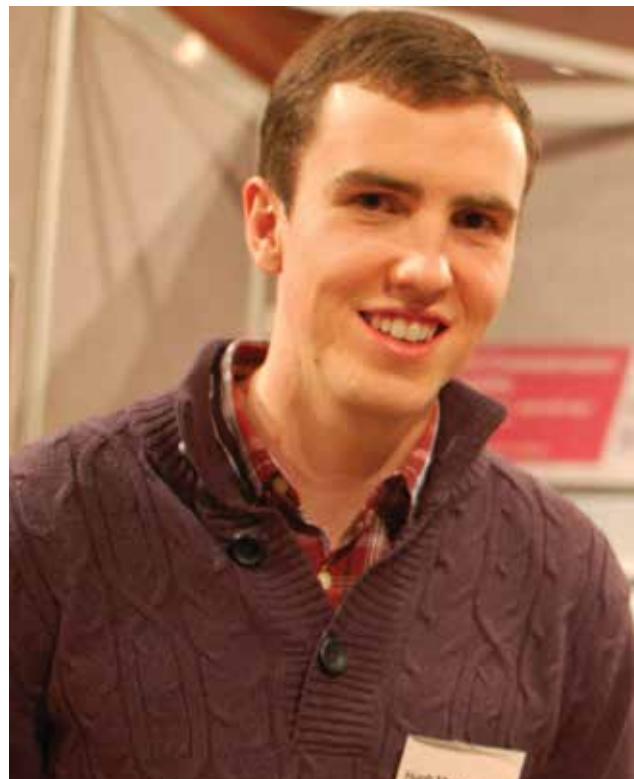
While Tommy was visiting New Plymouth, on the North Island of New Zealand, he gave a talk on parasites to the Taranki Young Conservationists Club.

Tommy also writes the Parasite of the Day blog: <http://dailyparasite.blogspot.com>

Following its success at ICOPA in 2010, the **Gene Technology Access Centre**, in association with the ASP, repeated the one-day Outreach program, "Parasites in Focus" on 17th August 2012.

The day, which is aimed at students in Years 10 and 11, involves an introductory talk by **Marshall Lightowers**, followed by the running of several workstations. Each workstation, staffed by demonstrators from the ASP, shows a different experiment from which students learn about parasites. About numbers 90 students attended.

Lindsay Dent, from the University of Adelaide, with a little help from **Ian Whittington**, **Lesley Warner** and **Mark Pharaoh** from the Mawson Centre, Polar Collections put together an interesting display for the University Open Day in July 2012. With funding from the ASP state outreach initiative Lindsay produced, amongst other things, a poster highlighting the connections between Sir Douglas Mawson, Antarctic Explorer and the Australian Helminthological Collection through Prof T Harvey Johnston and Pat Thomas (Mawson). A jar of parasitic worms from one of Mawson's Antarctic expeditions and a facsimile of his half sledge added to the atmosphere.



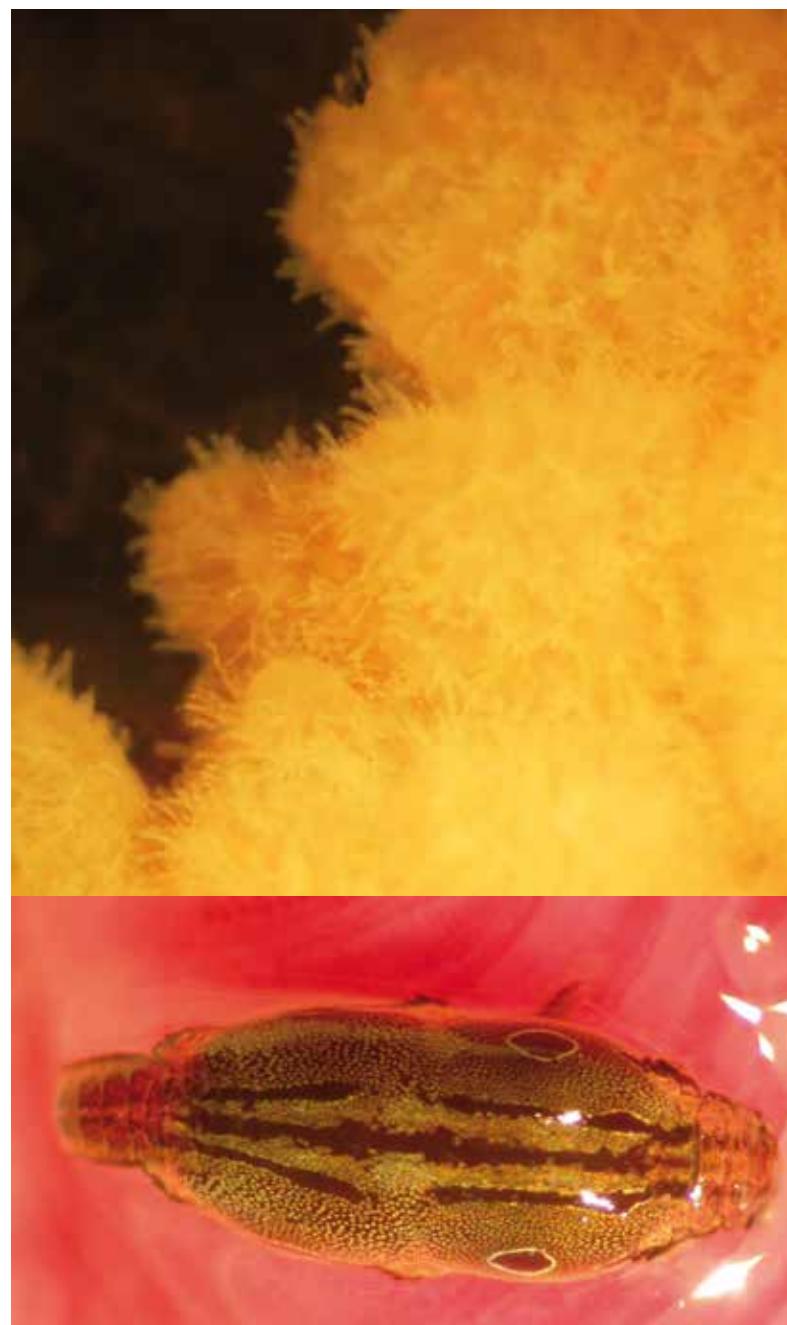
Hugh Murray

Contribution to the National Benefit

The contribution of ASP Members 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 ASP Network more directly, 2012 has been a year where national and international collaboration has been strongly fostered by the ASP Network through its, and OzeMalaR's Researcher Exchange, Training and Travel Fund. Additionally, the Network has created substantial training and networking opportunities for research students and early career researchers, again through these Researcher Exchange, Training and Travel Funds. Young researchers are publishing their research undertaken on ASP Network funding and winning grants and fellowships, either as spin-offs of research undertaken under the ASP Network Researcher Exchange, Training and Travel Award scheme or as a result of linkages forged at ASP 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.

Future Planning

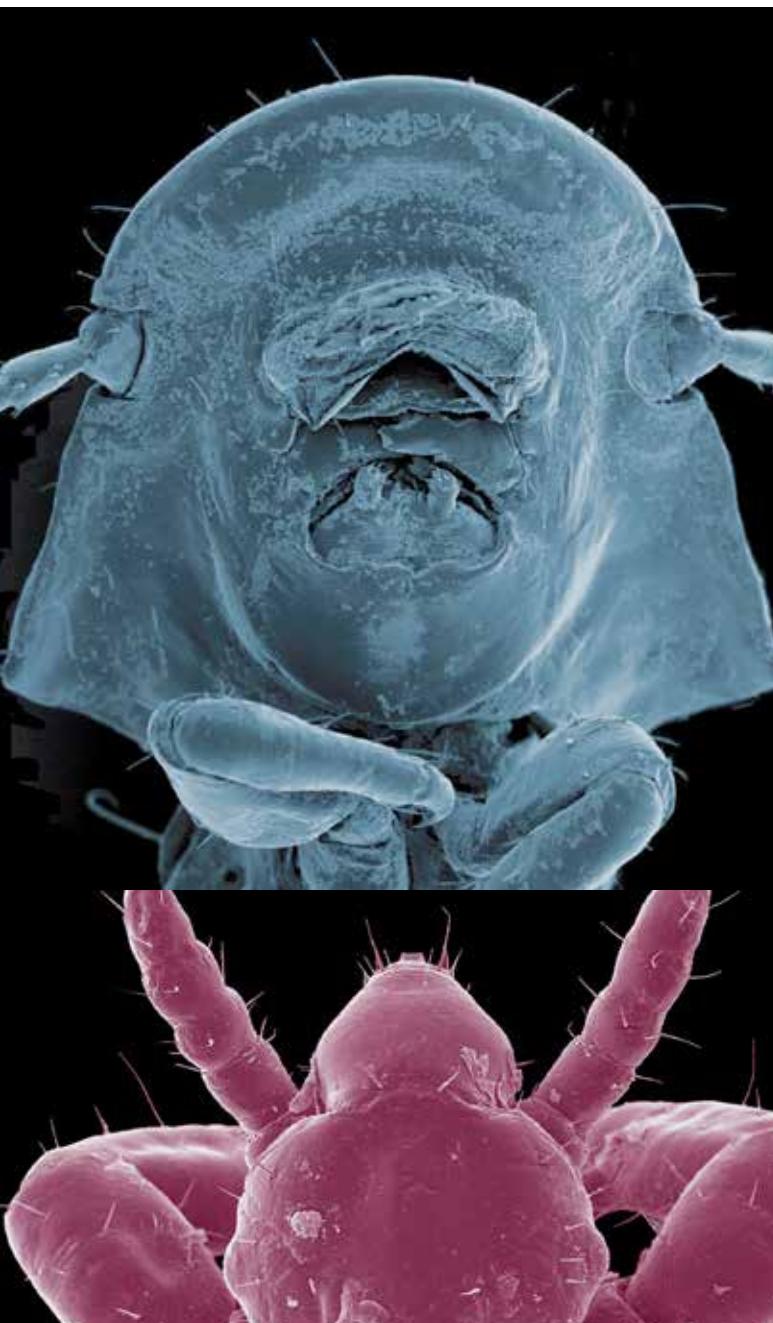
In addition to managing and administering the ASP Network Researcher Exchange, Travel and Training Award Scheme, the OzEMalar Travel Award scheme, the JD Smyth Awards, the ASP Student Travel Awards and the ASP Invited Lectureship Grants, and raising the awareness of Australian parasitology with the general public through the development of outreach initiatives, the ASP Network was able to further the strategic development of Australian parasitology research by holding workshops for students and Early Career Researchers in conjunction with the 2012 Annual Conference, helping to implement the ASP's Strategic Plan. In 2013, the Network will continue to contribute to the implementation of the ASP's Strategic Plan by continually looking for ways to improve the annual conference, invigorate the Society's Outreach Program, this year with the assistance of a grant won by Lisa Jones and Nick Smith from the Commonwealth Government's Inspiring Australia initiative, and by facilitating continued discussions and planning for an advanced postgraduate training course in parasitology.



Above

Images courtesy of Leslie Chisholm, Marine Parasitology, and Ian Whittington, Monogenean Research Laboratory, SA Museum, Adelaide

Statistical Snapshot 2012



Above
Images courtesy of Cath Covacin, Stephen Barker
and Rick Webb, University of Queensland

Number of active members

- Australian Society for Parasitology Incorporated (ASP) had 450 financial members in 2012.

Number of members funded to do various activities

- 65 ASP Student Members (including research students) were given funding assistance to attend 2012 ASP Annual Conference via the ASP Student Member Conference Grant scheme.
- 26 students and ECRs were awarded ASP Network or OzEMalaR Researcher Exchange, Training and Travel awards in 2012.

Conferences supported

- Molecular Approaches to Malaria Conference, February, 2012, attended by almost 400 researchers.
- 2012 ASP Annual Conference attended by 163 researchers.
- Northern Australia Malaria Symposium.

Number of international visits

- The ASP funded four international visitors to Australia (as invited lecturers to its 2012 Annual Conference);
- The ASP funded 24 researchers to travel to, and work in, overseas laboratories in 2012.

Number of publications produced

- 477 printed publications

Research funding received

- In 2012, Australia's parasitologists received 63 research grants securing more than \$50 million in new research grant funding.

ASP web site

<http://www.parasite.org.au>

ASP Facebook page

<http://www.facebook.com/ASParasitology>

ASP Twitter account

https://twitter.com/#!/AS_Para

OzEMalaR website

www.ozemalar.org.au

OzEMalaR Facebook page

<http://www.facebook.com/ozemalar>

OzEMalaR Twitter account

<https://twitter.com/#!/OzEMalaR>

Appendix 1

PUBLICATIONS BY ASP MEMBERS IN 2012.

Where applicable, links to abstracts in PubMed have been provided for 2012 publications

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Appendix 2

IN 2012, ASP MEMBERS SECURED OVER \$50 MILLION IN NEW RESEARCH GRANTS AND FELLOWSHIPS. (NOTE, INSTITUTION NAMES IN THE LIST BELOW REFER TO THE AUSTRALIAN ADMINISTERING INSTITUTION, NOT NECESSARILY THE HOME INSTITUTION OF INDIVIDUAL RESEARCHERS).

ARC Future Fellowships

Tham, Dr Wai-Hong, The Walter and Eliza Hall Institute of Medical Research, *Complement evasion strategies of malaria parasites*

Tonkin, Dr Christopher J, The Walter and Eliza Hall Institute of Medical Research, *Activation of invasion in Toxoplasma*

Wykes, Dr Michelle, Queensland Institute of Medical Research, *Mechanisms of subversion of malarial immunity*

NHMRC Aboriginal and Torres Strait Islander Health Research Fellowship

Ms Simone Reynolds, Queensland Institute of Medical Research, *Scabies mite proteins as targets for the development of new therapeutics*

NHMRC Australian Clinical Fellowship

Dr Josh Hanson, Menzies School of Health Research, *Improving the medical care of adults admitted to hospital with severe malaria*

NHMRC CJ Martin – Overseas Biomedical Fellowship

Dr Andreas Kupz, James Cook University, *Identification of novel strategies to mediate immunity against intracellular pathogens*

Dr Mark Agostino, The Macfarlane Burnet Institute for Medical Research and Public Health Ltd, *Improving the immune response to bacterial superbugs and malaria*

NHMRC Peter Doherty - Australian Biomedical Fellowships

Dr Hayley Joseph, The Walter and Eliza Hall Institute of Medical Research, *Changing patterns of immunity following large scale malaria control programs in the South West Pacific*

Dr Stephan Karl, The Walter and Eliza Hall Institute of Medical Research, *Tackling fundamental knowledge gaps about the malaria parasite species Plasmodium vivax, enabling significant advances in malaria control and drug and vaccine development*

Dr Cinzia Cantacessi, James Cook University, *Hookworm proteins as novel anti-inflammatory therapeutics*

Dr Hong You, Queensland Institute of Medical Research, *Identifying Genes Associated with Parasitism, and Novel Drug and Vaccine Targets*

Mr Wilson Wong, The Walter and Eliza Hall Institute of Medical Research, *Dissecting the molecular basis of malaria parasite cell movement*

NHMRC Practitioner Fellowship

Professor James McCarthy, Queensland Institute of Medical Research, *Developing drugs and vaccines for malaria by undertaking experimental studies in humans*

Appendix 2 cont.

NHMRC R.D. Wright Biomedical Fellowship

Dr Rowena Martin, Australian National University, *Understanding how to combat drug resistance in the malaria parasite: Examination of two proteins that are key to the parasite's ability to evade the toxic effects of antimalarial drugs*

Dorothea Sandars Churchill Fellowship

Stuart Ralph, University of Melbourne, *Investigating open source strategies for developing drugs against neglected parasitic diseases*

Alexander von Humboldt Research Fellowship

Dr Alex Maier, Australian National University

ARC Discovery Project Grants

Professor Geoff McFadden, The University of Melbourne, *Drug Targets in the relict plastid of malaria parasites*

Professor Mike Bull, Dr David Gordon, Dr Stephanie Godfrey and Dr Andrew Sih, The Flinders University of South Australia, *What drives parasite spread through social networks: lessons from lizards*

Dr Ross Waller, A/Professor Arnab Pain, The University of Melbourne, *Radical change in the architecture of a nucleus: loss of typical DNA organization systems in dinoflagellates*

ARC Linkage Project Grants

Dr Aaron R Jex, Professor Malcolm J McConville, The University of Melbourne, *Harnessing the 'omics revolution to investigate drug response and resistance mechanisms in Giardia duodenalis*

A/Prof Vicky M Avery, Dr Jeremy Burrows, Griffith University, *Screening platforms for malaria drug discovery: identification of new therapeutics*

Dr Alicja E Lew-Tabor, Dr Manuel Rodriguez Valle, A/Prof Kevin W Broady, Prof Matthew I Bellgard, Dr Dianne M Vankan, Prof Richard B Atwell, The University of Queensland, *Harnessing the genome of the Australian paralysis tick to develop effective control products*

ARC Linkage Infrastructure and Equipment Grants

Professor Geoff McFadden, Professor Leann Tilley, Professor Tony Bacic, Dr Eric Hanssen, Professor Paul Gleeson, Professor Dougal McCulloch, Dr Madhu Bhaskaran, Professor James Friend, Professor David Thorburn, Dr Jake Baum, The University of Melbourne, RMIT University, The Walter and Eliza Hall Institute of Medical Research, Murdoch Childrens Research Institute, *Three dimensional cryo-electron microscope facility*

Professor Shaun Collin, Professor Carlos Duarte, Professor William Erskine, Professor Barry Marshall, A/Professor Kathryn Heel, A/ Professor Mel Ziman, Dr Matthew Sharman, Dr Elin Gray, Professor Andrew Thompson, Professor Una Ryan, Dr Philip Stumbles, The University of Western Australia, Edith Cowan University, Murdoch University, *Expanding capability in Western Australian flow cytometry for earth, ocean, environmental and biomedical science: state-of-the-art four laser and 12 colour analysis*.

Professor David Sampson, A/Professor Peta Clode, Professor Kingsley Dixon, Professor Daniel Murphy, Dr Killugudi Swaminatha-Iyer, Professor Andrew Thompson, Dr Zonghan Xie, Professor Dongka Zhang, The University of Western Australia, Murdoch University, Edith Cowan University, WA Botanic Gardens and Parks Authority, *A world class, high resolution scanning electron microscopy facility for West Australian researchers*.

Meunier F, Goodwill G, Karunanithi S, Yap A, Drennan J, Mackay-Sim A, Wei M, Avery V, Rubinztein-Dunlop H, Griffith University, *Live molecular imaging using super*

resolution microscopy, two photon and spinning disk confocal microscopy

NHMRC Program Grant

Prof. Michael Good, Prof. Don McManus, Prof. Istvan Toth, Prof. Nick Anstey, Prof. Denise Doolan, Dr Chris Engwerda, Prof. Alex Loukas, Prof James McCarthy, Prof. Ric Price, Griffith University, Queensland Institute of Medical Research, The University of Queensland, Menzies School of Health Research, James Cook University, *Tropical Disease – Immunity, Pathogenesis and Vaccine Development: Global Translation*

NHMRC Project Grants

Professor Kieran Kirk, Australian National University, *Targeting an ion pump in the malaria parasite with multiple compound classes*

Professor Raymond Norton, Dr Jonathan Richards, Dr Christopher MacRaild, Monash University, *Generating an effective vaccine response against the intrinsically unstructured malaria antigen Merozoite Surface Protein 2*

Professor Marshall Lightowlers, University of Melbourne, *Immunological prevention of cysticercosis and hydatid disease*

Dr Michelle Wykes, Professor Arlene Sharpe, Queensland Institute of Medical Research, *The differential contribution of Programmed death-1 ligands to malarial immunity*

Dr Tsin Yeo, Professor Nicholas Anstey, Dr Timothy William, Dr Arjen Dondorp, Menzies School of Health Research, *A comparative study of the pathophysiology of severe knowlesi and falciparum malaria*

Professor Malcolm McConville, University of Melbourne, *Targeting Toxoplasma gondii latent stages responsible for chronic disease*

Professor Ronald Quinn, Professor Wesley Van Voorhis, Dr Rebecca Pouwer, Associate Professor Katharine

Trenholme, Dr Katherine Andrews, Griffith University, *Development of Fragment Hits into effective Antimalarials; Targeting Malaria Eradication*

Dr Darren Gray, Professor Gail Williams, Professor Archie Clements, Professor Yuesheng Li, Professor Remigio Olveda, Dr Peter Steinmann, Dr Kate Halton, The University of Queensland, *A school-based health education package for the prevention of soil transmitted helminth infections in China and the Philippines*

Dr Christian Engwerda, Dr Ashraful Haque, Queensland Institute of Medical Research, *Defining immune regulation and T cell responses during chronic infectious disease*

Professor Simon Foote, Associate Professor Brendan McMorran, Dr Gaetan Burgio, Macquarie University, *Identifying novel antimalarial targets using ENU mutagenesis in the mouse*

Dr Jacob Baum, Dr Stuart Ralph, The Walter and Eliza Hall Institute of Medical Research, *Cytoskeletal remodeling of the erythrocyte during malaria parasite invasion*

Professor Simon Foote, Associate Professor Brendan McMorran, Macquarie University, *Griseofulvin, a novel host-directed antimalarial drug*

Professor James Beeson, Professor Stephen Rogerson, The Macfarlane Burnet Institute for Medical Research and Public Health Ltd, *Surface antigens of Plasmodium falciparum-infected erythrocytes and immunity to malaria in humans*

Dr Christopher Tonkin, Associate Professor Brian Smith, Associate Professor Michael Lawrence, The Walter and Eliza Hall Institute of Medical Research, *Functional analysis of the Toxoplasma Myosin driving tissue dissemination and host cell invasion*

Dr Michelle Gatton, Associate Professor Qin Cheng, Queensland Institute of Medical Research, *Containment potential and risk of spread of artemisinin resistant Plasmodium falciparum*

Dr Jason Mulvenna, Associate Professor Jeffrey Bethony, Professor Paul Brindley, Associate Professor Malcolm Jones, James Cook University, *Biomarkers for the progression of cholangiocarcinoma: from risk factors to carcinogenesis*

Fisheries Research and Development Corporation Grants

Leef M, Nowak B, University of Tasmania, *The effects of AGD on gill function: use of a perfused gill model*

Crosbie PBB, Bridle AR, Nowak BF, University of Tasmania, *Atlantic Salmon Subprogram – culture and cultivation of Neoparamoeba perurans (AGD)*

Adams MB, Bridle AR, Nowak BF, University of Tasmania, *Comparative susceptibility and host responses of endemic fishes and salmonids affected by amoebic gill diseases in Tasmania*

Smart Futures Grant, Queensland Government

Miller TL, Knuckey R & Hutson KS James Cook University, *Integrated management of parasite infections in tropical aquaculture*

CASS Foundation Grant

Katherine Putnam, University of Melbourne, *Identification of new malaria drug targets using a novel high-throughput screening approach*

Far North Queensland Hospital Foundation Research Grant

Paul Giacomin, James Cook University, *Hookworm Protein Treatment As a Safe and Effective therapy for Coeliac Disease*

Australia-India Strategic Research Funding Grant

Engwerda C, Shyam Sundar, Queensland Institute of Medical Research and Banaras Hindu University, Varanasi, India, *Designing combination immune therapy and drug treatment to control infectious disease*

Bill and Melinda Gates Foundation Grants

Price RN, von Seidlein L, White NJ, Baird JK, Hien TT, Menzies School of Health Research, *Optimizing the radical cure of vivax malaria (OPRA)*

Reichman M, Avery VM, Griffith University, *Ultra-High Throughput Screening for Synergy (uHTSS)*

Buffet P, Avery V, Lavazec C, Griffith University, *Drug-induced mechanical clearance of gametocytes in the spleen (Part 2)*

Fidock D, Avery VM, Griffith University, *Development and Implementation of Medium to High-Throughput Luciferase-Based Assays to Identify Compounds Active Against Plasmodium falciparum Gametocytes*

National Institutes of Health USA Grants

Professors Adrian Hehl, Peter Deplazes, Mike Grigg and Nick Smith, University of Zurich, National Institute of Allergies and Infectious Diseases and James Cook University, *Sexual development in Toxoplasma: high-throughput functional genomics and proteomics, NIH EuPathDB Driving Biological Projects Grant*

Brindley P, Loukas A., Mulvenna J. James Cook University, *Role of liver fluke granulin in cholangiocarcinogenesis*, NIH R01 Grant

Adams J, Cheng Q, Price RN, Edstein M, Auliff A, Menzies School of Health Research and AMRI, *Genetic screen for P. vivax CQR*. NIH R01 Grant.

Medicines for Malaria Venture Grants

Avery VM, Griffith University, *Development of a Late Stage Gametocyte Assay*

Kirk, Prof. Kiaran, Australian National University, *Testing the MMV Malaria box on malaria parasite ion regulation*

Susan Sharman, Monash University, and colleagues, *Centre of Excellence in ADME Lead Optimisation*

Drugs for Neglected Diseases Initiative Grant

Susan Sharman, Monash University, and colleagues in the Australian Discovery Consortium (Monash University, Murdoch University, and Epichem Pty Ltd), *Discovering new drug candidates for Chagas disease, HAT and Leishmania*.

Human Frontier Science Program Young Investigator Grant

Boddey, Dr Justin, Rhoel Dinglasan and Philipp Jost, Walter and Eliza Hall Institute of Medical Research, *Role of exported proteins in the intracellular dynamics of liver-stage falciparum malaria*

DFID/MRC/Wellcome Trust Grant

Price RN, von Seidlein L, White NJ, Baird JK, Hien TT, Menzies School of Health Research, *Improving the radical cure of vivax malaria: a multicenter randomized comparison of short and long course primaquine regimens (IMPROV)*