

# Annual Report 2016



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# Introduction

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I AM DELIGHTED TO PRESENT TO YOU THE 2016 ANNUAL REPORT FOR THE AUSTRALIAN SOCIETY FOR PARASITOLOGY INC., WHICH HAS BEEN PREPARED BY OUR ASP NETWORK TEAM, LISA JONES, IAN HARRIS AND NICK SMITH.

## Research Achievements

Parasitology research in Australia continued to flourish, with over 550 research papers published in 2016 – this is a record and continues the increase in quantity and quality of research outputs produced by ASP members that has been seen for the last decade. At the same time, our journals have attained new records in citation statistics. I thank very much our journal leadership teams: Maria Meuleman, Brian Cooke, Alex Loukas and Jan Slapeta (*The International Journal for Parasitology*); Kevin Saliba and Andrew Koetze (*IJP: Drugs and Drug Resistance*); Andrew Thompson and Lydden Polley (*IJP: Parasites and Wildlife*); as well as Dale Seaton, from Elsevier, the publisher of all three of our journals, for his unwavering support.

In 2016, funding for parasitology research bounced back from a sustained 3 year low point, with over 40 grants or fellowships worth over \$33 million awarded to ASP members; this is very good news for our discipline. It is noteworthy that much of this success occurred outside of the ARC and NHMRC schemes, including significant international funding.

Full lists of Australian parasitology publications and research grants are included as Appendix 1 and Appendix 2 to this annual report.



ASP President, David Emery

## Researcher Exchange, Training and Travel Awards

The ASP continued to offer Researcher Exchange, Training and Travel Awards and its Mentorship Scheme in 2016, continuing to look to collaborations with international colleagues to help us maintain a leading global reputation in parasitology. Details and highlights of these awards appear elsewhere in this annual report. These small grants have the ability to change careers of our young researchers and it is pleasing to see that, in 2016, past recipients again won fellowships or grants to fund their research. I thank sincerely the Researcher Exchange, Training and Travel Assessment Committee, Una Ryan, Geoff McFadden, Kate Hutson, Nick Smith and Lisa Jones, for all their hard, impartial and diligent work.



## Introduction

### Honours

The ASP honoured several extremely deserving parasitologists in 2016: Denise Doolan was awarded the Bancroft-Mackerras Medal; Alexander Kennedy and Hanh Nguyen won JD Smyth Awards; Russell Stothard, Peter Crompton and Maria Dolores Bagues, were named ASP International Lecturers; Dhanasekaran Sakhivel and Mohammed Al-Hasnawy, were runner-up and winner, respectively, of Best Student Poster; Erick Tjhin and Deepani Fernando, were runner-up and winner, respectively, of Best Student Presentation; and Sam Emery and Adele Lehane, runner-up and winner, respectively, of Best Early Career Researcher Presentation at the annual conference. Other organisations also honoured several of our members. Continuing a fine winning tradition for parasitology at the prestigious Eureka Prizes, Leann Tilley, Nick Klonis, Julie Simpson and James McCaw, from The University of Melbourne, took out the Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research for their key scientific discoveries leading to insights into how artemisinin resistance by the malaria parasite may be overcome. Congratulations also to several other finalists for this year's awards including: The Boddey, Sleebs and Cowman team, the Walter and Eliza Hall Institute of Medical Research, in the Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research category for their research into determining how malaria parasites use a unique protein export pathway across the parasite's lifecycle, enabling collaboration with industry that is accelerating the development of a new antimalarial drug; The SHIFT Team, a collaboration between Murdoch Childrens Research Institute, The Kirby Institute, St Vincent's Hospital, Menzies School of Health Research and the Fiji Ministry of Health that has produced a landmark study showing that mass drug administration with the oral drug ivermectin is highly effective in controlling scabies and related bacterial skin sores, transforming the global conversation on integrated programs for neglected tropical diseases (finalist in the Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research category); and, Miles Davenport, Deborah Cromer, Mykola Pinkevych and David Khoury, Kirby Institute, UNSW with Stephen Kent, Peter Doherty Institute, The University of Melbourne, and Ashraful Haque, QIMR Berghofer Institute,

for their unique integration of mathematicians, computer scientists and physicists, in close collaboration with experimental scientists and clinicians, to develop a novel understanding of the 'mathematics of infection' using these insights to design and optimise treatment and vaccination for major infectious diseases (finalists in the UNSW Eureka Prize for Excellence in Interdisciplinary Scientific Research category). Peter Holdsworth received an AM "for distinguished service to veterinary science, particularly to animal parasitology and pharmaceutical development, and to professional scientific organisations". Freya Fowkes of the Burnet Institute won the prestigious Georgina Sweet Award for Women in Quantitative Biomedical Science. Alex Maier was awarded the ANU's Vice-Chancellor's Award for Public Policy and Outreach, while Vicky Avery and Melissa Sykes won Griffith University's Pro Vice Chancellor's Research Excellence Awards for Mid-Career and Early Career Researcher, respectively.

### Annual Conference

The 2016 ASP Conference was held in conjunction with the International Congress for Tropical Medicine and Malaria, in partnership with the Australasian Society for Infectious Disease, in Brisbane in September, 2016. The meeting was a resounding success, attracting over 1500 delegates and returning a healthy profit to the Society. The ASP is extremely grateful to the conference organising and scientific committees (David Looke, Denise Doolan, Kathy Andrews, James McCarthy, Paul Griffin, Tina Skinner-Adams, Lisa Jones, Marilena Salvo, Roland Cobbold, Chris Coulter, Bart Currie, Gregor Devine, Katja Fischer, Katie Flanagan, Robin Gasser, Paul Johnson, Cheryl Jones, Colleen Lau, Alex Loukas, Deborah Marriott, Weiland Meyer, Clare Nourse, Geoffrey Playford, Jenny Robson, Harsha Sheorey, Nick Smith, Wai-Hong Tham, Joseph Torresi, Nicole Townell, Mark Walker, Trent Yarwood) but, most especially, Mal Jones for his tireless enthusiasm in putting the conference together. The Society also owes a great debt to its army of conference volunteers, Thomas Williams, Leanne Low, Gillian Fisher, Thomas Teoh, Christopher Hart, Cara Wilson, Ellie Stellar, Jessie van Huis, MJ Chua, Naomi Clarke, Bilal Zulfiqar, David Teran, Megan Arnold, Jess Bridgford, Amy Jones and Maria Meuleman. The conference was sponsored generously

## Introduction

by the Bill and Melinda Gates Foundation, the International Journal for Parasitology, Elsevier, the Georgina Sweet Travel Support Fund, the Boehringer Ingelheim Foundation, the QIMR Berghofer Institute of Medical Research, Compounds Australia, Griffith University, The University of Queensland, Cambridge University Press, IVCC, the Walter and Eliza Hall Institute of Medical Research, New England Biolabs, the Australian Infectious Disease Research Centre and the Doherty Institute. More details about our conference can be found inside this annual report.

## Public Engagement and Outreach

Lisa Jones, yet again, was awarded a a Commonwealth of Australia National Science Week grant through the Department of Industry and Science for two events at The Tanks Arts Centre in Cairns: *Café Scientifique: Science, Music & Art – All in the Mind* on Tuesday 16th August; and *Pecha Kucha Night* Cairns inspired by science on Wednesday 17th August. Lisa continues to be an inspiration for us all as evidenced by ASP members' remarkable willingness and enthusiasm to embrace community engagement as a core activity of the Society throughout 2016 (see the highlights inside this annual report).

## Advanced Parasitology Course

The year closed with our third *Advanced Parasitology Course – Concepts in Parasitology*, held at ANU's field station at Kioloa, on the NSW south coast; it is a continuing source of great pride for the Society and I thank Alex Maier for again coordinating a brilliant course. More information about the course within...

## Our Council

Finally, I must thank the members of the Council of the Society, all of whom work enthusiastically on behalf of all members. My thanks to Peter Rolfe (Treasurer), Colin Stack (Executive Secretary), Una Ryan (President-Elect), Giel van Dooren (ACT rep.), Danny Wilson (SA rep.), Shokoofeh Shamsi (NSW rep.), Barbara Nowak

(Tasmanian rep.), Benedikt Ley (NT rep.), Abdul Jabbar and Nathan Bott (Victorian reps), Mark Pearson and Gillian Fisher (QLD reps), Stephanie Godfrey and Crystal Cooper (WA reps), Tina Skinner-Adams (Incorporation Secretary), Mal Jones (Bancroft-Mackerras Medal Convenor), Brian Cooke (IJP Editor), Kevin Saliba and Andrew Kotze (IJP:DDR Editors), Andy Thompson (IJP:PAW Editor), Haylee Weaver (Archivist), Nick Smith (Network Convenor) and Lisa Jones (Newsletter Editor, Webmaster and Network Communications Coordinator).

I must finally state that I am indebted to the dogged and dedicated efforts of the Treasurer, Peter Rolfe, who has single-handedly revised and restructured the Society's financial reporting and business systems over the past 2 years. This has been a Herculean task but a momentous outcome for the smooth functioning of the society. Thank you Peter.

**David Emery**  
**President of the ASP**



**Cover:** A young visitor to the exhibition *Parasites: Life Undercover* at the Queensland Museum, August 2016. *Parasites: Life Undercover* was supported by the Australian Society of Parasitology and ran from 10 August 2016 – 27 January 2017. The exhibition is featured later in the report.



Images from ICTMM/ASP 2016

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# Research Achievements

The contribution of parasitologists to Australia's fundamental, strategic and applied research effort is evident in the quantity and quality of publications listed in Appendix 1, all of which address one or more of Australia's Science and Research Priorities; thus, ASP Members contribute significantly to research on:

## Environmental Change

By assessing the susceptibility to, and monitoring the prevalence of, parasitic disease in wildlife, ASP researchers generate new information that will assist in the management of terrestrial and marine ecosystems.

## Food and Water

ASP researchers work hard to: better understand the epidemiology and transmission dynamics of parasites; discover and develop better surveillance systems for parasites on land and in water; and find new ways to control parasites in our livestock and fisheries.

## Health

ASP researchers carry out fundamental, strategic and translational research to: better understand host-parasite relationships; and discover and develop sustainable parasite control strategies, including new drugs and vaccines.

With over 550 publications involving Australian parasitologists in 2016, there were innumerable highlights; however, 2016 was especially noteworthy for Australian parasitologists' contributions to the understanding of how drugs work and new insights into control options for parasitic diseases, at least a few of which deserve special mention:

Baragaña B, Norcross NR, Wilson C, Porzelle A, Hallyburton I, Grimaldi R, Osuna-Cabello M, Norval S, Riley J, Stojanovski L, Simeons FR, Wyatt PG, Delves MJ, Meister S, Duffy S, Avery VM, Winzeler EA, Sinden RE, Wittlin S, Frearson JA, Gray DW, Fairlamb AH, Waterson D, Campbell SF, Willis P, Read KD, Gilbert IH. [Discovery of a Quinoline-4-carboxamide Derivative with a Novel Mechanism of Action, Multistage Antimalarial Activity, and Potent in Vivo Efficacy](#). J Med Chem. 2016 Nov 10;59(21):9672-9685.

Bernigaud C, Fang F, Fischer K, Lespine A, Aho LS, Dreau D, Kelly A, Sutra JF, Moreau F, Lilin T, Botterel F, Guillot J, Chosidow O. [Preclinical Study of Single-Dose Moxidectin, a New Oral Treatment for Scabies: Efficacy, Safety, and Pharmacokinetics Compared to Two-Dose Ivermectin in a Porcine Model](#). PLoS Negl Trop Dis. 2016 Oct 12;10(10):e0005030.

Creek DJ, Chua HH, Cobbold SA, Nijagal B, MacRae JI, Dickerman BK, Gilson PR, Ralph SA, McConville MJ. [Metabolomics-Based Screening of the Malaria Box Reveals both Novel and Established Mechanisms of Action](#). Antimicrob Agents Chemother. 2016 Oct 21;60(11):6650-6663.



Images from ICTMM/ASP 2016



## Research Achievements

Garcia HH, Gonzalez AE, Tsang VC, O'Neal SE, Llanos-Zavalaga F, Gonzalvez G, Romero J, Rodriguez S, Moyano LM, Ayvar V, Diaz A, Hightower A, Craig PS, Lightowlers MW, Gauci CG, Leontsini E, Gilman RH; Cysticercosis Working Group in Peru. [Elimination of Taenia solium Transmission in Northern Peru](#). N Engl J Med. 2016 Jun 16;374(24):2335-44.

Goodman CD, Siregar JE, Mollard V, Vega-Rodríguez J, Syafruddin D, Matsuoka H, Matsuzaki M, Toyama T, Sturm A, Cozijnsen A, Jacobs-Lorena M, Kita K, Marzuki S, McFadden GI. [Parasites resistant to the antimalarial atovaquone fail to transmit by mosquitoes](#). Science. 2016 Apr 15;352(6283):349-53.

Li H, O'Donoghue AJ, van der Linden WA, Xie SC, Yoo E, Foe IT, Tilley L, Craik CS, da Fonseca PC, Bogyo M. [Structure- and function-based design of Plasmodium-selective proteasome inhibitors](#). Nature. 2016 Feb 11;530(7589):233-6.

Preston S, Jiao Y, Jabbar A, McGee SL, Laleu B, Willis P, Wells TN,

Gasser RB. [Screening of the 'Pathogen Box' identifies an approved pesticide with major anthelmintic activity against the barber's pole worm](#). Int J Parasitol Drugs Drug Resist. 2016 Dec;6(3):329-334

Veiga MI, Dhingra SK, Henrich PP, Straimer J, Gnädig N, Uhlemann AC, Martin RE, Lehane AM, Fidock DA. [Globally prevalent PfMDR1 mutations modulate Plasmodium falciparum susceptibility to artemisinin-based combination therapies](#). Nat Commun. 2016 May 18;7:11553.

Wangchuk P, Giacomini PR, Pearson MS, Smout MJ, Loukas A. [Identification of lead chemotherapeutic agents from medicinal plants against blood flukes and whipworms](#). Sci Rep. 2016 Aug 30;6:32101.

Feature stories on some of these publications, and more, are included in the next few pages.



Images from ICTMM/ASP 2016

## Research Achievements

### NEW HOPE FOR MALARIA TREATMENT

RESISTANCE TO A KEY ANTI-MALARIAL DRUG CANNOT BE PASSED ON BY MOSQUITOES IN A BREAKTHROUGH SCIENTISTS BELIEVE COULD DRASTICALLY IMPROVE THE WAY WE BATTLE THE DISEASE.

THE DISCOVERY COULD POTENTIALLY SHUT DOWN THE AVENUE FOR MASS DRUG RESISTANCE TO SPREAD, MAKING MALARIA TREATMENT SIGNIFICANTLY MORE EFFECTIVE FOR THE 3.2 BILLION PEOPLE AT RISK WORLDWIDE.

The international research project was led by the University of Melbourne and focused on the drug atovaquone.

Atovaquone was introduced in 2000 and is safe for pregnant women and children, so it is one of the few anti-malarials that can be used in mass administration approaches.

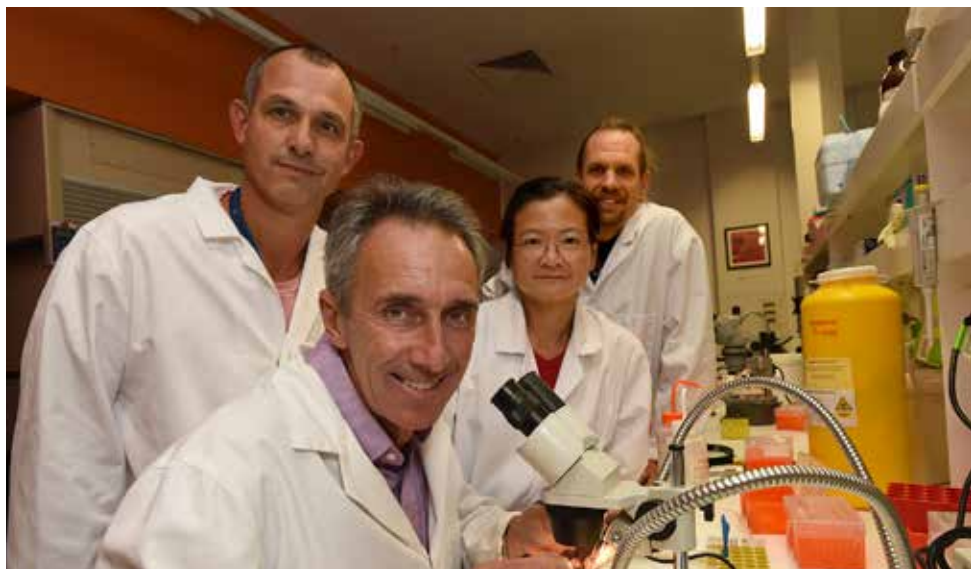
It was largely phased out of use because resistance was initially observed.

But as published in the journal *Science*, the new study reveals that although some malaria parasites had developed a genetic

mutation that protected them against the drug in early life, the mutation eventually killed the parasites by stopping production of an essential type of energy as they grew.

Lead authors Professor Geoff McFadden and Dr Dean Goodman are calling it a 'genetic trap' that could prove to be a significant step forward in the anti-malaria fight.

The pair, along with long-term collaborator Vanessa Mollard, have



led a team investigating the evolution and life cycle of the malaria parasite for the past six years.

"These results are very exciting because the spread of drug resistance is currently destroying our ability to control malaria," said Prof McFadden from the School of Biosciences at the University of Melbourne.

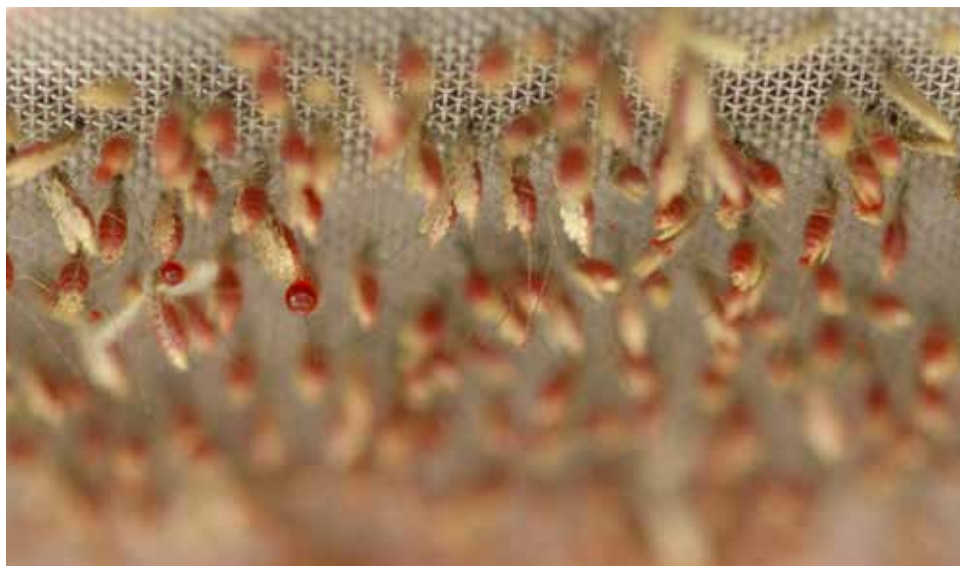
"We now understand the particular genetic mutation that gave rise to drug resistance in some malaria parasite populations and how it eventually kills them in the mosquito, providing new targets for the development of drugs."

## Research Achievements

"So the development of drug resistance may not be a major problem if the resistance cannot spread, meaning the drug atovaquone could be more widely used in malaria control.

The team also included colleagues in Indonesia, US and Japan who have been growing and studying billions of malaria parasites used to infect thousands of mosquitoes.

The researchers studied a model strain of rodent malaria and a



deadly strain of human malaria to confirm the resistant parasites could not be spread by mosquitoes, thereby preventing the re-infection of humans.

"It is very rewarding that our fascination with basic biology has produced such significant results."

"We are the first group to follow the drug resistant malaria parasite through its entire life cycle to understand what happens after drug resistance initially develops and whether they pass on resistance."

"Our next challenge will be to look for any spread of this drug

resistance in field settings such as Kenya and Zambia. We are hopeful that with the development of cheaper generic forms of the drug atovaquone, that there is a new hope in the treatment of malaria."

**"Parasites resistant to the antimalarial atovaquone fail to transmit by mosquitoes", Christopher D. Goodman, Josephine E. Siregar, Vanessa Mollard, Joel Vega-Rodríguez, Din Syafruddin, Hiroyuki Matsuoka, Motomichi Matsuzaki,**

**Tomoko Toyama, Angelika Sturm, Anton Cozijnsen, Marcelo Jacobs-Lorena, Kiyoshi Kita, Sangkot Marzuki, Geoffrey I. McFadden.**

**Science, 15 Apr 2016:Vol. 352, Issue 6283, pp. 349-353, DOI: 10.1126/science.aad9279**

**<http://science.sciencemag.org/content/352/6283/349>**

**Story source: Dr Nerissa Hannink, The University of Melbourne <http://newsroom.melbourne.edu/news/new-hope-malaria-treatment-drug-resistance-found-unable-spread-first-time>**

**Read the Pursuit article and watch video footage here: <https://pursuit.unimelb.edu.au/articles/trapping-malaria-in-a-gene-net>**

Images on previous page (McFadden laboratory team) and on this page (mosquitoes) credit The University of Melbourne

## Research Achievements

### OPEN SOURCE DRUG DISCOVERY

ASSOCIATE PROFESSOR MATTHEW TODD AND COLLEAGUES RAN A SPECIAL SYMPOSIUM ON OPEN SOURCE DRUG DISCOVERY AT THE INTERNATIONAL CONGRESS FOR TROPICAL MEDICINE AND MALARIA 2016 IN BRISBANE. THEY EXAMINED SEVERAL EXEMPLAR PROJECTS THAT HAVE EXPERIMENTED WITH OPEN SOURCE DRUG DISCOVERY.

ASP member Matthew Todd from the University of Sydney is an organic chemist coordinating the Open Source Malaria project <http://opensourcemalaria.org> that is trying a different approach to curing malaria using Wikipedia, Firefox and Linux as models for research collaboration. The project is aimed at finding new medicines for malaria using open source principles, everything is open and anyone can contribute, embodied in the 6 Laws of Open Research, the most important of which are:

1. All data and ideas are shared openly

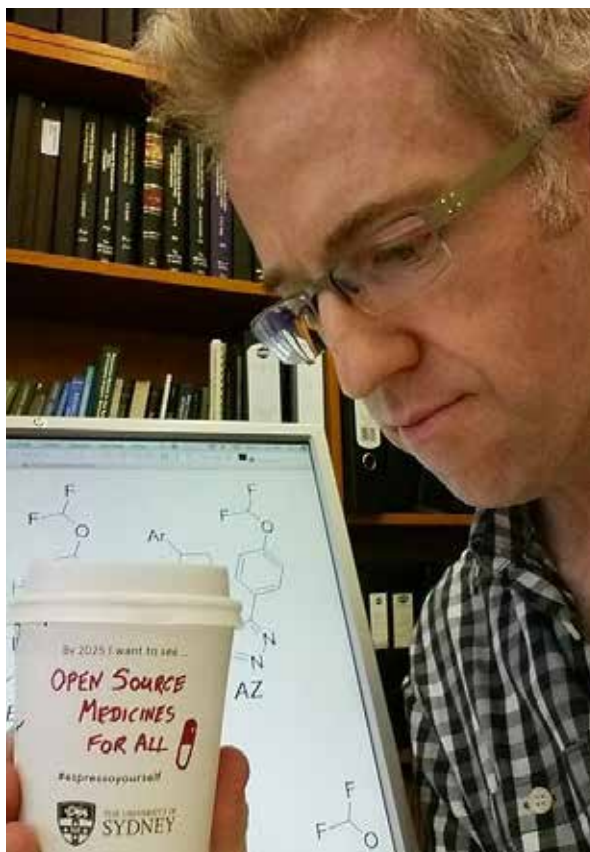
2. Anyone may take part

3. There are no patents

Matthew Todd has been promoting open source for more than ten years and was originally inspired by the internet and how open source was used to quickly fix any computer or software issues. "Anyone could come along and contribute to open source

software and I thought, imagine if you could do that with science," Matthew said. "We successfully achieved this in 2010 with an ARC Linkage project with the World Health Organisation to solve a problem to do with making the Schistosoma drug "Praziquantel" as a single enantiomer. When this problem came up I thought this was a perfect opportunity to test out the theory that open source could speed things up. The project was successful and the problem was solved quickly because experts we didn't know in the field of science contributed openly on the website. These people, often from companies in the pharmaceutical industry, provided strategic advice and ran experiments free of charge. Science should have an "arena" feel to it and the schisto project achieved that through these outside contributors," he said.

Currently most of work involves the synthesis of analogs of compounds originally identified by big pharmaceutical companies, with the aim of improving their potency while making the molecules more "druggable", and this is what is known as a "hit-to-lead" campaign. From the Open Source Malaria Landing Page scientists can see the most recent activity; there is a "To do List" and experiments from all





## Research Achievements

contributors are recorded in the electronic laboratory notebooks. The Open Source Malaria (OSM) Consortium is like “Linux for Malaria Research”.

Sharing is a fundamental theme in Matthew’s approach to science, not just with collaborators but with the general public too. He believes that open science has the benefit of showing other researchers the complete research methodology, where you made mistakes and, because of the real-time nature of the project, where the project can go next. “In traditional research practices you don’t share what your lab is doing: you would do work in the lab and then you would distil out a certain amount of the stuff you have done and then publish that as a paper in a peer reviewed journal rather like a press release,” Matthew said, “The crucial distinction (of open models) is that you’re not telling people what you’ve done, you’re telling people what you’re going to do in the future.”

OSM has grown in recent years. In 2011 the Todd lab at The University of Sydney received funding for a pilot project in open source drug discovery from the Medicines for Malaria Venture (MMV). The project champion at the outset was Tim Wells. Jeremy Burrows and Paul Willis came on board and led the suggestion to go after a few of the actives that had been placed in the public domain in 2010 by GlaxoSmithKline and others. Work got underway in the lab in August 2011. The team were successful in securing further funding from two Australian Research Council Linkage grants in 2012 and 2015. The current frontrunner compounds, in what is known as Series 4, are highly promising because two members of the series have been shown to be active in a mouse model of malaria. Matthew explained why he thinks open source drug discovery is the way forward when he said “I want a drug to be found for malaria as quickly as possible and I don’t really care who does that. The work is important, not who does it. You do it because you want to do good work, and for that to be of the widest possible use to humanity. I think the many talented contributors to the OSM consortium would agree with that.”

**This article has been adapted from Tim Groenendyk’s story “OPEN SOURCE DRUG DISCOVERY” published on the University of Sydney website <http://sydney.edu.au/research/spotlight/toddosdd.shtml>**

### TRAUB IN CAMBODIA

#### REBECCA TRAUB OF THE UNIVERSITY OF MELBOURNE SPENT A WEEK IN ROVEING DISTRICT, NORTHEAST CAMBODIA.

Rebecca Traub spent a week in Roveing District, northeast Cambodia training laboratory technicians for an upcoming hookworm efficacy trial that is being carried out in collaboration with the National Centre For Parasitology, Entomology and Malaria Control, Cambodian Ministry of Health and the Swiss Tropical Medical Institute, Basel.

The experience was highly enlightening for Rebecca, who feels she got her research in tropical parasitology ‘mojo’ back.



Above: Rebecca Traub in Cambodia

## Research Achievements

### MARSHALL LIGHTOWLERS IN NEPAL

#### MARSHALL LIGHTOWLERS TRAVELLED TO NEPALGUNJ IN NEPAL TO FACILITATE THE TESTING OF THE TSOL18 VACCINE.

Marshall Lightowlers travelled to Nepalgunj in Nepal as part of his involvement with the Global Alliance for Livestock Veterinary Medicines (GALVmed) which is facilitating commercialization of the University of Melbourne's TSOL18 vaccine against *Taenia solium* infection in pigs. Use of the vaccine has the potential to reduce *T. solium* transmission and reduce the incidence of human neurocysticercosis.

In Nepal, Marshall worked with staff of the NGO Heifer, as well as students from the Institute of Agriculture and Animal Science at Tribhuvan University, to undertake detailed necropsies on 110 pigs purchased from Dalit communities in the area.

The necropsies provided baseline data on *T. solium* infection levels prior to implementing treatment of pigs with the TSOL18 vaccine and oxfendazole. Almost a third of the pigs were found to be infected with *T. solium* cysts, some with very heavy infections.

Images top to bottom: 1. Marshall Lightowlers with children in a rural area in the Nepalgunj region of Nepal. 2. Undertaking necropsy assessment of *Taenia solium* infections in pigs in Nepal. 3. Pork meat from an animal infected with *Taenia solium* 4. The lab team in Nepal.



# Researcher Exchange, Training & Travel Awards

IN 2016, 12 NETWORK RESEARCHER EXCHANGE, TRAINING AND TRAVEL AWARDS WERE PROVIDED, MOST GOING TO STUDENTS OR ECRs FOR VISITS TO OVERSEAS LABORATORIES AND TRAINING COURSES.

## JD Smyth Travel Award winners

**Alexander Kennedy**, PhD Candidate, WEHI, to attend XXVI International Complement Workshop, Kanazawa, Japan, 4-8 September and for a Researcher Exchange to Rayner group at the Wellcome Trust Sanger Institute, Hinxton, Cambridge, UK. 11 - 30 September

**Charlie Jennison** (WEHI) awarded a JD Smyth Postgraduate Travel Award for to visit the University of Georgia, USA to learn the Plasmodium micro-well hepatocyte culture methods under Prof Kyle 26th February; Shoklo Malaria Research Unit Thailand to learn sample collection and P. vivax transmission; the University of Georgia, USA to infect hepatocytes and perform the downstream processing and analysis of infected hepatocyte cultures; and to laboratory of Takafumi Tsuboi at the University of Ehime to produce a number of proteins required for the generation of malarial liver stage specific antibodies.

**Jessica Johnson-Mackinnon** (The University of Tasmania) awarded a JD Smyth Postgraduate Travel Award to investigate the virulence, distribution and describe the relatedness of globally distinct outbreaks of amoebic gill disease in farmed salmon, in collaboration with the British Columbia Centre for Aquatic Health Services, Victoria, Nanaimo and Campbell River, Canada.

## ASP Network Travel Award winners

**W. Deepani D Fernando**, PhD student, QIMR Berghofer MRI, for a training course ESCMID summer school tropical and infectious diseases and clinical microbiology, Seville Spain, 2 – 9 July 2016

**Md Abdullah Al Mamun**, PhD student, Monash University/Federation University, for a 16S Metagenomic sequencing analysis workshop at University of Alberta, Edmonton, Canada 9-13 May 2016

**Thi Hong Hanh Nguyen**, PhD candidate, Bio21 Institute, for a training course Malaria Experimental Genetics, Wellcome Trust Genome Campus, UK 8 – 14 May 2016

**Sarah Preston**, Post-Doctoral Researcher, Melbourne University, Gasser Laboratory for a Researcher Exchange to The University of Georgia, Ray Kaplan's laboratory 12-29 February, 2016

**Michelle Power**, Senior lecturer, Biological Sciences, Macquarie University, for a Researcher Exchange to Max Planck Institute Berlin, Germany, to visit Kai Matuschewski to analyse Haemsporidia from Australian flying fox species, August 10, 2016 to September 14 2016

**Scott Cutmore** (The University of QLD) for a Researcher Exchange to explore marine trematode taxonomics with two experienced scientists in Japan, Assoc. Prof James Reimer Department of Biology, Chemistry and Marine Sciences, University of the Ryukyus, Nishihara, Okinawa and Assoc. Prof Sho Shirakashi Kindai University, Osaka.

**Michael Hammond** (RMIT) for a Researcher Exchange to study the systematics and host-parasite interactions of bucephalid trematodes of fishes in the laboratory of Tom Cribb, The University of Queensland.

**Hong You** (QIMR Berghofer) for a Researcher Exchange to establish a CRISPR-Cas9-mediated gene knock-down system in Schistosoma japonicum in collaboration with Paul Brindley's laboratory at the Department of Microbiology, Immunology and Tropical Medicine at the George Washington University USA.

**Javier Sotillo** (JCU) for a Researcher Exchange to the laboratory of Dr. Giovina Ruberti, Group leader at the National Research Council, Institute of Cell Biology and Neurobiology, Italy to learn techniques to transfer adult schistosomes from one host into a recipient host.

## Researcher Exchange, Training & Travel Awards

### ASP Student Conference Travel Grant

**The ASP awarded 108 ASP Student Conference Travel Grants in 2016 to attend the International Congress for Tropical Medicine and Malaria, incorporating the 2016 ASP Annual Conference, 18-22 September 2016 at the Brisbane Convention & Exhibition Centre.**

Rebecca Abraham (University of Adelaide), Mahdis Aghazadeh (UQ), Mohammad Al-Hasnawy (Monash University), Brendan Ansell (University of Melbourne), Megan Arnold (Griffith University), Jimena Balli-Garza (University of Tasmania), Amanda Barbosa (Murdoch University), Priyanka Barua (University Of Melbourne), Charlotte Bernigaud (QIMR Berghofer MRI), Sajad A Bhat (University of the Sunshine Coast), Jessica Bridgford (University of Melbourne), Xena Brooks (UQ), Geraldine Buitrago (James Cook University), Angela Cadavid Restrepo (ANU), Larissa Calarco (University of Technology, Sydney), Timothy Cameron (La Trobe University), Gowtam Chalasani (La Trobe University), Shona Chandra (University of Sydney), Phoebe Chapman (UQ), Ming Chua (Griffith University), Naomi Clarke (ANU), Eimear Cleary (ANU), Michael Coffey (WEHI), Martha Cooper (James Cook University), Crystal Cooper (University of Western Australia), Karina De Sousa (UQ), Adelaide Dennis (ANU), Shannon Donahoe (University of Sydney), Catarina dos Santos (University of Tasmania), Laure Dumont (University of Melbourne), Samantha Emery (Macquarie University), Jessica Engel (Griffith University), E. Yagmur Erten (University of Sydney), Deepani Fernando (UQ), Gillian Fisher (Griffith University), Abebe Fola (WEHI of Medical Research), Camila Franca (University of Melbourne), Hagos Gebremikael (University of Melbourne), Carlo Giannangelo (Monash University), Alexander Gofton (Murdoch University), Rory Gough (University of Technology Sydney), Ineka Gow (University of Technology Sydney), Telleasha Greay (Murdoch University), Irene Handayuni (Charles Darwin University), Sanduni Hapuarachchi (ANU), Christopher Hart (Griffith University), Shihab Hasan (UQ), Chris Hosking (La Trobe University), Daniel Huston (UQ), Charlie Jennison (University of Melbourne), Jessica Johnson-Mackinnon (University of Tasmania), Fran Jones (Murdoch University), Thomas Williams (Charles Sturt University), Shilpa Kapoor (La Trobe University), Alexa Kaufer (University of

Technology, Sydney), Jane Kelley (La Trobe University), Kit Kennedy (University of Melbourne), Alexander Kennedy (University of Melbourne), Weiling Koh (University of Sydney), Andrea Lawrence (University of Sydney), Clarenica Lie (University of Sydney), Siew May Loh (Murdoch University), Jessica Loughland (Menzies School of Health Research), Leanne Low (Griffith University), Ann Ly (University of Melbourne), Md Abdullah Al Mamun (Monash University), Kerryn Moore (University of Melbourne), Taylah Munro (Griffith University), Susanna Ng (Griffith University), Dinh Nguyen (University of Melbourne), Chloe Nguyen (University of Sydney), Damian Oyong (Charles Darwin University), Jacqueline Panozzo (Federation University), Unaiza Parkar (Murdoch University), Kathryn Parker (ANU), Zuleima Pava Imitola (Menzies School of Health Research), Catherine Perez (Murdoch University), Janavi Rambhatla (University of Melbourne), Mohammed Rashid (University of Melbourne), Vignesh Rathinasamy (LaTrobe University), Dhanasekaran Sakthivel (Monash university), Mengistu Seid (James Cook University), Saba Sinai-Mameghany (University of Sydney), Danielle Sisson (University of Melbourne), Sarah Sloan (La Trobe University), Sylvia Squire (Murdoch University), Daniel Squire (Murdoch University), Aloysious Ssemaganda (Griffith University), Cara Wilson (Charles Sturt University), Katharina Stracke (University of Melbourne), Andreas Stroehlein (University of Melbourne), Bemnet Amare Tedla (James Cooke University), Yen Thon (Thomas) Teoh (University of Melbourne), David Teran (UQ), Erick Tjhin (ANU), Edwin Tse (University of Sydney), Jessie van Huis (Griffith University), Kosala Weerakoon (UQ), Jessica Wilkie (La Trobe University), Isaac Kane (Charles sturt University), Eleanor Steller (Charles Sturt University), Luning Yang (Walter & Eliza Hall Institute of Medical Research), Xi Zen Yap (University of Melbourne), Russell Qi-Yung Yong (UQ), Alireza Zahedi Abdi (Murdoch University), Joy Manyi Zeng (ANU), Meng Zhang (ANU), Bilal Zulfiqar (Griffith University).



## Researcher Exchange, Training & Travel Awards

### RESEARCHER EXCHANGE & TRAVEL REPORTS

#### DHANASEKARAN SAKTHIVEL, MONASH UNIVERSITY, TRAVELLED TO JAPAN FOR HANDS-ON TRAINING AT THE CRYSTALLOGRAPHY SCHOOL OF OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY.

"The present rate of progress [in X-ray crystallography] is determined, not so much by the lack of problems to investigate or the limited power of X-ray analysis, as by the restricted number of investigators who have had a training in the technique of the new science, and by the time it naturally takes for its scientific and technical importance to become widely appreciated." Sir Lawrence Bragg, Australian-English physicist and X-ray crystallographer, Nobel laureate for Physics in 1915 in his concluding remark in Lecture (1936) on "Forty Years of Crystal Physics"

In my PhD program, I aim to examine the role of carbohydrate recognizing proteins of sheep (galectin 11 and 14 which have novel anti-

parasitic activities in resistant animals) and how they interact with glycan's present on the parasites surface in order to provide better insights in host immune resistance and for the design of a glycan based vaccine. In the early of 2015, I obtained the diffraction patterns of Galectin-11 of sheep and complexes of galectin-11 with carbohydrate molecules for the first time. Though the X-ray data of Galectin-11 collected, I needed appropriate training to define how these host glycans interact with parasites. Hence, I attended the crystallography school organized by Okinawa Institute of Science and Technology, Japan, in order to gain hands on training

to analyse X-ray crystallographic data, which was kindly sponsored in part by the ASP Network Researcher exchange program. I was the only student from Australia to get a boarding pass, among 16 international students selected by the committee to attend the third joint Okinawa Institute of Science and Technology (OIST) Okinawa Island, Japan and Comprehensive Computing suite for Protein Crystallography (CCP4), hands on training Crystallography School.

During the first day of my stay at Okinawa Institute of Science and Technology, I had the chance to present my research findings among students and scientists from various institutions. I also gained understanding regarding the collection of X-ray diffraction patterns of proteins in more innovative ways. In this platform I was trained to deal with critical structure solution processes in macromolecular crystallography, starting from data processing, through phasing and refinement, and ending with validation and deposition. I learned to use the next generation tools such as Mosflm, Scala, Refmac, ArpWarp, Phaser, Coot, Crank, SHELXC/D/E, Balbes, Mrbump, Buccaneer and many more

popular programs used for data processing and structure solution with the team of those world's leading software developers.

Apart from the direct help this award has given me to enable completion of my

thesis, for a graduate student like me, travelling overseas was also an excellent way to expand my academic networks. Following the successful completion of my workshop, I travelled to Kyoto, where there are thousands of ancient Buddhist temples, as well as gardens, imperial palaces, Shinto shrines and traditional wooden houses. My international contacts certainly helped me meet Professor Hiroshi Sugiyama's research group, members of Kyoto University. Prof's Sugiyama group is defining the chemical principles underlying the recognition, reactivity and structure of nucleic acids. Here, I discussed with his Post Doctoral fellows



## Researcher Exchange, Training & Travel Awards

Dr. Gengo Kashiwazak, Dr. Junetha Syed Jabarulla and Dr. C. Anandhakumar of biological inorganic chemistry division, about the design of highly efficient sequence-specific DNA acting agents and a suitable in vivo delivery method. Currently we are keen on a long-term goal to develop an artificial genetic switch for targeted treatment of selected parasite diseases.

The present drug resistant scenario in animal parasites requires novel as well as more efficient approaches to improve our understanding of host-parasite interactions and control options.

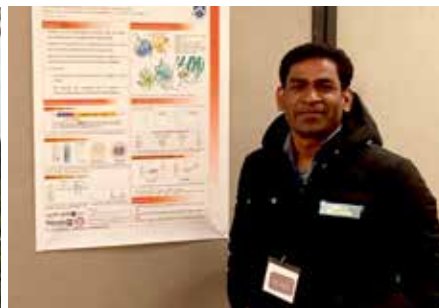
*Haemonchus contortus* is a globally well-known and widespread gastrointestinal nematode (GIN) of sheep and goats. The parasite causes severe production losses due to a range of physiologic impacts including reduced feed intake, digestion problems, anaemia, reduced fecundity, poor weight gain, reduced milk production and increased mortality.

*H. contortus* is ubiquitous and strongly influences livestock farm profits in tropical countries. It is estimated that 30% to 50% of production losses are caused by parasites and their treatment, where GIN infection are a significant issue. Even in the setting of Australian livestock industry where modern diagnostics and treatment are widely available, production losses and cost of drug treatment for GIN infections is estimated more than 1 billion dollars per annum.

Glycan and glycopeptide based vaccines are emerging candidates to reduce the significant burden of parasitic disease. Ultimately,

progress in innovative research to develop cutting-edge diagnostic methods and vaccine development requires greater opportunities to work with world leaders. Indeed, my Travel to Okinawa Institute of Science and Technology and Kyoto University has helped me formulate new ideas, exciting innovative ways to analyse and understand my data and I have learnt an enormous deal. This would not have been possible without the generous support of Australian Society for Parasitology through the ASP Researcher Exchange, Training and Travel Award. I thank the Australian Society for Parasitology for considering me for this prestigious

award and financial support. It's my immense pleasure to also extend my sincere thanks to Associate Professor Fadel. A. Samatey, Group Leader, Trans-Membrane Trafficking Unit, for providing additional necessary support throughout the workshop. Included are some pictures of me "hard at work".



Photos courtesy Dhanasekaran Sakthivel, at the Okinawa Institute of Science and Technology (OIST) Okinawa Island, Japan and Comprehensive Computing suite for Protein Crystallography (CCP4), hands on training Crystallography School

## Researcher Exchange, Training & Travel Awards

ALEJANDRO TRUJILLO GONZÁLEZ, JAMES COOK UNIVERSITY, TRAVELLED TO SPAIN FOR A RESEARCHER EXCHANGE AT THE INSTITUTE OF AQUACULTURE “TORRE DE LA SAL” (IATS) IN CASTELLÓN WITH DR ARIADNA SITJÀ-BOBADILLA AND DR. OSWALDO PALENZUELA, THIS REPORT BY ALEJANDRO TRUJILLO GONZÁLEZ.

The contribution I received from the Australian Society for Parasitology allowed me attend to the 9th International Symposium of Fish Parasites (9ISFP) and a month long research exchange in the Institute of Aquaculture “Torre de la Sal” (IATS) in Castellón, Spain, from the 1st of September to the 12th of October. The 9th ISFP was held at the University of Valencia Campus, where researchers from all over the world presented ground-breaking research in various areas of fish parasitology. As a first year PhD student, this was a unique opportunity to meet new people and learn about what its currently being done in research laboratories around the world. As I meet more researchers and



Above left: working with a gilthead seabream, *Sparus auratus* infected with myxozoan parasite, *Enteromyxum leei*. Above right: Aquatic Pathology Laboratory team. From Left to right: Dr Oswaldo Palenzuela, Alberto Fernandez, Raquel del Pozo, Dr Ariadna Sitjà-Bobadilla, Inmaculada Vicente, Nahla Hossam and Eldin Ahmed.

new techniques, I questioned my research approach and found better ways to accomplish my objectives during my PhD. During the conference, I gave an oral presentation “Tracking transparent monogenean parasites on fish from infection to sexual maturity” where I showed how fluorescent labelling can be used to study parasite ecology.

Following the conference, I started my research exchange with Dr Ariadna Sitjà-Bobadilla and Dr. Oswaldo Palenzuela in IATS, a public research centre that belongs to the Consejo Superior de Investigaciones Científicas (CSIC) in Spain. During this time I aimed to analyse samples from my current PhD project, in which I will identify strategic approaches to detect pathogens of quarantine concern associated with the importation of ornamental fish to Australia. Dr Sitjà-Bobadilla is a world-renowned expert of myxozoan, coccidian and monogenean parasites of farmed fish and Dr. Palenzuela is a specialist of *Cryptosporidium* and *Enteromyxum* species infecting marine fish.

During my month working in the Institute, I was trained in



molecular and morphological identification of myxosporean and cryptosporidian parasites. I also learned techniques to maintain an in vivo culture of *Enteromyxum leei* infecting gilthead

sea bream, *Sparus aurata*, as part of ongoing experiments in the facilities of the Institute. Specifically, I learned to develop nested PCR protocols to identify *Cryptosporidium* species in samples collected from infected fish. I honed my skills in histopathology and learned to identify myxozoan, myxosporean and cryptosporidian parasites found in different fish organs.

Raquel del Pozo (Senior lab technician) was invaluable in my understanding of the nested PCR protocols and Dr Carla Piazzon (PostDoc researcher) helped me to identify potential issues in

## Researcher Exchange, Training & Travel Awards

PCR protocols and what stages could be modified to increase the sensitivity of the protocols. Inmaculada Vicente (Senior animal husbandry assistant) and Alberto Fernandez (lab technician) showed me the re-circulating and flow-through systems they had established to maintain different species of fish, and what stages were of critical importance to maintain experimental infections and avoid cross-contamination between tanks. This knowledge greatly increased my understanding in animal husbandry and gave me essential skills I will use later in my PhD.

Most importantly, I learned how to cure and prepare olives for consumption. This was a small side project I had during my spare time, and as Rosario (the gatekeeper of the Institute) said: “olives are an essential component of Spanish culture”.

I would like to thank the ASP for their funding and encouragement of students to seek out international opportunities. My research exchange established the first collaboration between James Cook and IATS, paving the way for future exchange students to have more opportunities to travel and get involved in other research projects. With the help of the APS and IATS in Spain, Australian students have the opportunity to develop research in Europe, with new techniques, new fish species, and innumerable opportunities to learn something new.

Above, Alejandro and friends at the 9th ISFP in Valencia, Spain from left to right: Kate S. Hutson, Ana Delgado, Alejandro Trujillo, Alexander K. Brazenor at the 9th ISFP in Valencia, Spain.



### ALI RAZA OF THE UNIVERSITY OF QUEENSLAND TRAVELLED TO CANADA FOR A RESEARCHER EXCHANGE AT THE UNIVERSITY OF MONTREAL AND THEN ON TO SAN DIEGO, FOR AN ANTHELMINTICS WORKSHOP.

I had the opportunity to spend about 4 weeks in Prof. Roger Prichard's laboratory at the Institute of Parasitology, McGill University, Montreal, Canada, in early 2016. I received a warm welcome by the freezing cold of Montreal when I landed there. I was very excited to be making this trip because this laboratory is one of the world's leaders in research into anthelmintic resistance. The work carried out in this lab is well aligned to my own interests. The people working in the institute were very friendly and cooperative, and they cordially welcomed me to visit their labs. My main purpose was to learn some techniques in proteomics and genomics as Prof. Prichard's group works on drug transport proteins, ion channels and drug targets in nematodes and their roles in anthelmintic resistance.

During my visit, I was invited to not only attend the weekly seminars in the institute and hear about the on-going projects by different research groups, but also to present my research work and promote the Australian research on anthelmintic resistance. In addition, I also had an opportunity to work on a high-throughput technique, “pyrosequencing” to measure the frequency of single nucleotide polymorphisms (SNPs) in resistant and susceptible isolates of *Haemonchus contortus* collected from different sheep farms across Canada. This project is focusing on detection of the SNPs in beta-tubulin and dyf-7 genes responsible for resistance to benzimidazole and ivermectin in *H. contortus*.



## Researcher Exchange, Training & Travel Awards

Using this technique, we can investigate and identify the possible markers that can be used to diagnose nematode population resistant to anthelmintics in field conditions. I also attended a short training session on basic bioinformatics and the use of software for phylogenetic analysis.

Prof. Tim Geary, the director of the institute is a great personality, who allowed me to work in his lab where I learned about the use of fluorescent microscopy to investigate the effects of flubendazole on the cuticle of *Brugia malayi*. Meghan O'Neil (a

PhD student) also helped me to differentiate between anatomical structures of this nematode and understand its handling and storage. Researchers in Prof. Geary's group are also working on associating nematode ion channel activity with anthelmintic sensitivity. Different drug target proteins (glutamate-gated chloride ion channels and nicotinic acetylcholine receptors) are expressed in *Xenopus* oocytes and the effects of drugs on opening and closing of the ion channels are studied in a voltage-clamp technique. I was fortunate to learn about this technique and also assisted in a surgical procedure to harvest the oocytes from frogs. It was quite interesting for me to inject RNA in these tiny round 'balls' (oocytes) using a microscope and very fine microneedles.

I also participated in the actual electrophysiology experiments performed using a well-established system. I was also interested to learn the protein modelling and Mark (a PhD student) helped me to understand the basics of protein modelling and the use of different software for this purpose. The working experience on such advanced techniques which I acquired during this visit is a

valuable addition to my career portfolio.

During my visit, I also participated in an international symposium entitled "Anthelmintics: Discovery to Resistance II" held in San Diego, CA, USA, and presented my research work. I had good discussions on future research directions in the area of anthelmintic resistance with leaders in my field of research. In addition, I also discussed on some future postdoctoral career opportunities with different research groups

In short, my visit to the institute and drug resistance symposium, albeit for few weeks, was highly successful and most enjoyable. I really enjoyed the chilling weather of Montreal, company of my colleagues and the new networks that I created. In concluding,

I would like to acknowledge Prof Roger Prichard, Prof Tim Geary and all the staff and students in the institute especially Kathy Keller (senior technician) for their cooperation and

amazing hospitality throughout my stay. Furthermore, I would especially extend my gratitude to Mr. Shoaib Ashraf (ex-PhD student from the lab) for his wonderful hospitality and kind cooperation in arranging my accommodation and welcoming me to his house for delicious meals quite often. I successfully represented the ASP and the University of Queensland, and promoted Aussie research on anthelmintic resistance in Canada and the USA. I am greatly thankful to the ASP and the Graduate School, University of Queensland for the financial support that allowed this fruitful visit to take place.



Image courtesy of Ali Raza

## Researcher Exchange, Training & Travel Awards

### HANH NGUYEN FROM THE UNIVERSITY OF MELBOURNE WAS AWARDED AN ASP NETWORK RESEARCHER EXCHANGE, TRAINING AND TRAVEL AWARD TO ATTEND A TRAINING COURSE IN MALARIA EXPERIMENTAL GENETICS AT THE WELLCOME TRUST GENOME CAMPUS, UK IN MAY 2016

I attended the Malaria Experimental Genomics course at the Wellcome Trust Genome Campus in Hinxton from 8th May to 14th May 2016.

The course was conducted by Julian Rayner, Oliver Billker and Marcus Lee. The course took place at the CL1 and CL3 teaching laboratory at the Sanger Institute under the supervision of the demonstrators. The course covers gene editing methods, malaria parasite transfection, genotyping, flow cytometry and RNA-sequencing analysis visualisation. There were presentations from international invited speakers from the United States, Europe and Australia as well as local speakers. While the topic discussed was broad, the focus revolves around the discussion of the conditional knockdown system used for different settings and experimental purposes.

The talks were particularly informative as students were provided chances to ask questions and discuss specific projects with the speakers during the talk or over the next few days of the course.

Gene editing using CRISPR was one of the major themes for the

course. Marcus Lee guided me to design CRISPR single-stranded guide RNA and I successfully incorporate it into one of his pre-designed vector. This vector will be used as part of my project to generate edited bromodomain protein lines. Recently, I returned to my laboratory and aimed to set up an adaptable, efficient and easily operated CRISPR system for all of our members.

In addition, the course also focus on performing and comparing the difference between different eletroporation systems when working with *P. falciparum*, *P. berghei* and *P. knowlesi*. In my laboratory, we routinely use Biorad electroporation system for *P. falciparum* system which is cheaper to operate with relatively decent yield. However, the Biorad is inefficient for experiments requiring multiple transfections. The Lonza (Amaxa) is better suited for this purpose as there is a plate format that can hold up to 96 transfections where each condition requires less input

DNA. The electroporation is also gentler on the cells which may lead to better transfection yield. My laboratory is exploring Amaxa as an alternative option. Bioinformatic analysis such as RNA-sequencing analysis visualisation was also explained during the course by Dr. Thomas Otto. Everyone was also provided opportunity to visit a loader, whose job is to set up the sequencing machine, and show us that Sanger Institute is truly a sequencing leading centre.

My project aims to generate bromodomain protein knockdown parasite lines to test the influence of bromodomain inhibitors on them. Dr. Marcus Lee is funded by the GSK to generate bromodomain protein knockout parasite lines with similar purpose; and through the course, we discussed the project where he suggested some insights that I will try incorporate into my project.

It was a great place to study and talk to other experts in the field. I am most grateful to the ASP for providing me with this opportunity.



Above: course attendees at Hinxton

## Researcher Exchange, Training & Travel Awards

USING HIS JD SMYTH POSTGRADUATE TRAVEL AWARD, ALEXANDER KENNEDY TRAVELLED TO KANAZAWA IN JAPAN AND HINXTON AND LONDON IN THE UK BETWEEN 2ND SEPTEMBER AND 3RD OF OCTOBER 2016.

I would first like to thank the Australian Society for Parasitology for their generous support. As outlined below this travel was exceptionally productive, providing new ideas and collaborations as well as laying the groundwork for successful *P. knowlesi* culturing in Melbourne.

### **26th International Complement Workshop; 03/09/2016-09/09/2016; Kanazawa, Japan**

I attended the 26th International Complement Workshop held in Kanazawa, Japan. This workshop occurs every two years, bringing together experts in

the field of complement, a central component of innate immunity.

The abstract that I submitted to this conference was accepted for a 15-minute oral presentation. My presentation was titled 'Hijacking host complement regulators: mechanisms of *Plasmodium falciparum* complement evasion' and covered both published and

unpublished work from my PhD candidature. The abstract for this talk has been published in the journal *Immunobiology*, Volume 221(10) pp. 1155. My talk was well received with numerous questions and comments from laboratory heads in the field of complement and complement regulation on a range of topics around *Plasmodium falciparum* interactions with the complement system.

This workshop also offered a teaching day for young investigators that I attended. It provided a comprehensive background of the complement system in the morning followed by themed sessions in the afternoon. I elected to attend the 'Therapeutic Intervention in the complement system' and 'Complement deficiencies and diseases' sessions. Both were led by experts in their field and provided a great deal of insight into how complex and interconnected the complement system is as well as ways we

can intervene in this system. I look forward to applying this knowledge to how *Plasmodium falciparum* interacts with and dysregulates the complement system.

Furthermore, attendance at this meeting led to new collaboration opportunities, with a leading European complement laboratory making unique reagents available that will allow further investigation of host-pathogen interactions we have identified. Additional discussions also offered new avenues of deeper inquiry into our current projects.

### **Researcher Exchange: Wellcome Trust Sanger Institute, Rayner Group 11/09/16-23/09/16**

Following the conference, I went to the laboratory of Julian Rayner at the Wellcome Trust Sanger Institute in Hinxton, United Kingdom. The purpose of this visit was to learn to culture the



Above left: Kenrokuen Garden, Kanazawa, Credit: 26th International Complement Workshop.

Above right: The Wellcome Trust Sanger Institute in Hinxton, UK.

## Researcher Exchange, Training & Travel Awards

simian malaria parasite *P. knowlesi*, which has been adapted to invade human red blood cells. *P. knowlesi* causes zoonotic infections in South-Eastern Asia. Initially, I was taught to maintain a culture of *P. knowlesi* and how to identify the stages and morphology of the parasites during their rapid 27 hour lifecycle. In addition, I learnt to purify the late stage *P. knowlesi* schizonts via density method using a nycodenz cushion and how to use these schizonts to produce a synchronous *P. knowlesi* culture. This method was particularly valuable as generating a synchronous culture is important for downstream assays. In addition, *P. knowlesi* is resistant to sorbitol lysis, a common method used for generating synchronous *P. falciparum* cultures. In addition, I was taught to successfully freeze and thaw *P. knowlesi* cultures, which will be important for establishing these cultures in Australia.

My *P. knowlesi* synchronous parasites were used to set up a growth inhibition. These assays produce key functional data about parasite viability in different conditions. In this case, we tested the IC50 of several known *P. falciparum* inhibitors that were at hand, gaining interesting preliminary data worth further follow up in the future.

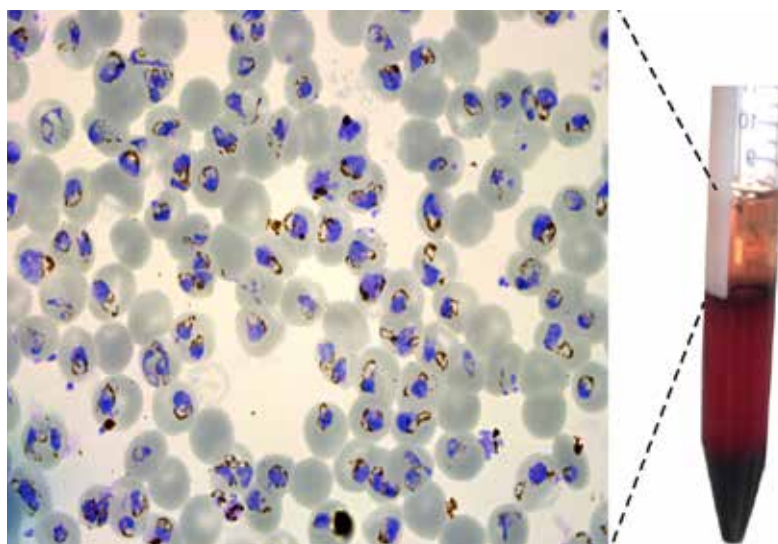
I was also guided through a transient transfection protocol that would express luciferase off and episomal plasmid in *P. knowlesi*. Our transfection was a success with luciferase activity readily detected the following day. Being able to successfully transfect *P. knowlesi* will allow us to produce transgenic *P. knowlesi* lines here in Australia allowing us to further probe the parasite biology.

In conclusion, the two weeks at Sanger Institute were highly productive, covering the essentials needed to establish *P. knowlesi* culturing and experiments in Australia. This success is thanks to Julian Rayner and the welcoming and helpful attitude of his lab members. In particular, I would like to thank his postdoctoral fellow Dr Theo Sanderson who supervised and taught me all of the *P. knowlesi* techniques mentioned above.

Researcher Exchange: London School of Hygiene and Tropical Medicine, Moon Group  
26/09/16 – 03/10/2016

I also visited Dr Robert Moon, who established the human adapted *P. knowlesi* cell line, at his laboratory at The London School of Hygiene and Tropical Medicine for one week. While at LSHTM, I presented a public seminar of my work on *P. falciparum* complement evasion strategies. In addition, I had extensive discussions on the *P. knowlesi* culturing methods refining the knowledge I had earlier learnt at the

Sanger Institute, as well as receiving detailed protocols for assays such as immunofluorescence assays. Dr Moon has also been able to transfect *P. knowlesi* with exceptional efficiency and I was able to observe the methods used to prepare and perform these high efficiency transfections. This was a very productive week of research exchange, owed in great part to Dr Moon's generosity with his time and methods.



Above: *Plasmodium knowlesi* schizonts growing in human red blood cells stained with Giemsa at 100 x magnification. Schizonts were enriched by floatation on a nycodenz cushion (right).



## Researcher Exchange, Training & Travel Awards

### KATE HUTSON DESCRIBES HER EXPERIENCE OF THE INTERNATIONAL WORKSHOP ON SYMBIOTIC COPEPODA, HELD AT THE HERON ISLAND RESEARCH STATION, A TRIP MADE POSSIBLE BY THE SUPPORT OF THE ASP NEWTORK'S TRAVEL AWARD SCHEME.

Researchers and students from around the world meet every three years to exchange ideas and learn research techniques on symbiotic copepods during the International Workshop on Symbiotic Copepoda (IWOSC). This year the conference was held at Heron Island Research Station, Australia

and was generously supported by the Australian Society for Parasitology. The global shortage of technical expertise in copepod taxonomy is a threat to biodiversity studies and aquatic animal health industries. More than 11,000 valid copepod species are known, about half of which live in symbiotic associations with

nearly every animal group, ranging from sponges to chordates. Only about 2% of aquatic invertebrate species and less than 20% of fishes have been surveyed for symbiotic copepods, which means there are many more waiting to be discovered and formally described.

The 1st and 2nd IWOSC were held at Cabrillo Marine Aquarium in San Pedro, California, U.S.A. and the University of Limpopo in South Africa, respectively. This 3rd IWOSC at Heron Island

comprised a fully residential event including research presentations, laboratory based workshops and the opportunity for participants to collect workshop related specimens on field trips in the scientific research zone of the Great Barrier Reef Marine Park. Four days were dedicated to symbiotic Copepoda, with the final day on symbiotic



Isopoda. The workshop was organised by Kate Hutson (James Cook University, Australia), Julianne Kalman Passarelli (Cabrillo Marine Aquarium, USA) and Danny Tang (Orange County Sanitation District, USA) while guest tutors included Geoff Boxshall of the Natural History Museum, London, Rony Huys of The Natural History Museum, London, Nico Smit of North-West University, South Africa and Niel Bruce of the Queensland Museum, Australia.

The first day began with a welcome and introduction session and a plenary presentation by Geoff Boxshall with an introduction to

Above: Jade Morris on snorkel during collections in the scientific zone off Heron Island, Great Barrier Reef (Photo: K Morris)

## Researcher Exchange, Training & Travel Awards

parasitic crustaceans. Following we were given an introduction to copepods of invertebrates by Rony Huys and the history of the discovery of Australian marine parasitic copepods by Kate Hutson. In the afternoon we heard from Jimmy Bernot, Diane Alps, Bruno Passarelli, Alejandro Trujillo-González, David Vaughan, Jonathan Barton, Nico Smit and Julian Uribe-Palomino on their research involving a diversity of aquatic parasite fauna.

The second and third days were themed with a focus on symbiotic copepods of invertebrates and fish, respectively. Collections on the reef were made in the mornings followed by lectures by the organisers and tutors on preservation, identification and accession techniques before we moved into the laboratory to dissect host



specimens and examine fresh preparations of symbiotic copepods. In the evening seine netting under the stars permitted collection of some nocturnal fishes for inspection the

following day.

The weather closed in on the fourth day which suited our planned lectures on copepod life cycles, how to examine copepod specimens, illustration techniques and the use of dichotomous

keys. After lunch we were challenged with a laboratory activity where participants were given preserved material and the resources to key out the specimens to family and genus. The final day involved a lecture by Nico Smit and a workshop by Nico and Niel working with keys and fresh and preserved parasitic isopod specimens.

Unfortunately the weather continued

to deteriorate and the 3rd IWOSC participants found themselves stranded on Heron Island in gale force winds and rain! Fortunately our caterer Pat kept us well fed, Niel kept us entertained with highlights from Africa and the wind subsided enough for us to return to Gladstone the following day!

Top: Organisers and guest tutors (L-R): Nico Smit, Niel Bruce, Danny Tang, Rony Huys, Julianne Kalman Passarelli, Geoff Boxshall and Kate Hutson (Photo D Alps). Middle left: inspecting invertebrate host collections for copepods (L-R): Alejandro Trujillo Gonzalez, Danny Tang and Jimmy Bernot. Middle right: each afternoon there were opportunities to examine fresh and preserved material in the laboratory. Bottom: *tellicola* sp. in starfish *Nardoa* cf. *tuberculata* (photo J Bernot)

# Honours

## **Bancroft Mackerras Medal**

Professor Denise Doolan of the Berghofer Queensland Institute of Medical Research was awarded the Bancroft Mackerras Medal for 2016. Denises's citation is reproduced on the following pages.

## **Australia Day Honours**

Congratulations to Dr Peter Anthony Holdsworth AM, Wanniasa, ACT. Peter was recognised for distinguished service to veterinary science, particularly to animal parasitology and pharmaceutical development, and to professional scientific organisations.

## **Georgina Sweet Award**

Associate Professor Freya Fowkes of the Burnet Institute won the prestigious 2016 Georgina Sweet Award for Women in Quantitative Biomedical Science. Freya is featured on the pages that follow.

## **Eureka Prizes**

Continuing a fine winning tradition for parasitology at the prestigious Eureka Prizes, Professor Leann Tilley, Dr Nick Klonis, Associate Professor Julie Simpson and Associate Professor James McCaw, from The University of Melbourne, took out the Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research for their key scientific discoveries leading to insights into how artemisinin resistance by the malaria parasite may be overcome.

Our congratulations also to several other finalists for the 2016 awards including:

- The SHIFT Team, a collaboration between Murdoch Childrens Research Institute, The Kirby Institute, St Vincent's Hospital, Menzies School of Health Research and the Fiji Ministry of Health that has produced a landmark study showing that mass drug administration with the oral drug ivermectin is highly effective in controlling scabies and related bacterial skin sores. SHIFT has transformed the global conversation on integrated programs for neglected tropical diseases. (Finalist in the Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research category).
- Professor Miles Davenport, Dr Deborah Cromer, Dr Mykola Pinkevych and, Dr David Khoury, Kirby Institute, UNSW; Professor Stephen Kent, Peter Doherty Institute, The University of Melbourne; and Dr Ashraf Haque, QIMR Berghofer Institute for their unique integration of mathematicians, computer scientists and physicists, in close collaboration with experimental scientists and clinicians, to develop a novel understanding of the 'mathematics of infection'. The team has used these insights to design and optimise treatment and vaccination for major infectious diseases. (Finalists in the UNSW Eureka Prize for Excellence in Interdisciplinary Scientific Research category).
- The Boddey, Sleebs and Cowman team, Walter and Eliza Hall Institute of Medical Research, in the Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research category for their research into determining how malaria parasites use a unique protein export pathway across the parasite's lifecycle, enabling collaboration with industry that is accelerating the development of a new antimalarial drug.

## **Griffith University**

Professor Vicky Avery received the 2016 Pro Vice Chancellor's Research Excellence Award - Mid/Senior Career Researcher. Dr Melissa Sykes was awarded the 2016 Pro Vice Chancellor's Research Excellence Award - Early Career Researcher

## Honours

### RECOGNITION FOR ASP MEMBERS

#### ASSOCIATE PROFESSOR FREYA FOWKES OF THE BURNET INSTITUTE WON THE PRESTIGIOUS 2016 GEORGINA SWEET AWARD FOR WOMEN IN QUANTITATIVE BIOMEDICAL SCIENCE

Head of Burnet Institute's Malaria and Infectious Disease Epidemiology Group, Associate Professor Freya Fowkes (pictured) won the prestigious 2016 Georgina Sweet Award for Women in Quantitative Biomedical Science. The \$25,000 award is presented to outstanding mid-career female scientists across Australia who demonstrate excellence in the area of Quantitative Biomedical Science.

The Georgina Sweet Award for Women in Quantitative Biomedical Science was created by Professor Leann Tilley as part of her Australian Research Council Laureate Fellowship program, to promote and support female scientists who demonstrate excellence in the area of Quantitative Biomedical Science.



With the award Associate Professor Fowkes will aim to understand how elimination of malaria can impact on rebound of clinical disease, and elucidate how infectious malaria reservoirs can spread drug resistant malaria.

She said it was a great honour to receive the Georgina Sweet Award, also won by Associate Professor Alicia Oshlack, Murdoch Childrens Research Institute and Associate Professor Kathryn Holt, University of Melbourne.

"To be recognised as a female leader in science in Australia is a great honour and I hope to emulate the success and achievements of other inspirational female scientists such as Professor Tilley" Associate Professor Fowkes said.

"During the award I hope to act as an ambassador for women in science, promoting and inspiring emerging female leaders in science in Australia."

Associate Professor Fowkes received

her award at a ceremony on Thursday 27th October at Melbourne University.

**Story and picture courtesy of the Burnet Institute**

[https://www.burnet.edu.au/news/739\\_burnet\\_malaria\\_researcher\\_wins\\_georgina\\_sweet\\_award](https://www.burnet.edu.au/news/739_burnet_malaria_researcher_wins_georgina_sweet_award)



## Honours

### BANCROFT-MACKERRAS MEDAL 2016

IT GIVES US ENORMOUS PLEASURE TO ANNOUNCE PROFESSOR DENISE DOOLAN OF THE BERGHOFFER QUEENSLAND INSTITUTE OF MEDICAL RESEARCH AS THE BANCROFT MACKERRAS MEDAL (BMM) RECIPIENT FOR 2016.

Denise's contributions to Australian parasitology are well and truly encompassed within the spirit of the BMM. Denise's dedication to, and unwavering support of, the ASP is evident to all. She was recently president of the society, presiding over an industrious period of growth for the society, which included expansion of the IJP family of journals, conceptualization of the postgraduate course (Concepts in Parasitology), and many other new initiatives. While steering the ASP through one of its most exciting development periods, Denise also made outstanding advances in the fields of molecular immunology and vaccinology of malaria. Over her career Denise has published well over 100 papers in the peer-reviewed literature, 50 of these in the last 5 years. Moreover, many of these papers where Denise is first or senior author

have appeared in the very best journals, including Science, Nature Med, Immunity, PNAS and Journal of Experimental Medicine.

Denise conducted her PhD at University of Queensland/ Queensland Institute of Medical Research (QIMR), where she was supervised by Professor Michael Good, and became his first PhD graduate. Denise then moved to arguably the best malaria vaccine laboratory in the world, The Naval Medical Research Centre in MD,

USA, working under the tutelage of Professor Stephen Hoffman. While at the naval malaria labs, Denise rapidly rose through the civilian ranks to become director of basic and pre-clinical research, where she led numerous malaria vaccine development projects and clinical trials and developed an international reputation that was second to none. It was therefore a great coup for QIMR in 2007 to lure Denise back to Australia as a group leader on a prestigious Pfizer Research fellowship. Since her return to Australia, Denise has established the Molecular Vaccinology laboratory at QIMR-Berghofer and currently heads the Biology program at the institute. After completing her Pfizer fellowship, Denise entered the highly competitive NHMRC fellowship scheme as a Principal Research fellow in 2013.

Denise has attracted an astonishing amount of funding for her research on malaria vaccines. Many Australian researchers struggle to maintain their productivity after working in the



## Honours

vibrant and well-funded critical mass of researchers in the US. Denise, however, not only managed to obtain NHMRC program and project grant funding, but also enjoyed the benefits of being principal investigator on grants from the US National Institutes of Health. This is no mean feat for a non-US researcher working in Australia, and as a sole-investigator no less! Her research has led to a number of paradigm shifts in fields of vaccinology and immunology, and this is reflected in not only her publications but the 13 patents on which she is an inventor in the field of infectious disease vaccines. Among her awarded patents is one arising from her demonstration that an antigen expressed during the liver but not sporozoite stage of the Plasmodium life cycle is a target of sterilising protection! Previously, the liver-stage had been considered protected from host immune responses, and it is this sort of out-of-the-box thinking, with no “dogmatising” restraints, that typifies Denise’s approach to her research and accounts for her reputation as a thought-leader and pioneer in this area. Indeed, when the editor-in-chief of Nature Genetics, a journal that needs no précis, recently visited her institute, he made a strong recommendation that Denise submits her most recent work to one of the leading Nature journals, emphasising that we have not yet seen the best of Denise Doolan! Having seen Denise present the work in question over the last few years, I have no doubt that her next series of publications will have an even bigger impact on the field of malaria vaccinology than her current work, and perhaps reinvigorate this important area of endeavour that has suffered recently due to bad publicity around a sub-optimal vaccine that is in the final stages of human clinical trials.

In the area of vaccinology, Denise provided the first experimental verification of the concept of multi-valent vaccination for any pathogen with any vaccine delivery system, resulting in a paradigm shift in strategies for vaccination against tropical diseases. She played a key role in the evaluation of DNA vaccines as a promising molecular vaccine platform, demonstrating that DNA vaccines against malaria are immunogenic in mice and monkeys, and executing the clinical immunology in support of the seminal study demonstrating the safety and immunogenicity of DNA vaccines in healthy humans. This established the foundation for clinical testing of DNA vaccines against other pathogens. She also led the preclinical evaluation and development of

malaria adenovirus vectored vaccines, showing that they could simultaneously induce both T cell and antibody responses and protect against parasite challenge, and could be designed to co-express multiple target antigens. Her team also conducted the seminal study demonstrating that adenovectors can induce functional antibodies capable of potent inhibition of blood-stage malaria parasite growth, with levels exceeding those induced by protein in adjuvant.

Denise’s overall scientific accomplishments are numerous. In the past 5 years however, key advances that she has pioneered are in the area of systems immunology. Denise was the first to apply the growing technology of proteome microarrays to Plasmodium, and used this information to search for the best malaria vaccine antigens using a high-throughput approach. She has since exploited this technology to reveal an entirely new set of T and B cell antigens for inclusion in malaria vaccines that have until now gone completely unnoticed. Using a rational approach to high-throughput screening, and combining human and mouse studies, Denise has addressed the complex nature of protective immunity in malaria through meticulous dissection of the protective immune response at the molecular level.

Not satisfied with merely identifying the major antigens that are required for an efficacious vaccine antigen, Denise has made major discoveries in understanding the nature of the protective immune response to malaria. Through genuine scholarship and an unparalleled knowledge of malaria biology and vaccinology, she has demonstrated that humans recognize CD8+ cytotoxic T lymphocyte epitopes on the Plasmodium falciparum circumsporozoite protein, the core component of the most advanced malaria vaccine candidate RTS,S. Denise then went on to show that cytokines are the critical mediators of immunity against liver stage malaria, resulting in a paradigm shift for pre-erythrocytic malaria vaccine design. This marriage of antigen discovery and detailed immunologic mechanisms of protection resulted in development of a novel epitope-based T cell screening strategy to rapidly identify target antigens of T cell responses from genomic sequence data.

The outcomes and relevance of Denise’s research outside of

## Honours

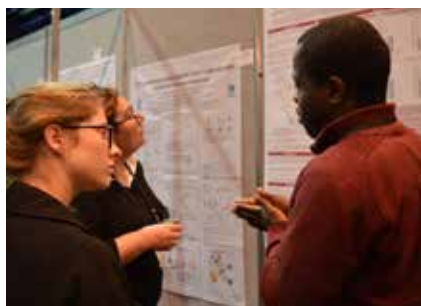
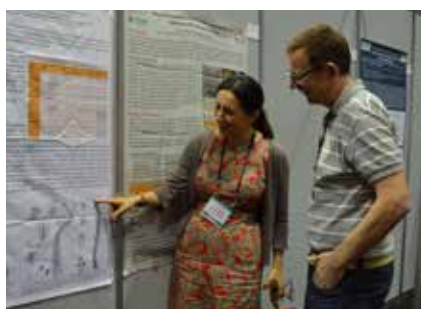
the malaria field are evident. She is responsible for the first experimental verification in any system of the concept of HLA class I supertypes, demonstrating that epitopes predicted by computer algorithms can be generated in vivo during the course of natural infection and recognised by host T cells. She subsequently extended this paradigm to class II T cell responses. These discoveries established the feasibility of developing a universally effective vaccine by focusing on a limited number of peptide specificities. This new concept of HLA supertypes has now been embraced by researchers in diverse fields including HIV, cancer, and autoimmunity, and has provided the foundation for a public access database and analysis resource for epitope data for infectious diseases, allergens and autoimmune diseases.

To summarise, Denise Doolan is an internationally recognised authority in malaria vaccine discovery and development. She is at the top of her game, and is on the cusp of making some of her greatest discoveries to date. She is a prolific author of high quality publications, a mentor held in the highest regard by her students

and postdocs, and a valued senior member of the QIMR Berghofer executive. In terms of this BMM nomination, Denise's contributions to the field of parasitology at large have been utterly selfless and ambassadorial, typified by her leadership of the ASP, her editorial and reviewer contributions to journals in the parasitology field, and the quality and quantity of her research output.

In 25 years of sustained research, Denise Doolan has proven herself to be a leading light in the malaria research community. The impact of her past, current, and undoubtedly future research efforts will lead to better treatments and control of malaria, and ultimately an efficacious vaccine.

**Congratulations, Denise, winner of the Bancroft-Mackerras Medal, 2016.**



Images from ICTMM/ASP 2016

# ASP Annual Conference

The 2016 ASP annual conference was part of the XIX International Congress for Tropical Medicine and Malaria 2016 (ICTMM2016) and jointly hosted by the Australasian Society for Infectious Diseases (ASID).

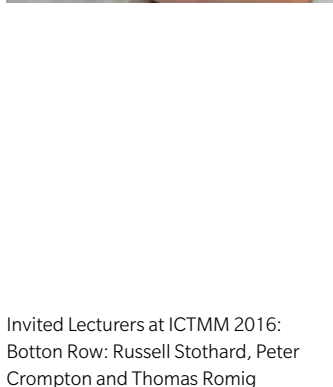
ICTMM2016 delivered workshops, satellite meetings and 83 concurrent sessions to 1500 delegates. With many thanks to supporters and sponsors of ICTMM2016; IJP and Elsevier, Georgina Sweet Travel Support from Melbourne University and the Boehringer Ingelheim Foundation. The ASP will adopt and make changes to the Gender Equity policy that was developed as part of the Georgina Sweet Travel Support. Many thanks to The Bill & Melinda Gates Foundation who provided funding for Awards for Talented Tropical Medicine and Malaria Investigators from Resource-Poor Regions to Attend and Participate in ICTMM 2016.

Congratulations to Malcolm Jones and the Management Committee (Denise Doolan, Kathy Andrews, David Looke, James McCarthy and Paul Griffin) for a wonderful conference with an exciting program featuring ASP Invited Lecturers Professors Russell Stothard, Peter Crompton and Maria Dolores Barges together with IJP invited lecturer Professor Leann Tilley, IJP:PAW invited lecturer Professor Dr Thomas Romig and IJP:DDR invited lecturer Professor David Fidock.

The conference started with some free parasitology fun on Sunday 18 September 2016 at the ICTMM Opening Ceremony in Brisbane with four of our most illustrious and entertaining scientists Peter O'Donoghue, Michael Good, Charlene Willis, and David Jenkins presenting about topical tropical medicine, the convoluted evolution of malaria vaccine strategies, and the many weird and wonderful parasites and the scientists who love them.



Invited Lecturers at ICTMM 2016:  
Top Row: David Fidock, Leann  
Tilley and Maria Dolores Barges



Invited Lecturers at ICTMM 2016:  
Bottom Row: Russell Stothard, Peter  
Crompton and Thomas Romig

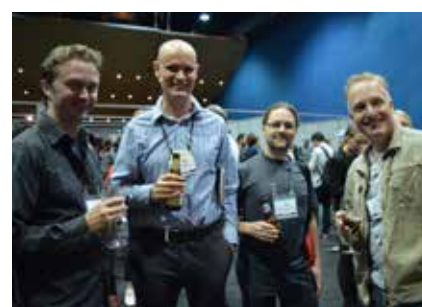


## ASP Annual Conference



### Opening Ceremony

The conference started on Sunday 18 September in Brisbane with parasitology presentations by four of our most illustrious and entertaining scientists Peter O'Donoghue, Michael Good, Charlene Willis, and David Jenkins.



Images from ICTMM/ASP 2016

## ASP Annual Conference

### ECR Breakfast

ASID & ASP co-sponsored the Early Career Breakfast on Monday 19th September 2016. 168 ECRs enjoyed networking and meeting some of our invited speakers, Leann Tilley, Una Ryan, Malcolm Jones and Cheryl Jones, ASID President. Nick Smith hosted the event.



Images from ICTMM/ASP 2016



## ASP Annual Conference



### ASP Annual General Meeting

The 2016 AGM was a lively meeting attracting 120 ASP members to the Queensland Museum on Tuesday September 20. Members had a chance to explore the fabulous exhibition *Parasites: A Life Undercover*, which is sponsored by the Society.

Images from ICTMM/ASP 2016

## ASP Annual Conference

### AN INTERVIEW WITH RUSSELL STOTHARD

PROFESSOR RUSSELL STOTHARD FROM THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE WAS AN ASP INVITED INTERNATIONAL LECTURER IN 2016. LISA JONES SPOKE WITH HIM AT ICTMM AND SPOKE TO HIM ABOUT HIS WORK.

Professor Russell Stothard from the Liverpool School of Tropical Medicine was an ASP Invited International Lecturer in 2016.

In addition to presenting at the 2016 ASP Conference at ICTMM in Brisbane, Russell visited Robin Gasser's laboratory at the University of Melbourne and Don McManus' laboratory at QIMR Berghofer MRI. This was his first visit to Australia but he has corresponded with several Australian colleagues throughout his career. Russ has always admired the ASP, for example, one of his earlier papers was published in the International Journal for Parasitology on *Trypanosoma cruzi* and most recently this year on female genital schistosomiasis. Until last Easter, Russ was Honorary General Secretary of the British Society for Parasitology (BSP), the members of which have diverse interests from medical to molecular etc., and he was keen to see how ASP compared to the BSP.

At the ICTMM, I caught up with him and asked why he chose to present on COUNTDOWN and Leiper's lasting legacy in helminthology (see <http://blog.journals.cambridge.org/2016/09/05/robert-t-leipers-lasting-legacy-on-schistosomiasis/>). "Scratch the surface of a human parasitologist and you'll find a fish parasitologist waiting to get out" was Russell's

introduction to why he chose this topic. It is actually just over 100 years ago that the lifecycle of the African schistosome was described by R.T. Leiper and it's important to remember its today. This is framed within a countdown on WHO 2020 targets for neglected tropical diseases, with COUNTDOWN an acronym of the DFID, UK programme he directs (see [www.countdownonntds.org](http://www.countdownonntds.org)).

Despite control, schistosomiasis is a major scourge to the health of children throughout Africa and there is urgent need to scale-up preventive chemotherapy. Although Leiper was a clinician, from the London School of Tropical Medicine and Hygiene, his passion was in solving conundrums, parasite lifecycles and having worked on other worms, those of fish, his acumen and insight was very well honed.

Russ's tongue-in-cheek remark is also a friendly pinch at clinical colleagues in the BSP who had been dismissive of those with

interests in wildlife, which ultimately led to a split of malariologists from the Spring Meetings, a dichotomy that began in the late 1980s. Russ remarked that it has taken a long time to get these factions working together again, united mainly by the rise in molecular epidemiology with shared laboratory tools and computer approaches that simply didn't exist a decade before.

Like Leiper, Russ is firmly interested in OneHealth and being brought up on a farm in the rural borders of England and Scotland he was interested in

parasites well before becoming a researcher. He developed a fascination of diseases in livestock, their ecology and also became a keen angler catching anything that could swim, or finding things within things that swam! Russell studied Microbiology and Zoology at Leeds, and after an expedition to East Africa became interested in molluscs and their snail-borne diseases.

In 1989 he took part in marine surveys, piloting small boats across the coral reefs of Mafia Island, Tanzania. Some 25 years later,





## ASP Annual Conference

he was pretty proud to solve that urogenital schistosomiasis on the island was actually an imported infection and not naturally endemic see <http://www.sciencedirect.com/science/article/pii/S0001706X12003117>.

Russ completed his PhD in 1995 at the Natural History Museum, London which is also WHO Reference Centre for schistosomiasis. His studies were undertaken mainly on Zanzibar where he was able to show that urogenital schistosomiasis has a clearly demarked endemic and non-endemic zone on the island. Taking advantage of his transmission maps, there have been major efforts to eliminate the disease there spearhead by ZEST: Zanzibar Elimination of Schistosomiasis Transmission (see <http://score.uga.edu/projects/elimination-of-schistosomiasis/>).

Russ therefore feels a close affinity with Leiper in that he was also looking for clues to find out about the disease in order to work out an intervention. To see the bigger picture of this disease Russ used a combination of molecular genetics (for snail identification) and spatial epidemiology (for GPS mapping) as well as having an understanding of the ecology of the parasites in people (water contact behavior) to look at the whole lifecycle and how all of the components fitted together on the island.

In 2002 Russell was employed to work as a field coordinator with Alan Fenwick on a Bill & Melinda Gates funded Schistosomiasis Control Initiative, primarily concerned with distributing praziquantel medications to children. He was in charge of developing the field programme to measure indicators of how this treatment was changing the morbidity of the disease. As a result, National Control Programmes were created in Tanzania, Uganda, Zambia, Niger, Mali and Burkina Faso. From that point on Russell was interested in public health interventions and the health system in Africa, and made many trips to each country. Having visited Uganda (like Leiper) many times Russ saw the important treatment gap in young children (preschool-aged) that needed solving with targeted epidemiological research. This led to SIMI: schistosomiasis in mothers and infants project as funded by the Wellcome Trust.

The SIMI project was also in collaboration with an Australian

colleague Colin Sutherland, based at the London School of Hygiene and Tropical Medicine. Working with Colin, the SIMI project revealed many new dimensions in the co-epidemiology of schistosomiasis and malaria co-infection in young children. The SIMI team helped to pioneer how treatment could be delivered in future assessing horizontal and vertical delivery of public health services.

This helped to break down siloes not only in the diseases but also in the infrastructures that arise around them for their control. Russ mentioned "Any young child deserves to be healthy whatever the disease doesn't (s)he?".

Looking to the future and sustainable development goals, control of NTDs are framed within it. Thus control methods have to expand their thinking beyond medicine and think of how agriculture, water and socio-economic development are all interconnected. This is part of the ethos of COUNTDOWN, to develop multidisciplinary teams conducting transdisciplinary research. Directing this team Russ remarked he was fortunate to employ several talented staff.

ASP member and recent PhD graduate from ANU, Suzy Campbell, joined the project at the Liverpool School of Tropical Medicine as an epidemiologist to review the control strategy for schistosomiasis and STH, a change from the cross-sectoral approach. Addressing the epidemiology of these diseases the team believe that it might not be "neglected populations" but rather the inequality of treatment causing issues with the delivery of treatments. To make a difference to these vulnerable communities they will provide opportunities for communities to access alternative interventions against these disease and explore new treatment strategies.

Both Suzy and Russ know just how important this research is and the feasibility of changing strategies to treat schistosomiasis and STHs in Ghana and Cameroon is filled with challenges: cost efficiency and bottlenecks mean that this research is not just a straightforward biological investigation. Implementing the research needs to be built into the health systems so that an integrated program of research combining epidemiology, parasitology and social science takes place. This integrated view will make a difference to people.

## ASP Annual Conference



### Prizes for the best poster and oral presentations

Best Student Poster: Mohammed Al-Hasnawy, Monash University.

Best Student Presentation: Deepani Fernando, QIMR Berghofer



Best Early Career Researcher Presentation: Adele Lehane, ANU.

Runner Up, Student Presentation: Erick Tjhin, ANU



Runner Up, Student Poster: Dhanasekaran Sakhivel, Monash University.

Runner Up, ECR Presentation: Samantha Emery, WEHI



Winner, ICTMM Best Poster Presentation: Michelle Stanton

## Journals

# IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY

### 2016 HIGHLIGHTS INTERNATIONAL JOURNAL FOR PARASITOLOGY (IJP)

[www.journals.elsevier.com/international-journal-for-parasitology](http://www.journals.elsevier.com/international-journal-for-parasitology)

#### Editor In Chief: Brian Cooke

The major IJP news in 2016 was that the journal broke the '4 barrier' with an Impact Factor of 4.242 (© Thomson Reuters Journal Citation Reports 2016). The IJP team remain confident that the IJP will continue to prosper under Brian's leadership and are looking forward to what lies ahead.

Some other highlights from 2016 included:

- IJP continued the experiment with social media, with a Facebook page started in March 2015 ('liked' by 1480 people at close of 2016; [www.facebook.com/IJPara](http://www.facebook.com/IJPara)) and Twitter in October 2015 (83 followers; @IJPara and now also on Instagram (45 followers; ijpara). Look for the green on black IJP logo (the 'real' IJP page). A 'story behind the cover' is featured for each IJP issue, so those who have a paper accepted for publication are encouraged to create a cover image and submit it for

consideration. If the submitted image is selected for the journal cover, it, and the associated article, will be promoted on Facebook, Twitter and Instagram.

- Together with Dale Seaton of Elsevier, Brian developed a talk, tailored to early-career researchers, based around the Elsevier Publishing Campus on 'how to publish your papers'. Brian and Dale first presented the talk at a very successful ERC breakfast at the joint NZSP+ASP conference in Auckland, then again at MAM2016 in Lorne. Brian has developed a modified version of the talk and has delivered this over the last 2 years to the students on the ASP parasitology course in Kiola. Let Brian know if you would like him to give this presentation to your institution.
- Nick Clark and colleagues (45:14 pp 891-899) created the most social media activity to date for an IJP paper and was featured on ABC News, Radio National and the BBC world Service. His paper is a fascinating piece of work on the high prevalence of avian malaria parasites in invasive Indian Mynahs and their potential threat to native wildlife and birds in Australia and elsewhere.

At the close of 2016, the editors were working on some Special Issues for 2017: Molecular Approaches to Malaria (MAM) 2016 conference (publication planned in February) and Singapore Malaria Network (SingMalNet) 2016 meeting (publication planned for March)

The editors are grateful to the Editorial Board members, reviewers and authors who continue to make IJP the highest cited journal dedicated to parasitology and publishing original research articles.



The twelve IJP covers for 2016

## Journals



### 2016 HIGHLIGHTS INTERNATIONAL JOURNAL FOR PARASITOLOGY: PARASITES AND WILDLIFE (IJP:PAW)

[www.journals.elsevier.com/international-journal-for-parasitology](http://www.journals.elsevier.com/international-journal-for-parasitology)

**Editors: R.C. Andrew Thompson, Lydden Polley**

As 2016 drew to a close, submissions to IJP:PAW continued to arrive at a healthy rate and had topped the 80 mark by the end of December – a significant increase over the previous couple of years. The quality of articles continued to be very high and the fantastic diversity of topics covered is a major strength of the journal. Subjects ranged from host-parasite co-infections, to climate change, ectoparasites on deep sea fish, and parasites of bees. A special issue on Invasions underway and two more special issues are planned in 2017.

Although the journal was waiting for Thomson's to release its Impact Factor, Elsevier have introduced their metric, CiteScore, which is likely to receive broad acceptance as a

valuable alternative to the Impact Factor – more information can be found on the IJP:PAW website by following the links. IJP:PAW's 2015 CiteScore is 2.7, ranking us 12 out of 58 parasitology journals, and ahead of Acta Tropica, Parasitology, Veterinary Parasitology and Experimental Parasitology.

#### Selected papers from 2016

Hillman A, Ash A, Elliot A, Lymbery A, Perez C, Thompson RCA. [Confirmation of a unique species of \*Giardia\*, parasitic in the quenda \(\*Isodon obesulus\*\)](#). Int J Parasitol Parasites Wildl. 2016 Jan 12;5(1):110-115

Yang R, Brice B, Ryan U. [Morphological and molecular characterization of \*Eimeria purpureicephali\* n. sp. \(Apicomplexa:Eimeriidae\) in a red-capped parrot \(\*Purpureicephalus spurius\*, Kuhl, 1820\) in Western Australia](#). Int J Parasitol Parasites Wildl. 2016 Jan 12;5(1):34-9

Chilton NB, Huby-Chilton F, Koehler AV, Gasser RB, Beveridge I. [Detection of cryptic species of \*Rugopharynx\* \(Nematoda: Strongylida\) from the stomachs of Australian macropodid marsupials](#). Int J Parasitol Parasites Wildl. 2016 Apr 19;5(2):124-33

Hobbs RP, Elliot AD. [A new species of \*Potoroxyuris\* \(Nematoda: Oxyuridae\) from the woylie \*Bettongia penicillata\* \(Marsupialia: Potoroidae\) from southwestern Australia](#). Int J Parasitol Parasites Wildl. 2016 Jun 27;5(3):211-6



Image : the woylie (*Bettongia penicillata*) in the SW of Western Australia (Murdoch Parasitology). See Hobbs and Elliot, A new species of *Potoroxyuris*



## Journals



### 2016 HIGHLIGHTS INTERNATIONAL JOURNAL FOR PARASITOLOGY: DRUGS AND DRUG RESISTANCE (IJP:DDR)

[www.journals.elsevier.com/international-journal-for-parasitology-drugs-and-drug-resistance/](http://www.journals.elsevier.com/international-journal-for-parasitology-drugs-and-drug-resistance/)

**Editors In Chief: Andrew Kotze & Kevin Saliba**

IJP:DDR continues to grow, with submissions increasing each year.

#### Selected papers from 2016

Mani T, Bourguinat C, Keller K, Carreton E, Peregrine A, Prichard RK. [Polymorphism in ion channel genes of \*Dirofilaria immitis\*: Relevant knowledge for future anthelmintic drug design](#) Int J Parasitol Drugs Drug Resist. 2016 Dec;6(3):343-355.

Preston S, Jiao Y, Jabbar A, McGee SL, Laleu B, Willis P, Wells TN, Gasser RB. [Screening of the 'Pathogen Box' identifies an approved pesticide with major anthelmintic activity against the barber's pole worm](#) Int J Parasitol Drugs Drug Resist. 2016 Dec;6(3):329-334

Raza A, Kopp SR, Bagnall NH, Jabbar A, Kotze AC. [Effects of in vitro exposure to ivermectin and levamisole on the expression patterns of ABC transporters in \*Haemonchus contortus\* larvae](#) Int J Parasitol Drugs Drug Resist. 2016 Aug;6(2):103-115

Bourguinat C, Che H, Mani T, Keller K, Prichard RK. [ABC-B transporter genes in \*Dirofilaria immitis\*](#) Int J Parasitol Drugs Drug Resist. 2016 Aug;6(2):116-124

Leitsch D, Müller J, Müller N. [Evaluation of \*Giardia lamblia\* thioredoxin reductase as drug activating enzyme and as drug target](#) Int J Parasitol Drugs Drug Resist. 2016 Dec;6(3):148-153.

Kumarasingha R, Karpe AV, Preston S, Yeo TC, Lim DS, Tu CL, Luu J, Simpson KJ, Shaw JM, Gasser RB, Beale DJ, Morrison PD, Palombo EA, Boag PR. [Metabolic profiling and in vitro assessment of anthelmintic fractions of \*Picrofilum terrestris\*](#) Int J Parasitol Drugs Drug Resist. 2016 Dec;6(3):171-178

Tran PN, Tate CJ, Ridgway MC, Saliba KJ, Kirk K, Maier AG. [Human dihydrofolate reductase influences the sensitivity of the malaria parasite \*Plasmodium falciparum\* to ketotifen - A cautionary tale in screening transgenic parasites](#) Int J Parasitol Drugs Drug Resist. 2016 Dec;6(3):179-183

Zhang Z, Gasser RB, Yang X, Yin F, Zhao G, Bao M, Pan B, Huang W, Wang C, Zou F, Zhou Y, Zhao J, Fang R, Hu M. [Two benzimidazole resistance-associated SNPs in the isotype-1  \$\beta\$ -tubulin gene predominate in \*Haemonchus contortus\* populations from eight regions in China](#) Int J Parasitol Drugs Drug Resist. 2016 Dec;6(3):199-206



Image from Mani et al Polymorphism in ion channel genes of *Dirofilaria immitis*

## Public Engagement and Outreach

### IN 2016, THE OUTSTANDING ENTHUSIASM OF ASP MEMBERS FOR PUBLIC ENGAGEMENT AND OUTREACH RESULTED IN NUMEROUS HIGHLIGHTS AND NOVEL INITIATIVES AND EVENTS.

In the following pages we highlight the Murdoch Parasitology team in Perth, National Science Week in Cairns, outreach at GTAC in Melbourne, Science Meets Parliament in Canberra and the *Parasites: Life Undercover* exhibition in Brisbane.

#### Other outreach activities reported by ASP members

On the 26th April the Griffith University Eskitis Institute for Drug Discovery and the Australian Society for Parasitology co-sponsored a public outreach event around World Malaria Day 2016. This event focused on two activities – a series of short talks to promote awareness of malaria and a primary school outreach component to promote malaria awareness through distribution of “What is malaria?” activity packs.

Amy Jones and other members of the Eskitis Institute for Drug

Discovery, Griffith University, held a stall over two days at the Royal Brisbane Show.

Jessica Johnson-Mackinnon and colleagues held an event for children between 5 and 10 year old at the University of Tasmania's Institute for Marine and Antarctic Studies Open Day. (pictured below)

Rebecca Traub (The University of Melbourne): Magnificent Microscopy – Life under a Lens. Gene Technology Access Centre, 21st August 2016. Middle and high-school students.

Rebecca Traub (The University of Melbourne): Year 10 work experience, 24th -29th November 2016, Gene Technology Access Centre. Supervised four students conducted a research project to screen for novel filarial in canine hippoboscids from Rajasthan, India.

Rebecca Traub (The University of Melbourne) was invited speaker at “One Health Day”, Department of Health, Victorian Government, Melbourne, 3rd November 2016.



## Public Engagement and Outreach

### ASP MEMBER OUTREACH: MURDOCH

#### ANDY THOMPSON AND ALAN LYMBERY HAVE PARTNERED WITH THE EASTERN METROPOLITAN REGIONAL COUNCIL TO RAISE AWARENESS OF 'ONE HEALTH' AS IT APPLIES TO URBAN WILDLIFE.

Supported by a LotteryWest grant of almost \$200,000, the 'Healthy Wildlife Healthy Lives' project aims to educate the community about 'One Health' focusing on human and domestic animal's contact with wildlife in urban areas. The hope is that this will help the community to interact positively with wildlife and protect and conserve the environment for the benefit of both wildlife and people. The project will initially focus on Perth's Eastern Region and will involve the community in the creation of an innovative, low cost and sustainable model of community education, including a dedicated website. The project will work closely with voluntary wildlife organisations as well as the Department of Parks and Wildlife and local veterinarians. Once developed, the project is expected to be applied beyond Perth's Eastern Region.

Many One Health projects in Australia have focused on the transfer of diseases from animals to humans and the public health consequences rather than the transfer of diseases from humans to animals and the consequences for wildlife health and conservation. This new and innovative project will seek to address this gap. The project will be concerned with a number of parasites such as *Toxoplasma* and *Giardia* and how human activities can transmit infections to wildlife such as backyard feeding. The project will also educate the community about the important impact humans have on the environment and native animals, for example, releasing invasive fish species like goldfish into waterways that then not only compete with native species of fish, but also transfer new parasitic

diseases to native species.

Outreach activities will be a major feature of the project, with community workshops held in the urban area. The first of these was held a few weeks ago with presentations from Alan, Alison Hillman and Andy. It was well attended and there was considerable interest from the public about which native animals are at risk from human activities, what parasitic diseases humans can inadvertently give to wildlife, and the threat of invasive species.

#### THE PARASITOLOGY GROUP AT MURDOCH PRESENT A HANDS-ON WORKSHOP TO 43 YEAR 12 STUDENTS.

The Parasitology Group hosted 'A day in the life of a Murdoch University student', with Parasitology representing the Biomedical Sciences at this event. The session was the most popular of all

those offered at the university, hosting 43 year 12 students from a range of high schools for a 1 hour hands-on workshop on parasitology. A ten minute talk was given by Dr Amanda Ash introducing the students to parasites and their importance. The students then worked through a series of microscopes in the laboratory, with a range of real parasite specimens to examine, including a flea identification station, whole specimens of gut and heart tissue containing worms, and microscope slides of malaria, trypanosomes and histology sections of flukes and cysts.

The students seemed engaged for the hour-long workshop, and many were suitably grossed out and fascinated by the specimens on offer.



Image: Alison Hillman at an outreach event for *Healthy Wildlife Healthy Lives*

## Public Engagement and Outreach

### ASP MEMBER OUTREACH: NATIONAL SCIENCE WEEK

#### LISA JONES WAS AWARDED A COMMONWEALTH OF AUSTRALIA NATIONAL SCIENCE WEEK GRANT FOR TWO EVENTS AT THE TANKS ARTS CENTRE IN CAIRNS.

When hip-hop singer Naomi Wenitong woke up from a coma three months after being pronounced dead in a car accident it was her bushy eyebrows that shocked her, not the multiple fractures in her face or her complete loss of memory.

"My eyebrows were a mess, but my nails were amazing so I had to get on the phone to my sister and ask her what she had been thinking," Naomi laughed.

The accident and Naomi's incredible recovery from a brain injury made national headlines as the Indigenous performer had shot to fame as part of the ARIA chart-topping duo Shakaya in 2002.

Naomi relived her often hilarious story and share her music through this National Science Week event that tackles the serious issue of brain injury through science, art and music. Professor Alan Nimmo from James Cook University interviewed Naomi, delving

into the science of our minds at Café Scientifique. Professor Nimmo also discussed his groundbreaking research on a drug to stop the brain swelling after a head injury Dr Kate Miller, ASP member from James Cook University gave a wonderful talk on toxoplasma describing the parasite as a "puppetmaster". Dr Tasmin Rymer and Dr Ernest Jennings gave talks about a person's perception of pain and bizarre animal behaviour.

This National Science Week event also featured Brainwave, an interactive art piece created by JCU Creative Media Unit staff and

students, that uses visual arts and multimedia to connect the science of our minds with the research taking place around us.

PechaKucha Night featured ASP members Denise Doolan and Alex Loukas who gave wonderful 6 minute presentations about worms and vaccines along with four other James Cook University researchers presenting on bees, solar energy and climate change.



Top left: young parasitologists enjoying parasite craft table.  
Top right: Kate Miller "Parasite Puppetmaster". Bottom left: Alan Nimmo and Naomi Wenitong. Bottom right: the crowd enjoying Cafe Scientifique.



## Public Engagement and Outreach

### TWO STORIES FROM GTAC

DURING MAY AND JUNE 2016, EIGHT YEAR 10 STUDENTS FROM SIX VICTORIAN COUNTRY SCHOOLS UNDERTOOK PARASITOLOGY-THEMED RESEARCH PROJECTS FOR THEIR WORK EXPERIENCE PLACEMENTS AT GTAC, THE GENE ACCESS TECHNOLOGY CENTRE IN MELBOURNE.

During May and June 2016, eight Year 10 students from six Victorian country schools undertook parasitology-themed research projects for their work experience placements at GTAC. The projects enabled the students to immerse themselves for one week working in an authentic research environment. The students collaborated with practising parasitologist, Mackenzie Kwak (AgriBio, LaTrobe University) and educator, Tony Chiovitti (GTAC) exploring the phylogenetics of parasitic ticks of birds and platypuses. For their analyses, students used scanning electron and optical microscopy to collect morphological data, as well as generating DNA barcode sequences from their specimens. During the placements, Dr Abdul Jabbar, a Senior Lecturer, took the students on a tour of the parasitology labs at the Faculty of Veterinary and Agricultural Science, University of Melbourne. The tour gave students insights into the burden of parasitic disease in companion animals and Australian livestock.

The students provided glowing feedback of their experience at the conclusion of the placements. For example, one student wrote: "I learnt so much but even though we focused on ticks, it wasn't all

about ticks. I learnt about genetics, bioinformatics, morphology, chemistry, taxonomy and parasites. I also met some really nice, like-minded people who all had a passion for science." (SK, Year 10, Wangaratta High School).

IN ITS SEVENTH YEAR, THE PARASITES IN FOCUS STUDENT PROGRAM IS A SPECIAL PROGRAM DEVELOPED AND RUN AS A COLLABORATION BETWEEN THE GENE TECHNOLOGY ACCESS CENTRE (GTAC) AND THE ASP. REPORT BY DR TONY CHIOVITTI, GTAC



This program aims to raise awareness of the societal and economic consequences associated with parasitism through impacts on ecosystem dynamics, agricultural security, and human health. The program also exposes secondary school students to a diverse range of careers that are supported by training in parasitology. In the Victorian school curriculum, the only explicit mention of parasitism is in Unit 1 of the VCE Biology study

design under topics on relationships between organisms within an ecosystem. Technologies for studying parasites as pathogens address a number of key skills and techniques relevant to key content addressed in the broader VCE Biology study design. For these reasons, the Parasites in Focus student program is designed primarily for students of Years 10 and 11.

### Opening address by Robin Gasser

For Parasites in Focus, Robin Gasser introduced students to the

## Public Engagement and Outreach

main groups of parasites, their complex life cycles, and some of the afflictions they cause in their hosts. During his presentation, Robin circulated samples of the parasites among the audience. At the conclusion of the presentation, students asked probing questions ranging from mechanisms that adapt parasites to their way of life, to details of infection processes and their treatment.

### Hooked on Parasites

Parasitic diseases cost the Australian sheep industry almost \$900 million per annum. Working with scientist mentors in the GTAC laboratories, students applied techniques of the veterinary pathologist to diagnosing a parasitic infection of sheep. An assessment of clinical signs, faecal egg counts, and examination of larvae and adult worms led students to deduce the sheep were infected by the nematode, *Haemonchus contortus*. Students concluded by proposing strategies to manage the health of the flock.

### A Case of Cross-Border Detection

Malaria represents the world's biggest health issue caused by parasites. Working in the GTAC laboratories with scientist mentors, students used biotechnology to identify the specific malarial parasite infecting a tourist who had returned from overseas. Applying polymerase chain reaction and gel electrophoresis experiments, students determined the tourist was infected by the deadliest type, *Plasmodium falciparum*. The result is crucial for informing the patient's treatment.

### Parasites Getting it Under Control

Australia is a world leader in the field of biological control, in which pathogens, predators, or parasites are harnessed to specifically control populations of the target pest with minimal disruption to

other species. Working in the GTAC computer laboratory, students used the computer simulation software, NetLogo, to investigate the effects of various natural enemies on populations of the light brown apple moth, a pest of the grape industry. Evaluation of their mathematical models led students to conclude that the parasitoid wasp, *Trichogramma* was the most suitable biological control.

The students loved the hands-on experiments and workshops:

"This workshop was very interesting and fun, seeing how this kind of lab works was a great experience"

"It was good to see how some scientists work in controlling pest populations, and how modern technologies integrate into the (real) world"



**This special event program could not have been delivered to the standard GTAC had envisaged without the generous support of a grant for \$2,000 from the Victorian branch of the ASP.**

## Public Engagement and Outreach

### SCIENCE MEETS PARLIAMENT 2016

PROFESSOR BARBARA NOWAK OF THE UNIVERSITY OF TASMANIA AND DR SHOKOOFEH SHAMSI OF CHARLES STURT UNIVERSITY REPRESENTED THE ASP AT SCIENCE MEETS PARLIAMENT 2016 IN CANBERRA. THIS REPORT BY BARBARA NOWAK.

Science meets Parliament was organised on 1 and 2 March by Science and Technology Australia. This is an annual event with the first day run in the Hotel Realm and the second in the Parliament House.

On the first day after welcome and overview, Prof Brian Schmidt AC, ANU gave the opening address. There were a couple of presentations from the sponsors, including CropLife and ANSTO. Ms Sue Weston, Deputy Secretary DIIS talked about National Innovation and Science Agenda. There was a lot of information provided by journalists. In Meet the Media the chair Kylie Walker AAS discussed turning science into news with Paul Bongiorno AM, contributing editor to

Network Ten and Alison Carabine Political Editor ABS RN Breakfast. There was some discussion about translating science into policy and what it requires.

That afternoon was used to prepare scientists for the meetings with parliamentarians. This was achieved by presentations

from former participants and rehearsing organised by Dr Rod Lamberts ANU and Dr Will Grant ANU.

In the evening we attended Gala Dinner in the Great Hall of Parliament House. Bernie Hobbs ABC science broadcaster was the MC, presentations were given by a number of guest speakers including The Hon Christopher Pyne MP, Minister for Industry, Innovation and Science and The Hon Bill Shorten MP, Leader of the Opposition.

I shared my table with The Hon Alannah MacTiernan MP member for Perth (ALP) who was very interested in aquaculture and made a real effort to talk to all scientists around the table. Senator Janet Rice (VIC, AG) was also sitting at our table.

Next morning we joined a long queue to Parliament House. I (together with Dr Sophie Lewis ANU, Dr Danielle Martin ANSTO

and Dr Maxine Roberts ANSTO) met with The Hon Julie Collins MP, member for Franklin (ALP), who was concerned about current cuts at CSIRO and was very interested in equal opportunities including gender equity and supporting more women going into



## Public Engagement and Outreach

science. I have talked about outreach activities sponsored by ASP and their role in encouraging young people to study science. The timing of my meeting with parliamentarian meant that I missed presentations from Prof Ian Chubb and Senator Kim Carr.

After my meeting it was time for lunch at National Press Club. The National Press Club address was delivered by Dr Alan Finkel AO, Chief Scientist for Australia.

Following lunch we returned to Parliament House to attend Question Time. Last session of the day was a Parliamentary Forum (Science and politics, how do they mix) with Prof Aidan Byrne CEO ARC, The Hon Karen Andrews MP, The Hon Richard Marles MP and The Hon Adam Bandt MP chaired by Genevieve Jacobs and followed by drinks and closure of the event.

The Hon Alannah MacTiernan MP found me during the drinks to give me a copy of *Scaling Up – Inquiry into Opportunities for Expanding Aquaculture in Northern Australia* prepared by Joint Select Committee on Northern Australia which she is Deputy Chair.

I learnt a lot and was inspired by some of the presentations, in particular Prof Brian Schmidt and Dr Alan Winkel gave excellent talks. It was also good to get a general feel for political climate for

science and the increasing importance of collaboration with industry and research innovation. There was a lot of great advice helpful not only in contacts with parliamentarians. I really enjoyed the dinner and Leader of the Opposition's address. There were amazing opportunities for networking and I met people I have not seen since I was doing my PhD. I would like to thank the ASP for sending me to Science meets Parliament 2016.

I encourage more Early Career Researchers who are members of the ASP to participate in the future. I thought it was really beneficial to send an ECR and a more experienced researcher.



Previous page: Professor Barbara Nowak and Dr Shokoofeh Shamsi at Science meets Parliament 2016 in Canberra. This page top: Shokoofeh with Hon Christopher Pyne Minister for Industry, Innovation and Science. Bottom: Shokoofeh and Barbara with Hon Bill Shorten MP, Leader of the Opposition.



## Public Engagement and Outreach

### PARASITES: LIFE UNDERCOVER

A NUMBER OF ASP PARASITOLOGISTS, INCLUDING TOM CRIBB, GLEN COLEMAN AND VICKY AVERY, GAVE FREE TALKS AT THE QUEENSLAND MUSEUM IN AUGUST 2016 TO HELP CELEBRATE NATIONAL SCIENCE WEEK AND PROMOTE THE EXHIBITION PARASITES LIFE UNDERCOVER.

Queensland Museum CEO and Director, Professor Suzanne Miller said the exhibition would give visitors an opportunity to understand the impacts they have on both animals and humans.

"Parasites: Life Undercover highlights the significance parasites have on our daily lives, from the common pests such as fleas and lice such as treating heartworm in a pet to the more serious epidemics and threats such as malaria and those skin and gut parasites costing our livestock industries over a billion dollars each year," she said.

"Parasitism is a highly successful way of life. Parasites are a real and serious threat to all living things and this exhibition will showcase the fascinating evolution of parasites, their resilient life cycles and their ability to move from one host to another in order to not only survive, but in many cases, thrive."

"Having plagued us for centuries, parasites have certainly gained a bad reputation, but you will also see the positive role parasites can play in the medical industry and in developing our immune systems."

Parasites: Life Undercover was supported by the Australian Society of Parasitology. ASP president Professor David Emery said the Society hoped it would promote the knowledge and fascination of parasitology to the general public.

"Parasites are our world at the Australian Society of Parasitology and we are truly excited to partner with Queensland Museum to bring this unique exhibition to Brisbane, which will coincide with our annual conference," Professor Emery said.

"We are always looking a ways to connect with the community and recently have had artists collaborate with us on a unique project exploring the theme of parasites and health. One of the signature artworks of this project, Gula Guri mayin, which means heal the body by Cairns artist Bernard Lee Singleton will feature in the exhibition."

**Parasites: Life Undercover was developed by the Museum of Natural History Berlin Germany with support of Bayer HealthCare Animal Health.**

**Parasites: Life Undercover was supported by the Australian Society of Parasitology and ran from 10 August 2016 – 27 January 2017 on Level 2, Queensland Museum.**



## Public Engagement and Outreach



Images from the exhibition Parasites: Life Undercover.

## Education



# Concepts in Parasitology

A two-week parasitology course for postgraduates and Early Career Researchers

THE 2016 ASP ADVANCED COURSE, CONCEPTS IN PARASITOLOGY, TOOK PLACE BETWEEN NOVEMBER 27TH AND DECEMBER 10TH AT THE ANU'S BEAUTIFUL KIOLOA CAMPUS, A FIELD STATION ON THE NSW SOUTH COAST.

Course Convenor was Associate Professor Alex Maier (ANU). A large faculty of prominent parasitologists contributed during the two weeks.

- Rob Adlard (Queensland Museum)
- Glenn Andersen (Virbac Australia)
- Nigel Beebe (University of Queensland)
- Ian Beveridge (University of Melbourne)
- Susan de Burgh (Bayer Australia)
- Brian Cooke (Monash University)
- Tom Cribb (University of Queensland)
- Christian Doerig (Monash University)
- Giel van Dooren (Australian National University)
- David Emery (University of Sydney)
- Robin Gasser (University of Melbourne)
- Paul Giacomini (James Cook University)
- Stephanie Godfrey (Murdoch University)
- David Jenkins (Charles Sturt University)
- Aaron Jex (University of Melbourne/WEHI)
- Amy Jones (Griffith University)
- Steve Lee (Australian National University)
- Alan Lymbery (Murdoch University)
- Alexander Maier (Australian National University)
- Geoff McFadden (University of Melbourne)
- Nicki O'Donoghue (University of Queensland)
- Peter O'Donoghue (University of Queensland)
- Ryan O'Handley (University of Adelaide)
- Stuart Ralph (University of Melbourne)
- Louise Randall (University of Melbourne)
- Melanie Rug (Australian National University)
- Una Ryan (Murdoch University)
- Kevin Saliba (Australian National University)
- Robyn Slattery (Monash University)
- Brad Sleebs (Walter and Eliza Hall Institute)
- Christina Spry (Australian National University)
- Melissa Sykes (Griffith University)

## Education



After the welcome address, Dr. Steve Lee (ANU) kicked-off the event with a lecture on mobile microscopes and a workshop to manufacture lenses to convert mobile phones into microscopes. The workshop was followed by a Welcome BBQ. During the first two days three ANU parasitology labs (K. Saliba, M. Rug, and G. van Dooren) opened their doors to the course participants sharing the expertise in physiology, imaging and cell biology and taking advantage of the instrumentation that is available at the ANU Canberra campus. Erick Tjhin, Esther Rajendran, Kathryn Parker, Sherry He, Joanne Lee, Daryl Webb and Frank Brink enthusiastically supported the modules run at the ANU campus in Canberra.

In Kioloa, 27 lecturers filled the course with a wealth of content. The concepts were mainly based on the themes from previous years, representing important and current topics in Parasitology. 7 lecturers were the first time in Kioloa, 6 lecturers also participated last year and 14 have done all three years.

In a spirit of continuous improvement, the 2016 course was refined in line with suggestions made in the previous years.

For the 2016 course we received 23 applications, which allowed us to fill the 16 available places. Gender distribution of participants was 15 females and 1 male (also reflective of the applications).

14 participants were PhD students, 1 was employed in the public service, and 1 worked in industry. We had 2 students from the USA (Louisiana State University). Two students were charged the ASP member rate (to accommodate for financial hardship created by the floods in Baton Rouge in August 2016), but both joined the ASP. Five of the fourteen PhD students studying at an Australian University were international students.

As in previous years, the background of the participants was very diverse adding to the vibe of the course (and representing the ASP constituency). There was plenty of opportunity to exchange perspectives and experiences and this was appreciated by the participants.

The following committee members were responsible for creating the framework for the ASP course: Una Ryan, Stuart Ralph, Arraon Jex, Rob Adlard and Alex Maier.

Above: course participants at Concepts in Parasitology 2016



# Statistical Snapshot 2016

## Number of (active) members;

Australian Society for Parasitology Incorporated (ASP) had 475 financial members in 2016.

## Number of ECRs funded to do various activities;

108 students were given funding assistance to attend the 2016 ASP Annual Conference/ICTMM 2016.

10 students and ECRs received JD Smyth and ASP Network Researcher Exchange, Training and Travel, out of a total of 12 awards made in 2016.

## Conferences supported;

2016 ASP Annual Conference as part of ICTMM 2016 which was attended by over 1500 delegates.

## Number of publications produced;

Over 550 printed publications.

## Research funding received;

In 2016, Australia's parasitologists received over 40 research grants securing more than \$33 million in new research grant funding.

## Websites

ASP web site | [www.parasite.org.au](http://www.parasite.org.au)

ASP Facebook page | [www.facebook.com/ASParasitology](https://www.facebook.com/ASParasitology)

ASP Twitter account | [twitter.com/AS\\_Para](https://twitter.com/AS_Para)

ASP YouTube channel | [www.youtube.com/user/ASPParasiteNetwork](https://www.youtube.com/user/ASPParasiteNetwork)

The ASP's Google Plus account | <https://plus.google.com/100938254649203422506/posts>

International Journal for Parasitology web site | [www.journals.elsevier.com/international-journal-for-parasitology](http://www.journals.elsevier.com/international-journal-for-parasitology)

IJP Facebook: [www.facebook.com/IJPara](https://www.facebook.com/IJPara)

IJP Twitter: [twitter.com/IJPara](https://twitter.com/IJPara)

IJP Instagram: [www.instagram.com/ijpara/](https://www.instagram.com/ijpara/)

International Journal for Parasitology – Parasites and Wildlife | [www.journals.elsevier.com/international-journal-for-parasitology-parasites-and-wildlife/](http://www.journals.elsevier.com/international-journal-for-parasitology-parasites-and-wildlife/)

IJP:PAW Facebook | [www.facebook.com/IJPPAW/](https://www.facebook.com/IJPPAW/)

International Journal for Parasitology – Drugs and Drug Resistance website | [www.journals.elsevier.com/international-journal-for-parasitology-drugs-and-drug-resistance/](http://www.journals.elsevier.com/international-journal-for-parasitology-drugs-and-drug-resistance/)

IJP:DDR Facebook | [www.facebook.com/IJPDDR/](https://www.facebook.com/IJPDDR/)

## Newsletters

Three newsletters were published during the year, pictured right.

Volume 27.1 May 2016

Volume 27.2 September 2016

Volume 27.3 November 2016



# Appendix 1: Publications by ASP Members in 2016

WHERE APPLICABLE, LINKS TO ABSTRACTS IN PUBMED HAVE BEEN PROVIDED FOR 2016 PUBLICATIONS.

## Health and Wellbeing

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**Antony HA**, Parija SC. [Antimalarial drug resistance: An overview](#). Trop Parasitol. 2016 Jan-Jun;6(1):30-41. doi: 10.4103/2229-5070.175081. Review.

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## Appendix 1

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## Appendix 2: Research grants awarded to ASP Members in 2016

IN 2016, ASP MEMBERS SECURED OVER \$33 MILLION IN NEW RESEARCH GRANTS AND FELLOWSHIPS.

**Institution names in the list below refer to the Australian Administering Institution, not necessarily the home institution of individual Researchers)**

### ARC Linkage Grants

**Professor Terence Spithill; Dr Travis Beddoe; Dr Robert Dempster; Dr Glenn Anderson** (Virbac Australia Pty Ltd and La Trobe University) This project aims to optimise the formulation of novel fluke vaccine antigens by constructing combination hybrid recombinant antigens and using a protein adjuvant to improve immunogenicity, and test new antigens expressed in young flukes as vaccines and evaluate their ability to synergise with hybrid vaccines. *Fasciola* (fluke) infections cause serious economic losses to livestock production and fluke drug resistance threatens control, so new therapies such as a vaccine are needed. These vaccines should be evaluated in cattle trials. The major outcome plan is validation of hybrid antigens for commercial vaccine development for fluke control in cattle, leading to more sustainable beef and milk production in Australia.

**Professor Peter Irwin; Professor Una Ryan; Dr Charlotte Oskam; Dr Liisa Ahlstrom; Associate Professor Peter Banks; Professor Roy Hall; Dr Sonja Hall-Mendelin; Dr Bettina Schunack** (Bayer Australia Ltd, Bayer Healthcare, Queensland Health and Murdoch University) This project aims to determine the bacterial, protozoal and viral biodiversity in wildlife ticks and their native mammal hosts, and provide new information about the biology and transmission dynamics of these microorganisms and their potential to cause disease in wildlife, domesticated animals and humans. Anticipated outcomes are improved diagnostic tests

and management protocols for tick-borne disease in Australia.

### ARC Discovery Grants

**Philip Andrews, Lukasz Kedzierski, Hongzhe Sun and Michael Mehring** (Monash University) – to develop new anti-leishmanials.

### ARC Future Fellowships

**Rowena Martin** (ANU) – to continue her efforts to understand antimalarial drug action and resistance.

### NHMRC Senior Principal Research Fellowships

**Alex Loukas** (JCU) – an NHMRC Senior Principal Research Fellowship to continue his work on helminth immunobiology and vaccine development.

**Alan Cowman** (WEHI) – an NHMRC Senior Principal Research Fellowship to continue his research on the biology of the malaria parasite.

### NHMRC Principal Research Fellowships

**John Baell** (Monash University) – to develop new anti-parasitic drugs.

### NHMRC Career Development Fellowships

**Aaron Jex** (The Walter and Eliza Hall Institute of Medical Research) R.D. Wright Biomedical Fellowship, *Systems biology of neglected parasites*

## Appendix 2

### NHMRC Early Career Research Fellowships

**Robert Summers** (ANU) – to carry out research to suppress antimalarial drug resistance.

**Pasi Korbonen** (The University of Melbourne) – to harness systems biology to tackle neglected tropical diseases.

### NHMRC Project Grants

**Alan Cowman, Justin Boddey, Wilson Wong and Anthony Hodder** (all Walter and Eliza Hall Institute of Medical Research), *Effector export in *P. falciparum* infected human erythrocytes*

**Andrew Steer** (Murdoch Childrens Research Institute), **Margot Whitfield** (St Vincents and Mater Health Sydney), **Tibor Schuster** (Murdoch Childrens Research Institute), **Titus Nasi** (National Referral Hospital, Honiara), **Oliver Sokana** (Ministry of Health and Medical Services Solomon Islands), **Ross Andrews** (Menzies School of Health Research), **Lucia Romani** (The Kirby Institute for infection and immunity in society), **Michael Marks** (London School of Hygiene and Tropical Medicine), **Daniel Engelman** (University of Melbourne - Centre for International Child Health), *Cluster randomised trial comparing one versus two doses of ivermectin for mass drug administration to control scabies*

**Andrew Steer** (Murdoch Childrens Research Institute), **Margot Whitfield** (St Vincents and Mater Health Sydney), **Handan Wand** (University of New South Wales), **Mike Kama** (Fiji Centre for Communicable Disease Control, Mataika House, Suva, Fiji), **Joseph Kado** (Fiji Ministry of Health), **Ross Andrews** (Menzies School of Health Research), **Lucia Romani** (The Kirby Institute for infection and immunity in society), **Natalie Carvalho** (University of Melbourne), *Does mass drug administration for scabies result in control of serious bacterial complications? A proof of concept towards global elimination*

**Asha Bowen** (Telethon Kids Institute, Subiaco WA), **Jonathan Carapetis** (Telethon Kids Institute, Subiaco WA), **Steven Tong** (Menzies School of Health Research), **Julianne Coffin** (The

University of Notre Dame Australia), **Andrew Steer** (Murdoch Childrens Research Institute), **Roz Walker** (University of Western Australia), **Julie Marsh** (Telethon Kids Institute, Subiaco WA), **Raymond Christophers**, *Skin disease control in remote Aboriginal children: translating evidence into practice with a cluster randomised, stepped wedge trial*

**Brendan Crabb** (Burnet Institute), **Travis Beddoe** (La Trobe University), **Tania de Koning-Ward** (Deakin University), **Paul Gilson** (Burnet Institute), *Functional resolution of PTEX, the exporter of virulence factors in malaria parasites*

**Christopher MacRaid** (Monash University), **Raymond Norton** (Monash University), **Jonathan Richards** (Burnet Institute), *Enhancing the immune response to disordered malaria antigens*

**Laurens Manning** (University of Western Australia), **Timothy Davis** (University of Western Australia), **Brioni Moore** (University of Western Australia), **Moses Laman** (Papua New Guinea Institute of Medical Research, Goroka, Papua New Guinea), **Kevin Batty** (Curtin University of Technology), **Sam Salman** (University of Western Australia), **Leanne Robinson** (The Walter and Eliza Hall Institute of Medical Research), *Enhancing clinical management of paediatric malaria in endemic areas with transmission of multiple *Plasmodium* species*

**Malcolm Jones** (The University of Queensland), *A new animal model for genitourinary schistosomiasis*

**Malcolm McConville** (University of Melbourne), **Christopher Tonkin** (The Walter and Eliza Hall Institute of Medical Research), **Vernon Carruthers** (University of Michigan Health System), *Targeting acute and chronic toxoplasmosis*

**Michael Duffy** (University of Melbourne), **Tania de Koning-Ward** (Deakin University), **Stefan Knapp** (Goethe University Frankfurt), *The role of novel and essential bromodomain proteins in coordinating malaria parasite gene regulation and their potential as anti-malarial targets*

**Michelle Boyle** (Burnet Institute), *T-follicular helper cell subsets*

## Appendix 2

*that induce protective anti- Plasmodium falciparum antibodies*

**Nicholas Smith** (Western Sydney University), **Adrian Hehl** (University of Zurich), **Peter Deplazes** (University of Zurich), *A transmission-blocking vaccine to prevent toxoplasmosis*

**Rowena Martin** (Australian National University), **Adele Lehane** (Australian National University), *Determining the mechanistic basis of the patterns of inverse drug susceptibility induced by two key drug resistance proteins of the malaria parasite*

**Scott Mueller** (University of Melbourne), *Immune surveillance of the CNS during malaria infection*

**Stephan Karl** (The Walter and Eliza Hall Institute of Medical Research), **Istvan Kezsmarki** (Budapest University of Technology and Economics), **Moses Laman** (Papua New Guinea Institute of Medical Research, Goroka, Papua New Guinea), **Malcolm Jones** (The University of Queensland), **Peter Metaxas** (University of Western Australia), *Field-based evaluation of a novel magneto-optical technique to diagnose malaria*

**Timothy Davis** (University of Western Australia), **Brioni Moore** (University of Western Australia), **Moses Laman** (Papua New Guinea Institute of Medical Research, Goroka, Papua New Guinea), **Kevin Batty** (Curtin University of Technology), **Laurens Manning** (University of Western Australia), **Sam Salman** (University of Western Australia), *A study of artemisinin combination therapy given at delivery to prevent postpartum malaria and to young infants to treat uncomplicated malaria.*

### Other research grants

ASP members have reported the following additional funding.

**Vicky Avery** and **Sandra Duffy** Griffith University's Nature Incentive Scheme and \$2500, for the contribution made to the following Nature article in 2016; Diversity-oriented synthesis yields novel multistage antimalarial inhibitors.

**Vicky Avery** Griffith University Research Infrastructure Project (GURIP): Imaging and Quantitative Cell Analysis Facility.

**Amy Jones** CASS Travel Grant and ASM travel award to attend the ASM (American Society of Microbiology) Microbe Meeting held June 16th-20th 2016, Boston, USA to give an oral presentation.

**Amy Jones** Theo Murphy (Australia) Fund, (administered by the UK Royal Society) to participate in the 2016 Theo Murphy High Flyers Think Tank – An interdisciplinary approach to living in a risky world (Australian Academy of Science) held on 20-22 July in Canberra

**Melissa Sykes and Bilal Zulfqar** Tony B. Academic Travel award covering flights and accommodation to present a poster at the SLAS2017 6th Annual Conference and Exhibition, February 4-8, 2017 in Washington, DC

**Bilal Zulfqar** Griffith University International Experience Incentive Scheme (IEIS) Travel Grant to be used towards his planned visit to Prof Louis Maes' lab in Belgium in 2017.

**James McCarthy** (QIMR Berghofer Medical Research Institute)

- Bill and Melinda Gates Foundation Grand Challenges – New Interventions for Global Health: Novel Sensor and Biomarkers for Diagnosis of Malaria Using Human Breath
- NHMRC Northern Australia Tropical Disease Collaborative Research Programme 1131932 Improving Health Outcomes in the Tropical North: A Multidisciplinary Collaboration
- Wellcome Trust Translation Fund Award An innovative antimalarial treatment – Proof of Efficacy in Malaria Human Challenge Model
- PATH-MVI Controlled Human Malaria Infection Transmission (CHMI Transmission)
- PATH Biomarkers for Malaria Elimination “BIOME” Plasmodium Vivax (“Pv”)



## Appendix 2

- PATH Plasmodium Falciparum ("Pf") Histidine-Rich Protein 2 ("HRP2") Introduction and decay model to define HRP2 dynamics and Pf detection over time
- Medicines for Malaria Venture A proof-of-concept study to assess the effect of (+)-SJ000557733 (SJ733) against early Plasmodium falciparum blood stage infection in healthy participants
- Foundation for Innovative New Diagnostics (FIND) P. falciparum hrp2 sequencing project
- Medicines for Malaria Venture A single centre, two-part, Phase I study to investigate the safety, tolerability and pharmacokinetic profile of ascending oral doses of MMV390048 and its antimalarial activity against Plasmodium falciparum in healthy adult subjects
- Medicines for Malaria Venture A Phase Ib experimental study to assess the in vivo safety and response to chloroquine of Plasmodium vivax isolate HMPBS02-Pv in healthy participants with induced blood stage malaria infection

**Geoff McFadden** (University of Melbourne) McCoy Foundation Grant for "Wildlife Pathogen Biobank"

**Michael Duffy** (University of Melbourne) in partnership with McGill University, the Medicines for Malaria Venture, the Structural Genomics Consortium at University of Toronto and the Drugs for Neglected Diseases initiative, Global Health Innovative Technology Fund grant for, "Targeting bromodomains for novel anti-parasitic mechanisms of action for malaria, Chagas disease, leishmaniasis and cryptosporidiosis."

**Ala Lew** and **Peter James** (University of Queensland) Meat & Livestock Australia Donor Company (MDC) funding, to, for 'Cattle tick and Buffalo fly host genetics, susceptibility to buffalo fly lesions and biomarkers for resistance'.

**Ala Lew** (University of Queensland) Advance Queensland Innovation Partnership grant for 'Improving the identification of tick resistance in beef cattle', to, and collaborators.

## Appendix 3: ASP Member Survey 2016

IN 2016 THE ASP SURVEYED MEMBERS TO FIND OUT WHAT THEY THOUGHT ABOUT GOVERNANCE, LEADERSHIP AND OPERATIONS OF THE AUSTRALIAN SOCIETY FOR PARASITOLOGY TO HELP PLAN FOR THE FUTURE. THE FULL REPORT CAN BE DOWNLOADED FROM THE MEMBERS RESOURCES SECTION OF THE ASP WILDAPRICOT MEMBERSHIP WEBSITE, SEE “APPENDIX 3 FOR 2016 ASP ETM & AGM DRAFT MINUTES...”

[HTTP://ASPWILDAPRICOT.ORG/MEMBERRESOURCES](http://aspwildapricot.org/membersresources)

Investigating models of governance and operation for the Australian Society for Parasitology in a changing economic and social environment.

Good corporate governance is essential for the smooth and efficient financial and operational running of an organisation and to protect the rights of its leaders. This study analysed the governance and operations of the Australian Society for Parasitology (ASP) within the context of a changing social and economic environment. 156 participants were surveyed for their opinion about the governance and operations of the ASP and 20 members of the ASP leadership team participated in telephone interviews to identify the current governance and operational systems of the ASP. All participants were asked to consider how the ASP might operate in the future.

The research questions were:

What should the Constitution of the Australian Society for Parasitology look like?

What is the best governance model for the Australian Society for Parasitology within the framework of the mission, vision and values identified in Constitution?

What are the possibilities for the Australian Society for Parasitology

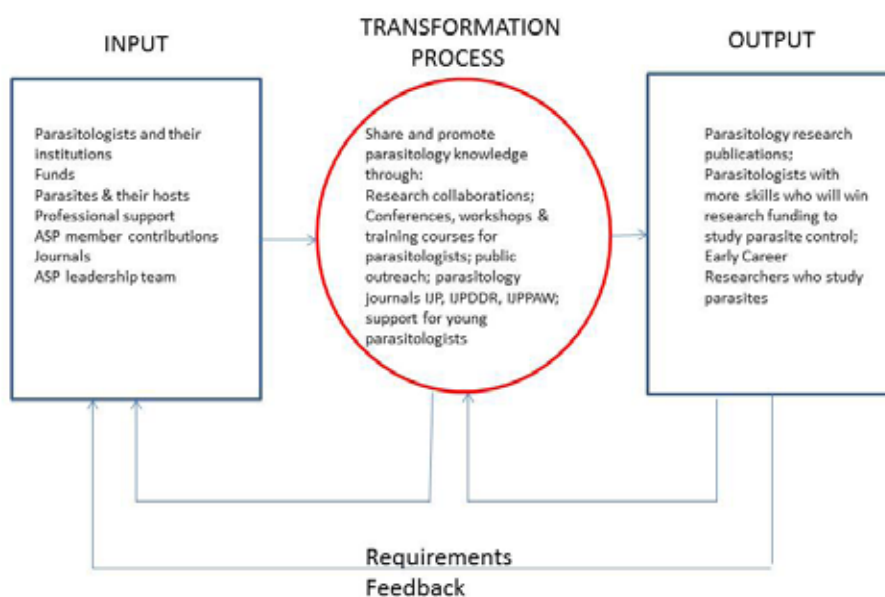


Fig 1. ASP Operations

# Appendix 3

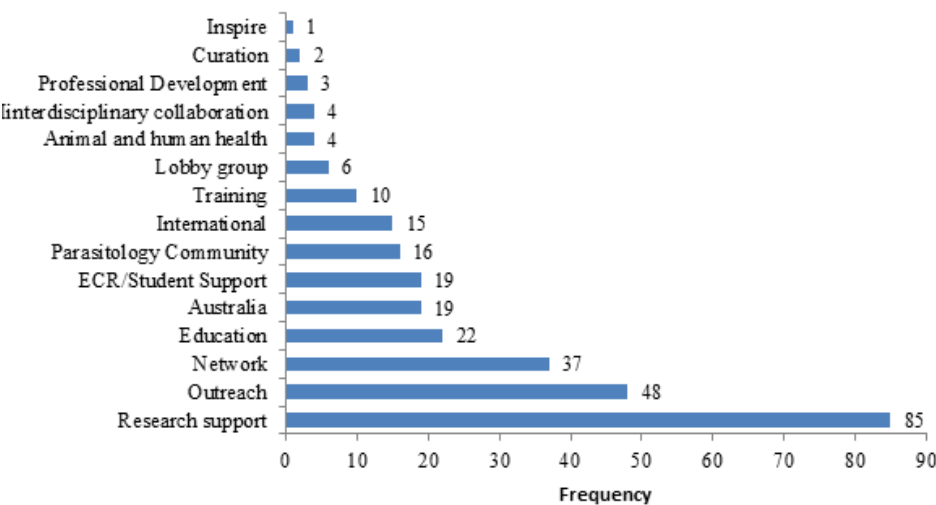
in the future?

External factors have affected the macro environment of the ASP, with effects on science research funding and job opportunities for scientists in Australia. These forces for change have made the ASP consider how they might need to adapt in the future.

The aim of this research was to determine the best model for governance and operation of the ASP to enable the Society to continue to grow and develop within the constraints of a changing economic and social environment.

## ASP Operations

The Operations of the ASP (Figure 1) can be analysed as a transformation process where inputs of material, management, labour and capital are identified, they go through a transformation process and are turned into outputs, goods and services. ASP Operations analysis showed that the ASP administered and funded grants, professional development courses and networking opportunities for its members, it has frequently and regularly organised large, international conferences, and supported numerous public education and engagement initiatives financially and through in-kind contributions.



## Summary of key findings

Survey participants (n=139) represented both male and female ASP members equally, reflecting the ratio of males to females in the whole of the ASP. In contrast, the gender ratio for interview participants (n=20), representing the ASP leadership team, had more males, (75%), than females, (25%), reflecting the current gender ratio of the ASP leadership team. ASP members from a good spread of institutions and locations participated in the survey.

95% of participants agreed or strongly agreed with the ASP Object as stated in the ASP Constitution (2014): "The Society fosters association of persons interested in parasitology, fosters establishment and proper curation of collections of Australian parasites, and, by facilitating intercourse and discussion, promotes investigation and advances knowledge of parasitology". Some commented that there were aspects missing including "outreach", "international" and "student support", and a few noted with surprise the inclusion of "curation of collections".

Participants thought that using a "voting-based method of decision making where the group agrees to a portion of votes and the majority of votes wins" was used most frequently when the ASP leadership team were making decisions.

The ASP relished in giving opportunities for future generations of parasitologists, they were passionate about the discipline and ensuring the vibrancy and future of the Society. It was important to

Fig 2. Survey participant response to "What do you think the ASP mission and vision is?", themed, n=136

## Appendix 3

identify what motivated participants to be an active ASP member to make sure that that motivation continued in the future.

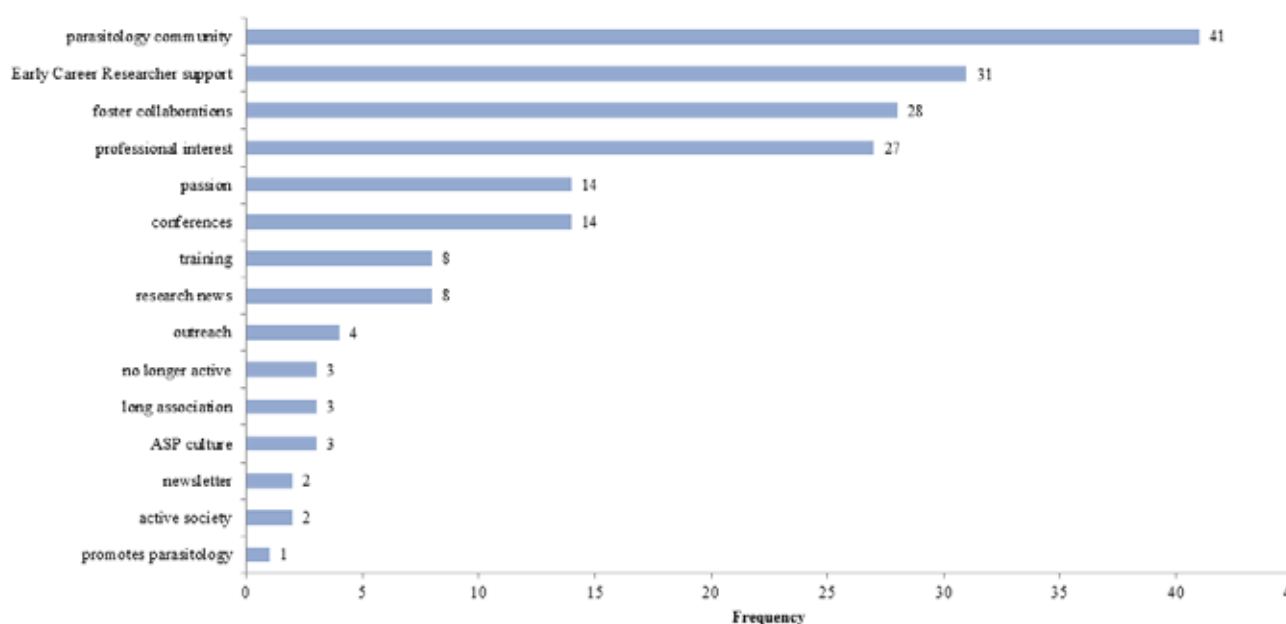
Institutional “support” (or the lack thereof) for ASP activities was clearly an area that many participants felt strongly about; however how to address that issue was not clear cut. Institutional support is necessary to keep people in the discipline of parasitology. Some felt that the ASP needed to act as a lobby group and this could include lobbying within their own institution. Implicit in many comments was the thought that the status of the ASP as an independent and objective voice is one of the society's strengths that the ASP should not align with any one institution.

Considering the future of the ASP and how to ensure that the transformation process happens efficiently so that the outputs are more valuable than the inputs was asked through several questions around threats to the ongoing stability of the science workforce. In terms of what happens during the transformation process

“mapping the tasks and understanding the best way to do those based on a streamlined and modernized structure” is essential. The future threats highlighted a combination of external factors that the ASP have little influence over and internal factors that they have full control over and the AGM is the ideal forum to have a discussion and form a working group to feed into the strategic planning process.

Blue sky thinking around future income sources for the ASP revealed that participants were not convinced this was necessary or ideologically right because it doesn't sit well with the culture and values of the Society. However, this might not apply to concepts like “crowd-funding”, “sponsorship”, “endowments” and “philanthropy” and are ideas worth pursuing as part of the future planning for the ASP along with the concept of “clever spending”. The organisational culture of the ASP was revealed as a culture that enabled members to take risks, be fully engaged if they desired, and a culture that has resulted in some highly creative

Figure 3. Survey participant “Motivation to be an active ASP member”, categorised into 15 themes, n=102



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organisational outputs which has helped to make the ASP a rich and vibrant society.

### ASP Constitution

Survey participants gave eloquent interpretations of their version of the ASP mission and vision, two are highlighted here and all have been coded into 15 themes (Figure 2).

“To promote, champion and advance the field of parasitology on a global scale”

“To promote the teaching and research of parasitology in Australia and worldwide. Support and promotion of young researchers and excellence in research. Education of, and communication to, the public about parasitology. Collection, curation and documentation of parasites for which there is little information. Promotion and fostering of international collaboration.”

The top ranked themes were “Research support”, “Outreach” and “Network”.

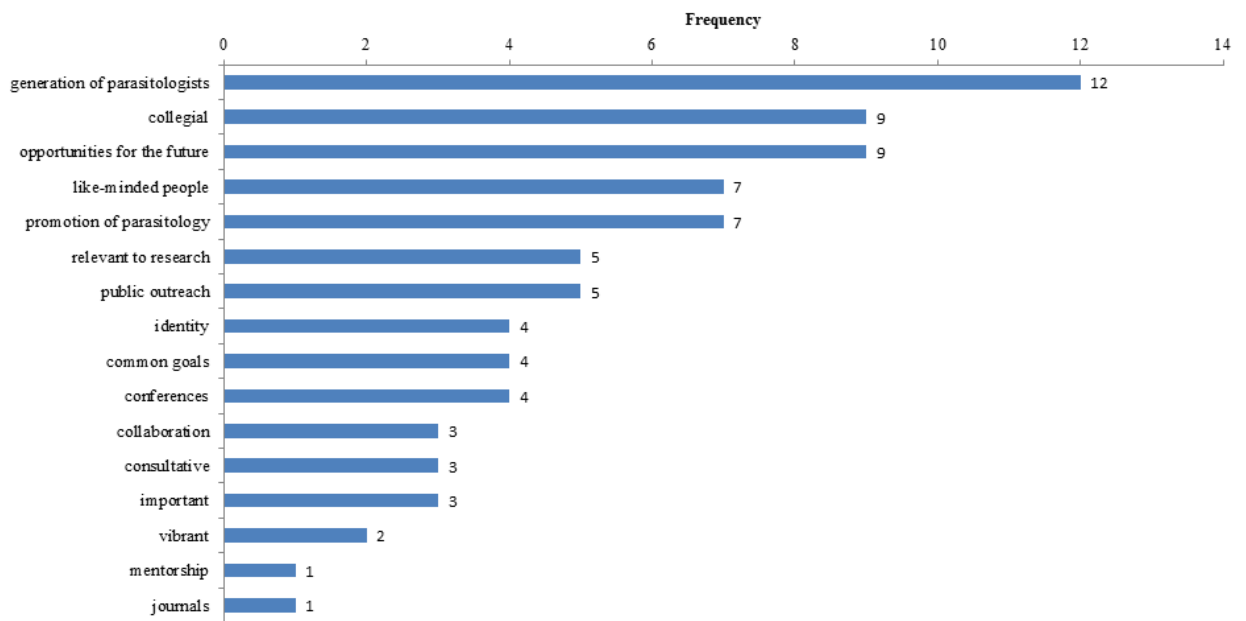
Survey and interview participants when asked to identify their motivation to be an active ASP member were united in “Early Career Researcher support” and a “collegial parasitology community” as main themes (Figure 3 & 4). They gave the following comments:

“Maintain contact with likeminded colleagues; maintain knowledge in parasitology; support early career researchers and students”

“Love of parasitology, desire to be part of the parasitology community, and want to support other members.”

“I am less active since retirement, but I love the organization, its spirit and its members”

Fig 4. Interview participant “Motivation to be an active ASP member”, themed, n=20





"It is the only society that solely focuses on parasites and is one of the society's that is most relevant to my research."

"The collegiality and the opportunities the society creates for the next generations of parasitologists."

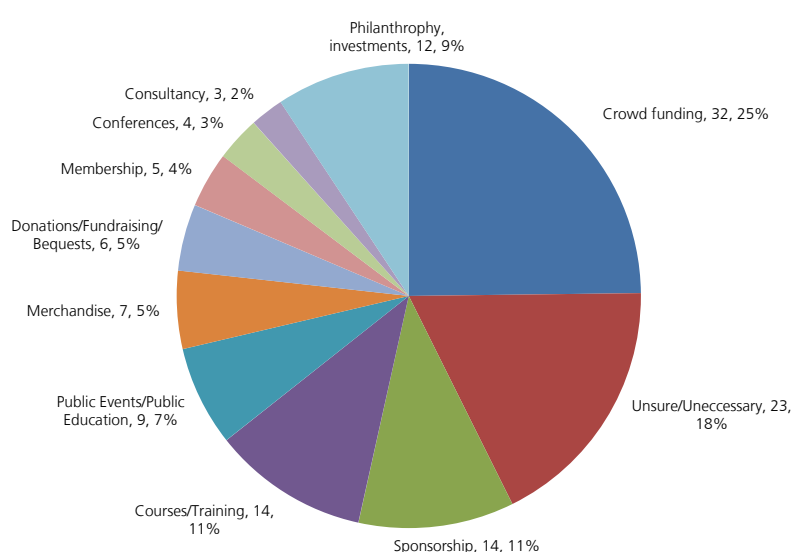
"The ASP promotes the science and training and mentoring students, we need to do this well if we want parasitology to thrive."

"Passionate about the discipline at large, thoroughly enjoy everything the ASP offers particularly the meetings,"

### Leadership

When asked about the best decision they were involved in and why Interview participants talked about the "financial support of initiatives", "support for the CIP course" and described being part of "democratic decision making processes that made them feel good". A majority of Interview participants felt the decision making process that the ASP Council and Executive used enabled their

Fig.5. Survey participant suggestions for "future ways the ASP might generate income", categorised into the top 10 themes, n=81



views to be heard and accepted that a "majority vote" rules, also outlined in the ASP Constitution (2014).

".. there have been hard moments in the past surrounding financial issues, but other than that the future decisions have been most important and satisfying.."

"...opportunities for the next generations of parasitologists that it ensured the vibrancy and future of the Society."

### Income sources

Survey and Interview participants were asked to do some "blue sky" thinking around potential future income sources for the ASP. Survey participants (Figure 5) were not sure it was necessary (18%) but several thought of "crowd-funding", "sponsorship", "courses" and "events". Interview participants gave the following suggestions (Figure 31) "corporate support or sponsorship", profit making "courses", "endowments" and "philanthropy". One suggested "Industry membership could be looked at to make it more valuable." Participants didn't necessarily agree that the ASP

needed to diversify its income, two comments from participants "the bigger issue is clever spending" and "I think that it does not need to find new ways to generate income, it could look at its expenditure side if there is concern about balancing its considerable budget" identifies a different way of looking at increasing income for the ASP.

### Conclusion

One final comment highlighted the importance of maintaining the organisational culture of the ASP;

"The organisational culture of the ASP is such that individuals are allowed to take risks, they are engaged and they produce some really creative activities that make the ASP such a vibrant society."

## Appendix 3

This study highlighted the importance of ASP members feeling like they own part of the society. Overall ASP members were happy with the ASP Operations, the governance and mission and vision statements were congruent. Comments from participants and information from other sources all resonated with principles that promote good governance and the following changes are recommended:

### 1) Changes to the Constitution

a) Make the election processes for Council explicit in the constitution with a page on the ASP website dedicated to explaining how to nominate someone for Council, how it will be decided who is elected.

b) Consider the representation of ASP members on Council, whether a student representative can be included.

c) Assess voting status of Council and effect on decision making process.

2) Discuss with ASP membership whether the ASP should try to make profit from some of their activities and, therefore, increase income, and the ways this could be achieved.

3) Discuss with ASP membership workforce employed to deliver ASP Operations, whether this is desirable and sustainable long term to support the work of the ASP volunteers to benefit the Society and the discipline of parasitology.

Any proposed interventions need to have ASP membership support before being delivered and the change management process will be evaluated to enable the ASP to be a learning organisation within a changing macro-environment.

Core competencies of organisations are hard to imitate and achieved through people; with the right combination of people and communication channels the ASP could, as a team, contribute more than each individual and this has been seen with the success of ASP Operational Outputs. To continue to flourish in a constantly changing macro-environment the ASP needs to maintain competitive advantage as a learning organisation. Being able to lead change and deal with unplanned change are the core elements of learning organisations. With a focus on people with a shared vision; thoughtful communication; using systems thinking and continually challenging processes and taking risks the ASP has shown itself to being a learning organisation.

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