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The Australian Society for Parasitology Inc.

NEWSLETTER

Volume 30 Issue No.3 October 2019

Women of parasitology

IMAGE: Susan de Burgh, Liisa Ahlstrom, Clare Anstead, Barbara Nowak, Leann Tilley, Rebecca Traub and Una Ryan at the 2018 ASP Annual Conference in Adelaide

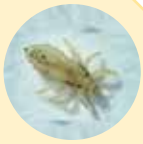
CLIMATE CRISIS & PARASITIC DISEASES

What are parasites?

Parasites are **organisms that lives in or on another organism**, its **host**. Although viruses and some bacteria follow this definition, they are not considered "parasites". Only **eukaryotes** can be classed as parasites, which features three major groups:

Ectoparasites
(external parasites)


Ticks


Lice


Mosquitoes

Some ectoparasites can transmit pathogens (bacteria, viruses and endoparasites). For example mosquitoes transmit the malaria parasite.

Did you know?
Only pregnant, female mosquitoes feed on blood. They are attracted to the CO_2 we breath out.

Helminths
(worms)


Hookworm


Tapeworm

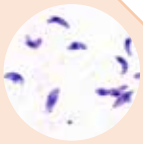

Roundworm

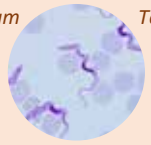
Worms typically live inside an animal's gut, where they lay eggs and are released though faeces (poop), allowing further transmission (either by directly swallowing eggs or in some cases, by larvae burrowing their way through the skin!)

Did you know?
Some tapeworms can grow up to 12m long in the human's gut!

Unicellular parasites
(a single cell)


Malaria
Plasmodium


Toxoplasmosis
Toxoplasma


African sleeping sickness
Trypanosoma

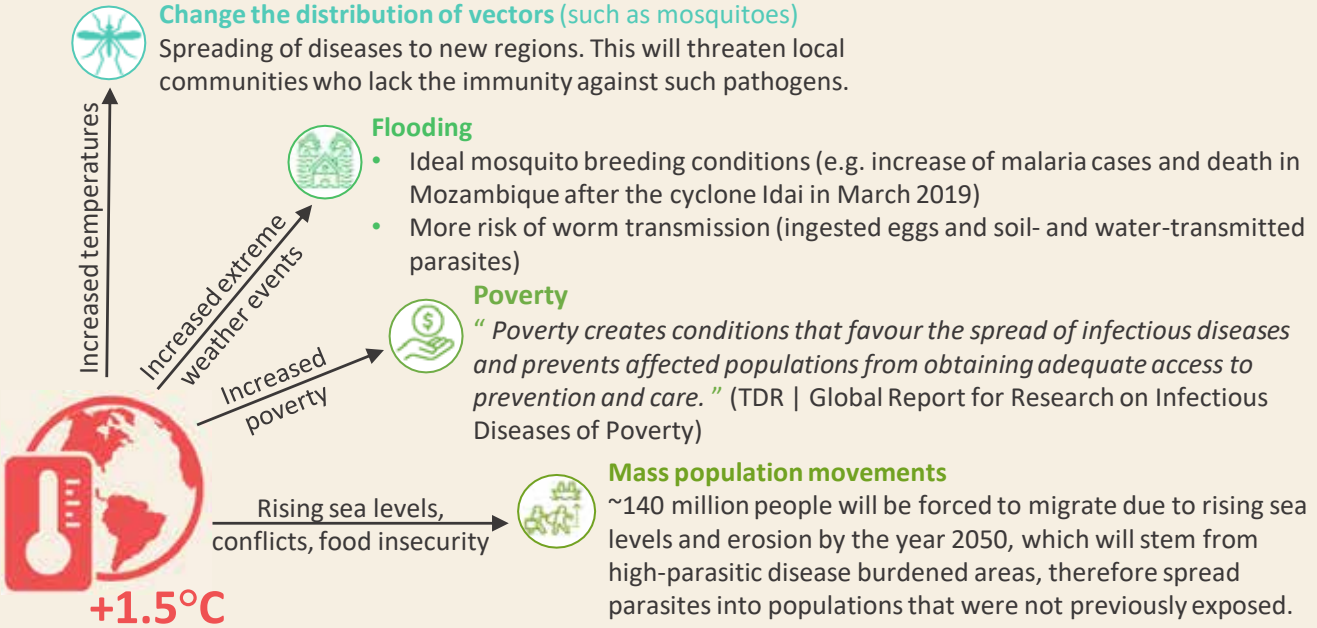
Malaria, African sleeping sickness and toxoplasmosis are caused by unicellular parasites. Some of them are transmitted through a vector, like mosquitoes or flies.

Did you know?
Nearly half of the world population is at risk of contracting malaria

What will happen with a global warming of 'just' +1.5°C? How is it going to affect parasitic diseases?

The **Intergovernmental Panel on Climate Change (IPCC)** is the United Nations body for assessing the science related to climate change. In 2018, they published a report explaining the consequences of a global warming 1.5°C*. What did they report? How is climate change going to affect parasitic diseases?

* by 2100, as compared to the pre-industrial era. Besides, we are currently on track for a global warming of at least +4°C



All references are available on: https://bit.ly/31orUKj . This fact sheet is not exhaustive, but aims to highlight key effects of climate change on human parasitic diseases. Prepared by Coralie Boulet, PhD student in Carvalho Lab - Molecular Parasitology (La Trobe University). Approved by the ASP Council.

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NEWSLETTER

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IN THIS ISSUE

From the President's Desk

Dear Members,

I would like to thank Una Ryan, Amanda Ash and Charlotte Oskam for the amazing job they have done in the last 2 years leading ASP. A huge thank you for all your work as the outgoing ASP Executive. We have big boots to fill! I'm relieved that Una will stay for a year on the Council as Past President and provide advice and support.

Big welcome to Nathan Bott (Treasurer) and Shokoofeh Shamsi (Executive Secretary) and the new ASP Council members: Ali Raza (QLD rep – featured in this Newsletter), Mike Gardner (SA rep) and Leann Tilley (Convenor of Bancroft-Mackerras Medal). I'm looking forward to working together with all new and current members of the Council.

Congratulation the new Bancroft-Mackerras Medal winner - Rebecca Traub (I really enjoyed Rebecca's presentation at the ASP conference and looking forward to the interview in the next Newsletter) and our most recent ASP Fellows: Denise Doolan (please see this Newsletter), Kevin Saliba and Alex Loukas (looking forward to the stories in a future Newsletter).

I would like to thank Tina Skinner-Adams for her service as Incorporations Secretary for all her hard work, we really appreciate her contributions.

We are proud to stand with #Climate Strike. I would like to acknowledge and thank Coralie Boulet for her initiative, proposing the action and providing a lot of information and Lisa Jones for following up and creating a new website page. Please see https://www.parasite.org.au/blog/asp-stands-with-climatestrike/ for more information, there is also a downloadable flyer on Climate crisis and parasitic diseases.

The 2019 ASP Constitution has been accepted by the QLD government and uploaded to the ASP website https://www.parasite.org.au/the-society/constitution/. All of the ASP Council and ASP AGM meeting minutes can be accessed in the members only resources section of the wildapricot membership site https://asp.wildapricot.org/ .

We have signed contracts with the venue (Shangri-La Hotel) for our next year conference in Cairns and the Executive is meeting in Cairns next week to do some final checks. We are running the conference together 10th International Symposium for Fish Parasitology, this is the first time this international conference will be in Australia and we are very happy we

From the President's Desk continued

could bring this event here. As usually Lisa Jones is doing an amazing job organizing the conference and I really appreciate her all her efforts, corporate knowledge and organizational skills. There is more information about the conference on ASP website, I'm told that hotel accommodation can be hard to find that time of the year in Cairns so please book it early.

We have a lot of fantastic stories in the Newsletter featuring achievements and activities or many ASP members. I would like to congratulate everybody whose achievements are covered in this Newsletter. In particular, the winner of undergrad prize at UTS, hope you will continue your passion for parasitology in your studies or professional endeavors. If you have a story about your research or other achievements, please share them with us through your State representative.

On a personal note, the last few months have passed really fast for me with some field work on tuna farms, teaching commitments, travel to Chile to present at an industry forum on salmon diseases and travel to Portugal to present at 19th Conference on Fish and Shellfish Diseases where I also caught up with other ASP members – Nathan Bott and Cecilia Power gave great talks about tuna parasites. We met with international ASP members: Victoria Valdenegro, Melanie Andrews and Lukas Neumann who are all now based in Norway but still working (at least sometimes) on parasites, it is great to see their interest and passion for parasites is continuing.

Best regards,

Barbara Nowak
President of the ASP

www.parasite.org.au
www.facebook.com/ASParasitology
www.twitter.com/AS_Para

Vale M.D. Rickard (1941-2019)

Remembering ASP Fellow Michael Desmond ('Mike') Rickard (22nd September 1941 – 25th June 2019)

Mike Rickard was born in India, where his father was an officer serving in the British Army during WW II. After the war the family returned to Liverpool, but then migrated to New Zealand in 1949, when Mike was 8 years old.

Following high school at Heretaunga College, Mike followed his older brother Brian and enrolled in veterinary science at the University of Queensland. He graduated BVSc in 1963 with first class honours and a University Medal for outstanding academic excellence. Mike then undertook a PhD in the Department of Parasitology headed by Prof. John Sprent, under the supervision of John and Colin Dobson, working on the carbohydrate metabolism of *Babesia rodhaini* in mice, graduating in 1967.

That year, Mike was appointed Lecturer in Veterinary Parasitology at Massey University in New Zealand. In 1969 he moved to the University of Melbourne, Faculty of Veterinary Science, as a Senior Lecturer in Parasitology, becoming a Reader in 1978. He also served as Associate Dean of Research and Graduate Studies, among other contributions to Faculty administration.

At Melbourne, Mike began a programme of research on immunity to the larval stages of taeniid cestodes, prompted by a political ban imposed by the USA on the importation of Australian sheep meat due to the presence of cysticerci of *Taenia ovis* (American sheep were infected with the same parasite but its presence in Australian sheep meat was used as an excuse for the ban).

In 1971, Mike published a seminal paper showing that larvae of *Taenia ovis* and *T. taeniaeformis* confined in diffusion chambers in the peritoneal cavity of their intermediate hosts (sheep and rats

respectively) induced immunity to challenge with infective eggs. In doing this he overturned the accepted wisdom of the time that immunity to metazoan parasites could only be achieved in some cases after direct exposure to living parasites. Mike's laboratory eventually identified the proteins associated with the development of immunity, and developed the first genetically engineered vaccine against a parasite (*Taenia ovis*). It was celebrated as one of the "Milestones in Parasitology" in 1993, although commercialization was fraught with difficulty.

Apart from his major interest in taeniid cestodes, Mike also collaborated in diverse areas, such as the life cycles of protists (Sarcocystis), other cestodes (*Anoplotaenia* in Tasmanian devils) and gastrointestinal nematodes of ruminants (*Camelostrongylus*). He also supervised a number of PhD students including Ian Beveridge, Brian Coman, Phil Craig, David Bowtell, David Jenkins, Henrik Bøgh and Robin Gasser, and accommodated numerous post-doctoral researchers and sabbaticants in his lab.

During his tenure at the University of Melbourne, Mike was awarded the degree of Doctor of Veterinary Science by the university (1979), was President of the Australian Society for Parasitology (ASP) in 1982, was awarded the Bancroft-Mackerras medal for excellence in research by the ASP in 1983, and was elected as a Fellow of the Society in 1987. Mike was heavily involved in the bid led by prof Sprent to host ICOPA VI in Brisbane and officially accepted the invitation from the World Federation of Parasitologists to hold the conference during the closing ceremony of ICOPA V. The ASP appointed him as the scientific programme coordinator for ICOPA VI. In 1986, Mike was elected to the Executive Board of the World Federation of Parasitologists, one of only six members from around the world.

In 1989, while retaining a position with the University as Professorial Research Fellow, Mike took up the post of Chief of the CSIRO Division of Animal Health. This was a demanding appointment, as Mike dealt with the accidental release of Rabbit Calicivirus, and was required to manage the consolidation and evolution of the Division during the mid-late 1990s in the face of a number of fiscal and policy challenges. He transitioned into the post of CSIRO Special Advisor on Animal Welfare in 2001.

Mike was awarded the Gilruth Prize by the Australian Veterinary Association (2014) for outstanding service to veterinary science in Australia, and in 1991 was the recipient of the Clunies Ross Medal for Science and Technology. He also was elected a Fellow of the Australian Academy of Technology and Engineering in 1992.

Following his retirement from the CSIRO in 2005, Mike continued to be an active member of the federal Animal Welfare and Ethics Committee.

Mike died unexpectedly in June; he is survived by his wife Trish, his sons Jeff and Tony, his daughter, Kylie, and four grand-children.

Image: Mike Rickard in 1990

Denise Doolan awarded ASP Fellowship

Professor Denise Doolan was awarded a Fellowship of the ASP during the Society's 2019 Annual Conference in Adelaide.

Denise Doolan is a Professorial Research Fellow (Immunology of Infectious Diseases) and Deputy Director of the Australian Institute of Tropical Health and Medicine at James Cook University (Cairns, Campus). Her research has focussed on developing novel immunotherapeutics and immunodiagnostics for complex pathogens that cause chronic diseases, using malaria (and more recently, other infectious diseases) as a model. She completed her PhD in Molecular Immunology in 1993 under the supervision of Michael Good at the Queensland Institute of Medical Research, focusing on malaria vaccines. After graduating from her PhD, she was awarded a National Academy of Sciences Postdoctoral Fellowship to work at the United States Naval Medical Research Center with Stephen Hoffman on malaria vaccine development. After appointments as Director of Basic and Preclinical Research & Development and then Scientific Director of the US Navy Malaria Program, she returned to Australia in 2007.

Back in Australia, she established the Molecular Vaccinology Laboratory at the Queensland Institute of Medical Research, with the support of a Pfizer Australia Senior Research Fellowship, followed by a NHMRC Senior Research Fellowship. In 2016, she relocated to the Australian Institute of Tropical Health and Medicine at James Cook University (Cairns Campus) and in 2018 was awarded a NHMRC Principal Research Fellowship.

Denise is an outstanding scientist with >150 publications, which have attracted >7,000 citations, a h-index of 47 and an i10-index of 111. She has received >$20 million in research funding over the course of her career including a sole CI on an NIH RO1 grant worth >USD$2.5M.

She is passionate about improving the health of the millions of people worldwide suffering from infectious and chronic diseases. Much of her career has focused on malaria immunology and vaccine development and she has played a leading role internationally in driving the development and application of approaches to identify priority target antigens, molecules and immune mechanisms that can be targeted for intervention against malaria. More recently, she has moved into research that intersects infectious and chronic disease. Her research agenda encompasses core themes of (1) host-pathogen immunity, (2) antigen discovery, (3) vaccine engineering, and (4) biomarker discovery, using state-of-the-art genome-based technologies and human models of disease and is the subject of a current NHMRC fellowship entitled "System-based approaches to inform the design of vaccines and biologics against complex pathogens". This project specifically will develop a pipeline of parasite antigens and immunomodulatory molecules that can be transitioned towards clinical development and testing, as well as identify biomarkers of disease risk that can be used for population-based screening to define at-risk individuals for targeted intervention.

Her track record in translating research is evidenced by 13 patent families (1 licensed; plus 2 pending) in vaccinology, immunology, and antigen discovery. Although her primary focus has been malaria, many of the technologies and strategies established for malaria can be applied to a range of public health threats.

Her scientific standing in the community

Denise Doolan FASP continued

is evidenced by being a regular plenary/ keynote invited speaker for national and international conferences on diverse topics (malaria, vaccines, host-parasite immunity, infection-related cancers), including funded invitations to national and international meetings; in the past 3 years, invitations include Lausanne, Berlin, Mexico City, Yogyakarta (Indonesia), Singapore, Portugal, Seoul, and USA.

She has been invited to write and review for premier journals including Nature, Nature Immunology, Nature Medicine, Science, Immunity, PNAS, Cell Host Micro, Trends in Immunology and Advances in Biotechnology.

She also regularly serves on the scientific program committees for international and national meetings; including lead organizer of the XIX International Congress of Tropical Medicine (Brisbane, 2016). She has served on a variety of Senior Management Committees, including the Australian Institute of Tropical Health and Medicine (2016 to present); QIMR Berghofer MRI Director's Consultative Committee (2011-2015); QIMR Berghofer MRI Biology Dept Coordinator (2011-2015), Australian Infectious Diseases Research Centre Management Committee (2011-2015) and Queensland Children's Medical Research Institute Research Advisory Committee (2012-2014). She also serves on 4 Editorial boards and is currently Speciality Chief Editor for Frontiers in Immunology: Immunotherapies and Vaccines.

In addition to her scientific contributions to the field of Parasitology, Denise has also made significant contributions to the ASP. She served on the Executive Board of the Australian Society of Parasitology from 2010-2014 and was President for 2 years (2011-2013). In 2016, she was awarded the ASP Bancroft Mackerras medal for her contributions to Parasitology and the Society. Since 2016, Denise has served on the specialist editorial board for IJP.

New state representative

Dr Ali Raza is the new ASP State Rep for Queensland

Dr Raza completed his PhD at CSIRO and School of Veterinary Science, University of Queensland (UQ) in 2017 and joined Queensland Alliance for Agriculture and Food Innovations as a Postdoctoral Research Scientist. His PhD project focused on studying the mechanisms of anthelmintic resistance in livestock nematodes. He is a passionate scientist who loves to work with infectious organisms, especially the Parasites. Dr Raza is determined to develop national and international collaborations for innovative scientific research in the field of Parasitology. His major areas of interest include investigating means to control endo- and ectoparasites, anthelmintic resistance and drug discovery, breeding for parasite resistance and host immunity to parasites. Before starting PhD at UQ, Dr Raza graduated as Doctor of Veterinary Medicine with summa cum laude and was awarded with Gold Medal. He worked as a lecturer at the Faculty of Veterinary Science, University of Agriculture, Faisalabad, Pakistan and has four years of teaching experience. Currently, he is working on developing more efficient and practically feasible methods for assessing ticks and buffalo fly (BF) numbers to facilitate rapid and accurate phenotyping for susceptibility. This project aims to develop a set of standards for commercial scoring of these ectoparasites and identifying new biomarkers and/or genomic breeding tools that facilitate selection of cattle resistant to ticks and BFs.

Undergraduate Prize

Althea Bastien an Honours student at the University of Technology Sydney was recently presented with the Australian Society for Parasitology Undergraduate Prize by Professor Nick Smith.

Conference honours

Professor Rebecca Traub of the University of Melbourne was the recipient of the 2019 Bancroft-Mackerras Medal for Excellence in recognition of her outstanding contributions of its members to the Science of Parasitology.

Professor Alex Loukas of James Cook University and Professor Kevin Saliba of the ANU were awarded Fellowships of the ASP.

Full features of these researchers will follow in the next newsletter.

Conference prizes

Five young researchers were rewarded with prizes at this year's Annual Conference.

Congratulations to Yan Zhang, University of Melbourne for Best Poster by a Student ASP Prize, Juan Miguel Balbin, University of Adelaide for Best 5-minute Oral Presentation by a Student ASP Prize, Amy Lee Burns, University of Adelaide for Best 15 minute Oral Presentation by a Student ASP Prize, Eva Hesping, Griffith institute for Drug Discovery (GRIDD) Griffith University for Best 2-minute Oral Poster Presentation by a Student ASP Prize, and Alex Gofton, CSIRO for Best Sheep Blowfly related Presentation or Poster by an Early Career Scientist sponsored by Australian Wool Innovation.

Top row: Yan Zhang, Juan Miguel Balbin, Amy Lee Burns. Bottom row: Eva Hesping, Alex Gofton

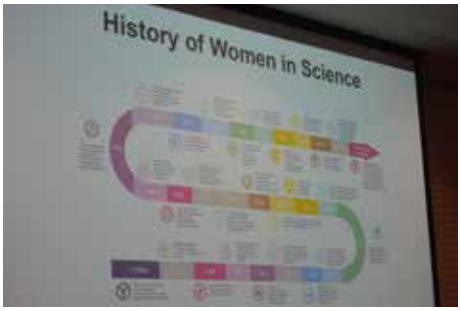
Images from the Annual Conference Part 1

Monday evening

The 2019 ASP conference opened with Jack Kanya Kudnuitya Buckskin, a proud Kaurna and Narungga man who has dedicated his life to learning and passing on his knowledge and language of the Adelaide Plains to future generations of Kaurna people, who delivered the Welcome to Country; followed by the Bayer sponsored "Extraordinary Women in Parasitology" cocktail event, which was a fun, free, family friendly event open to the public featuring the stories of trail-blazing women parasitologists with an address by the outgoing ASP President, Professor Una Ryan, Murdoch University and panel discussion by women parasitologists. There was parasitology-themed face painting and Rina Fu's "My Mad Scientist Mummy" performance and childrens workshop; and then the presentation of our new ASP Fellows.

Images from the Annual Conference continued

Monday evening



Images from the Annual Conference continued

Tuesday morning

Tuesday began with "Breakfast With Your Mentors" where the 2019 ASP Invited speakers discussed science careers with the Early Career Researchers. The 2019 Bancroft-Mackerras Medal for Excellence winner was announced, Professor Rebecca Traub, University of Melbourne and Rebecca's BMM oration opened the scientific program of the 2019 ASP Annual Conference.

Images from the Annual Conference continued

Tuesday morning

Images from the Annual Conference continued

Tuesday afternoon










Images from the Annual Conference continued

Tuesday afternoon

ACREME Update

Over the last six months, The Australian Centre of Research Excellence in Malaria Elimination (ACREME) has continued to progress our collaborative research into the surveillance, diagnosis, treatment and prevention of malaria, with a focus on the Asia Pacific Region.

Publications

A notable highlight was the publication of a longitudinal surveillance study led by Ric Price at the Menzies (Kenangalem et al PLoS Med 2019), which found that adoption of a universal policy of artemisinin-based therapy for malaria infections of any species in Papua, Indonesia was associated with a significant reduction in total malaria-attributable morbidity and mortality.

James Beeson's group at Burnet Institute published two studies advancing our understanding of the functional antibody response to malaria, in particular functional complement-fixing antibodies induced by the malaria vaccine RTS,S (Kurtovic et al BMC Medicine 2019 and identification of specific targets of complement-fixing antibodies (Reiling et al Nat. Commun. 2019).

Sarah Auburn (Menzies) is investigating genetic and genomic surveillance tools to support P. vivax elimination and recently published a genomic analysis of P. vivax in Southern Ethiopia, revealing selective pressures in multiple parasite mechanisms (Auburn et al J. Infect. Dis. 2019).

Travel awards

ACREME awards travel and seed grants to promote collaborative malaria research in Australia and overseas. PhD student Damian Oyong (Menzies) visited the Burnet Institute to train with James Beeson's team in a specialised functional antibody assay. PhD student Win Han Oo (Burnet Institute) received travel support to attend malaria Technical Strategy Group (TSG) meetings in Nay Pyi Taw, Myanmar. Postdoctoral researcher Roslyn Hickson (University of Melbourne) visited the Mathematical/ Economic Modelling (MAEMOD) team lead by Professor Lisa White at the Mahidol Oxford Tropical Medicine Research Unit (MORU) in Bangkok.

Seed grants

ACREME seed grants were awarded to Ricardo Ataide (Burnet Institute), Maria Rebelo (QIMR-Berghofer), and Kamala Thriemer (Menzies). Ricardo Ataide and team will combine geospatial surveillance techniques and antibody biomarker measurements from a cohort of pregnant women to identify malaria transmission hotspots around Madang, Papua New Guinea. Maria Rebelo is developing a novel mouse model of artemisinin-resistant malaria to screen and prioritize antimalarial drugs effective against artemisinin-resistant parasites. Kamala Thriemer is leading a study to identify suitable sites for a large-scale high dose primaquine effectiveness study and collect preliminary surveillance data to inform the study design.

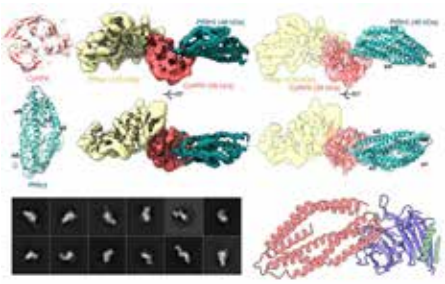
You can find out more about ACREME's network of researchers and research projects at www.acreme.org.au or by sending an e-mail to acreme-contact@unimelb.edu.au

Photo credit: Pearl Gan in association with Oxford University Clinical Research Unit, Vietnam and EOCRU, Jakarta.

The malaria key

In a recent Nature paper, Wilson Wong and researchers from the Cowman laboratory at WEHI, have revealed the unique molecular 'key' used by Plasmodium falciparum to enter human blood cells.

The key is a complex of three parasite proteins – called Rh5, CyRPA and Ripr – which work together to unlock and enter the cell, Professor Cowman said. "This complex is fundamental to the malaria parasite's ability to enter cells and cause infection. With this new information we can now target the parasite in a much better way because we understand how it functions to infect the blood.



"Capturing the first ever image of the protein complex – revealing with astounding clarity exactly what it looks like – was a 'Eureka' moment in the field of malaria research," he said.

These findings are significant because the entry of the malaria parasite into human red blood cells enables rapid growth, multiplication and spread; driving serious symptoms such as fever, chills, malaise, diarrhoea and vomiting.

The team led by Professor Cowman prepared samples for the study by genetically engineering parasite DNA and extracting the proteins Rh5 and CyRPA. The third protein, Ripr, was produced by the biotechnology company ExpreS2ion.

Dr Wilson Wong said the 3D image of the 'Rh5/CyRPA/Ripr' complex was obtained using the world's most advanced cryo-electron microscope, the Titan Krios, at the Howard Hughes Medical Institute's Janelia Research Campus.

"Together with our colleagues in the US we obtained hundreds of thousands of images of the complex from different angles."

Professor Cowman said the new structure provided researchers with critical information for designing an effective vaccine against the Plasmodium falciparum parasite.

ASP EDUCATION

Veterinary parasitologists at the University of Sydney have developed a SmartSparrow-powered module for use in the teaching of horse parasitology.

Nichola Calvani and Jan Šlapeta of the University of Sydney recently attended WAAVP in Madison where they presented the collaborative project between USYD, CSU and UQ on teaching horse parasitology. The presentation was also featured at the ASP conference in Adelaide by Anne Beasley.

These presentations and the module itself were one of the milestones for the ASP-supported initiative. In August, shortly after the conference presentations, the SmartSparrow powered module was used in teaching DVM Year 3 students at the University of Sydney. The students reported that after completion of the module they were on average 78% more confident that they could diagnose and appropriately advise clients about horse parasite management. You can check the module here: https://aelp.smartsparrow.com/v/ktnsycfu/bu1pjhu3.

This is a great outcome for the team of Nichola Calvani, Gabi Van Galen, Kris Hughes, Anne Beasley, Shokoofeh Shamsi and Jan Šlapeta. The good news is that the ASP has funded another module, this time on canine heartworm, so stay tuned. On that same note – Jan has received funds from the Australian Companion Animal Health Foundation to look more into heartworm!

News from the ASP Network for Parasitology

ISFPX & 2020 ASP Annual Conference

We look forward to seeing you at the 10th International Symposium for Fish Parasitology and 2020 Australian Society for Parasitology Annual Conference which will be held at the Shangri-la Hotel in Cairns, Australia from 6-9 July 2020. Registration and abstract submission will be open shortly. Please note to be eligible for a 2020 ASP Student Conference Travel Grant you must have a valid ASP Student membership by 07 April 2020 and meet all of the other criteria.

We hope you will join us at the ISFPX & 2020 ASP Conference to discuss the latest research and state-of-the-art technologies in parasitology with our outstanding mix of quality international and Australian scientists. Our invited plenary speakers include the following:

Elsevier Plenary Lecture Series - IJP Invited Lecturer

- Dr Meta Roestenberg, Leiden University Medical Centre

Elsevier Plenary Lecture Series - IJPPAW Invited Lecturer

- Dr Elizabeth Warburton, Ben Gurion University of the Negev

Elsevier Plenary Lecture Series - IJPDDR Invited Lecturer

- Professor Jane Hodgkinson, University of Liverpool

Once again we will offer a parents/carers and children room during the conference separate from the lecture theatres so that parents/carers will be able to watch and listen to the conference presentations live online using their own devices.

Follow the conference on social media with the hashtags #ISFPX #2020ASP

Check the Conference website https://www.isfpx.org/ for more information and we look forward to seeing you in Cairns in July 2020!

We would like to acknowledge the generous support of our 2020 ASP conference sponsors, thanks to Elsevier Parasitology and the International Journal for Parasitology (IJP), IJP DDR and IJP PAW, and New England Biolabs.

Network Mentorship Scheme

Network Mentorship Scheme Early career researchers are encouraged to apply to the Network Convenor (nick.smith@parasite.org.au), in strict confidence, for funding to participate in the Network Mentorship Scheme. The scheme allows young investigators to be paired with experienced, successful academics to discuss, plan, prioritise and set targets for their career. Typically, the early career researcher will fly to the institute of a senior parasitologist and spend a day there. Arrangements for professional development and progress to be reviewed by the pair annually can also be arranged. Importantly, mentors need not be from an individual's home institution but can be drawn from across the Network. The scheme has proved very valuable for several young researchers and their mentors already and covers mentorship across all aspects of working in parasitology including research, teaching, leadership, communication and outreach and other areas of professional development.

JD Smyth & Travel Award reports

Please read about our JD Smyth & Travel Award recipients who have recently returned from their researcher exchange and training programs. Olivia Carmo, PhD student at The University of Melbourne was awarded the prestigious JD Smyth Postgraduate Travel Award for a Researcher Exchange with Dr. Tobias Spielmann, in Hamburg, Germany and then attend the Biology of Parasitism: Modern Approaches, Marine Biological Laboratory (MBL), Woods Hole and to visit the labs of A/Prof. Christof Grundner and Prof. Joe Smith at the University of Washington. Sanduni Hapuarachchi, PhD student from Australian National University was awarded the prestigious JD Smyth Postgraduate Travel Award to attend the 2019 Woods Hole Biology of Parasitism Course and researcher exchanges to visit laboratories in Boston, New York and Philadelphia, USA.
Dr Hong You, QIMR Berghofer was awarded an ASP Network Researcher Exchange, Training and Travel Award for a Researcher Exchange to Peter Hotez's laboratory at National School of Tropical Medicine, Baylor University, Texas, to learn novel adjuvant technologies and exchanging ideas in parasite vaccinology USA.

Congratulations to all recent grant winners highlighted below. If we have missed your grant announcement please email Lisa.Jones1@jcu.edu.au

ARC Linkage Grants

Dr Scott Carver; Dr Shane Richards; Associate Professor Michael Charleston; Dr David Phalen; Dr Kate Mounsey; Dr David Nichols. University of Tasmania. Developing feasible in situ control of mange disease in wombats. Our goal is the development of feasible in situ control of sarcoptic mange in wombat populations. Globally important, the Sarcoptes scabiei mite infects >100 mammal species and is among the 50 most common human diseases, causing health, welfare and population impacts. This infection is treatable, and we will test a new treatment (fluralaner), develop new models to guide management, and conduct replicated field trials. This will enable science-based guidelines, advancing disease control, local eradication, and regulatory approval for wombats. Our research framework

is adaptable to other mange-impacted species, and advance methods and theory for control of treatable disease in wildlife. MSD ANIMAL HEALTH; DPIPWE; THE TRUSTEE FOR THE MOE ASSOCIATES TRUST; WATER NSW; HYDRO TASMANIA; BONORONG WILDLIFE SANCTUARY PTY LTD. $178,117.

Professor Robin Gasser; Dr Bill Chang. University of Melbourne. Illuminating genomic dark matter to develop new interventions for parasites. This project aims to unravel the molecular basis of parasitism using leading-edge post-genomics approaches. This research expects to explore genomic 'dark matter' in the genome to discover how parasites survive and cause disease. The resultant shift in the understanding of molecular mechanisms and processes governing parasitism will lead to new ways of disrupting the intricate parasite-host relationship, which will translate into innovative technologies or products to ameliorate the burden of parasites in livestock animals. Expected socioeconomic benefits include lifting Australia's scientific knowledge base, reputation in biology and biotechnology, livestock production and investment in translational research. YOURGENE BIOSCIENCES CO LTD, TAIWAN .$1,175,000

Dr Neil Young; Dr Pasi Korhonen; Dr Lynn Fink. The University of Melbourne. Next-generation genomic resources to tackle parasitic diseases of animals. The revolution in genomics provides unprecedented opportunities to tackle destructive parasitic diseases affecting billions of animals worldwide. Through a synergy of leading-edge technologies and a strong partnership with BGI International, this project aims to deliver major conceptual advances in the understanding of parasitism; an unparalleled skills-base in genomics and bioinformatics; innovative new molecular technologies; and new treatments and diagnostic tests as biotechnological outcomes. This leap forward in Australia will substantially enhance the global profile of parasitology research, training and employment opportunities for early career scientists, and improve access to international research funding and networks. BGI INTERNATIONAL PTY LTD. $619,000

NHMRC Invesigator Grants

Leadership

A/Pr Justin Boddey (Walter and Eliza Hall Institute of Medical Research) Validating glycosylation as a therapeutic target to prevent malaria transmission. The parasites that cause malaria have unique proteins on their surface that are essential for infection of humans and mosquitoes. These proteins are useful for making vaccines to train the immune system to recognize and block malaria infection. Our latest research has shown that these proteins are modified with sugars that enhance parasite virulence. We are studying these modifications more closely to facilitate the development of improved malaria vaccines. $2,282,424

Prof James Beeson (Burnet Institute) Defining malaria immunity to advance effective vaccines Burnet Institute The major objective of this proposal is to advance the development of a highly effective and long-lasting malaria vaccine through achieving major new advances in understanding the mechanisms of human immunity to malaria, identification of key targets of protective immunity, and antigen combinations for high efficacy, and identifying strategies for generating long-lasting vaccines with sustained efficacy. $2,048,640

Prof Michael Good (Griffith University) Novel vaccine technology to translate knowledge of immuno-pathogenesis into vaccines and therapeutics. Malaria and streptococcal diseases are collectively responsible for the loss of over 1,000,000 lives each year. We have studied the immune responses to the organisms responsible for these diseases and have used novel technology to develop candidate vaccines which are showing great promise in both pre-clinical and pilot stage human trials. We plan to conduct early phase trials of vaccines for both organisms and to further understand how the immune system can be trained to control them. $1,501,595

Prof Miles Davenport (University of New South Wales) Infection Analytics: Harnessing quantitative, experimental and clinical approaches to advance infectious disease control. Infectious diseases such as HIV and malaria continue to kill millions of people worldwide. Advances in experimental techniques mean that we can now measure and analyse infection and host immunity at an unprecedentedly detailed scale. The challenge becomes to fully harness this wealth of data. This project involves interdisciplinary collaboration between mathematicians, biologists and clinicians to use this data to develop novel treatments and vaccines for human infectious disease. $1,128,030

Emerging Leadership Level 1

Dr Stephen Scally (Walter and Eliza Hall Institute of Medical Research) Structural and functional characterization of Plasmodium falciparum reticulocyte binding proteins. Malaria is an infectious disease of global significance. This proposal will study a family of malarial proteins important for human red blood cell invasion. It will first identify the human red blood cell receptors that the malarial proteins recognize and then structurally and functionally characterize receptor and antibody binding. This will provide the 3D blueprints necessary to inform vaccine design. $639,750

Dr Deborah Cromer (University of New South Wales) Control of Infectious Disease. This research will employ truly unique interdisciplinary approaches to understanding infection and immunity. Recently there has been an explosion in

Funding news continued

experimental and clinical data without a corresponding increase in the necessary skills to interpret them. In this investigator grant I will apply my strong and proven skills of communication across the two very diverse fields of mathematics and biology to answer fundamental questions in the fields of HIV, Malaria and Vaccination policy. $639,750

Dr Danushka Marapana (Walter and Eliza Hall Institute of Medical Research) Understanding parasite ubiquitination to generate novel antimalarials Malaria remains the most serious and widespread parasitic disease in humans. As parasites show increasing resistance to the frontline treatments, we need potent antimalarial drugs with new modes of action. My project proposes a new method of drug treatment that can be adapted to specifically target parasites. I will initially identify and then activate parasite protein complexes known the E3 ubiquitin ligases, using drugs known as PROTACs, to ultimately degrade key parasite proteins. $ $639,750

Dr Rhea Longley (Walter and Eliza Hall Institute of Medical Research) Leveraging naturally acquired immune responses to malaria to advance control and elimination of this disease. Malaria is an infectious disease that still affects millions of people worldwide, including in the Asia-Pacific region. There are currently no tools to identify individuals with hidden liver-stage parasites, known as hypnozoites. This is hindering our efforts to eliminate malaria. My research will uncover how immune responses to malaria are acquired and maintained. I will leverage this knowledge to develop the first surveillance tool that can identify people with hypnozoites. $561,800

Development

Prof Ivo Mueller Development of a novel point-of-care Plasmodium vivax dot-matrix antibody test to accelerate malaria elimination To efficiently eliminate P. vivax (Pv), malaria control programs needs tools to detect areas with ongoing transmission and to identify and treat people with dormant Pv liver infection. To assist with these tasks, we are developing a novel cost-efficient and field-deployable diagnostic test that recognises specific patterns in a person's immune responses to malaria. This test will expand the capacities of current rapid-diagnostic tests to detect not only current but also recent past infections. $978,263

Prof Alexander Loukas (James Cook University) Hookworm peptide therapeutic for oral treatment of IBD. We have identified a peptide (small fragment) derived from a hookworm protein that suppresses inflammation. The peptide can be administered orally to mice and prevent the onset of inflammatory bowel disease (IBD). We now plan to optimise the structure and delivery method of the peptide and advance its development towards clinical trials in IBD. $732,700

Prof Leann Tilley (University of Melbourne) Development of a novel drug class for the treatment of Plasmodium falciparum malaria. Recent gains made in malarial control are now threatened by the emergence of antimalarial drug resistance, which is causing up to 50% treatment failure. New drugs are needed that have novel mechanisms of action, are fast acting and show activity against all known resistant parasite strains. We have identified a class of compounds that fits these criteria and propose to develop them as drug leads. $445,920

With best wishes,

Nick and Lisa

Closing dates for ASP awards

ASP Fellowships
1 January 2020

ASP Researcher Exchange, Travel and Training Awards & JD Smyth
22 March 2020,
25 September 2020

John Frederick Adrian Sprent Prize
30 September 2022

Bancroft-Mackerras Medal for Excellence
30 September 2020

More information
www.parasite.org.au

$400 Undergraduate Prizes

The Australian Society for Parasitology is pleased to announce that it will be offering undergraduate student prizes of $400 each to Australian Universities identified as offering a suitable course in parasitology, for presentation to the best undergraduate student in parasitology (highest passing mark/grade).

The course(s) must be taught by a financial member of the ASP (of more than one year standing), and must comprise at least 30% parasitology. **Requests for 2020 prizes must be made by the eligible University to the ASP Treasurer by the 30th September 2020. Please complete the online application form:**

www.parasite.org.au/awards/asp-undergraduate-prizes/

JD Smyth Postgraduate Travel Award

Olivia Carmo, a PhD student in the Tilley group at the University of Melbourne, traveled to meet: Tobias Spielmann at the Bernhard Nocht Institute for Tropical Medicine in Hamburg, Germany; all thirty-eight lecturers at the Biology of Parasitism course in Woods Hole, Massachusetts USA; and Joe Smith at the University of Washington, in Seattle.

As a postgraduate student, my three months abroad were vital in learning new skills and reconnecting with international collaborators to enrich my parasitology work here in Australia. My PhD work in Leann Tilley's lab at the University of Melbourne focuses on virulence-factor trafficking within the host cell during the Plasmodium falciparum asexual blood stage.

It was therefore invaluable to meet Tobias Spielmann and his group at the Bernhard Nocht Institute (BNI) for Tropical Medicine. I had the opportunity to present my work to his lab and conversely learn about their recent findings. Our discussions allowed me to reconsider the scope of my PhD project here in Melbourne, encouraging me to tease hypothesis out of my current dataset to take a directed, rather than -omic, approach. Visiting Tobias's group was also a valuable opportunity to discuss future projects and establish support for my postdoctoral fellowship applications in two years.

After visiting the BNI I flew to Massachusetts where I started the seven-week Biology of Parasitism (BoP) course hosted by the Marine Biological Laboratory in Woods Hole. Six days a week we had three hours of lecture in the morning, followed by lunch with the speaker, then laboratory work that often trailed off into the early hours of the morning. The cohort of sixteen students and structure of the course allowed an immersive learning experience. I was amazed day after day listening to, and speaking with, accomplished parasitology lab heads. They encouraged our questions and expressed interest in our work, both our BoP lab research and the work we had done at our home institutes. The course fostered such a generous, supportive community, often precipitating in collaborations or job offers from the visiting lecturers to us students. For me, discussions with the lecturers (and fellow students) led to insightful conversations and ideas for new techniques.

Beyond the inundation of brilliant discussions, I learned new molecular biology, immunological, bioinformatic, and biochemical techniques. More specifically, I gained extensive experience with qPCR, mouse-work and tissue preparation, immunohistochemistry, flow cytometry, ELISAs, nano-luciferase expression quantitation, FPLC, differential centrifugation, and blue native PAGE to name a few. As a Plasmodium falciparum researcher, it was exciting to apply these new techniques to non-Plasmodium systems, including Anopheles, Toxoplasma, Giardia, and Trypanosoma. These skills were acquired over the course of four lab modules, each two weeks long culminating in a presentation.

The most beneficial and relevant module was led by a senior African Trypanosome academic, Jayne Raper. Under Jayne's

Olivia Carmo continued

supervision I designed and executed experiments to investigate whether or not oligomerization of a trypanolytic factor was attributed to a c-terminal leucine zipper-like motif. Her module taught me the meticulous sample preparation and FLPC trouble-shooting skills to feel confident delving into a more protein-centric project upon my return to Melbourne. My seven weeks at BoP were a transformative experience, I feel honored and grateful to have met my peers, the visiting lecturers, module directors, and course directors, all of whom made me feel welcome in the greater parasitology community.

Less than 36 hours after finishing BoP I was at the Seattle Children's Hospital in Washington visiting Joe Smith's and Alexis Kaushansky's labs. Joe Smith has collaborated with our group here in Melbourne before, so it was valuable to catch up on his lab's recent work focusing on host-biology. As a PhD candidate studying parasite biology, it was refreshing to present my work to researchers well trained in host-biology and hear their insight. Academics like Fred Mast at Seattle Children's Hospital offered especially novel ideas and I was happy to discuss future directions/projects extensively after my seminar.

Visiting the Seattle Children's Hospital was valuable for discussing my own research and establishing connections for prospective projects as well. In Hamburg, Woods Hole, and Seattle, I met brilliant parasitologists, had engaging discussions, learned new skills, and established connections that will foster great collaborations in my academic career.

Thank you to the ASP J.D. Smyth Student Travel Award committee for sponsoring my travel and catalyzing my academic career in parasitology.

Previous page. Top: BoP Day 1: Standing in front of my rendering of an early trophozoite-infected erythrocyte. Bottom: My lab mates in the BoP lab where we spent our afternoons, evenings, and early mornings.

This page. Top: A fellow student and I enacting a Leucine Zipper. Bottom: The BoP 2019 cohort including directors Barbara Burleigh and Flaminia Catteruccia, course assistants Lilith Renae South and Charisma Burrows, and the founder of BoP, John R. David (standing front and center).

JD Smyth Postgraduate Travel Award

Sanduni Hapuarachchi, a PhD student at the Australian National University, describes her seven weeks at the Biology of Parasitism course at Woods Hole.

The Biology of Parasitism (BoP) is a course that I had heard of very early on in my parasitology research. My supervisors and colleagues had told me about the amazing experiences they had at BoP and I was thrilled to have the opportunity to be a 'BoP-er' myself this year! The course is run for 7 weeks comprising of both lectures as well as practical experience in the laboratory delivered by notable researchers in the field. This year was the 40th anniversary of BoP, and our cohort was privileged to meet the founder of the course, John David.

During BoP, I received hands-on experience on a myriad of parasites, vectors and subject materials of which I have had little or no previous experience in. The course consisted of 4 main modules, each running for either 1 or 2 weeks.

In the first module, I worked with Shaden Kamhawi and her teaching assistant Tiago Serafim (National Institute of Health) on Leishmania and its vector; the Phlebotomine sand fly. The highlight of this module for me was the skills I learnt in dissecting the midguts and salivary glands of sand flies (which were much smaller compared to Anopheles mosquitoes!). The isolated midguts were analysed for differences in the microbiota between the infected and uninfected vector. In the second module, I worked with Melissa Lodoen and her teaching assistant Tatiane Lima (University of California, Irvine) to understand the innate immune activation during Toxoplasma gondii infection. During this module, we isolated splenocytes and peritoneal exudate cells from mice infected with T. gondii and studied the immune cell recruitment as well as activation during early and late-stage infection.

The third module was on Giardia cAMP signaling, run by Alexander Paradez and his teaching assistant Han-Wei Shih (University of Washington). Among many techniques, I learnt how to culture Giardia in vitro and to induce the knockdown of parasite protein expression using CRISPRi and morpholinos.

In the last module, I worked with Jayne Raper and her teaching assistants Joey Verdi and Daphne Ko (Hunter College, City University of New York) to characterise a channel-forming protein known as apolipoprotein L-I, which offers immunity against Trypanosoma brucei in certain primates. I learnt various techniques involved in protein purification including density gradient ultracentrifugation, size exclusion chromatography and nickel affinity chromatography.

In the span of 7 weeks at the BoP course, I obtained a more holistic view of parasitology and a better understanding of the current techniques, implementations and challenges of the field. After the course I also had the opportunity to visit other parasitology labs in the region, including that of Barbara Burleigh (Harvard T.H. Chan School of Public Health) and Joseph DeRisi (University of California San Fransisco). The BoP course and the subsequent lab visits have strengthened my passion and curiosity for parasitology and I am very grateful to the Australian Society of Parasitology for supporting me in this incredible experience.

Left: View from the BoP lab of Eel pond, Woods Hole.
Right: Protein purification with FPLC

ASP Network Researcher Exchange, Training and Travel Award

Hong You of QIMR Berghofer describes her trip to Houston where she visited the lab of Professor Peter Hotez at Baylor College of Medicine.

Anti-schistosomiasis vaccines could play an important role as part of a multifaceted control approach against the disease. This being said, , many biological bottlenecks still exist, including the lack of generating sufficiently protective immune responses for lead schistosome vaccine candidates so that the long-term aim of curative worm reduction can be achieved. Time consuming steps along this path also include protein expression, purification and refolding on a large scale, especially in regard to insoluble proteins expressed in the Escherichia coli system.

Supported by an ASP Exchange Travel Award, I visited the laboratory of Professor Peter Hotez (well known to many ASP members) at the Centre for Vaccine Development, Baylor College of Medicine, Houston, USA for 17 days to discuss my work and to conduct research. Hotez's laboratory currently leads a team of researchers developing vaccines against several parasitic infections including Ascariasis and Chagas disease, in addition to work on well advanced vaccines already in clinical trials for hookworm and schistosomiasis. Recently,

Top: Hong You with Professor Peter Hotez at Baylor

Bottom: Hong You with some of Peter Hotez's group at Baylor

his team developed novel mRNA vaccine technology in their Houston laboratory, which may lead to increased protein translation, and the modulation of innate and adaptive immunogenicity thereby generating a safe and long-lasting immune response in animal models and humans. mRNA vaccines can be manufactured quickly and cheaply and have the potential and to become powerful interventions against a range of parasitic diseases. Already multiple mRNA vaccine platforms against a number of pathogens and several types of cancer have produced highly encouraging outcomes both in animal models and humans.

During my visit, I learned the procedures for making mRNA vaccines, their delivery using lipid nanoparticles and methods for detecting in vitro immune responses generated by dendritic cells induced by a mRNA vaccine. The advantages of a mRNA vaccine are several in that it does not involve genome integration, there is no need for time consuming product development which is involving a short time for manufacturing and scalability. As well as Peter Hotez, Bin Zhan and Jeroen Pollet (Centre for Vaccine Development, Baylor College of Medicine, USA), this scientific interaction involves myself and Don McManus (QIMR Berghofer Medical Research Institute) and Malcolm Jones (University of Queensland). This visit formed a vital part and link for my future development of applied collaborative research between QIMR Berghofer and Baylor College of Medicine. This collaboration will result in advanced and important novel studies that will provide a truly revolutionary approach to improve our ability to develop and effective schistosomiasis vaccine. I anticipate that introducing the technology to QIMR Berghofer will result in novel findings and several high quality publications, providing the basis in future to apply for national and international project funding.

I am extremely grateful to the ASP for the provision of the financial support that allowed me to undertake such a valuable and rewarding period of training in the USA

ANU Outreach

Parasitologists from the ANU were enthusiastic participants at InterACTive Science, a new event held during National Science Week.

Erick Tjhin (van Dooren group), Cibelly Goulart (van Dooren group), Vanessa Howieson (Saliba group), Alex Maier, Merryn Fraser (Maier group), Theresa Storiko (Maier group), Stephanie Henkel (Saliba group), Jonathan King (Saliba group), Sarah Shafik (Martin group), Sashika Richards (Martin group), and Melanie Rug (Centre for Advanced Microscopy), shared their time and enthusiasm for parasites at an ANU Parasitology stall led by Christina Spry (Saliba group). During the day, visitors to the stall had a chance to see a range of parasites – including some still alive – and get a feel for parasites by putting their hand in a "Parasite mystery box". There were also games, such as "Match the parasite with its host" and "Count the parasites in my blood", as well as an online quiz focused on the benefits of parasites, and videos showing parasites in action. Visitors to the event additionally had the opportunity to witness Alex Maier's "The hidden circus – the unbelievable abilities of parasites" performance (see more details below). The fun continued into the evening with an "After dark" session, where the addition of glow-in-the-dark quinine-containing gin and tonics to the stall was a hit.



InterACTive Science photos. Top left: Christina Spry, Cibelly Goulart and Erick Tjhin (and PAM, our Parasitology Assistant Mannequin) ready for action. Top right: Melanie Rug, Alex Maier and Merryn Fraser engaging with visitors to the stall. Bottom left: Alex Maier on stage during "The hidden circus – the unbelievable abilities of parasites" show. Bottom right: Stephanie Henkel and Jonathan King primed to share their knowledge of parasites and anti-parasitic drugs while serving gin and (glow-in-the-dark) tonics.

Schools outreach in NSW and the ACT

In July, parasitologists from the ANU ran a 'Parasite Detectives' practical for 40 eager Year 12 Human Biology students from Narrabundah College, ACT. The students enjoyed performing diagnostic PCRs, microscopy and literature searches in order to diagnose their demonstrators with parasitic diseases, ranging from malaria to Chagas disease.

The unfortunate, parasite-afflicted demonstrators included Vanessa Howieson (Saliba lab), Cibelly Goulart and Erick Tjhin (both Smith/van Dooren lab), Sadaf Ilyas (Burgio lab), Martin Huang and Melanie Ridgway (both Maier lab) and Giel van Dooren. We thank the Research School of Biology teaching staff for technical assistance and Danny Wilson's group (University of Adelaide) for providing Plasmodium knowlesi samples for the prac.

Earlier in the year, Alex Maier gave an interactive presentation about parasites of all kinds to a group of Year 11 and 12 students from Bega High School, NSW. Additionally, in March, Christina Spry (Saliba group) gave a presentation about malaria to a group of enthusiastic Year 11 and 12 Human Biology students from Erindale College, ACT.

Alex Maier and Denise Higgins in Germany

The Hidden Circus

Alex Maier gave a public lecture at Urania in Berlin entitled 'The hidden circus – the unbelievable abilities of parasites'. The lecture was developed in conjunction with his collaboration with Anna-Sophie Jurgens from the College of Arts and Social Sciences at ANU. Alex, complete with costume (see image below), engaged the audience with the capabilities of parasites.

Alex takes the stage at Urania in Berlin with his public lecture "The hidden circus – the unbelievable abilities of parasites".

ParCur Workshop

In May, Alex Maier and Denise Higgins (ANU) along with colleagues in Germany ran a three-day workshop on parasitology curriculum at Humboldt Universität Berlin. The workshop was attended by parasitologists from Germany, Switzerland and the USA, who discussed the challenges, approaches and latest developments in parasitology teaching. The workshop also involved a press conference and the production of short videos for use in teaching.

Participants at ParCur share their expertise (left) to develop better resources (including short videos, centre) for parasitology teaching. Parasites were even the subject of dinner conversations (right).

Virtual reality cow parasites at La Trobe

Using a script from Evan at Federation University, Teresa Carvalho and colleagues from the School of Life Sciences laboratory, presented the Cow Parasite VR system with great success at the La Trobe University open day.

Looking for future parasite scientists at UTAS

Mai Dang reports on an event for 5 to 10-year-old chidlren who were visiting the University of Tasmania, Institute for Marine and Antarctic Studies open day with family members. The theme of this event was "Looking for future parasite scientists" which was aimed to encourage children's interest in parasitology.

At the first station, we run a 5-minute class using labelled plasticine models of four species of parasites (amoebae, blood flukes, isopods and copepods) which are researched by the Aquatic Animal Health research group. Children were learned about anatomy and shape of the parasites and how affect their fish hosts. After completing the class, children were granted a Future Fish Parasitologist certificate and welcome to join Aquatic Animal Health team. With the certificate, kids had opportunities to join in the second station which was an Aquatic Animal Health wet lab where they worked as vets and diagnosed fish parasitic diseases. A kiddie pool was filled with water and populated with floating fish "infected" by the four parasites of focus. Children were given fishing poles with magnetic lures and allowed to catch fish. If they caught one fish infected with each of three parasites and properly identified the parasites (using the information that they had learn from the class), they were allowed to choose a prize for ASP prize collection including microscopes, kid science books, fish shaped umbrellas, origami aquatic animals and giant microbe toys.

The ASP event was very successful with many children joining in the activities. The ASP sponsorship for this event were used purchase the materials necessary to construct and decorate at all activities and to purchase the ASP prize collection. The event was also supported by Professor Katherine Andrews with 30 copies of her great book titled "My mum is a parasite scientist. That's RAD" which were used as meaningful gifts. This event was advertised by UTAS as part of the Open Day. ASP banner was displayed. Many children experienced their first exposure to fish parasites and clearly demonstrated the absorption of their new knowledge. The interactive participation in activities helped to foster curiosity about parasitology. We received very good feedback from the visitors and from UTAS staff regarding all of the activities.

Rina Fu at Twilight

In March, Rina Fu ran a *My Mad Scientist Mummy* science stall at the Twilight Community Fair, an annual family-friendly event hosted by John Septimus Roe Anglican Community School in Beechboro, Western Australia.

There was a large crowd of 1000-2000 people with plenty of food vans, rides and activities for kids. Many members of the public including children (toddlers to upper primary) visited her science outreach stall "My Mad Scientist Mummy". This year, in addition to Rina's storybook sketches, she was able to share the published and printed version! She had a returning parent from last year who remembered about her story book concept and congratulated her for bringing it to fruition.

With the support of ASP State Representative who liaised with colleagues from Murdoch University, Rina borrowed jars of tapeworms and other awesome parasites for the event. Rina and her team engaged the little ones through hands-on activities at the 'little scientist station', 'fishy parasites' and 'under the microscope'. They also had many interested parents and grandparents come through to encourage our work.

The "Scientist Mummy" stage show was a blast. The team was fortunate to have Seto (the quokka laboratory assistant from Rina's storybook) come to life to assist her on stage. Though they had some behind-the-scene drama as his stage was taken down by the strong wind three times before they were due, and ultimately, required 2 people and sand bags to weigh it down! With the help from little scientist volunteers, Rina disclosed her secret blueprint and unveiled her custom-built invention: The Super-Dupa Spheros prayer Mark III at the theatre show.

Parasites Lost

Parasites lost (Fringe World, Windsor Hotel, Perth, February 13-16) was Alanta Colley's personal, entirely true story of trials, tribulations, and tapewom. The show was an account of her experiences traveling around the world, working in remote communities, and about some of the parasites she collected (unintentionally) on the way.

Alanta Colley is a public health practitioner, a comedian, and a bee-keeper. Co-founder of Sci Fight Science Comedy Debate, Alanta has appeared on Dr Karl's podcast, ABC News, and in Frankie Magazine, as well as regularly around Melbourne. She spent most of her twenties gallivanting about various countries, working in East Timor, Cambodia, Uganda and Kenya, on malaria prevention programs and sanitation programs. She's lived in villages, and taught health education to remote communities. She's also managed to contract most of the world's least pleasant parasites. Essentially she's terrible at her job. During 3 days show in Perth, lots of parasite lovers, including a big team from Murdoch University went on an adventure with Alanta, across the world and through her intestine; and learned about some of the world's cheekiest micro-organisms, and how Alanta contracted each of them. Not a show for the faint of heart!

Bugs Song and Book Week

The hardworking Rina Fu recently recorded an original science song for young children and presented a series of shows for Children's Book Week.

'The Bugs Song' is a bouncy and engaging piece that takes listeners through the familiar macroscopic bugs including insects to smaller bugs that we can view with a magnifying glass to microscopic bugs that many scientists from the ASP are devoting their lives to. The simplicity of the tune and lyrics enables toddlers as young as 3 years old to learn about microscopic bugs and parasites as well as extending their vocabulary. This song provides a fun platform to teach young children such complex concepts! In addition, The Bugs Song encourages curiosity in young children and prompts grown-ups and older children to ask further questions and look into such 'bugs'.

Right: recording The Bugs Song. Below: performing to one of the three schools visiting the Duncraig Library for Children's Book Week.

GRIDD at the Brisbane Science Festival

In August, the Griffith Institute for Drug Discovery (GRIDD) organized a stall at the Brisbane Science Festival where 1901 people from the general public, mostly children and their parents, attended and participated in various activities.

Drug discovery research was highlighted, including research against parasitic diseases by displaying microscopy slides (Necator americanus; male, Giradia duodenalis trophozoites and Toxoplasma gondii from commercial clinical samples) and key rings were given away. These showed microscope images (mostly parasites: malaria and kinetoplastids) captured by GRIDD researchers. In addition, young children interacted with 'giant' toy microbes (including malaria parasites) and earned more about them. Children were interactively engaged with performing with sugar gradient test and pH indication test for household items using cabbage juice (Image 1). Fourteen GRIDD researchers enthusiastically volunteered to explain the activities, guided and supervised children in performing activities, interacted and described about their research.

The new book from That's RAD! Science, 'My Aunt is a Crystal Scientist', was launched on the main stage and followed by signing of the free copies by the author, Professor Jenny Martin at the GRIDD stall. In addition, the authors of the other three books in the series, including Professor Kathy Andrewes, malaria researcher and author of "My Mum is a Parasite Scientist" participated in handing out free copies and signing their books. Children and their parents were excited to interact with the authors and learn more about their research.

There was also a photobooth for children and parents to dress up as scientists. The ASP banner was displayed at the photobooth and participants asked requested to use hashtags for social media to promote our society and its interest in furthering parasitology outreach and education.

Lastly, GRIDD organised a colouring-in station for children in a common area dedicated to younger children ('The Under-5 zone'). The pictures provided were carefully chosen to represent GRIDD research and included pictures of the lab and parasites. Further, word-matching and word search sheets were prepared to engage older children (e.g., 'malaria' word match).

Images from the GRIDD stall and photo booth at the Brisbane Science Festival

State News

Victoria

La Trobe University

William Star, 3rd year Microbiology subject (MIC3AMM - Advanced Medical and Veterinary Microbiology) was awarded the ASP Undergrduate Prize.

Coralie Boulet (PhD student) won 2nd Prize of the 3 minutes thesis competition at the School Level and will compete at the College Level (La Trobe). She talked about her PhD research project on repurposing existing drugs as antimalarials.

Dr Teresa Carvalho has been promoted to Senior Lecturer in the Department of Physiology, Anatomy and Microbiology.

The University of Melbourne

Gasser Lab

Grants & Awards

Clare Anstead & colleagues were awarded $2.5M from Australian Wool Innovation. The $2.5 million four-year research investment is a collaboration between AWI, the University of Melbourne and CSIRO to undertake preliminary research into the development of a flystrike vaccine targeting the Australian sheep blowfly (Lucilia cuprina).

Andreas Stroehlein, **Anson Koehler** & **Pasi Korhonen** were each awarded FVAS Research Initiative Fund Grants from the University of Melbourne.

Andreas Stroehlein was awarded the Chancellor's Prize for Excellence in the PhD Thesis "Kinomes of selected parasitic helminths - fundamental and applied implications".

Dili Herath won best oral presentation at the FVAS Postgraduate Symposium for her talk "Arylpyrrole and fipronil analogues that inhibit the motility and/or development ofHaemonchus contortus in vitro".

Promotions

Tao Wang was promoted to Level B Research fellow. **Clare Anstead** was promoted to Senior Lecturer.

Baby/Wedding news

Clare Anstead returned to work from maternity leave (baby Margot was born on April 23, 2018). **Neil Young** welcomed baby Emma to the family in June (big brother Alex is very excited). **Darcy Wang** was married in November.

Convocations

Yaqing Jiao recently submitted her PhD thesis "Discovery of new chemicals with anthelmintic activity against barber's pole worm and other parasitic nematodes" in November.

McFadden Lab

Prof **Geoff McFadden** was awarded the Woodward Medal, from the University of Melbourne.

Dean Goodman was promoted to level C. FadLab PhD students

Claire Sayers (now at Sanger) and **Taher Uddin** (now at Griffith U) have both graduated and will receive their doctorates on December 10th.

Geoff, Dean and **Justin Boddey** (WEHI) were awarded an NHMRC Project Grant to explore transmission of drug resistance.

Ralph Lab

Stuart Ralph, **Geoff McFadden** and **Dean Goodman** were awarded an NHMRC Project Grant to explore alternative splicing changes during the life cycle.

Creek Lab

Visits

Dr **Deus Ishengoma** (Director, Tanzania Institute of Medical Research, Tanga,Tanzania) and Dr **Abdi Abdirahman** (Wellcome Trust Fellow, KEMRI, Kilifi, Kenya) both undertook sabbatical placements with **Darren Creek** and **Christian Doerig** during 2018, sponsored by the WIPO RE:search program A number of such placements happened in Australian parasitology labs last year.

Dr **Ghizal Siddiqui** visited **Katja Becker**'s lab in Giessen, Germany in September 2018 to use advanced molecular tools to measure the impact of drug treatment on oxidative stress in malaria parasites (ASP funded).

Awards

Dr **Darren Creek**: NHMRC Excellence Award for CDF level 2 Biomedical fellowship (this was awarded at the end of June last year, so probably didn't make last year's report).

NHMRC Grants

Creek, Fowkes "Host and pathogen contributors to artemisinin resistance" NHMRC Project Grant 2019-2021.
Creek, Scammells, Ralph, Norton, Devine "New Aminobenzimidazole Antimalarial Agents with a Novel Mechanism of Action" NHMRC Project Grant 2019-2021.

PhD Graduations

Carlo Giannangelo "Biochemical pathways and molecular targets involved in the mechanism of action of ozonide antimalarials in Plasmodium falciparum"

Recent Publications

C Giannangelo, FJI Fowkes, JA Simpson, SA Charman, DJ Creek. Antimalarial Activity in the Context of Artemisinin-Resistant Malaria. Trends in Parasitology (accepted 2019/6/5) https://doi.org/10.1016/j.pt.2019.05.002

AE Sexton, C Doerig, DJ Creek,TG Carvalho. Post-genomic approaches to understanding

State News continued

malaria parasite biology: linking genes to biological functions. ACS Infectious Diseases. (accepted 6/6/2019) DOI: 10.1021/acsinfecdis.9b00093

Lian Xue, Da-Hua Shi, Jitendra R Harjani, Fei Huang, Julia Beveridge, Tamir Dingjan, Kung Ban, Sarah Diab, Sandra Duffy, Leonardo Lucantoni, Sabine Fletcher, Francis CK Chiu, Scott Alan Blundell, Katherine Ellis, Stuart A Ralph, Grennady Wirjanata, Silvia Teguh, Rintis Noviyanti, Marina Chavchich, Darren John Creek, Ric Price, Jutta Marfurt, Susan A Charman, Matthew Cuellar, Jessica Strasser, Jayme Dahlin, Michael A Walters, Mike Edstein, Vicky M Avery, Jonathan B Baell. 3, 3'-Disubstituted 5, 5'-Bi (1, 2, 4-triazine) derivatives with Potent in vitro and in vivo Antimalarial Activity. Journal of Medicinal Chemistry. 2019, 62, 5, 2485-2498

Tilley Lab

PhD completions

The Tilley lab had a number of PhD completions, **Laure Dumont** (co-supervised Simon Cobbold), **Tuo Yang** (co-supervised Simon Cobbold) and **Oliver Looker** (co-supervised Matt Dixon).

Visits

Olivia Carmo visited Tobi Spielman at BNI and Joe Smith at Seattle Children's hospital.

Awards

Olivia Carmo was awarded JD Smyth, ASP travel award to visit labs and attend the Woods hole Biology of parasitism course. She won the best poster prize at the BioMalPar meeting in Heidelberg Germany.

Publications

The knob protein KAHRP assembles into a ring-shaped structure that underpins virulence complex assembly. Looker O, Blanch AJ, Liu B, Nunez-Iglesias J, McMillan PJ, Tilley L, Dixon MWA. PLoS Pathog. 2019 May 9;15(5):e1007761.

Multimodal analysis of Plasmodium knowlesi-infected erythrocytes reveals large invaginations, swelling of the host cell, and rheological defects.
Liu B, Blanch AJ, Namvar A, Carmo O, Tiash S, Andrew D, Hanssen E, Rajagopal V, Dixon MWA, Tilley L. Cell Microbiol. 2019 May;21(5):e13005.

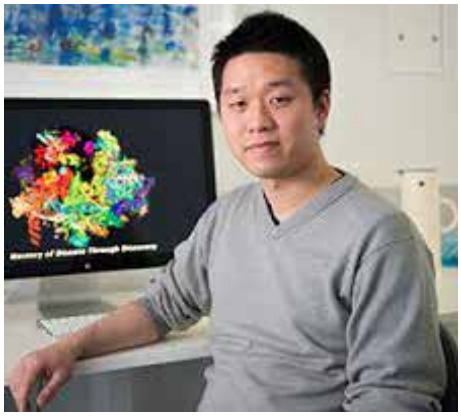
Target Validation and Identification of Novel Boronate Inhibitors of the Plasmodium falciparum Proteasome. Xie SC, Gillett DL, Spillman NJ, Tsu C, Luth MR, Ottilie S, Duffy S, Gould AE, Hales P, Seager BA, Charron CL, Bruzzese F, Yang X, Zhao X, Huang SC, Hutton CA, Burrows JN, Winzeler EA, Avery VM, Dick LR, Tilley L. J Med Chem. 2018 Nov 21;61(22):10053-10066.

*

The annual Parasitology special interest group meeting was held at Doherty Institute, University of Melbourne on 27 September 2018. Prof **Robin Gasser** gave an update on NGS/WGS in parasitology and Assoc Prof **Siddhartha Mahanty**, D**r Shio Yen Tio** and Dr **David Griffin** presented three interesting (human) parasitology cases seen in various hospitals. Retiring parasitologist Dr **Norbert Ryan** (from VIDRL) was felicitated for his contribution to this Group and Parasitology in general.

*

Congratulations to **Mike Duffy** who was awarded an Australia-Germany Joint Research Co-operation Scheme with collaborators at with University of Erlangen.



Walter and Eliza Hall Institute of Medical Research

Cowman Lab

Publication:

Wilson Wong (pictured below) from the Cowman laboratory published a recent paper in Nature, the study was led by Professor Alan Cowman and Dr Wilson Wong at the Walter and Eliza Hall Institute, along with collaborators at the Howard Hughes Medical Institute's Janelia Research Campus (US) and the company ExpreS2ion Biotechnologies in Denmark.

See the feature article earlier in this newsletter for more details.

ACT

Australian National University

Outreach

Parasitologists from the ANU were enthusiastic participants at InterACTive Science, a new event held during National Science Week. Parasitologists from the ANU also ran a series of outreach events for school students in the ACT and NSW and **Alex Maier** and **Denise Higgins** ran events in Germany. These events are featured earlier in this newsletter.

Left: Wilson Wong

State News continued

Right: Wenna Lee
Below: Rina Fu and Di Barton

ASP Undergraduate Prize

An ASP Undergraduate Prize was recently awarded to **Daniel Song-Xiao Yu** – who achieved the highest grade in the 2018 ANU third year undergraduate Parasitology course. Daniel is currently undertaking Honours at the ANU in Simon William's lab studying how plant pathogens cause disease.

Science & Technology Australia (STA) Canberra Meet-up

Christina Spry represented the ASP at Science & Technology Australia's Canberra Meet Up on June 3rd. The meeting was an informal opportunity to catch-up with representatives from various STA member organisations and meet the new STA President-Elect Dr Jeremy Brownlie who will take over from Professor Emma Johnston AO as President of STA in late 2019.

Western Australia

Murdoch University

PhD completions/graduations

Dr. Daniel Squire (Murdoch University)
Dr. Sylvia Squire (Vector and Water-borne Pathogens Research Group – Murdoch University)
Dr. Kimberly Loh (Vector and Water-borne Pathogens Research Group – Murdoch University)

International Visitors

Dr. Dandan Liu - visiting scholar from Yangzhou University-China
Prof. Mehdi Soltani visiting scholar from Tehran University-China

Grants/Awards:

Wenna Lee (current honors student within Vector and Water-borne Pathogens Research Group – Murdoch University) received the Vice Chancellor's Commendation of Academic Excellence Award. Wenna graduated with a Bachelor of Science on Feb 2019, with a double major in Clinical Laboratory Science and Biomedical Science from Murdoch University. Having graduated with a maximum GPA of 4.0 out of 4 opened many doors for her. Apart from being awarded with the prestigious University medal, she also clinched a Summer Scholarship 2018/2019 with the Australian Society of Microbiology, Murdoch University Academic Excellence Scholarship for Honours and Harry Butler Scholarship for Honours. On May 22nd, she was invited to deliver the student address where (pictured) she received the Award in Laboratory Medicine 2018 and Vice Chancellor's Commendation for Academic Excellence 2018.

New South Wales

Charles Sturt University

Publications

Shafaet Hossen, a PhD student in Shokoofeh Ahamsi's lab had his first publication released recently.

Hossen, M. S., & Shamsi, S. (2019). Zoonotic

nematode parasites infecting selected edible fish in New South Wales, Australia. International Journal of Food Microbiology, 108306.
https://www.sciencedirect.com/science/article/pii/S0168160518306846

National Science Week

Members of Di Barton's Parasitology Lab did some activities with Rina Fu.

Honours students

The Parasitology lab at CSU has two new Honours students – both Vet Sc students – Scott Day (working on Clinostomum spp. In local fish and birds) and Vanessa Lee (working on parasites of Tasmanian Devils). Additionally, Hannah Fahey (3rd year Animal Sc doing a project course) will be studying parasites of feral pigs in NSW.

The other Honours students (Ashleigh Baker and Megan Porter – working on pentastomids and other parasites of feral mammals) and the Masters of Animal Sc student (Alara Nuhoglu – working on cercaria in freshwater snails) are heading towards the pointy ends of their projects and are finishing up lab work in preparation for the write up.

University of Sydney

Laboratory of Veterinary Parasitology @ McMaster Building

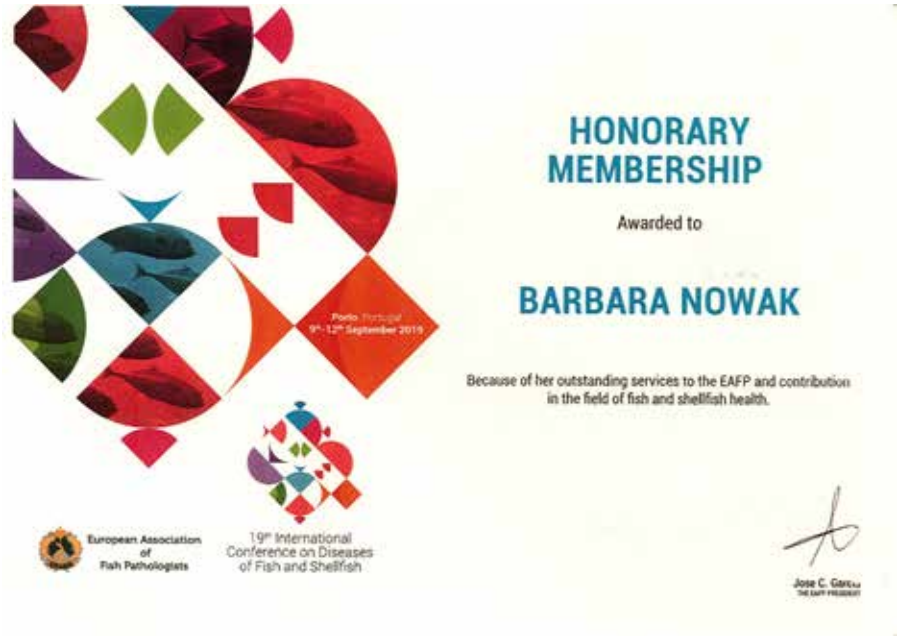
The Faculty of Science at USYD regularly runs STEM activities to inspire the next generation of young scientists. In July, Veterinary Parasitology staff were approached by the Science Communication team to host students from the International Science School (ISS). The ISS gathered 140 top science students from Australia, China, Japan, India, New Zealand, Thailand, the USA and the UK for a two-week program. In our half day workshop revolving around Fasciola diagnosis we provided hands-on laboratory activities using a case study of suspected sudden death in sheep. Awesome work by our PhD student Shona Chandra and technical support team Kate Gilchrist, Laura Woolfenden and Veronica Ventura. Students carried out a sedimentation to identify fluke eggs then followed up with a Gram stain to identify Clostridium. We also fielded general questions about sheep health and studying veterinary science.
July was a busy time for the lab with PhD students Nichola Calvani and Shona Chandra, along with the boss Jan Šlapeta all travelling out of state or abroad to present at conferences and catch up with fellow parasitologists!

Some years back Jan went to the US for a sabbatical in Boris Striepen's lab to develop a mouse model for Cryptosporidiosis and apply CRISPR/Cas9. All these years later it is finally time to celebrate after their paper led by Adam Sateriale got published in Cell Host Cell & Microbe – "A Genetically Tractable, Natural Mouse Model of Cryptosporidiosis Offers Insights into Host Protective Immunity" (https://doi.org/10.1016/j.chom.2019.05.006). The three went on to have several beers in Philadelphia while Jan was visiting UPenn.

Nichola and Jan attended WAAVP in

State News continued

Madison where they presented the collaborative project between USYD, CSU and UQ on teaching horse parasitology. (See feature on SmartSparrow).
Dr Esther Kanduma joined the USYD parasitology team in July. Esther is a tick researcher at the University of Nairobi, Kenya, and is currently visiting the SSVS on a short term post-doc fellowship, working with David Emery and Jan Šlapeta on ticks of cattle and the diseases they vector in Kenya.



Tasmania

University of Tasmania

ASP members Tina Oldham and Jessica Johnson-Mackinnon graduated in August 2019. We congratulate Dr Oldham and Dr Johnson-Mackinnon (below) and wish them all the best.

Congratulations for Mai Dang for College of Science and Engineering Best Current PhD student runner up award. Mai's is a very active ASP member and her outreach through ASP, including Open Day (described in this Newsletter) as well as her publications and research achievements supported the nomination for this award.

Dan Huston started his 6 months Endeavour Research Leadership Award at University of Tasmania with some field work on tuna parasites in South Australia and a visit to Nathan Bott's lab at RMIT. Dan contributed a lecture on parasitic life cycles to undergraduate students as well as research seminars.

Barbara Nowak was elected Honorary Member of European Association for Fish Parasitology. Since 1975 EAFP elected 16 Honorary Members, 3 of them women.

Right: Tina Oldham and Jessica Johnson-Mackinnon

State News continued

South Australia

University of Adelaide

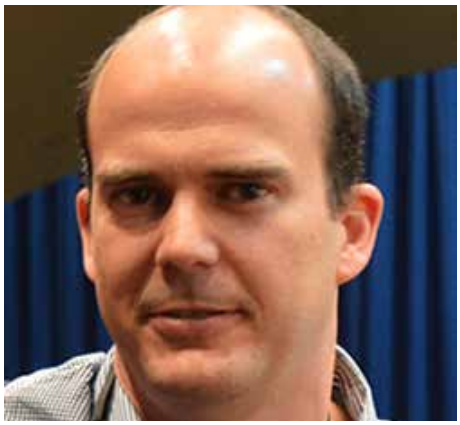
Congratulations to **Dr Danny Wilson,** University of Adelaide who recently won a 2019 South Australian Tall Poppy Science Award within the Research Field: Malaria Biology, Parasitology.

Every year more than 400,000 children globally die of disease caused by malaria parasites. The mosquitoes that transmit the parasite are becoming resistant to our best insecticides, and in some places, the parasite is becoming resistant to many of the drug therapies that were previously effective.

Dr Wilson's research is focused on tackling this issue on two fronts: developing new drugs that kill malaria parasites, and working on developing a vaccine for the parasites. He has identified new drug chemotypes to develop as antimalarials, and developed new parasite tools to fast-track malaria vaccine development.

Danny communicates his science through numerous radio interviews, using a claymation video, and through science evenings at kindergartens. Dr Wilson received his PhD from the University of Melbourne in 2009, and is currently a senior postdoctoral fellow at the University of Adelaide.

Source: https://www.adelaide.edu.au/news/news108222.html



Employment and research opportunities

Seattle Children's
HOSPITAL • RESEARCH • FOUNDATION

Post-doctoral Fellow – Smith Lab - Seattle Children's Research Institute

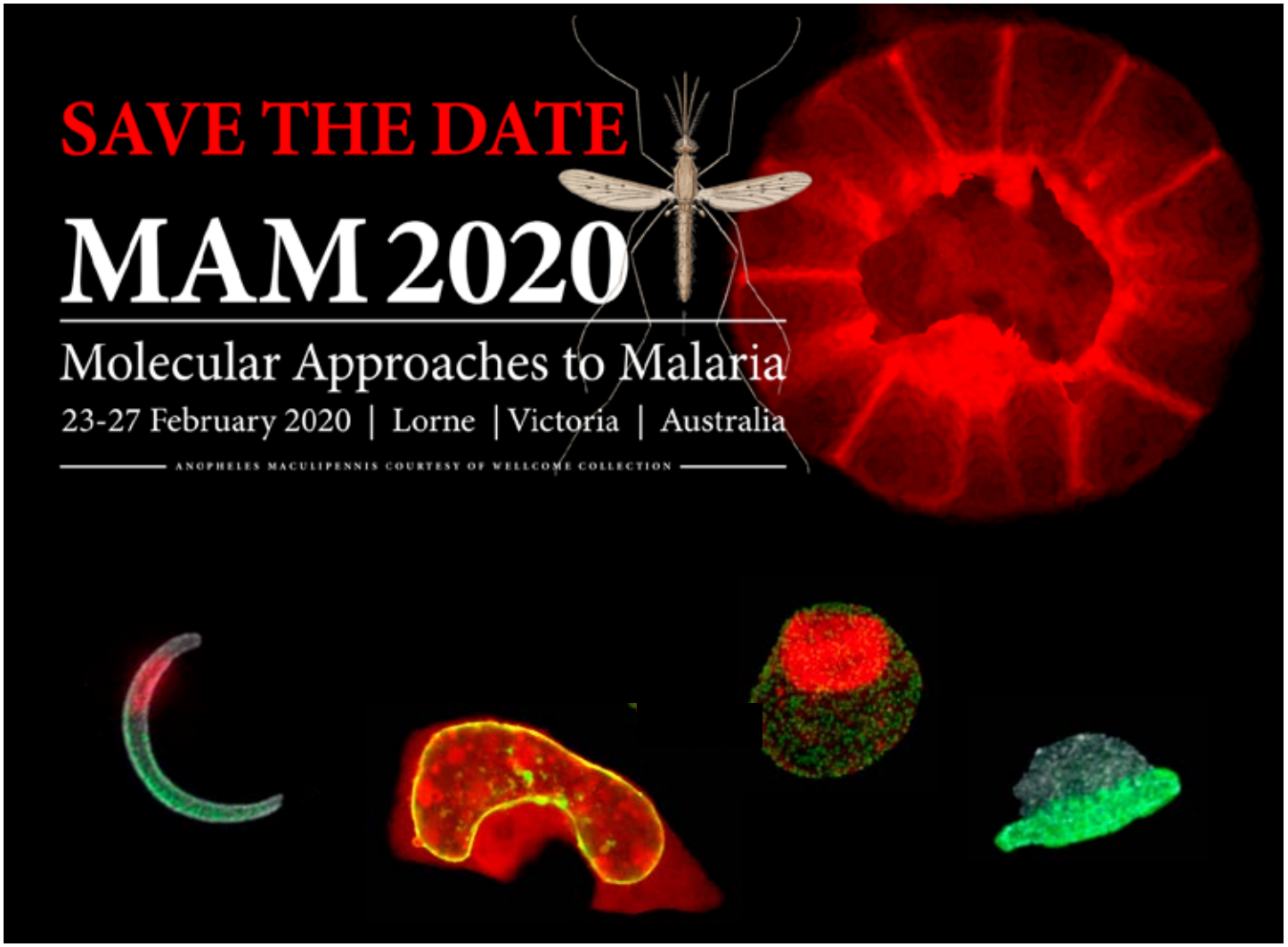
Malaria and Endothelial Dysfunction

The research lab of Professor Joseph Smith at the Center for Global Infectious Disease Research at Seattle Children's Research Institute is recruiting a Postdoctoral Scientist to conduct research investigating vascular dysfunction in cerebral malaria (https://www.seattlechildrens.org/research/centers-programs/global-infectious-disease-research/research-areas-and-labs/smith-lab/). This project aims to elucidate the cell biology and molecular mechanisms of how malaria parasites damage the blood-brain barrier. We utilize a broad range of experimental and computational approaches integrating novel 3D microvessel platforms and field site research in Africa and India. Our overall goal is to expand fundamental understanding of endothelial dysfunction caused by highly inflammatory diseases and to inform novel disease interventions.

The successful candidate will have a keen interest in working with Plasmodium as a parasite of global health importance, pathogen interaction with endothelial cells, and the translation of novel findings into approaches for intervention. Expertise in infectious disease models, cell biology, molecular biology or molecular genetics is important. The successful candidate is expected to (i) have strong written and verbal communication skills, (ii) establish clear goals and to organize and prioritize research, (iii) be willing and able to work with a diverse team of scientists, including postdocs, students and technicians.

Interested applicants must provide a cover letter detailing their scientific achievements and goals, explain their interest in working on the malaria-vascular interaction and provide a curriculum vitae with the contact information of three references. Please write to joe.smith@seattlechildrens.org.

Upcoming events



Bioticks 2019

1-4 December 2019
Aradero Beach Resort, Cuba

Abstract submission deadline:
15 October 2019

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Website: https://bioticks2019.cigb.edu.cu/

asmr Australian Society for Medical Research

Public, Political, Scientific Advocacy

Ebbs and Flows

From Discovery to Practice

AUSTRALIAN SOCIETY FOR MEDICAL RESEARCH
NATIONAL SCIENTIFIC CONFERENCE

November, 20-21 2019

WA Maritime Museum
Fremantle, Western Australia

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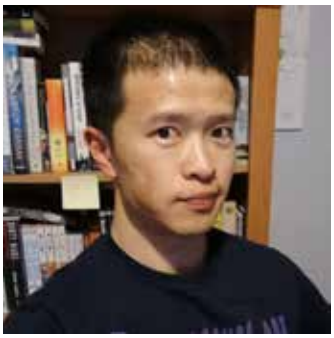

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