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NEWSLETTER

Volume 34 Issue No.2 December 2023





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Dear Members,

As another busy year draws to a close, just a brief note from me to thank you all for being an important part of the ASP in 2023. ASP members have continued to undertake amazing work across teaching, research, translation and outreach. Many examples of this are highlighted in this newsletter, but I would also like to acknowledge the enthusiasm, engagement and achievements of all our members who collectively drive our field of research, contribute to the success of the ASP and drive opportunities for ASP members.

The 2023 ASP Conference in Darwin was a great experience for attendees and I would like to thank Deborah Holt and Steven Kho and the rest of the organising committee for running such an outstanding event. The venue, talks, invited speakers and Conference dinner were all very high quality and much of the feedback about the Conference I received was very positive. Congratulations to Wai-Hong Tham, who was awarded the 2023 Bancroft-Mackerras Medal for Excellence at the 2023 ASP Conference, the highest recognition of achievement for our Society. Wai-Hong's research is Internationally recognised and she is a great role model for researchers in our field. Congratulations to our Conference student presentation award winners Capella Maguire, Sophie Collier, Maxine Smith, Tana Sukee, Emily Francis and Connor McHugh whose presentations were rated highly, but it was broadly recognised that the standard of presentations at the Conference was excellent.

The 2023 Conference had many highlights including the Early Career Researcher Workshop and a focus on One Health and Tropical Medicine. Sponsorship enabled four International Early Career



Academics to attend the Conference from Vietnam, Malaysia, Laos PDR and Ukraine who would otherwise not have been able to. Along with showcasing our members research, the Conference also provided a forum for the exchange of ideas that will facilitate teaching the next generation of researchers. Finally, the Conference provided a great opportunity for students, EMCRs and Academics to interact and network, with the success of this reflected in the feedback from attendees. The 2024 ASP Conference will be held in Auckland, New Zealand, August 26th-29th, it will be a great Conference in collaboration with the New Zealand Society for Parasitology and Anaerobic Protists and I am looking forward to seeing many of you there!

Thanks to Stuart Ralph and Michelle Power for organising the Concepts in Parasitology Course for 2023, and to the researchers who volunteer their time to teach at the course. Along with local and international delegates, the ASP provided sponsorship for four International early career researchers to attend. This remains a very positive experience for these

PRESIDENT

From the President's Desk continued

researchers and their career development. Thanks to Jill Chmielewski, Sarah Preston and Stuart Ralph for organising the ASP online seminar series, a valuable way for ASP members to give updates on research progress outside the ASP Conference.

Congratulations to those awarded funding throughout the year across NHMRC, ARC, Government, non-Government and Industry schemes. It was once again a strong year for ASP members and highlights the strength of our research, including for those grants that didn't quite make it this year. Congratulations to Una Ryan who has been named Australia's leading researcher in Tropical Medicine and Parasitology for 2024 in The Australian's Research Magazine and also the 2023 Elanco/WAAVP Research Prize. Congratulations also to Patricia Graves and Alan Cowman who were named American Society for Tropical Medicine and Hygiene **Distinguished International Fellows** and Alan was also awarded a lifetime achievement award at the 2023 Molecular Parasitology Meeting at Woodshole, USA.

Thank you to the editors and contributors to our three ASP led Journals, IJP, IJP-PAW and IJP-DDR, with all three Journals publishing some outstanding research through 2023. The work of these Journals allows the ASP to support student and ECR research development, such as through exchange programs, with reports from recent exchanges outlined in this newsletter.

A big thank-you to all those driving outreach opportunities with, and on behalf of, the ASP, with many examples covered from page 31. Your efforts keep members work visible to the community and excite the next generation of scientists!

Finally, I'd like to thank the entire ASP Executive, Council Members and Officers that volunteer and work tirelessly behind the scenes to ensure the smooth operation and success of our Society, the ASP Network and our prestigious Journals. Special thanks to outgoing ASP Executive and Council members Vito Colella, Clare Anstead, Deb Holt, Ian Beveridge, Leann Tilley. Also thanks to our incoming



Executive and Council members Hayley Bullen, Ghizal Siddiqui, Kamil Braima, Lucas Huggins, Robin Gasser, Alex Loukas, I look forward to working with current and new Council members in 2024.

Have a Happy and safe Festive Season and New Year, I am looking forward to seeing you all and hearing about the new outstanding achievements of ASP members in 2024!

Best Regards,

Danny



President of the ASP

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

ASP AGM

2023 Australian Society for Parasitology Annual General Meeting

The 2023 Australian Society for Parasitology Annual General Meeting was held as a hybrid face-to-face (at the 2023 ASP Conference) and online Zoom meeting on Wednesday 6th September.

Business conducted

The following business was conducted at the 2023 Annual General Meeting of the Society. The minutes and reports for ASP meetings are available on WildApricot / members / resources section. To access them please login to your Wildapricot account (<u>https://asp.wildapricot.org/memberresources</u>) and check the members resources or email the Secretary (secretary@parasite.org.au).:

- received the Society's financial statement, and audit report, for the last reportable financial year;
- presented the financial statement and audit report to the meeting for adoption;
- elected members of the Council;
- appointed an auditor or an accountant for the present financial year;
- announcement of ASP Awards and Prizes;
- receipt of reports from Editors, Convenors, Archivists, Secretariat and subcommittees; and
- review and debate other actions or decisions by the Council.





BMM winner, Wai-Hong Tham

Congratulations to Wai-Hong Tham who was awarded the 2023 Bancroft-Mackerras Medal for Excellence from the Australian Society for Parasitology. The nomination for Wai-Hong's award is published below.

Prof. Wai-Hong Tham has made a series of fundamental contributions to the molecular and structural mechanisms involved in host-pathogen interactions in malaria. Her work drives the rational design of novel intervention strategies for vaccine candidates, antibody-based therapies and diagnostic tests. She is an author on 70 papers published in top-ranked journals including Science, Cell and Nature. Wai-Hong has received a series of awards for her research including the 2017 David Syme Research Prize, the 2018 Burnet Prize, the 2020 International Award Biochemical Society and the 2017-2022 Howard Hughes-Wellcome Trust International Research Scholar Award.

Scientific Contributions to Science of Parasitology

Malaria remains the most significant global infectious disease, infecting over 200 million people annually. Prof. Tham's research contributes to the fundamental understanding of how Plasmodium falciparum and Plasmodium vivax, the two most deadly malaria parasites that infect humans, enter human red blood cells and evade the immune system. She identified novel host- pathogen interactions and examined their molecular and structural mechanisms to drive rational design of new vaccine candidates or diagnostics. These discoveries are evaluated in the context of immuno-epidemiological studies and global sequence diversity analyses. Her leadership and contributions in this field have culminated in a series of fundamental discoveries that changed our understanding of malaria biology and will ultimately lead to improved anti-malarial interventions.

In the last five years, her most impactful contribution to date has been the identification of novel vaccine and diagnostic targets for malaria, specifically in understanding the role of *Plasmodium*



vivax Reticulocyte Binding Protein (PvRBP) family in how malaria parasites enter human blood cells, as targets of immunity in malaria endemic regions and leading to their development in a serological biomarkers diagnostic assay to detect *P. vivax* infections. These breakthrough discoveries which were published in Science, Nature, Nature Medicine and PNAS together with 20 other papers significantly advanced our understanding of how *P.* vivax enter blood cells, identification a new vaccine candidate for *P. vivax* and led to the development of novel diagnostic program to detect *P. vivax* infections.

Her direct contribution to the field of P. vivax invasion is the use of structural biology approaches and the generation of recombinant proteins and antibody tools for the PvRBP family. Currently, there is still no long-term in vitro culture system for P. vivax, leading to challenges in understanding its biology using conventional molecular parasitology methods and genetic manipulation. Using recombinant PvRBP proteins, her work contributed to the identification of two new receptors for P. vivax invasion (Gruszczyk et al, Science 2018, Malleret et al., Nature Microbiology 2021), to the development and understanding of naturally occurring immunity in longitudinal cohorts in Thailand, Brazil, Cambodia and PNG, to the identification of PvRBP

as new potential vaccine targets for P. vivax and provided the first 17 crystal structures of this family of proteins. Her collection of antibodies against PvRBPs (mouse monoclonal, rabbit polyclonal and human antibodies) and recombinant PvRBP proteins have facilitated several discovery research programs in Plasmodium (Loy et al., PNAS 2018, Prajapati et al., Sci Reports 2019). She led collaborations with field site partners in Brazil, Thailand, India, Cambodia and PNG to understand the importance of the PvRBP family in naturally acquired immunity and to enable the first testing for anti-PvRBP antibodies to block invasion in multiple vivax endemic settings.

Red blood cell receptors for malaria parasite entry

Plasmodium vivax is the most widely distributed human malaria parasite and accounts for 13 million clinical cases per year and hundreds of million infections per year in the Americas, Central and Southeast Asia, as well as Africa. While it has significant impact on global health systems and can cause severe illness and death, only two P. vivax candidate vaccines have reached Phase I clinical trials, compared to 23 P. falciparum vaccine candidates. The updated Malaria Vaccine Technology Roadmap to 2030 recognizes the importance of *P. vivax* and calls for a vaccine to achieve at least 75% efficacy over two years.

BMM winner, Wai-Hong Tham



Wai-Hong's work focuses on the structural and molecular mechanisms utilized by *P. vivax* to invade reticulocytes, the young red blood cells specifically targeted during *P. vivax* infection. *P. vivax* invades reticulocytes using a family of adhesins displayed on the parasite surface, the *P. vivax* Reticulocyte Binding Proteins (PvRBPs). Her lab determined the first crystal structures of the red cell binding domain of the PvRBP family and defined the residues required for reticulocyte binding (Gruszczyk et al., PNAS 2016). Critically, she went on to identify the human binding partner for the PvRBP2b parasite adhesin, Transferrin

Receptor 1 (TfR1), which mediates an essential pathway of *P. vivax* reticulocyte entry, and determined that antibodies to PvRBP2b effectively block TfR1 binding and reticulocyte invasion (Gruszczyk et al., Science 2018). *P. vivax* only invades young red blood cells called reticulocytes. Her breakthrough discovery showed that Transferrin Receptor 1 (TfR1), present on reticulocytes, is a critical receptor for *P. vivax* invasion and binds to parasite ligand PvRBP2b. Her work rejuvenated the field of *P. vivax* invasion biology which has only worked on one receptor Duffy Antigen, for over two and a half decades. To further

define the P. vivax invasion complex and how the PvRBP2b -- TfR1 interaction may be inhibited therapeutically, her lab used cryo-electron microscopy to determine the structure of PvRBP2b in complex with TfR1, and crystallisation and solution studies to determine the mechanism by which mouse antibody binding to PvRBP2b prevents complex formation (Gruszczyk and Huang et al., Nature 2018). She has complemented this work with a detailed understanding of mechanisms of inhibition from naturally occurring human antibodies against PvRBP2b (Chan et al., Nature Comms 2021). This body of research has defined our understanding of P. vivax reticulocyte invasion, validated a novel strategy of vaccine development, and provided a framework for the rational design of an effective P. vivax vaccine.

Understanding natural acquired immunity in *P. vivax*

The main challenges for P. vivax vaccine candidate development are the lack of an in vitro culture system and the high genetic diversity in the global P. vivax population. These aspects impact the ease of functional validation and also necessitate the need to identify globally conserved epitopes that elicit neutralizing antibodies. To advance the pipeline of P. vivax novel vaccine candidates, Wai- Hong's research has active ongoing involvement in immunoepidemiological studies in different malaria transmission settings as well as the isolation and characterization of human monoclonal antibodies from developed during naturally acquired infection.

Her work maintains a strong focus on understanding malaria parasite proteins and their role in naturally-acquired immunity in different regions of varying P. vivax endemicity with 10 manuscripts in the last five years. In collaboration with Prof. Nguitragool (Mahidol University), she showed that pyrbp genes are transcriptionally active in field isolates and that PvRBP proteins are targets of naturally-acquired immunity in infected Thai individuals (Hietanen et al., 2015, Longley et al., 2017). In a separate study using a cohort of 264 young Papua New Guinean children, she observed that IgG1 and IgG3 levels against PvRBP1a and PvRBP2b are strongly associated with lower

BMM winner, Wai-Hong Tham



risk of clinical disease (Franca et al., 2016). In recent work, she used two longitudinal cohorts of over 1000 participants of all ages, in low transmission settings in Thailand and Brazil to understand if PvRBPs are targets of naturally acquired immunity and the roles they play in clinical immunity (He et al., PNTD 2019). She determined that antibody responses to PvRBP2b showed strong evidence of protective immunity against clinical episodes, independent of age and exposure, therefore highlighting the potential for PvRBP2b as a vaccine candidate and demonstrating it should be prioritized for further examination.

As a direct outcome on her work on Plasmodium vivax Reticulocyte binding Proteins (PvRBP) to advance the malaria elimination agenda, her collaborators are developing a field- deployable pointof-care and screening test to correctly identify people with the highest risk of recurrent P. vivax infections and to serve as a diagnostic tool to target the silent hypnozoite reservoir in serological screening and treatment. This development was based on serological studies that have identified a panel of vivax antigens which include the PvRBPs, as serological markers of previous infection. The panel includes the recombinant PvRBP proteins, in particular PvRBP2b, produced and functionally characterized by the Tham Lab. These antigens were identified through a combination of high-throughput screening

of over 300 potential vivax antigens in Thai and Brazilian patients followed by in-depth validation of candidate antigens in cohorts from Thailand, Brazil, Solomon Islands and Peru using a high-throughput, multiplexed Luminex bead array assay (Longley and White et al., Nature Medicine 2020). This led to a patented assay which predicts with a high degree of accuracy (>85% sensitivity & specificity) whether a person was infected with P. vivax parasites in the previous nine months. Led by Mueller lab and their collaborative partners, they are developing a field-deployable point-of-care and screening test to correctly identify people with the highest risk of recurrent P. vivax infections. This work will provide the first ever set of tools to efficiently targeting asymptomatic hypnozoite carriers, thus greatly facilitating malaria elimination in the Asia-Pacific and the Americas.

Professor Wai-Hong Tham is an exceptionally worthy winner of the Bancroft-Mackerras Medal.



Wai-Hong Tham @tham_lab gave a wonderful response on social media after being awarded her prize.

"Incredible to be awarded the 2023 Bancroft-Mackerras Medal @AS_Para for our work on *Plasmodium vivax* and how they enter into the youngest of human red cells - fun body of science spanning structural biology, immuno-epi and molecular parasitology #2023ASP #Malaria

@WEHI_research

Always a team effort! Our first research program when I started my lab @WEHI_ research in 2013 - huge thanks to the forever curious scientists who took on the risks of new projects and to our incredible collaborators and communities throughout the years @WEHI_Postdocs



My favourite image from our work - our discovery of Transferrin Receptor 1 hijacked as an entry receptor for P. vivax into young red cells by binding to parasite adhesin PvRBP2b - never get enough cryo-EM! #2023ASP #Malaria #StructuralBiology

@WEHI_research

@AS_Para



BMM winner, Wai-Hong Tham

Very excited to see the extension of our work on *P. vivax* parasite adhesins to a deeper understanding as targets of acquired immunity and a marker of prior vivax exposure and its potential in diagnostic applications

Longley, R.J., White, M.T., Takashima, E. et al. Development and validation of serological markers for detecting recent Plasmodium vivax infection. Nat Med 26, 741–749 (2020). <u>https://doi.org/10.1038/</u> <u>s41591-020-0841-4</u>

@rhea_longley

@michaelwhite_36





The third person from left is Jo Mackerras - dedicated parasitologist and entomologist and she studied the rat lung worm, cockroaches, #Malaria #Mosquitoes would have loved to meet her over dinner!

Who at #2023ASP can name the 12 images on the back of the medal?





Thank you to @WEHI_Director @CrabbBrendan for nominating me with Alan Cowman - this is my 20th year of science in which also marks my entry into wonderful world of #Parasites #Malaria & always grateful to collab Ivo Mueller who talked non-stop about P. vivax! #2023ASP @AS_Para

@WEHI_research"

Meet the ASP President

Danny Wilson was elected into the position of ASP President Elect at the 2022 ASP AGM in Cairns on 6 July 2022. At the 2023 ASP AGM, 6 September 2023, Danny took over the role of ASP President.

Danny, tell us a bit about yourself and about your background?

I have lived and worked in four Australian cities starting with then Northern Territory University in Darwin, QIMR in Brisbane, WEHI in Melbourne and now the University of Adelaide. I am originally from Darwin and prefer being outside when its sunny to being in front of a computer, so now I take my laptop outside and do both. I was always interested in science, but really found the pathway I wanted to pursue when I learnt about molecular biology at Uni.

Tell us how you became involved in parasitology?

My entry into parasitology came through working as a Research Assistant with Dr (now Prof) Katja Fisher at QIMR in Brisbane. Working with Katja, Prof Dave Kemp, Dr Deborah Holt and others, I got to apply and develop my interest in Molecular Biology across human/rodent malaria parasites and then the scabies mite as this program was established. I then moved to WEHI in Melbourne to undertake a PhD with Prof James Beeson and Prof Brendan Crabb. I was then lucky enough to undertake a PostDoc with Prof Alan Cowman at WEHI before moving to the University of Adelaide and establishing my own research into malaria and Toxoplasma with the support of collaborators such as Assoc Prof Ryan O'Handley and Prof Geoff McFadden.

What keeps you motivated as a parasitologist?

Working as part of a team, discovering new things that no one knew about before, killing parasites.



The Wilson Laboratory at the ASP Conference (above) and outgoing President Rebecca Traub handing over the batton to incoming President Danny Wilson (below).



How do you see your research developing in the future?

I would like to expand our capabilities in the new parasite models we are working in, establish new expertise in the lab and help students and EMCRs develop their careers.

What has been the highlight of your science career so far?

Working with my lab group and many great collaborators.



What aspects of your role as ASP President are you looking forward to the most?

Working with ASP Council and members to maintain a strong and engaged society that helps all stakeholders in the field, and in particular students and EMCRs.

Meet the ASP Treasurer

Hayley Bullen was elected into the position of Treasurer, at the last ASP AGM in Darwin on 6 September 2023.

After completing her Bachelor of Biomedical Science degree in 2006, Hayley went on to pursue her Honours and PhD degrees in the lab of Professor Brendan Crabb and Associate Professor Paul Gilson at the Walter and Eliza Hall Institute and later at the Burnet Institute. Her work centred on deciphering the roles of novel membrane protein complexes in the malaria parasite *Plasmodium falciparum*.

After completing her PhD studies, Hayley moved to the lab of Professor Dominique Soldati-Favre at the University of Geneva, Switzerland where she continued her research on model Apicomplexan parasite *Toxoplasma gondii*. Here she deciphered the signalling mechanisms underpinning a key step in the invasion process of *T. gondii*.

In late 2015 Hayley moved back to the Burnet Institute in the lab of Professor Brendan Crabb and Associate Professor Paul Gilson, whereupon she initiated antimalarial mechanism of action and resistance studies, and investigations into novel aspect of malaria protein export.

Outside of the lab, Hayley volunteers with Health Australia Tanzania, which seeks to support grass-roots charities in Tanzania in the delivery of health and hygiene-related projects. She also spends plenty of time at skateparks with her two sons.



ASP Treasurer, Dr Hayley Bullen

\$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 2024 prizes must be made by the eligible University to the ASP Treasurer by the 30th September 2024. Please complete the online application form:**

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

Meet the ASP Executive Secretary

Ghizal Siddiqui was elected into the position of Executive Secretary, at the last ASP AGM in Darwin on 6 September 2023.

Dr Ghizal Siddiqui's passion for parasitology was ignited during her studies at Monash University. She did her doctorate with Prof Brian Cooke, where she investigated the role of parasite kinases in phosphorylation and signalling of exported parasite proteins involved in parasites' pathogenesis. Using multiple gene editing approaches, she identified a subset of these kinases to be essential to the survival of the parasite during its development in the human red blood cell life cycle. During her PhD, she also received funding from the Australian Society of Parasitology (OzEMalaR) for a 6-month research exchange (\$5K) with Prof Andrew Tobin, Uni of Leicester UK, to characterise malaria parasite proteome and phosphoproteome. By the end of her PhD, her goal was to expand her proteomics-based techniques to include other branches of omicstechnologies, including metabolomics to answer questions around metabolic drivers that regulate protein expression and participate in protein binding, some of the key mechanism of action and resistance for current and novel antimalarials. As a result of this recognised expertise and passion in uncovering parasite biology by developing and deploying novel omics technologies, she was recruited by A/Prof Darren Creek (an international expert in metabolomics) as a postdoctoral researcher in 2016 at Monash Institute of Pharmaceutical Sciences (MIPS). Since the recruitment. she now has an established reputation in using integrated multi-omics (proteomics and metabolomics) to understand new and unique biological processes of the



parasite. She leads a multidisciplinary program that has identified new research directions (interrogating redox biology of the parasites), top quality publications (22 in multi-omics; and 17 in parasite biology), >\$1.1M of research funding in multiomics applications (head-hunted to lead the 'omics' aspects in category 1 grants), ~\$12.7K of awards (including opportunity

ASP Executive Secretary, Dr Ghizal Siddiqui

for research exchange, 6-month in UK and 1-month in Germany), and supervision of 4 PhD students and one PhD and 5 honours (all receiving H1) students to completion.

A History of Parasitology in Australia and Papua New Guinea. Authors: Beveridge, Ian and O'Donohue, Peter J.

If you would like a copy, please send your name and address to Maureen Engler ASP Secretariat maureen.engler@parasite.org.au Ph # 0488139155



Meet the ASP State Representative from Victoria

Lucas Huggins was elected into the position of Victoria State Representative at the last ASP AGM in Darwin on 6 September 2023.

Lucas is a Postdoctoral Fellow within the University of Melbourne Veterinary School. His current research focus is centred around the development of portable pan-pathogen diagnostics for companion animals with the overarching aim of safeguarding Australia against vector-borne disease bioincursions via the use of third-generation sequencing nanopore technology. Lucas has previously conducted a major research project exploring the vector-borne pathogens of community and stray dogs in Cambodia. This work has allowed him to design and develop numerous novel molecular diagnostic methods, whilst also assessing the effectiveness of chemopreventive products at protecting vitally important mine detection dogs from contracting vector-borne pathogens across Southeast Asia.



Lucas Huggins, University of Melbourne

Welcome to the ASP Fellows Representative

Robin Gasser was elected into the position of Fellows Representative at the last ASP AGM in Darwin on 6 September 2023.

Professor Robin Gasser is an eminent veterinary scientist at the University of Melbourne and ASP Fellow. His fundamental research has generated deep knowledge and understanding about the biology of parasites, their interactions with their hosts and the diseases they cause by applying and integrating a range of advanced technologies to explore their genomes and function. His achievements include the identification of a range of novel targets for antiparasitic drug development. He has used this extensive fundamental research to underpin the development of innovative methods for the diagnosis, treatment and control of socioeconomically important parasitic diseases of animals and humans for subsequent translation and commercialisation.



Meet the ASP State Representative from the Northern Territory

Kamil Braima was elected into the position of Northern Territory Representative, at the last ASP AGM in Darwin on 6 September 2023.

I am a Postdoctoral Molecular Scientist at Menzies School of Health Research in Darwin, NT. My first exposure to the ASP was attending the 2015 ASP Concepts in Parasitology (CIP) course in Kioloa Coastal Campus, ANU, and I have been an ASP member since the start of my PhD in 2017 at Murdoch University, Perth, Western Australia.

I have held diverse research roles in both zoonotic and human parasitology-related research, from investigating human gut microbiota to the identification and genotyping of medically important parasites. My current research is mainly focused on molecular diagnostics of the malaria parasite species *Plasmodium knowlesi* - contributing to the improvement and development of new diagnostic assays.

Beyond research, I have been actively involved in public engagement and capacity building, providing laboratory training and expertise domestically and internationally. I look forward to being the next ASP NT representative.

ASP members in the Northern Territory please email me (kamil.braima@menzies. edu.au) with any queries.



Kamil Braima, Menzies School of Health Research

Parasites in the Pacific 26 - 29 August 2024

Parasites in the Pacific 2024 will be held at the University of Auckland, New Zealand, from Monday August 26 to Thursday August 29, 2024, inclusive, and will encompass a range of exciting modern themes and invited speakers. It will be held in conjunction with the annual Conferences of the Australian (ASP) and the New Zealand (NZSP) Societies for Parasitology and also the 7th International **Conference on Anaerobic** Protists (ICAP2024).

We anticipate that around 300 scientists will meet in Auckland for Parasites in the Pacific 2024 to discuss the latest research and state-of-the-art technologies in parasitology. The program will include an outstanding mix of quality Australian, New Zealand and international scientists.

Parasites in the Pacific 2024 embraces the values of inclusiveness, social justice, environmental sustainability, scientific advancement, and education within the broader life science community. The following report indicates how Parasites in the Pacific 2024, and its partners, support these core values.

Scientific advancement

The scientific program will cover all parasitology themes from Veterinary Parasitology to Human Parasitology, with Anaerobic Protists, Malaria, Strongyloides, Bioinformatics, Microscopy, Livestock, Wildlife Parasitology, Fish Parasitology, Companion Animals and One Health. The program covers all aspects of parasitology research and that includes basic research in all areas of life science. Our confirmed Invited Speakers are:

Dr Carmen Faso, University of Bern, Switzerland, International Journal for Parasitology Lecturer, Elsevier Parasitology Lecture Series.

Dr Ralph Vanstreels, Institute of Research and Rehabilitation of Marine Animals, Espírito Santo, Brazil, and University of California, Davis, IJP: Parasites and Wildlife Lecturer, Elsevier Parasitology Lecture Series.

Prof Raina Fichorova, Professor of Obstetrics, Gynecology and Reproductive Biology, Harvard Medical School, Plenary Lecturer for the 7th International Conference on Anaerobic Protists.

Prof Upinder Singh, Stanford University, USA Plenary Lecturer for the 7th International Conference on Anaerobic Protists.

More than 50% of the delegates are early career researchers/students, and every abstract will be delivered as an oral presentation, giving ECRs wonderful exposure to an international audience. To ensure there is no bias in the selection of talk length in the program all identifiable data will be removed so the organising committee can assess the talks based solely on the quality of abstract submitted. The program will include events and workshops to help mentor early career researchers.

Environmental impact

Parasites in the Pacific 2024 aims to keep our impact on the environment as low as possible. We will minimise printing and use of plastics including name tags. The Conference abstract booklet will not be printed but, rather, will be available electronically to download; it will also be available on the Conference app and Conftool website. Food choices are selected to reduce food mileage, use local produce, and the venue, Waipapa Taumata Rau University of Auckland has a long history of energy and water efficiency, as well as waste reduction and has a commitment to achieve net-zero carbon status through carbon emissions inventory aligned with the latest international standards ISO14064-1:2018.

Inclusivity

The Parasites in the Pacific 2024 Conference Organising Committee recognises the importance of participation by indigenous researchers from around the world, people with disability, people from diverse cultural and linguistic backgrounds, parasitologists of all ages and career stages and LGBQTI+ people. The committee is also committed to achieving gender equality at this event. We value the wealth of talent, creativity and discoveries achieved by women in the fields of tropical medicine and parasitology. We acknowledge that women continue to be underrepresented in the fields, particularly at senior levels, and in the diverse countries that constitute attendance at the congress. This goal of gender equality in our discipline is vitally important for two reasons. The first reason relates to the science we conduct. We recognise that women are under-represented at congresses, both in invitations to speak and in participation. Thus, the important contributions and discoveries made by a significant portion of our community remain under-recognised. Secondly, it is understood that career development in the sciences is driven, not only by publication output, but also by prestige measures, such as active and invited participation in scientific conferences. Equal representation at conferences is thus important for women to thrive and develop in their careers.

To support researchers with families there will be a parent's room available for delegates to use during the conference. This will have the conference presentations live streamed into the room for parents/ carers to watch with their children alongside them.

There will be a multi-faith prayer room available for delegates to use during the conference.

We also want Parasites in the Pacific 2024 to be a safe, happy and enjoyable conference for all, at the same time acknowledging that, unfortunately, discrimination and harassment can still occur at scientific events. Therefore, we will have a strict Code of Conduct to create a safe space for all our conference delegates and will not tolerate discrimination or harassment of any kind.

#2023ASP Annual Conference

The 2023 ASP Conference featured an outstanding mix of quality international and Australian scientists. The scientific program covered all parasitology themes from Veterinary Parasitology to Human Parasitology, with Malaria, Strongyloides, Bioinformatics, Microscopy, Livestock, Wildlife Parasitology, Companion Animals and a One Health focus.

We would like to acknowledge the generous support of our 2023 ASP conference sponsors, thanks to Elsevier Parasitology and the International Journal for Parasitology (IJP), IJP DDR and IJP PAW, Virbac, Vetoquinol, Elanco, New England Biolabs and Southern Cross Diagnostics.

The 2023 ASP Annual Conference took place September 5 – 8, at Double Tree by Hilton Esplanade Darwin, NT. This was run as a hybrid event allowing 19 delegates and speakers to participate and present remotely through Zoom if they were unable to attend the conference in person. The 2023 ASP Conference attracted 214 conference delegates with 168 abstracts submitted, 36 invited speaker abstracts and 132 contributed abstracts (77 abstracts were presented by early career researchers).

The Larrakia or 'Saltwater' people are the traditional owners of the land in and surrounding Darwin as well as the area around Darwin Harbour, the land on which this meeting took place. Our conference logo was created by Aboriginal artist based in Darwin, Jayde Hopkins. Jayde is a proud Gurindji and Woolwonga woman born and raised in the NT who is also studying a Bachelor of Biological Sciences to become



Our conference logo was created by Aboriginal artist based in Darwin, Jayde Hopkins

an infectious disease researcher.

ASP Conferences and events embrace the values of inclusiveness, social justice, environmental sustainability, scientific advancement, and education within the broader life science community.

Our 2023 ASP Conference Invited Speakers

- Professor Banchob Sripa, (Tropical Disease Research Center, Khon Kaen University, Thailand) Elsevier One Health Workshop Plenary Lecturer
- Professor Colleen Lau, (School of Public Health, The University of Queensland) Elsevier One Health Workshop Plenary Lecturer

• Elsevier Plenary Lecturer: Associate Professor Matthew Grigg (Menzies School of Health Research, NT) IJP Invited Plenary Lecturer • Professor Wai-Hong Tham, Walter and Eliza Hall Institute, 2023 Bancroft-Mackerras Medal for Excellence Winner

- Dr Rintis Noviyanti, (Eijkman Institute for Molecular Biology in Jakarta, Indonesia & BRIN)
- Elsevier Plenary Lecturer: Professor Tomáš Scholz (Institute of Parasitology, Biology Centre of the Czech Academy of Sciences, Czech Republic) IJP:PAW Invited Plenary Lecturer
- Associate Professor Melanie Rug (Australian National University)
- Dr Rachel Korman Invited Speaker sponsored by Vetoquinol
- Professor Alexander Maier, (Australian National University)
- Dr Wendy Page (Strongyloides Australia and 2021 Northern Territory Australian of

2023 ASP Conference

• Elsevier Plenary Lecturer: Professor Jacquin C. Niles, (MIT Center for Environmental Health Sciences, MIT Department of Biological Engineering, U.S.A.) IJP:DDR Invited Plenary Lecturer

• Professor Ala Tabor, (QAAFI Centre for Animal Science, University of Queensland) Livestock Parasitology Invited Speaker sponsored by Virbac

- Professor Zeno Bisoffi, (IRCCS Ospedale Sacro Cuore Don Calabria, Italy) Strongyloides Workshop Plenary Lecturer
- Associate Professor Sarah Auburn, (Menzies School of Health Research)
- Professor Rebecca Traub, Invited speaker sponsored by Elanco

• Amy Kirke, Fisheries Research Scientist with Northern Territory Government, PhD candidate with Charles Darwin University.

This year's conference had a strong One Health and Tropical Medicine theme with a One Health workshop sponsored by Elsevier, "A deep dive into One Health approaches and practices in parasitology", dedicated to the late Prof Don McManus. As part of this workshop, the ASP Disadvantaged Researcher Fund and the Australian Centre for International Agricultural Research (ACIAR) sponsored four early-career academics to participate from Vietnam, Malaysia, Laos PDR and Ukraine.

"Attending the One Health Conference provides a unique opportunity to learn about the latest advancements and research in the field of One Health, which focuses on the interconnectedness of human, animal, and environmental health. This allows me to gain valuable insights and knowledge that can be applied to my own work and research." ASP Conference delegate

ASP Affiliate Strongyloides Australia hosted a Stronglyoides workshop on the 'most neglected of neglected tropical diseases' at the 2023 ASP Annual Conference. Community members attending the conference had their registration cost sponsored by Southern Cross Diagnostics.

"It was amazing to visit Darwin. The



Virbac

Elanco







A huge thanks to our 2023 ASP Conference sponsors!

networking at the Strongyloides workshop was excellent. The presentation from Zeno Bisoffi was wonderful and finding out the story about the Gotthard Tunnel anaemia was a real highlight for me!" ASP Conference delegate

Three Bioinformatics workshops took place, organised by JD Smyth and Travel Awards recipients Maree Widdicombe (RMIT) and Clarisse Louvard (RMIT) in collaboration with Dr Jacob Westaway (Menzies School

of Health Research) with assistance from Ashton Kelly. The team delivered three workshops for a total of 79 participants.

This year we had 85 students at the ASP conference. Students and Early Career Researchers (ECRs) were invited to an ECR student breakfast event organized and hosted by the ASP Student Representative, Jill Chmielewski. Jill coordinated this event with a team of mentors, Dale Seaton; Brian Cooke; Andy Thompson; Kevin Saliba;

2023 ASP Conference

Mal Jones; Christian Doerig; Una Ryan; Ala Tabor; Amanda Ash; Tomas Scholz; Kate Miller; Sarah Preston. It took place on the first morning of the conference, Wednesday 6th September 700am – 830am with the theme "publishing your research". 100 participants attended this workshop.

Early Career Researcher Workshop participants said they really liked:

"Discussion, Food."

"Nice and relevant choice of questions for the discussion groups"

"The roundtable discussions were a good idea"

"I got more ideas on publishing a paper and writing grant applications etc."

"Enjoyed the structured conversations at the tables with mentors."

"ECR participation"

"It was great to meet students and talk about research issues in publishing"

"Our mentor was very knowledgeable and willing to share his opinion."

"Feedback and contributions from people"

"Each table had a mentor to discuss publishing process"

"Good for networking"

"Discussion with editors"

"Topics discussed and also the discussion and insights given by the students/experts"

"Getting to interact with experts from the publisher"

"Sharing of relevant experiences, with a focus on publications"

"Issues pertaining to publishing are relevant to every scientist."

"Motivation to publish good quality paper"

"I enjoyed the networking and engagement of conversations with others, particularly PhD students just starting out."

The ASP celebrates excellence through our ASP Student Prizes and congratulations to our ASP Student Prize Winners from the 2023 ASP Annual Conference, 5-8 September, Darwin, pictured right from top. **Capella Maguire, Australian National University** "Investigating the role of mitochondrial dehydrogenases in Toxoplasma gondii" won Best 15 Minute Talk presented by a student; Sophie Collier, University of Melbourne "Investigating organellar inheritance of the apicoplast and mitochondrion in Plasmodium berghei" won Best 5 Minute Talk presented by a student; Maxine Smith, James Cook University "A potential helminth-derived therapeutic for early life inflammatory bowel disease" won Best 3 Minute Talk presented by a student; Tana Sukee, The University of Melbourne "The nematode family Cloacinidae (Strongyloidea), parasites of Australasian kangaroos, wallabies and wombats: from morphology and ecology to molecules" won Runner-up 15 Minute Talk presented by a student; Emily Francis, The University of Sydney "A mixed amplicon metabarcoding and sequencing approach for surveillance of drug resistance to levamisole and benzimidazole in Haemonchus spp." won Runner-up 5 Minute Talk presented by a student; and Connor McHugh, James Cook University "Necator americanus recombinant proteins as novel type 2 diabetes therapeutics", won Runner-up 3 Minute Talk presented by a student.

The ASP awarded 72 ASP students 2023 ASP Student Conference Travel Grants with travel funding reimbursing 70% of estimated costs. The total funding allocated was \$107,928.

Our extraordinary Welcome to Country ceremony was delivered by The Youth Mill. <u>https://theyouthmill.com.au/</u>

We purchased lanyards and tshirts through AusDesigns, an employer of people with disabilities in the Darwin region of the Northern Territory. The unique designs



2023 ASP Conference student prize winners













2023 ASP Conference

were created by local Indigenous people and reflect their communities of origin. https://www.helpingpeopleachieve.com.au/ ausdesigns/

Our public outreach event this year was co-hosted by Inspiring NT "Through the wormhole? Larvae's all you need" held at Bustard Town on Thursday 7th 630pm compared by our own parasitology comedian, Michelle Power and joined by Jessica Hoopes, Mal Jones and Rina Fu. https://www.parasite.org.au/blog/throughthe-wormhole-larvaes-all-you-need-publicoutreach-event-darwin/

There was a parents/carers and children room during the conference separate from the lecture theatre so that parents/carers could watch and listen to the conference presentations live. A multi-faith room was available for delegates to use. The conference venue is fully accessible for delegates who require lift access.

The ASP aims to keep our impact on the environment as low as possible through the ASP Meeting by minimizing printing and plastics. The Conference lanyard is reusable, made of material with local indigenous artwork as the design, we used card for the nametags, the Conference abstract booklet was available electronically. Food choices are selected to reduce food mileage, use local produce, the conference venue (Hilton) uses Lightstay system to measure environmental impact, has set sciencebased carbon targets aligned with climate science and the Paris Climate Agreement, and approved by the Science Based Targets initiative (SBTi).

The ASP supports multiculturalism and antidiscrimination including non-discrimination on the basis of gender, sexual orientation, race, religion or disability. The ASP is an inclusive organisation. The ASP recognises the importance of participation by Aboriginal and Torres Strait Islanders and welcomes all Aboriginal and Torres Strait Islanders and all indigenous researchers from all countries. We encourage participation from people with disability, people from diverse cultural and linguistic backgrounds, parasitologists of all ages and career stages and LGBQTI+ people. The Society is committed to achieving gender equality across all its Committees and



2023 ASP Conference fabulous volunteer team! Ellen Ploeger, Ashton Kelly, Keng Heng Lai, Emma Mao, Connor McHugh and Maxine Smith.

represented in awards, prizes and at events. Conference organising committee:

Conference Co-Chairs

Deborah Holt, Charles Darwin University

Steven Kho, Menzies School of Health Research

Conference Organising Committee

Kamil Braima, Menzies School of Health Research

Jacob Westaway, Menzies School of Health Research

Katrina MacMahon, Menzies School of Health Research

Benedikt Ley, Menzies School of Health Research

Danny Wilson, The University of Adelaide

Nick Smith, Australian Society for Parasitology

Amazing Volunteers

Ashton Kelly, University of Queensland Connor McHugh, James Cook University Maxine Smith, James Cook University Keng Heng Lai, The University of Adelaide Emma Mao, The University of Adelaide Ellen Ploeger, Burnet Institute



The last word!

What did delegates enjoy about the 2023 ASP Conference?

Conference delegates especially loved the networking opportunities and the scientific program at the 2023 ASP Conference and made the following comments:

"I enjoyed the opportunity to learn from and network with other professionals in my field."

"ASP is one, if not the, outstanding conferences in parasitology. Always a

2023 ASP Student Prize Winners interviews

A word from the wise....

Capella Maguire, Australian National University "Investigating the role of mitochondrial dehydrogenases in Toxoplasma gondii" won Best 15 Minute Talk presented by a student;

Please tell us about your research.

My PhD project is focused on mitochondrial metabolism in the apicomplexan parasite, *Toxoplasma gondii*. Currently, I am investigating the importance and role of the TCA cycle as well as the mitochondrial dehydrogenases that feed the electron transport chain in the parasite. To functionally characterise key enzymes in these metabolic pathways, I use a combination of forward and reverse genetics as well as physiological and metabolomic analyses.

What did you particularly enjoy about attending the 2023 ASP Conference in Darwin?

I really enjoyed the large variety of presentations at the conference with topics ranging from fundamental biology through to public health approaches and outreach strategies. I certainly learnt a lot! There were also excellent opportunities to network with other researchers and I enjoyed the fun social events which enabled me to meet students from across Australia.

What advice would you give to other ASP Student members who may be at the beginning of their PhD journey?

If you are a first year PhD student, it can be helpful to start with a relatively broad project as this will allow you to identify the most interesting directions to take for the remainder of your PhD journey. It is important to keep up to date with the relevant literature, develop good organisational skills, pace yourself within a healthy work-life balance, and build a strong support network. Overall, stay curious and enjoy the PhD experience!



Capella Maguire with colleagues enjoying Darwin at the ASP Confrence,

2023 ASP Student Prize Winners interviews

Sophie Collier, University of Melbourne

"Investigating organellar inheritance of the apicoplast and mitochondrion in Plasmodium berghei" won Best 5 Minute Talk presented by a student;

Please tell us about your research.

My research project is focused on understanding how organellar inheritance of the apicoplast and mitochondrion is achieved in *Plasmodium* parasites. Plasmodium harbour a single mitochondrion and a single relict plastid (apicoplast) throughout their life cycle. Both organelles are essential and are used as drug targets. Previous genetic cross studies indicated that both organelles are maternally inherited during sexual reproduction, but the mechanisms underpinning such uniparental inheritance were unknown. To investigate organellar inheritance in a sex-specific manner, I constructed and observed P. berghei lines with fluorescently tagged apicoplasts and mitochondria using static and livecell microscopy techniques. Using digital droplet PCR, I also investigated whether the organellar genome is degraded prior to the exclusion of these organelles from the male microgamete. Maternal inheritance systems sometimes fail-a bit of 'Adam' mitochondrial DNA occasionally gets through in humans for instance. To test whether paternal leakage occurs in malaria parasites, I am force-crossing single sex lines of *P. berghei* with a selectable polymorphism in the mitochondrial genome of the male parent. This experiment will elucidate the frequency of paternal leakage in Plasmodium and will inform us as to whether drug resistance encoded by the mitochondrial genome can be inherited from the male parent in malaria parasites. Overall, this work will better inform future therapeutic strategies targeting mitochondria and apicoplasts, improve our understanding of how organelle-encoded resistance mutations are transmitted and optimise malaria treatments targeting these important organelles.

What did you particularly enjoy about attending the 2023 ASP Conference in Darwin?

I really loved that the ASP conference was such a student-friendly and supportive environment. It was exciting to see so many wonderful talks from Honours, Masters and PhD students at different stages of their research projects. As a late-stage PhD student, it was also a fantastic opportunity to speak to early career researchers and to hear their perspectives and advice regarding life and building a career beyond your PhD. One thing I particularly enjoyed about ASP was the diversity of topics and parasites that are researched around Australia (and beyond). It was fascinating to hear about the research happening outside of Plasmodium and helped me to think about my own research project through different perspectives.

What advice would you give to other ASP Student members who may be attending their first ASP Conference in Auckland next year?

Don't be afraid to ask questions or speak to others attending the conference. Whilst daunting, everyone is really friendly and there is a wonderful sense of community and collaboration regardless of the parasite you are working with.

Maxine Smith, James Cook University

"A potential helminth-derived therapeutic for early life inflammatory bowel disease" won Best 3 Minute Talk presented by a student;

Please tell us about your research.

My research focuses on the differences in intestinal immune cells between early life and adults. A growing concern amongst younger cohorts is inflammatory bowel disease, with case numbers increasing drastically over the last decade. I am utilising individual hookworm-derived recombinant proteins as potential therapeutics for paediatric inflammatory bowel disease.

What did you particularly enjoy about attending the 2023 ASP Conference in Darwin?

ASP provides a fantastic opportunity to learn about various parasites and network with other students and postdocs. The atmosphere is very welcoming, and an amazing conference for early career researchers.

That was quite a challenge to win the best 3 min talk at the conference - what advice would you give to other ASP Student members who have to prepare a short (3 minute in your case) talk at a conference?

I will try to include only a few data slides when preparing for a short talk. Adding too much data into a short period of time can cause you to rush through it and can confuse the audience. It's best to add less and take your time.

2023 ASP Conference

pleasure to attend and meet others."

"Discussions with people working on different research fields was quite enriching."

"I thought that it was an extremely wellrun meeting with a host of excellent speakers."

"It was my first experience with ASP and I enjoyed participating."

"It was very enjoyable and really good discussion. I've never been to such a multidisciplinary gathering."

"In person networking with colleagues. Friendly atmosphere. Supportive, enjoyable for new and seasoned attendees. Outreach session was great."

"Excellent conference. Friendly and relaxed, with great networking opportunities."

"Thank you for such an amazing conference! Also the welcome to country was fantastic and I thoroughly enjoyed it."

"Really lovely conference; thanks to everyone who contributed to making it great"

"Great science in a friendly atmosphere"

"Meeting interesting people; excellent organisation; very good meals; venue."

"Networking with bunch of nice researchers"

"Well organised, a great venue and some excellent talks."

"Variety of parasitological fields of expertise"

"Exchange the idea to improve my current work."

"Be there in person and having the oportunity to meet good long time friends and met with new, esp. the young upcoming scientists/ students."

"New connections with people from different projects."

"Gain more update knowledge and networking"

"The networking and mentoring of students"

"Diversity of topics"

"Meeting new people and initiating collaborations"

"Industry-related talks."

"Great program, good location, social events really helped me network"

"The broad scope of fields within parasitology that were presented on."

"Networking, catching up with people, utilising the 'parasitology network' having chat's aside the work related topics, getting to know new people."

"The variety of topics discussed. Also, as a student, I felt the sense of belonging being the ASP 2023 was my first Parasitology conference."

"Networking at the social events. Also really liked the workshops"

See you in Auckland, New Zealand in 2024!





2023 ASP Conference



2023 ASP Conference



2023 ASP Conference



2023 ASP Conference



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2023 Concepts in Parasitology Course

ASP CiP Course Convenors, Stuart Ralph and Michelle Power have just wrapped up another highly successful two-week course at UQ's Moreton Bay Research Station offering students a unique opportunity to work with prominent Australian parasitologists and learn state-ofthe-art research techniques.

The Concepts in Parasitology (CiP) course took place between Saturday 25th November and Friday 8th December 2023. CiP offers early career researchers and students a unique opportunity to learn cell-biology, immunological, imaging, biochemical, bioinformatic and genetic techniques for parasitology research. The objective of the course is to provide a comparative overview of the most important topics in parasitology, equipping early career researchers with the conceptual framework, technological know-how and skills to meet the challenges of the future. Building on the strength of the Australian parasitological community, world-experts across a wide range of disciplines shared their knowledge and insights with participants.

https://www.parasite.org.au/education/concepts-in-parasitology/

This year four early career researchers were sponsored to attend CiP as part of the ASP's Disadvantaged Researcher Award Scheme and we profiled them for this newsletter.



Brian Bartilol

I am a Kenyan parasitologist, focusing on the transmission dynamics of malaria and lymphatic filariasis, as well as developing novel control strategies against Anopheline vectors. Additionally, I am a graduate student pursuing a master's in parasitology, with my thesis focused on unraveling the transcriptomics of sand fleas. I am eager about the upcoming ASP Concepts in Parasitology course, facilitated by prominent and experienced Australian parasitologists at the state-of-the-art facility, Moreton Bay Research Station. Over the two weeks, my goal is to acquire comprehensive knowledge and skills in all realms of parasitology. Studying alongside individuals from diverse backgrounds, races, and nationalities will further enable me to broaden my horizons.



Aires, Argentina. I got my degree in

of Quilmes. I have studied biofilm

the first line of pharmacotherapy,

bioavailability, etc. I believe CiP is an

in nature. I am really looking forward to

learning more about different parasites,

knowing other students and professors

research involving different aspects of the

life, learning more about drug discovery,

getting hands-on experience in the drug

efficacy practices, and mostly to having

you so much for this once-in-a-lifetime

opportunity.

fun hand in hand with our curiosity. Thank

field of parasitology, observing local marine

participating in the course and their

properties such as distribution,

Ramayana Brito

Giuliana Muraca I am Giuliana from Berazategui, Buenos I am Ramayana Brito, a biologist from Brazil immersed in the fascinating world of Biotechnology from the National University Parasitology. Holding a Master's degree in Parasitary Biology from the Universidade eradication for my undergraduate thesis, Federal do Rio Grande do Norte and a and recently moved on to study Chagas Ph.D. in Parasitology from the Universidade disease treatment while doing my PhD Federal de Minas Gerais (UFMG), my thesis at the National University of La Plata. research has primarily focused on the We study nanopharmaceutical carriers host-parasite relationship, particularly with for the treatment of Chagas disease, a Toxoplasma gondii and Plasmodium. protozoan-born disease endemic in our During my Master's, I explored the region, hoping to improve benznidazole,

impact of chronic T. gondii infection on the structure of perineuronal nets in the cortex of infected mice. In my Ph.D., I extended my focus to atypical strains of Toxoplasma, analysing their impact on immune responses in the brain and lungs, specifically studying resident macrophages. As a Post-doctoral researcher at the Laboratory of Immunobiology and Control of Parasites at the UFMG, supervised by Dr. Lilian Bueno and Dr. Ricardo Fujiwara, my current work expands to various parasites and their interaction with the host's immune system. I'm actively involved in the search for and immunological evaluation of new vaccine candidates against Plasmodium vivax and Leishmania. Driven by a passion for uncovering the complexities of parasitic

amazing opportunity to keep discovering all the different ways parasites have to survive

EDUCATION

2023 Concepts in Parasitology Course

life cycles and their impact on the host, I am committed to contributing to scientific knowledge in the field of parasitology.

Embarking on the "Concepts in Parasitology" course by the Australian Society for Parasitology, I am enthusiastic about the opportunity to delve into advanced concepts and developments within the field. Building on my background in the host-parasite relationship, I expect the course to deepen my knowledge of diverse parasitic organisms and their interactions with hosts and the environment. Eager to refine both theoretical knowledge and practical skills, I anticipate engaging discussions with colleagues and learning from experienced researchers. My overarching goal is to deepen my expertise, stay informed about global trends in parasitology research, and foster collaborative connections within the scientific community.



Onyiche Emmanuel ThankGod

Having attended Veterinary School in Nigeria, I graduated as a Doctor of Veterinary Medicine (DVM) from the University of Maiduguri, Borno State in 2010. After one year of practice, I went further to complete additional degrees including Master's and Doctorate in Veterinary Parasitology from the University of Ibadan, Nigeria and North-West University, South Africa respectively. My Ph.D. advisor was Prof. Oriel Thekisoe, a renowned South Africa Parasitologist. During my Ph.D., I was a visiting doctoral researcher at the Friedrich Loeffler's Institut, Germany and National Research Center for Protozoan Disease, Obihiro University of Agriculture and Veterinary Medicine, Japan. I began my Research career in January, 2015, as a Research Officer with the Foremost, National Veterinary Research Institute, Vom Nigeria, which is a wellknown institute that has pioneer numerous research on animal diseases and the

production of vaccines and other biologicals of Veterinary Importance. Towards the end of the year 2015, I took up another appointment as a Lecturer II with the University of Maiduguri, Nigeria and has risen through the ranks to become a Senior Lecturer in 2020. Currently, I am the Head of Department, Veterinary Parasitology and Entomology in the same institution. I have won several academic prizes both as an undergraduate and postgraduate student. In 2020, I was awarded the Senior WO Neitz Medal for the best PhD thesis with focus in Parasitology in South Africa by the Parasitological Society of Southern Africa (PARSA) and in the following year in 2021, I also got the Sinnecker-Kunz Prize, which is an international Award for early career researcher undertaking research in Ticks and Tick-Borne Diseases by the German Society for Parasitology. As I prepare to attend the CIP course, I am excited about the prospects of meeting the resource-rich Faculty members and course participants, with the latter which I understand was drawn widely across Australia and other parts of the world. Also, I have little hands on experience and insight on aquatic parasitology and parasites of wildlife, so I believe that this course will give me the much-needed impetus to venture into this new and exciting areas in the nearest future. Lastly, I thank the Australia Society of Parasitology for the funding and opportunity partake in the Concept in Parasitology Course.



CiP 2023 in images



www.parasite.org.au

2023 Concepts in Parasitology Course

CiP 2023 in images supplied by course participants



ASP Seminar Series



Our recent ASP Online Seminars featured Doris Pierce, James Cook University, Gemma Zerna, LaTrobe University, Maddy Ray, Charles Sturt University, and Aya Taki, The University of Melbourne.

Our online ASP Seminar Series on 11 August featured Doris Pierce, James Cook University, presenting "Experimental hookworm infection in humans with metabolic disease: A Phase 1b trial" and Gemma Zerna, LaTrobe University, presenting "Enhancing Liver Fluke Therapeutic Efficacy Through Vaccine Formulation" with co-chairs Jill Chmielewski, University of Adelaide, and Stuart Ralph, University of Melbourne.

Doris completed a Bachelor of Sport and Exercise Science (Hons) at JCU, with her Honours project investigating the effect of different exercise modes on acute arterial stiffness responses, an indicator of future cardiovascular disease. Changing direction, her PhD (also with JCU) revolved around the Worms and Metabolism (WAM) clinical trial that proposed an innovative approach to diabetes prevention, using human hookworms to improve insulin resistance in humans with metabolic disease. Doris found the idea that something so maligned as intestinal parasites could turn out as a possible prevention of one of today's most insidious diseases fascinating and is very grateful her supervisors gave her the chance to be involved in this project, given her very different undergraduate background. Some of you may have heard Doris talk about this trial's protocol during the 2018 ASP conference in Melbourne, and today, Doris will present some results.

Gemma has recently completed her PhD project that aimed to develop a vaccine to negate the effects of liver fluke, an internal parasite that reduces welfare and the production of cattle, sheep and goats. Her key PhD focus was on vaccine formulation and developing novel ways to deliver parasite antigens to the host immune system to stimulate an optimal response.

Gemma is now a Postdoc scientist with a similar research focus on improving animal health via vaccine development and investigating immune system pathways. Improving animal health and on-farm productivity is a major interest and she has been able to pursue this passion within the Beddoe and Spithill laboratories, which focus on livestock-pathogen interactions and biochemistry in the Department of Animal, Plant and Soil Science within the Centre of Agribiosciences (AgriBio).

Alongside my scientific research Gemma is also Subject Coordinator for Animal Science subjects delivered at La Trobe University.

Our online ASP Seminar Series on 17 November featured Maddy Ray, Charles Sturt University, presenting "Parasites of Australian Native Ducks" and Aya Taki, The University of Melbourne presenting "Advancing anthelmintic discovery with high-throughout screening – 'from hit to target'" with co-chairs Jill Chmielewski, University of Adelaide, and Stuart Ralph, University of Melbourne.

Madeleine (Maddy) Ray completed a Bachelor of animal science with first class honours in 2020 with the School of

EDUCATION

ASP Seminar Series continued









Above: Our seminar speakers (from L-R) Doris Pierce, James Cook University, Gemma Zerna, LaTrobe University, Maddy Ray, Charles Sturt University, and Aya Taki, The University of Melbourne.

Agricultural, Environmental and Veterinary Sciences at Charles Sturt University. The project produced a systematic review of the history of parasitology in Australian native water birds, with special interest in duck species. Due to her passion for animal health, Maddy began her PhD, with Charles Sturt University and is currently in her third year. Her research focuses on the parasites of Australian native ducks using both traditional morphological and modern molecular techniques to identify parasite species. Though her research, Maddy is keen to find out how these parasites impact host health along with their potential for zoonosis.

As we are aware parasites are everywhere, however they are severely neglected in Australia, especially when we look at the knowledge of parasites surrounding our native wildlife species particularly our native birds. Waterbirds are of a key interest due to their use of both terrestrial and aquatic environments for survival. By using both types of environments these birds are exposed to a much higher diversity of parasites to say birds that are purely terrestrial. Not only is their use of environment influential but also the behaviours in which they exhibit can also have a great impact on parasites exposure. There is currently a very large gap in knowledge of almost 50 years with many of the traditional repots only being able to identify parasites to the family or genus level. The development of molecular technologies in recent years has resulted in a more in depth understanding of parasites and how they interact with their hosts. Parasites obviously do not only affect animal hosts, but many are zoonotic in nature and result in varying levels of disease in humans. So far, my research has found several parasites that have a potential to be zoonotic along with being of economic significance to the agricultural, particularly the poultry industry.

Aya is a research fellow in Robin Gasser's lab at the University of Melbourne. Her PhD at RMIT University focused on a novel method for delivering antigens, using a nanoparticle template to create proteinbased nanocapsules for vaccines targeting pathogens like malaria parasites. Prior to her PhD, Aya earned her BSc (Honours) at RMIT, characterising malarial proteins as potential vaccine candidates.

In her postdoctoral journey, she has taken on diverse roles, from developing a nanocapsule vaccine for Helicobacter pylori at RMIT, advancing food allergy diagnosis and conducting clinical studies at James Cook University to structural characterisation of allergens at synchrotron. She also explored the therapeutic potential of algae-derived compounds for gut inflammatory diseases through an industry collaboration.

Currently, Aya is leading efforts in anthelmintic discovery and development. Her team, through public-private partnerships, has screened over 250,000 compounds in the last four years since the establishment of a new high-throughput screening platform, resulting in the discovery of synthetic and natural-derived "hit" compounds with selective activity against parasitic worms. Her presentation will showcase the phenotypic screening platform using nematode of parasitic (Haemonchus contortus) and free-living (Caenorhabditis elegans), and her success in identifying anthelmintic compounds.

Our ASP Online Seminar Series image is created by Thorey Jonsdottir.

Email secretary@parasite.org.au with ideas for speakers, themes or chairs for future ASP Seminar Series presentations.

Parasites at The Beaker Street Festival

Report on ASP Outreach Event in Tasmania.

Beaker Street Festival is an annual celebration of science and art in lutruwita/ Tasmania and it is one of Australia's premier National Science Week events, which aims into bringing the public, particularly those not that interested in science and science together. As a part of this event, 3 Tasmanian ASP members: Dr Nick Fountain-Jones, PhD candidate Elise Ringwaldt and Prof Barbara Nowak joined the Roving Scientists and talked about parasites and parasitology to the public on Friday 4 & Saturday 5 August at The Beaker Street Festival Hub at the Tasmanian Museum and Art Gallery in a popup science bar, which included a parlour of curiosities such as wildlife and fish parasites. The Roving Scientists are researchers ranging from Honours students to professors, who volunteer in the Festival Hub to chat to the public in a fun and welcoming way. While some Beaker Street Festival events are ticketed, the public can attend the Festival Hub free of charge. Everybody is encouraged to have a beer with a scientist at the world's biggest Science Bar.

This event raised awareness of parasitology and Australian Society for Parasitology among the public and other researchers. It was an outreach event targeting Tasmanians and visitors to Tasmania, which gave us an opportunity to communicate our research and passion for parasitology to the broader community. There was a lot of interest in parasites, for example the fish parasites in jars attracted young and old members of the public and there were a lot of questions about eating raw fish and catching diseases from fish. Recreational fishermen and their partners shared their fish parasite stories, while children and students asked us questions and looked for particular information to collect signatures on their bingo cards.

We took part in the networking event for the Roving Scientists and all other researchers involved in Beaker St Festival. This event was sponsored by ASP and was introduced by an award-winning journalist, science writer and a communicator Zoe Kean. The networking event encouraged communication and collaboration between researchers from different disciplines.



Above: Images from Beaker Street Festival

One Health Workshop

Report on the One Health ASP Outreach Event in Tasmania

The second One Health Tasmanian/ Lutruwita conference was held on December 1st 2023 at the UTas Sandy Bay Campus. It brough together researchers, health and biosecurity professionals across disciplines to network and talk about One Health issues on the island state. This also included for the first time, Tasmanian state government officers and a representative from the One Health CDC. In total, 29 people attended in person and five joined online and included the majority of Tas ASP members. I was able to promote the society to the audience and encouraged those interested to join.

There were 13 talks and a breakout session to further progress an ARC Linkage project being developed by conference delegates. Excitingly, this project will help facilitate parasite projects across the state in the future as part of a Tasmanian One Health genomic surveillance strategy. Kate Hutson was going to introduce herself to ASP members as the next state representative but had to leave early.

> Right: Images from the Tasmania State Outreach event One Health Conference



Outreach activities in Western Australia

ASP member Rina Fu and her fabulous outreach activities in Western Australia!

ASP Resource in the frontline of STEAM Outreach

FASP Russell Hobbs donated a box collection of parasite slides to Rina Fu in July 2023. "I saw an article in the ASP newsletter that Rina was calling for donations of parasite specimens for community outreach, I thought I would put these to good use!" says Russell, former Secretary and inaugural Editor of the ASP newsletter.

"I was so thrilled when Russell contacted me with his offer" exclaimed Rina. "I was going full steam with the MicroToons animation production for National Science Week at the time, and I felt so honoured to be visited by Russell and to have him take the time to go through the specimens with me". "What's so special to me is the history behind the slides," explained Rina. "Many of the parasites were collected from various animals by Russell himself or his colleagues whilst he was in Alberta. There is so much history and passion captured in each slide, I feel so privileged and will definitely put them to good use to inspire our next generation!"

Indeed, Russell's *Echinococcus granulosus* slide has reached the eyes of over 100 children aged 5 to 15 in November, as Rina weaved parasite microscopy into 6 of her unique STEAM workshops over 2 days.

Police & Community Youth Centres, Midland WA, STEM series for Home School Groups

22nd November

As part of a 5-week STEM series, Rina Fu embedded parasitology front and centre in this week's content for home school students (see photo). Children as young as five years old danced and bopped to her original tune 'The Bugs Song', which the ASP outreach fund supported towards her studio recording of the track a few years ago. "Once the resource is built I



FASP Russell Hobbs is examining a specimen slide from his collection.

Rina Fu is thrilled to receive animal parasite specimens for her community engagement work, whilst Russell is taking a closer look at Rina's self-illustrated microbes in her debut picture storybook My Mad Scientist Mummy.



Outreach activities in Western Australia cont...

can use it again and again with different community groups, the response is always very positive!" says Rina. "The kids and parents all get into it." In the older primary school age and high school student workshops, students learned about ecto and endoparasites. Rina also shared her tick dragging experience from the ASP Concepts In Parasitology course and images captured from that awesome experience.

The Crafty Parasite malaria pipe-cleaner stop motion engaged students from Year 3 to Year 10 and even produced giggles in the teens when they watched the end scene. Their understanding was put into action through hands on parasite feeding activities.

Women In Technology WA's inaugural TechTrails for Primary School Students



Dr Rina, as she is affectionately known by the community, is teaching homeschool students aged 5 – 7 'The Bugs Song' at the PCYC STEM workshop. Rina's original song introduces young children to big bugs, small bugs and microscopic bugs, including hungry ones called parasites (right) Rina sharing about the ASP CIP course and her tick encounter.



you should have seen the kids queuing up for the microscopes. I wowed the kids with Russell Hobb's parasite! They loved it!"







Left top and below: Crafty Parasites Malaria's stop-motion a hit with the kids. Russell Hobb's slide of Echinococcus granulosus, enjoyed by year 5 and 6 students at the WiTWA TechTrails. (Top) Crafty Parasites in action! Year 5 and 6 students creating their own fluffy mosquitoes as part of Rina's session in the inaugural TechTrails program.

23rd November

Rina Fu was invited by Women in Tech WA, as a role model and speaker in their inaugural TechTrails program in a primary school setting. Rina had previously been contributed to the TechTrails high school program and had welcomed the idea of engaging younger students.

"The timing was pretty tight and varied between classes, so I had to make quick decisions with my planned activities" says Rina. "I shared my journey in becoming a scientist with the kids coupled with making a pipe-cleaner mosquito, one of the craft ideas from Crafty Parasites Malaria.

"It was a scorching 40 degree day in the Peel region (outside Perth metropolitan area), so we used that to our advantage to take the PVA glued on mosquito googly eyes out to dry in the sun!"

Students watched a short segment from the 15 min Crafty Parasite episode, including the malaria life cycle and awardwinning research footage from Prof. Photini Sinnis (Johns Hopkins Bloomberg School of Public Health) which showed fluorescent sporozoites being ejected from a mosquito proboscis. "After making their mozzies,

Outreach in WA and Queensland



Top left: ASP Crafty Parasites Malaria was a main feature in TechTrails WA. Photo (lower): Women in Technology WA host Introducing Rina Fu to students as one of the role models and speakers. !



Science Week at Peace Lutheran College, Cairns

ASP members Lisa Jones, Kate Miller, and Nick Smith along with their awesome volunteers helped to CELEBRATE SCIENCE WEEK with Peace Lutheran College Primary School students as they immersed themselves in all things science with rotating activities in each of the classrooms. With the help of roving scientist, Mrs. Evered, special visitors from the field of sciences, and their amazing teaching team, it truly was a fun and educational day. The incredible team delivered the Crafty Parasites Malaria resource in 40 minutes to three groups of 50 students each, which was an amazing achievement and lots of fun!

Right: ASP Crafty Parasites Malaria delivered to Peace Lutheran College students in August for National Science Week.



Outreach in ACT

On Parasites in Cooleman Court Volunteering for National Science Week, 2023

Parasites: they're not the companions you want to have living with ... or on ... or in you, mooching off your hard earned nutrients and body warmth. Nor are they a favourite topic at family dinner (this, I learnt this the hard way). So I was surprised and delighted at how many people walked over to our stand at Cooleman Court this year, decked out with worms in jars, microscope slides of creepy creatures, and shocking, brightly-coloured posters, to learn more about them.

There's something about the gorey and explicit that succeeds in enticing and capturing attention, despite all-round grossness. The microscopes and interactive games were a big draw. They attracted participants of all ages, from children to grandparents, allowing them to enter the world of science and experimentation first-hand. Faces lit up as success was achieved in first focussing on a sample, or cracking the answer to a 'what's in the box?' sensory game.

My personal favourite activity was asking them a slightly cheeky trick question; 'how many worms do you think are in this one litre jar?'. Guesses ranged from 20 to 1,000. I took great pleasure in informing them it was actually just one. Eyes immediately widened and jaws dropped to the floor.

Engagement was a big tick for us. What could be a bit trickier, was balancing out often skin-



scrawling information about parasites. Avoiding nightmares, instead promoting feelings of understanding and empowerment.

The eyes of cautious parents remained fixed on preserved specimens as we explained the various types of parasites that common household pets can acquire. It was a relief to reassure them that most are treatable with tablets from a vet, and a great opportunity to plug the day-to-day merit of parasitology research. Pet owners were often grateful for gaining new understanding, or at least more determined to protect their fur-malies from the worms they saw clearly displayed.

In my experience, children were surprisingly calm and stayed for longer than I expected, keen to have a look at all the different ticks, worms and mites that they could get their hands on.

Working together at the parasitology stand was incredible fun.

It's not every day that you get to share your

ASP State Outreach team from ANU, ACT National Science Week, Katya Strahan and colleagues

(undeniably icky) passion in such a public forum, connecting with people of all ages and backgrounds. It's a great example of how public outreach should be, lending accessibility to complex content. Witnessing mixed expressions of 'ew yuck' and wonder (not unlike mine when undertaking an undergraduate parasitology course at ANU headed up by Alex Maier), I couldn't help but wonder if maybe we had just had the pleasure of meeting the next generation of parasitologists to come

Written by Katya Strahan, one of our next gen parasitology enthusiast. and volunteer at the science week stall (the one waving in the photo).

ASP Education

The Australian Society for Parasitology is launching a new award for excellence in teaching.

The society would like to name it after a female parasitologist and we are looking for suggestions of people who have made life-long contribution to teaching and demonstrated an enduring passion for understanding parasite biology.

Please message email suggestion of who you think it should be named after and why to sj.preston@federation.edu.au
OUTREACH

Outreach in NSW

Parasites – A hidden force of nature Shokoofeh Shamsi TEDxWagga Wagga

In a healthy environment, free from human intervention, there is a delicate balance between populations of parasites and their hosts because at the end of the day, parasites need their host to survive. Without them, parasites die. In many instances, we humans disturb this delicate balance, turning parasites into monsters by ignoring their impact and importance in the ecosystem.

In this Ted talk, I argue that we -humans- must change our focus and remember that it is not 'our' environment. The environment belongs to all creatures and humans are only a small part of it. Parasitic and non-parasitic creatures have evolved together for over a billion years and learnt to live together long before humans arrived on the planet. We must always remember, there's more to the environment than what we can see, and understanding these hidden players are crucial for sustainable ecosystem management. Parasites may be invisible, but their impacts are enormous.

https://www.youtube.com/ watch?v=q3Ejo5NIqWY



Undergraduate Prize winners from JCU

Congratulations for academic achievements in 2022 from James Cook University undergraduate students

Australian Society for Parasitology Undergraduate Prize winners:

ASPEN SANYU ZHOU

LOEVA GWENN KAELYN LE CAM

JCU Prizes

Prize: Australian Society for Parasitology Prize 2 Prize Recipient Name: Loeva Lecam

Degree: Bachelor of Veterinary Science

I love that 1 am studying vet science, studying about subjects that will be immediately relevant to my dream profession, including doing a lot of hands-on practical learning. It makes it enjoyable to come to class when on relevances are down to early and hand hild ar approprivation students. There are many fields 1 could see myself working in 1. have a strong passion for canine mutrifican, yet 1 aboventil file to work in a mated practice with large animals (especially horses). Currently, my biggest career goal would be to work as a widdlife vet in a zoo.

Thank you very much for your generous prize! I was not expecting this pleasant and welcome surprise. I in thrilled to have made my parasitology lecturer very proud. Thanks again!



ank you for supporting students at JCU edu.au/prizes



JCU Prizes

Prize: Australian Society for Parasitology Prize
Prize Recipient Name: Aspen Zhou Sanyu

Course: Bachelor of Veterinary Science

What I enjoyed the most about my time at JCU was the hands-on learning during our clinical

I look forward to practicing as an Anatomical/Clinical Pathologist, in time. Thank you for your generosity: it is very much annecdated. Having this annual prize certainly hel

hank you for your generosity; it is very much appreciated. Having this annual prize certainly helps aread awareness of the various specializations available to vet students when they graduate.



Thank you for supporting students at JCU <u>(cu.edu.au/prizes</u>

MES COOK NIVERSITY STRALIA



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<u>July (53:08)</u>

Special Issue

Anti-helmintics V: drugs, resistance, and vaccines

Aroian, R.V., Loukas, A., Martin, R.J., 2023. Anthelmintics V: Dugs, resistance, and vaccines. Int. J. Parasitol. 53, 391-392.

https://doi.org/10.1016/j. jjpara.2023.05.004

Image courtesy of Dr. Qian Ding, University of Massachusetts Chan Medical School, USA.

International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



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www.parasite.org.au

Hemphill, A., Letao, A., Ortega-Mora, L.-M., Cooke, B.M., 2023. ApicoWplexa 2022: 6th international meeting on apicomplexan parasites in farm animals Int. J. Parasitol. 53, 459-461.

https://doi. org/10.1016/j. ijpara.2023.05.003

Image designed by Noé Haudenschild, Institute of Parasitology, University of Bern, Switzerland.

Photo courtesy of Dr. György Kriska and Eszter Papp (Eötvös Loránd University, Budapest, Hungary).

International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



September (53:10)

Duc, M., Himmel, T., Ilgūnas, M., Eigirdas, V., Weissenböck, H., Valkiūnas, G., 2023. Exo-erythrocytic development of two Haemoproteus <u>species</u> (Haemosporida, Haemoproteidae), with description of Haemoproteus dumbbellus, a new blood parasite of bunting birds (Emberizidae). Int. J. Parasitol. 53, 531-<u>543.</u>

https://doi. org/10.1016/j. ijpara.2023.02.009

Original image courtesy of T. Himmel, University of Veterinary Medicine Vienna, Austria.

International Journal for Parasitology continued

INTERNATIONAL JOURNAL FOR PARASITOLOGY



<u>constraint</u> obscures richness: a mitochondrial exploration of cryptic richness in <u>Transversotrema</u> (Trematoda:Trans versotrematidae). Int. J. Parasitol. 53,

https://doi. <u>org/10.1016/j.</u> ijpara.2023.06.006

Original images provided by S. Cutmore, Queensland Museum Network, Australia.

International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



Season's Greetíngs from IJP. Wíshíng you a happy and successful 2024. Brían, Jan and María



www.journals.elsevier.com/international-journal-forparasitology-parasites-and-wildlife/

Editor: R.C. Andrew Thompson

Facebook: www.facebook.com/IJPPAW/

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PAW End of Year Message from IJPPAW editor Andrew Thompson and interviews from ASP members with recently published IJP:PAW articles.

As we near the close of another successful year for our journal, I would like to thank all those colleagues who contribute to this success. This would not have been possible without the commitment and generosity of our Reviewers who work so hard for PAW so that decisions can be made on average within a month. Thank you too to our Editorial Board, and in particular our Advisory Board for all their support, ideas, and encouragement throughout the year. Finally, thank you to everyone who has chosen to publish their work in out journal. We continue to publish a fantastic diversity of papers which cover the full breadth of wildlife parasitology, from all over the world. I wish you all an enjoyable festive season and all the best for a peaceful and productive New Year.

Andrew Thompson, Editor IJPPAW

Recent publication and interview:

Robert Poulin, Bronwen Presswell, Jerusha Bennett, Daniela de Angeli Dutra, Priscila M. Salloum, "Biases in parasite biodiversity research: why some helminth species attract more research than others", *International Journal for Parasitology: Parasites and Wildlife*, Volume 21, 2023, Pages 89-98, ISSN 2213-2244, <u>https://doi. org/10.1016/j.ijppaw.2023.04.010</u>

https://www.sciencedirect.com/science/ article/pii/S2213224423000330

Abstract: As the number of known and described parasite species grows every year, one might ask: how much do we actually know about these species beyond





the fact they exist? For free-living taxa, research effort is biased toward a small subset of species based on their properties or human-centric factors. Here, using a large data set on over 2500 helminth parasite species described in the past two decades, we test the importance of several predictors on two measures of research effort: the number of times a species description is cited following its publication, and the number of times a species' name is mentioned in the scientific literature. Our analysis highlights some taxonomic biases: for instance, descriptions of acanthocephalans and nematodes tend to receive more citations than those of other helminths, and species of cestodes are less frequently mentioned in the literature than other helminths. We also found that helminths infecting host species of conservation concern receive less research attention, perhaps because of the constraints associated with research on Scanning electron micrographs of four helminth parasites recently discovered from New Zealand. A, Nematode Seuratia shipleyi

from sooty shearwater; B, Acanthocephalan Corynosoma hannae from New Zealand sole; C, Larval stage of cestode from sprat; D, Trematode Copiatestes thyrsitae from barracouta. Image credit: Drs Bronwen Presswell and Jerusha Bennett.

threatened animals, while those infecting host species of human use receive greater research effort. Intriguingly, we found that species originally described by many co-authors subsequently attract more research effort than those described by one or few authors, and that research effort correlates negatively with the human population size of the country where a species was discovered, but not with its economic strength, measured by its gross domestic product. Overall, our findings reveal that we have conducted very little



research, or none at all, on the majority of helminth parasite species following their discovery. The biases in study effort we identify have serious implications for future research into parasite biodiversity and conservation.

Robert, tell us why it's important to study parasite biodiversity and conservation?

Parasites are among the most diverse organisms on the planet, yet they are also among the most threatened. Ecologists are rapidly uncovering the many complex ways in which parasites are embedded in natural communities, and how they contribute to the maintenance of animal biodiversity and ecosystem stability. Parasitologists have a huge role to play in not only the study of parasite biodiversity, but also the implementation of measures to ensure their recognition and conservation.

What is the significance of your finding that "very little research, or none at all, on the majority of helminth parasite species following their discovery" and what should researchers do to mitigate this?

All we know about the vast majority of parasite species that have been discovered is that they exist, i.e. they are found in a particular host species in a given locality. We don't know their full life cycle, their growth or reproductive rates, their impact on host health, their full geographical range, etc. This sort of information is available for less than 1% of known parasite species, mainly those of medical or veterinary concern. I feel future research efforts need to strike a better balance between breadth of knowledge (finding new parasite species) and depth of knowledge (finding out what they do).

Tell us how you think that parasitology researchers might influence the future research into parasite biodiversity and conservation?

Parasitologists have all the knowledge, training and passion needed to make a difference. As a group, we need to share that more broadly with other scientists and the public. This can be achieved, for example, by developing regional and global databases of parasite diversity and spatial distribution accessible to conservationists; working more closely with the IUCN and local agencies focused on biodiversity conservation; pushing for the inclusion of parasitological content in university (and high school too, why not?) biology and ecology curricula; and taking every opportunity to get the public and policy makers onboard by highlighting the environmental and societal benefits of a healthy parasite fauna.

Recent publication and interview:

Megan Porter, Diane P. Barton, Nidhish Francis, Shokoofeh Shamsi, "Description of two new species of *Diplectanum* Diesing, 1858 (Monogenea: Diplectanidae) collected from *Protonibea diacanthus* (Lacepède, 1802) (Teleostei: Sciaenidae) from waters off northern Australia", International Journal for Parasitology: Parasites and Wildlife, Volume 21, 2023, Pages 99-109, ISSN 2213-2244, <u>https://</u> doi.org/10.1016/j.ijppaw.2023.04.004

https://www.sciencedirect.com/science/ article/pii/S2213224423000275

Abstract: Two new species of the family Diplectanidae Monticelli, 1903 from the gills of *Protonibea diacanthus* (Lacepède, 1802) (Teleostei: Sciaenidae) off the northern Australian coast are described. Previous studies have either morphological or genetic results, whereas this study combines morphological and advanced molecular methods to provide the first detailed descriptions for species of *Diplectanum* Diesing, 1858 from Australia utilising both methodologies. Two new species, *Diplectanum timorcanthus* n. sp. and *Diplectanum diacanthi* n. sp., are morphologically described and genetically characterised using the partial nuclear 28S ribosomal RNA gene (28S rRNA) and the internal transcribed spacer 1 (ITS1) partial sequence.

Megan, tell us what are Diplectanum Diesing, 1858 (Monogenea: Diplectanidae), why they are important to study and how did you get involved in researching this parasite?

Belonging to the family Diplectanidae, Diplectanum is a fascinating genus of monopisthocotylean monogeneans primarily known to infect the gills of perciform fishes. Like many parasitic organisms of marine fish, they are abundant but neglected! And reports of Diplectanum spp. are incredibly scarce in Australia, and of those species' reports that do exist, even less have been genetically described.

Taking a step back from parasite species identification, many of Australia's commercially important large marine fish species lack any parasite assemblage assessment, and the potential impacts of these organisms on fish hosts remains undetermined. Identifying parasitic organisms through advances in identification techniques is the first step in deciphering parasite taxonomic evolution and will assist in parasite community studies within important fish populations. As hologenophore reports and parasite taxonomic identifications develop, marine ecosystem function and fish host health will be better understood.

As a part of my PhD, I was keen to collect and identify several parasitic organisms of different genera from *P. diacanthus*. Given the residence and high prevalence of monogenean ectoparasites in the sciaenid, I chose to describe this organism because I am passionate about advancing the taxonomic descriptions of gill





Composite drawing of Diplectanum timorcanthus (above) and Megan Porter in the lab during her PhD (right)

parasites, and building on the knowledge surrounding these organisms and their impact on the host in the era of climate change.

What is morphological and advanced molecular methods did you use to study the species of Diplectanum Diesing, 1858?

To perform morphological analysis of Diplectanum timorcanthus n. sp. and Diplectanum diacanthi n. sp. the collected monogeneans were mounted on a microscope slide with 70% ethanol and 1 drop of acetostain, which was then fixed with a coverslip and glycerine jelly. These are not complicated tasks but extremely delicate ones which require patience and proper training - remember these are only about 1mm in length. To publish thorough morphological details of each species, representative slide-mounted specimens were chosen, and characters of systemic importance were measured using a motorised microscope. Characteristics of interest were also commented on, for example squamodiscs and male copulatory organs, which both demonstrated speciesspecific morphology. Composite drawings of each new species were created, and comparisons made with those Diplectanum species already reported.



molecular identity of the new species' of Diplectanum, genomic DNA extraction was performed using DNeasy Blood & Tissue Kits (Qiagen). After DNA extraction was complete, polymerase chain reaction (PCR) amplification was done to target two separate genes of each specimen: nuclear 28S rDNA and the internal transcribed spacer (ITS1). Representative samples were sent to the Australian Genome Research Facility (AGRF) and were subjected to Sanger sequencing using the same primer sets used for PCR.

Phylogenetic trees for both gene regions (28S rDNA (partial) and ITS1) were constructed from the sequences generated in this study along with representative (similar and closely related species) sequences from GenBank. Although the sequences didn't match with any sequences present in GenBank, that did not immediately make them new species as many described species have not been sequenced. So, then, I had to compare the measurements, descriptions and drawings with known species to ensure that these were species that had never been described before.

Using a combination of morphological and



molecular techniques, this study was able to successfully identify and publish new taxonomic identifications for *Diplectanum timorcanthus* n. sp. and *Diplectanum diacanthi* n. sp.

Tell us what will be the next stage of your research?

I am excited to continue my PhD research on the parasitism affecting the blackspotted croaker (Protonibea diacanthus). I have been fortunate in my research to collaborate with several fellow researchers, mentors, university and government bodies, and members of the public to report on several aspects of parasitology in the northern sciaenid. I have published on the trophic ecology and population structure of P. diacanthus and its associated parasites, with my most recent work reporting on the short-term seasonal influences on parasites, and the predictions that can be generated surrounding the future of the P. diacanthus fishery and the parasite community as climate changes intensify. I will be submitting my PhD soon and hoping to continue research with parasites - keep me in mind when you are looking for a post-doc on those new grants!

In order to additionally publish on the



Please enjoy an interview with ASP member Christopher Hart and a recently published IJP:DDR paper. In other great news, congratulations to Assoc. Prof. Tina Skinner-Adams and colleagues from Griffith University for their NHMRC Ideas grant "Combating treatment refractory giardiasis: New drugs and combination therapies".

Christopher JS. Hart, Andrew G. Riches, Snigdha Tiash, Rebecca Abraham, Keely Fayd'Herbe, Ellis Joch, Bilal Zulfiqar, Melissa L. Sykes, Vicky M. Avery, Jan Šlapeta, Sam Abraham, John H. Ryan, Tina S. Skinner-Adams, "Thieno[3,2-b] pyrrole 5-carboxamides as potent and selective inhibitors of *Giardia duodenalis*", International Journal for Parasitology: Drugs and Drug Resistance, Volume 23, 2023, Pages 54-62, ISSN 2211-3207, <u>https://doi. org/10.1016/j.ijpddr.2023.09.002</u>

https://www.sciencedirect.com/science/ article/pii/S2211320723000295

Abstract: Giardia duodenalis is the causative agent of the neglected diarrhoeal disease giardiasis. While often self-limiting, giardiasis is ubiquitous and impacts hundreds of millions of people annually. It is also a common gastro-intestinal disease of domestic pets, wildlife, and livestock animals. However, despite this impact, there is no vaccine for Giardia currently available. In addition, treatment relies on chemotherapies that are associated with increasing failure rates. To identify new treatment options for giardiasis we recently screened the Compounds Australia Scaffold Library for new chemotypes with selective anti-Giardia activity, identifying three compounds with sub-µM activity and promising selectivity. Here we extended these studies by examining the anti-Giardia activity of series CL9569 compounds. This

compound series was of interest given the promising activity (IC50 1.2 μ M) and selectivity demonstrated by representative compound, SN00798525 (1). Data from this work has identified an additional three thieno [3,2-b]pyrrole 5-carboxamides with anti-Giardia activity, including 2 which displayed potent cytocidal $(IC50 \le 10 \text{ nM})$ and selective activity against multiple Giardia strains, including representatives from both human-infecting assemblages and metronidazole resistant parasites. Preclinical studies in mice also demonstrated that 2 is well-tolerated, does not impact the normal gut microbiota and can reduce Giardia parasite burden in these animals.

Chris, tell us why it's important to study Giardia duodenalis and how did you get involved in researching this parasite?

There are several important reasons to study Giardia. The genus Giardia comprises multiple species of parasitic organisms that are pathogenic in a wide range of animals and humans. As a parasite of humans Giardia parasites have a toll on human health. Infections can be sub-clinical, acute, or chronic and the host-parasite factors that affect infection severity are currently unclear. Both acute and chronic giardiasis can be debilitating, with the most recent WHO estimates suggesting that there are ~200 million cases of giardiasis per year. While disadvantaged populations are disproportionately affected, even those in developed nations such as the United States of America and Australia are impacted. While available data are scarce, hospitalizations due to Giardia infection cost upwards of \$30 million per year in the USA alone, and disease duration and treatment costs are likely to increase as metronidazole-resistance rates are becoming more common.

In addition to their impact on human and animal health, *Giardia* are understudied

www.journals.elsevier.com/international-journal-forparasitology-drugs-and-drug-resistance/

Editors In Chief: Andrew Kotze & Kevin Saliba

Facebook: www.facebook.com/IJPDDR/

early diverging eukaryotes and the model metamonad. Close relatives include intestinal symbionts (e.g., *Monocercomonoides* sp.), and free-living heterotrophs (e.g., *Kipferlia bialata*) in addition to other parasites. In this context, studying *Giardia* may give us insight into how the first eukaryotes developed and lived.

I originally started working with Giardia as an undergraduate when I was offered a position in Dr. Ian Cock's laboratory at Griffith University. Ian was interested in using traditional knowledge from indigenous populations as a starting point for drug discovery against a variety of pathogens that included Giardia. Giardia fascinated me because we can easily see it, and its morphology, including its four distinct pairs of flagella, unique adhesion organelle (ventral disc), and two equivalent nuclei, was fascinating. A couple of years later I met A/Prof Tina Skinner-Adams who was lecturing upper-division Infectious Disease and was looking for Honours students to undertake Giardia research. I jumped at the opportunity to continue to research with this weird and neglected organism, and after Honours stayed in the Skinner-Adams lab to complete my PhD studies.

What is the significance of examining the anti-Giardia activity of the three compounds with sub-µM activity and promising selectivity?

As a pathogen of humans and non-human animals including companion animals and livestock, *Giardia* can have a significant one health impact. This is exacerbated by the significant shortcomings of currently available anti-*Giardia* chemotherapies which includes agents that have long treatment regimens, poor efficacy and compliance, and increasing parasite resistance. While a few new compounds have entered the anti-*Giardia* drug discovery pipeline over the last two



decades, the primary treatments have remained the same for years given many of the most promising new compounds have limitations of their own. New options are desperately needed to improve treatment outcomes. Ideally these compounds should be potent for the parasite, but also selective for *Giardia* over other organisms and human cells, so as not to induce further health impacts.

In this highly collaborative work, we explored the efficacy of a hit series found in a medium-throughput screen for novel small-molecule inhibitors of Giardia duodenalis (aka G intestinalis and G. lamblia). This series was particularly interesting as several molecules within the initial series (obtained from Compounds Australia, Griffith University) demonstrated efficacy better than that of currently used chemotherapies and were selective inhibitors of Giardia. Our team demonstrated that compounds within this series could kill parasites at nM concentrations, nearly an order of magnitude more potent than metronidazole. These are among some of the most active anti-Giardia agents ever documented and hence represented great "hit" compounds for further development.

Tell us what will be the next stage of your research?

The small-molecule inhibitors discussed in this article have been used as starting



Thieno[3,2-b]pyrrole 5-carboxamides as potent and selective inhibitors of Giardia duodenalis

points to examine structure activity relationships so that pre-clinical drug candidates can be developed. The mode of action of these compounds is also being assessed. This work is being led by A/Prof Skinner-Adams (Griffith University) and Dr. Andrew Riches and Dr. Jack Ryan (CSIRO, Australia).

My own research focus has shifted toward tool development and to examining the basic biology of *Giardia*, with a particular focus on building better genetic tools to further understand gene regulation in *Giardia*. Ultimately, I would like to marry these two worlds and work on applied tool development for additional drug discovery/ development in *Giardia*. I believe that a better understanding of the basic biology of *Giardia* will give us better drug targets, and better tools to probe *Giardia* biology.

Don't forget there are discounted rates for ASP members to publish as Open Access in Elsevier Journals IJP, IJPPAW and IJPDDR and also for One-Health.

The discounted rate for IFTM affiliated Society (members) is https://www.sciencedirect.com/journal/one-health/publish/openaccess-options

ASP Travel Awards and JD Smyth Postgraduate Travel Awards

ASP Travel Awards

Congratulations to the September2023 winner of the ASP TResearcher Exchange, Travel and Training Award, Sai Lekkala, Research Assistant (Tonkin/ McCarthy labs) WEHI for a Researcher Exchange Researcher Exchange to the University of Pennsylvania, November 15 – December 1 (2023) to visit Professor Boris Striepen's lab (collaborator) to a establish a *Cryptosporidium*/Apicomplexan parasite CHIM model, which serves as a potential conduit for other ASP affiliated research groups to trial their lead drug candidates in humans.

Grant winners

Congratulations to recipients of recent ARC and NHMRC Parasitology Grants 2023

NHMRC Investigator Grants

Prof. Justine Smith

Flinders University

Addressing the Greatest Unmet Needs in Uveitis

Uveitis is a disease that affects the tissues inside the eye. It may be caused by an infection, inflammation or a cancer. Seven in 10 people who have uveitis experience poor eyesight. The goal of my research is to protect and restore the sight of people with uveitis. Over the next 5 years, my team will work across the laboratory and clinic to address problems in different types of uveitis: *Toxoplasma* parasite infection, accumulation of fluid in the retina during inflammation, and lymphoma.

\$2,953,040

Prof. Peter Gething

Curtin University

Geospatial analytics to transform malaria strategies in Africa

Malaria is a leading cause of death in Africa. Declining trends since 2005 are now reversing and new strategies are required. I will build on the unique data, analytics and engagement capabilities of my program, the Malaria Atlas Project, to discover why progress has stalled and plan more effective strategies. I will analyze the impact of current tools across the continent, and explore how impact can be maximized by reducing deployment inefficiencies and better responding to climatic influences.

\$2,897,165

Dr Angela Devine

The Menzies School of Health Research

Economic analyses to optimise malaria control and elimination

Malaria is a disease of poverty that affects almost 40% of the global population with over 241 million cases each year. Working with partners in Indonesia and Papua New Guinea, my economic models will help national policy makers to select the best combination of tools to reduce the greatest number of malaria cases. My goal is to select policies that will maximise health benefits with the currently available tools and funding, to eliminate malaria as quickly as possible.

\$587,040

Dr Steven Kho

The Menzies School of Health Research

Understanding the large *Plasmodium* reservoir in the spleen – a hidden barrier to malaria elimination

Malaria is a parasitic disease infecting >240 million people and causing >600 thousand deaths annually. I recently discovered that its major infectious reservoir is hidden in the spleen. My research vision is to provide a deep biological understanding of the hidden splenic reservoir in malaria. My research will inform the development of new and improved control strategies for the detection, treatment and prevention of malaria.

\$587,040

Assoc. Prof. Sarah Auburn

The Menzies School of Health Research

Accelerating *Plasmodium vivax* malaria elimination with molecular information

Plasmodium vivax parasites form dormant liver stages that awaken weeks to months later causing clinical malaria and confounding surveillance. My program will develop laboratory and data analysis tools that use information on *Plasmodium vivax*

Closing dates

ASP Fellowships 1 January 2024

ASP Researcher Exchange, Travel and Training Awards & JD Smyth 30 March 2024

John Frederick Adrian Sprent Prize 30 September 2025

Bancroft-Mackerras Medal for Excellence 30 September 2024

More information www.parasite.org.au

genetics to inform researchers and policy makers on antimalarial treatment efficacy and community transmission.

\$2,670,201

Dr Ram Bhusal

Monash University

Harnessing ticks' tricks to develop therapies for inflammatory diseases

Inflammatory diseases are caused by the release of chemokines at the affected site. Chemokines attract immune cells to the site, leading to inflammation and tissue damage. Blocking the activity of chemokines is a promising approach to suppress inflammation. I propose to modify natural chemokine binding proteins from ticks called "evasins", so that they effectively block the activity of chemokines involved in various inflammatory diseases. This could lead to new anti-inflammatory treatments.

\$662,040

Dr Stephen Scally

The Walter & Eliza Hall Institute of Medical Research

Exploiting malarial invasion proteins for novel multi-stage malaria vaccines

Malaria is an infectious disease with a complex lifecycle that moves between mosquito and human hosts. This proposal will study the role of a protein complex important for parasite invasion in both humans and mosquitoes and structurally and functionally characterize how antibodies can prevent this. Insights generated will then be used to develop and test a novel multi-stage malaria vaccine.

\$1,586,190

Dr Adam Bartlet

The University of NSW

Geospatial analytics for the control and elimination of neglected tropical diseases

My research program integrates geospatial analytics to produce policydriven outcomes for the control and elimination of neglected tropical diseases (NTDs). This will be achieved through the incorporation of geospatial analytics in designing, implementing, evaluating, and informing interventions for programs across Angola, Timor-Leste, Vanuatu and Vietnam that aim to control and eliminate schistosomiasis, soil-transmitted helminths, lymphatic filariasis, trachoma, scabies and yaws by 2030.

\$497,224

Prof. Jake Baum

The University of NSW

Next generation malaria vaccines targeting the parasite cell surface

More than half a million children die each year from malaria infection. Infection starts with a mosquito bite when sporozoites, the single-celled malaria parasite form, are released into the skin. To advance the possibility of an effective, critically needed malaria vaccine, this Investigator will use unique tools to define sporozoites in precise genetic, protein and immunological detail - using these insights to design and test tomorrow's malaria vaccines.

\$2,897,165

Dr Hyun Jae Lee

The University of Melbourne

Defining phenotypic diversity in CD4+ T cells to better protect against malaria.

Malaria remains a global health problem, particularly affecting children with high rates of illness and death. One of the challenges in fighting malaria is the lack of effective vaccines. Here, I will use advanced single-cell technology and computational approaches to closely examine immune cells that best protect against malaria. By doing so, I aim to contribute to the development of improved vaccines and more effective treatments for the disease, ultimately reducing burden of malaria.

\$662,040

Dr John Woodford

Berghofer Queensland Institute of Medical Research

Malaria volunteer infection studies for *Plasmodium vivax*

Plasmodium vivax is the second most common cause of malaria and causes 14 million cases per year. Most are in the Asia-pacific region. Despite this, there are few drugs and no vaccines available to treat P.vivax malaria. Controlled, experimental infection of healthy volunteers has been used as a safe and successful tool to study the more common species of malaria. Using existing models this project will establish volunteer infection studies for P.vivax to accelerate drug and vaccine development.

\$456,020

News from the ASP Network for Parasitology

NHMRC Ideas Grants

Dr Lauren Holz and colleagues

The University of Melbourne

Development of an efficacious malaria mRNA vaccine

mRNA vaccines have been administered to millions of people and shown to be safe and effective at reducing COVID. This has opened the door for developing mRNA vaccines that target other human pathogens. We have shown liver-resident memory T cells (Trm), a specialised type of immune cell, can provide protection from malaria in mice and developed a novel mRNA vaccine approach to generate these cells. In this study we begin to investigate how this vaccine can be translated from mice into humans.

\$1,384,755

Assoc. Prof. Ashraful Haque and colleagues

The University of Melbourne

Fate and fidelity of T cell memory during repeated malaria infection

Children rarely develop immunity to malaria after a first infection, leaving them susceptible to severe disease during each subsequent infection. Although immune cells called T cells can protect against malaria, we don't understand how well they function during re-infection. We will define the impact of re-infections on T cells in children in a malaria-endemic region as well as in experimental models. Our data may assist in devising new ways to prevent children from dying with severe malaria.

\$2,248,976

Assoc. Prof. Tina Skinner-Adams and colleagues

Griffith University

Combating treatment refractory giardiasis: New drugs and combination therapies

Giardia parasites cause significant disease and disability on a global scale. However, there is no vaccine to prevent infection and current treatments are failing due to parasite drug resistance. To combat drug resistant parasites new treatment strategies are needed. We aim to address this need and end treatment failures by identifying innovative multi-drug treatment options that include new anti-*Giardia* agents with 300-fold better activity and different modes of action to currently used drugs.

\$790,709

Dr Mariusz Skwarczynski and colleagues

The University of Queensland

Paving the way for a Clinical Vaccine Candidate against Hookworm Infection

Hookworm infection affects 400 million people, worldwide, each year and costs the global economy billions of dollars. There is no commercial hookworm vaccine. This project will produce vaccine candidates against hookworm that are safe, potent against a variety of hookworm species, and induce strong, long-term immune responses after single immunisation. Ultimately, the project will lead to the development of the first highly effective vaccine candidate against hookworm for clinical trials.

\$855,524

Prof. Alyssa Barry and colleagues

Deakin University

Predicting the emergence and spread of drug resistant malaria parasites

We will confirm if malaria parasite variants from Papua New Guinea with mutations that may cause drug resistance are resistant to current antimalarial treatments, and evaluate how these mutations emerge and spread in populations. This knowledge will enable the development of a mathematical model that predicts where drug resistance may emerge next and where it is most likely to become prevalent, helping the malaria control program to prevent, contain and eliminate drug resistant malaria.

\$1,352,354

Dr Hong You and colleagues

Berghofer Queensland Institute of Medical Research

Harnessing CRISPR-Cas13 molecular diagnosis in the fight against Intestinal parasitic worms

The availability of powerful diagnostics is key for controlling parasitic infections. We will use molecular CRISPR-based technologies to develop sensitive, use-friendly diagnostics for human strongyloidiasis and establish a high throughput platform that can detect multiple helminth infections simultaneously. Our discoveries will break the current diagnostic bottleneck and significantly enhance surveillance capabilities for diagnosis of human infections caused by parasitic worms globally.

\$721,919

Dr Adele Lehane and colleagues

The Australian National University

Na(+)-dysregulating antimalarials: blocking the roads to resistance by understanding PfATP4 and its place in parasite physiology

The most deadly malaria parasite has acquired resistance to most antimalarials, and there is a danger of malaria becoming an untreatable disease. Cipargamin is a promising new antimalarial that targets a protein needed for salt balance in the parasite. In this project we seek to understand the ways in which parasites can protect themselves from cipargamin, and explore strategies for preventing resistance. We will also characterise other proteins that regulate salt balance in malaria parasites.

\$837,718

Dr Benedikt Ley and colleagues

The Menzies School of Health Research

Change of G6PD activity in the course of malaria

Malaria is a serious and potentially deadly disease. Following a first symptomatic phase, some malaria species develop asymptomatic forms that cause a second symptomatic phase weeks to months after the first episode. The drugs currently used to treat this malaria species can cause severe side effects in people with low activities of a particular enzyme (G6PD). This project will test whether G6PD levels increase during a malaria attack, rendering treatment much safer than what is assumed to date.

\$1,290,154

Prof. Diana Hansen and colleagues

Monash University

Immune responses to asymptomatic malaria: dissecting cellular signatures to overcome immunosuppression and improve vaccination strategies

This project will undertake a comprehensive immunological and molecular analysis of individuals experiencing asymptomatic malaria is an urgent need for new drugs. Our Ideas in an endemic area of Indonesia. The project will demonstrate that asymptomatic malaria is not benign as previously thought, providing a framework for new polices supporting massscreening and treatment of asymptomatic malaria. We will also identify critical immune responses to eradicate these persistent infections with innovative vaccination strategies.

\$873.271

Prof. Kathy Andrews and colleagues

Griffith University

Defining new mechanisms of action and resistance for the malaria drug proguanil

Malaria causes >200 million clinical cases and >600,000 deaths annually. There is no broadly effective malaria vaccine and drug resistance is a significant global problem. Thus, it is essential that we use current drugs effectively to limit parasite resistance development and to ensure their continued use. This project addresses the need to understand how existing malaria drugs work by investigating the mode of action and potential resistance mechanisms of the antimalarial drug proguanil.

\$831.316

Dr Phurpa Wangchuk, Assoc. Prof. Kate Miller and colleagues

James Cook University

Novel plant-derived anti-inflammatory drugs Antibodies, white blood cells and

Inflammatory Bowel Disease (IBD) affects 1 in 250 Australians, and its management costs \$3.18 billion per annum. Given that IBD is a lifelong disease without a cure, and its prevalence is expected to increase sharply, there Grant proposal over the next five years aims to discover next-generation IBD therapeutics from four selected tropical plants by identifying novel drug lead candidates and undertaking preclinical development using animal IBD models.

\$1.789.652

Dr Michael Duffy and colleagues

The University of Melbourne

Which Plasmodium falciparum virulence antigens elicit immunity associated with protection from severe malaria?

Malaria parasites kill by binding infected cells to blood vessel walls. The binding proteins appear more similar to each other in deadly parasites than in parasites that don't cause severe malaria. We will identify the deadly parasite binding proteins, find out whether antibodies to them are protective, investigate how they bind and determine how common the deadly parasites are. This knowledge will help to develop therapies to block binding and to assess the viability of vaccines.

\$890,588

Prof. Stephen Rogerson and colleagues

The University of Melbourne

protection from severe malaria

We study antibodies that recognise PfEMP1s. proteins expressed on malaria infected red blood cells. We will identify the most dangerous PfEMP1 types, and the most protective antibodies, using samples from severe and mild malaria. Unusually, PfEMP1 antibodies often lack a key sugar. The deadly PfEMP1 types will then be studied with white blood cells, which can clear or kill the parasites. We will study how such antibodies develop, and how they function. Our work may lead to a PfEMP1 vaccine.

\$1,020,306

News from the ASP Network for Parasitology

Dr Alessandro Uboldi and colleagues

The Walter & Eilza Hall Institute of Medical Research

The role of ubiquitination in *Toxoplasma* differentiation into latent forms

Infection with *Toxoplasma* parasites can lead to birth defects, blindness and lifethreatening disease in people with weak immune systems. Disease occurs when parasites, which can remain in a dormant state in the body for years, "awaken" to cause tissue damage. We have identified proteins that are important for the longterm maintenance of *Toxoplasma* in the body and will seek to understand their function so that we may disable them to prevent longterm infection and disease.

\$611,061

NHMRC Development Grants

Dr Bard Sleebs and colleagues

The Walter & Eliza Hall Institute of Medical Research

Development of aspartyl protease inhibitors targeting the diarrheal parasite Cryptosporidium

Cryptosporidium parasites cause cryptosporidiosis which is a severe diarrheal disease and is a leading cause of childhood mortality and morbidity. There are currently no effective drugs or vaccines to treat cryptosporidiosis. We have identified that an antimalarial drug class with a known mechanism of action also kills *Cryptosporidium* parasites. We aim to enhance the anti-cryptosporidium efficacy and advance this drug class into human clinic trials with the support of our commercial partners.

\$1,453,577

Prof. Diana Hansen and colleagues

Monash University

Uncovering the burden of asymptomatic malaria: dissecting immune responses to infection to overcome immunosuppression and improve vaccination strategies

This project will undertake a comprehensive immunological and molecular analysis of individuals experiencing asymptomatic malaria in an endemic area of Indonesia. The project will demonstrate that asymptomatic malaria it is not benign as previously thought, providing a framework for new policies supporting massscreening and treatment of asymptomatic malaria. We will also identify critical immune responses to eradicate these persistent infections with innovative vaccination strategies.

\$749,918

NHMRC Synergy Grant

Prof. Darren Gray and colleagues

Berghofer Queensland Institute of Medical Research

Ending the neglect – setting the platform for strongyloidiasis elimination in Australia

Strongyloidiasis is a disease caused by a parasitic worm and is the most neglected of the Neglected Tropical Diseases. It is a disease of poverty linked to poor sanitation and hygiene. Infection can be acute and chronic and even fatal. Surprisingly, Strongyloidiasis is endemic in rural and remote parts of Australia and disproportionately affects Indigenous communities. We will utilise a multidisciplinary approach to provide the blueprint for its elimination in Australia

\$5,000,000

ARC Discovery Grant

Prof. Alex Maier and colleagues

Australian National University

This project aims to characterise host molecules (in particular lipids) that are crucial for the transition of malaria parasites from one host to another. Malaria parasites encounter different environments upon their transition from human to the mosquito host. This project expects to generate new knowledge on physiological changes that are triggered by particular differences in micronutrient abundance that allow the parasites to survive in the new host. Anticipated outcomes include the identification of new intervention strategies and improved transmission model systems for vector-borne diseases. This gained knowledge could provide benefits to future biomedical applications by informing diagnostics or treatment of lipid associated diseases.

\$664,654

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 researchers to be paired with experienced, successful academics to discuss, plan, prioritise and set targets for their career. Arrangements for professional development and progress to be reviewed by the pair annually. Importantly, mentors need not be from an individual's home institution. The scheme covers mentorship across all aspects of working in parasitology including research, teaching, leadership, communication and outreach and other areas of professional development.

With best wishes,

Nick and Lisa

www.youtube.com/user/ASPParasiteNetwork www.parasite.org.au www.facebook.com/ASParasitology www.twitter.com/AS_Para

ASP Researcher Exchange Reports

Dawson Ling

My research exchange (17th September - Researcher conducted experiments investigating the function of previously identified protein targeted by a novel antimalarial using lipid-based metabolomic methods. Consequently, researcher has gained new technical expertise such as lipid extraction from Plasmodium falciparum parasites, Plasmodium falciparum parasite metabolism quenching, and gas chromatography-mass spectrometry (GCMS). After the exchange is completed, researcher will continue to communicate with researcher(s) at the host institution (Institute for Advanced Biosciences) to critically analyse GCMS data, as well as liquid chromatography-mass spectrometry (LCMS). This work will contribute towards previous findings during researcher's PhD and will result in a publication sometime next year (2024).



Shatabdi Paul

I had the opportunity to meet pioneering researchers in insect immunology, Professor Dr. Jens Rolff and Dr. Sophie Armityage. Malavika Menon (Doctoral student of Dr. Sophie Armityage). Malavika showed me how they artificially infect Drosophila in lab to see how they respond to infection and investigate insect tolerance and resistance.

I had met my co-supervisor Dr Md Kawsar khan who is a postdoctoral researcher in the Free University of Berlin. During my visit, we finished editing my first PhD paper and we submitted the manuscript entitled "Cooler and drier conditions increase parasitism in subtropical damselfly" in Biology Letters. We discussed about my PhD third aim where we want to understand the insects immune response to parasite infection. We have designed our experimental procedure to achieve that aim. I also gained training in immune-assays specific for insects from Professor Jens Rolf including numeration of hemocytes, and phenol oxidase enzyme activity. Now, I am planning to follow these methods in damselfly-parasite study (in my third chapter of PhD) in the parasitology and behavioural ecology laboratories at Macquarie University.

I also attended Behaviour2023 conference (Association for the study of Animal Behaviour (ASAB), from 14th to 20st of August). I have presented my research in the conference in general session on parasites and host-parasite interactions. I had met several renowned researchers in the conference, and they gave suggestions on how to improve the quality of PhD works. We also discussed the methodology to understand the impact of parasitism in insect reproductive behaviour.



Left:Dawson Ling at work

Right from top: Shatabi Paul Extracting damselfly gut to look for endoparasites; Malavika, showing how to infect Drosophila; Infecting Drosophila with bacteria; Group photo after gaining training on infecting insects (from the left Md Tangigul Haque, me, Malavika, Md Kawsar Khan, Master's student, Lab technician) with my co-supervisor, Md Kawsar Khan

ASP Researcher Exchange Reports

Maree Widdicombe

ASP student travel grant report

Maree Widdicombe, RMIT University Supervisor: A/ Prof. Nathan Bott

Outcomes:

Skills:

During my trip to Cambridge University, I began learning how to produce and interpret a transcriptome. Bioinformatics was a steep learning curve and the trip was able to provide me with support from experienced researchers that could teach me where to start and the basic skills needed to continue once I returned home. With the help of Cinzia's lab group and Dr. Oliver White I was able to produce a transcriptome and gene counts from my sequencing data which I can now continue analysing at my home institution to understand how genes are differentially expressed in fish that are infected with aporocotylids. The training from this trip will also benefit our research group as I can pass on my skills to other students and researchers wanting to learn similar methods.

Collaboration:

The trip helped to develop a working relationship between myself, Prof. Cinzia Cantacessi and her lab group and Dr. Oliver White. Cinzia was able to advise on my research and study design which has improved the output. The visit allowed us to talk about future projects and helped to continue collaborations between her research group in Cambridge and ours at RMIT University. Cinzia will also be travelling to Australia during her sabbatical and will be visiting RMIT University and giving a seminar on her research.

I was able to meet her PhD candidates James Roony, Klara Stark and Marina Papaiakovou. It was great to talk to students working in other areas of parasitology and discuss our different projects and methods. Marina also works at Natural History Museum in London and I was able to visit her and had the chance to meet Dr. Andrea Waeschenbach, Dr. lesus Hernandez-Orts and Dr. Tim Littlewood. I had the chance to see the parasite collection at the Natural History Museum and discussed future research that they wanted to complete that would align with my research and the research of Nathan Bott.

Research:

The trip to visit the University of Cambridge ensure the standard of research will be publishable and we are currently working on a manuscript from the data I analysed during Outcomes this travel. We also plan to run a workshop at the next ASP conference in Darwin which will help introduce other parasitologists to bioinformatics.

Phoebe Rivory

Collaborating organisations and researchers

7th International Workshop on Angiostrongylus and Angiostrongyliasis, Tenerife, Spain

Organisers: Dr Pilar Foronda Rodríguez (pforonda@ull.edu.es) & Dr Claudia Caterina Paredes Esquivel (claudia. paredes@uib.es)

Lab exchange at the University of the Balearic Islands (UIB), Mallorca, Spain

Host: Dr Claudia Caterina Paredes Esquivel (claudia.paredes@uib.es)

7th International Workshop on Angiostrongylus and Angiostrongyliasis

Here, I had the pleasure of meeting many of the prolific academics who have dedicated most (if not all) of their research



Presenting at the 7th International Workshop on Angiostrongylus and Angiostrongyliasis at the University of La Laguna, Tenerife, Spain.

ASP Researcher Exchange Reports

to understanding Angiostrongylus. The two-day workshop was located in the beautiful city of La Laguna and included a range of presentations from researchers from 4 continents.

I had the opportunity (as the only representative for Australia at this meeting) to present for 30 minutes about Angiostrongylus in an Australian context and discuss findings from one of my recent publications "Fatal neural angiostrongyliasis in the Bolivian squirrel monkey (Saimiri boliviensis boliviensis) leading to defining Angiostrongylus cantonensis risk map at a zoo in Australia" https://doi.org/10.1016/j. onehlt.2023.100628

The workshop included a separate day trip to Mt Teide – a 3,718m active volcano in the centre of the island.

This was my first overseas academic venture, and my first time presenting at an Angiostrongylus-focussed event. The news article published for the event can be found here: <u>https://www.ull.es/portal/noticias/2023/foro-internacional-parasito-angiostrongylus/</u>

During my two-week endeavour, I was warmly welcomed by Dr Claudia and Sebastià (an RA at the lab) where we were able to form a strong collaboration and not only exchange research ideas/ methods, but learn about each other's cultures and experience as researchers and academics.

Due to the relatively recent invasion of Angiostrongylus into Mallorca, we were able join forces and develop a new project focussing on the detection of larvae in gastropods near an 'endemic' area where definitive (rat), intermediate (slugs and snails) and accidental hosts (children) all interact. Together we decided to deploy a combination of methods, including some of which I had not performed before such as hand-made beer traps to collect gastropods, a modified Baermann for larval extraction and a conventional ITS-1 PCR. We are continuing our study and are currently still processing samples. The project will become more comprehensive as future students at the UIB are being recruited to also perform questionnaires and trap rats.

At the UIB, the two-way transfer of skills and knowledge not only allowed for me to expand my physical skill base, but it also fostered better critical thinking and confidence in my own research ideas. Through these collaborations, I was also able to broaden my academic network and gain insights into diverse research approaches.





From top:

Attendants of the 7th International Workshop on Angiostrongylus and Angiostrongyliasis at the base of Mt Teide, Tenerife, Spain

Undertaking field work with Dr Claudia Paredes Esquivel and Sebastià Jaume-Ramis as part of our collaborative project at the University of the Balearic Islands.

State News

Murdoch University

Congratulations to **Professor Una Ryan,** Murdoch University who has been named Australia's leading researcher in Tropical Medicine & Parasitology for 2024 in an article published in The Australian 's Research Magazine.

https://www.google.com/amp/s/www. theaustralian.com.au/special-reports/theseare-the-top-researchers-and-institutions-in-250-fields-of-research/news-story/8ce1607e5 b9674a63c0ebe88927081f7%3famp



Top: Una Ryan

Below: ASP members Ashleigh Peck and Xavier Barton



Exploring New Frontiers: ASP members showcase their research at the 2023 Australian Entomological Society Conference

The 2023 Australian Entomological Society's 54th Annual General Meeting and Scientific Conference, held at the Albany Entertainment Centre in Western Australia, was a significant event highlighting the latest in entomological research. Murdoch University's PhD candidates and ASP members Xavier Barton and Ashleigh Peck stood out with their innovative presentations. Xavier focused on enhancing DNA extractions from ticks for advanced molecular studies, underscoring the importance of quality in such processes. Ashleigh's presentation, titled "Adapting to big city life," explored mosquito biodiversity in urban and peri-urban settings and its role in monitoring parasites and viruses, offering crucial insights into mosquito-borne microbiota.

Tick Talk: Community Outreach on Tick Science and Safety at Perth Library

The City of Perth Library, in a valuable community outreach initiative, successfully hosted a seminar by Associate Professor **Charlotte Oskam** on "Troublesome Ticks," as part of the Harry Butler Institute series. The event, which took place on the 1st of November 2023, offered a comprehensive look into the life cycle and microbiology of ticks, drawing in an audience keen on understanding these often-misunderstood creatures. Charlotte's expertise illuminated the environmental significance and complex behaviours of ticks, providing attendees with crucial knowledge on proactive bite prevention and correct tick removal methods.



Troublesome Ticks

Tickling the Web of Science

In an innovative event designed to weave together the threads of arachnid research, Associate Professor Charlotte Oskam presented at the inaugural Western Australian Colloquium of Arachnology on the 19th of October 2023. Held to foster a web of connections among students and experts in the field, the colloquium presented an opportunity for world-class scientists to share pioneering research methods and their latest findings. Against the backdrop of Western Australia's rich diversity of over 800 arachnid species, Charlotte's presentation added a unique perspective to the assembly, characterised by her expertise in the intersection of arachnology and infectious diseases. Her focus on the molecular insights of Australian ticks provided a ticklish twist to the predominantly spider-centric session, highlighting the complexities of vector-borne diseases and their impact on public health.



Tickling the Web of Science

State News continued

Parasitology Pioneer: **Professor Una Ryan Clinches the Prestigious 2023 Elanco/ WAAVP Research Prize**

At the 29th International WAAVP Conference in Chennai, India, held from August 20-24, 2023, Professor Una Ryan was recognised with the 2023 Elanco/WAAVP Excellence in Research Prize. The event spotlighted solutions for global parasitic challenges, fittingly acknowledging her contributions to the field. As the first female recipient of the WAAVP Excellence in Research Prize since its inception, Una's achievement breaks new ground and serves as an inspiration for all researchers in the field of veterinary parasitology and scientific research at large. Her recognition underscores the significant contributions and advancements she has brought to the discipline.

Citation:

Following her graduation with a first-class honours BSc in Zoology from University College Dublin in 1988, she completed her PhD on the molecular characterisation and diagnosis of Cryptosporidium and Giardia infections at Murdoch University in 1996. Subsequently, her academic career at Murdoch has focused on research on the biology of Cryptosporidium and other zoonotic protozoa. The excellence of Professor Ryan's research is clearly demonstrated by its practical impact, for example, the publication in the Journal of Eukaryotic Microbiology (49:433-440) was the first to determine that two distinct species of Cryptosporidium, C. hominis and C. parvum, were responsible for the majority of cases of human cryptosporidiosis and led to the development of patented PCR-based methods for the detection of Cryptosporidium in clinical, environmental and drinking water samples. Importantly, Professor Ryan's research has reflected the One Health paradigm and her work has impacted policy development in relation to the use of water resources, as well as novel diagnostics. Further examples include research on Babesia, Theileria and trypanosomes of koalas, on tick-borne parasites of companion animals and on the cause of non-Bartonella tickborne diseases of humans in Australia. She has co-authored 364 original papers, 2 books, 15 book

chapters and 33 invited reviews. She was awarded the Australian Federal Minister's Prize for Achievement in Life Sciences (2000), the Murdoch University's Vice Chancellor's Excellence in Research Award (2010), the Bancroft-Mackerras Medal from the Australian Society for Parasitology for excellence in research (2014) and the Vice Chancellor's Excellence in Research Award for Distinguished and Sustained Achievement (2016). She is currently co-Editor in Chief of Parasitology Research. She has successfully supervised 21 Ph.D. students and contributes to a wide range of institutional committees. Professor Ryan's contribution to research in Veterinary Parasitology has clearly been outstanding, with significant impact not only in veterinary medicine, but across the One Health spectrum and is therefore a worthy recipient of the Elanco/WAAVP Award for Research Excellence.





Prof Una Ryan receiving her WAAVP excellence award from Ass Professor Charlotte Oskam and Dr Amanda Barbosa

State News continued

72nd Lindau Nobel Meeting in Physiology and Medicine

Dr. Siobhon Egan, Murdoch University (WA)

Since 1951, the Lindau Nobel Laureate Meetings support the exchange between different generations, scientific disciplines and cultures. Once every year, around 30-40 Nobel Laureates convene in Lindau to meet the next generation of leading scientists: 600 undergraduates, master students, PhD students, and postdocs from all over the world. Courtesy of The Australian Academy of Science and the Science and Industry Endowment Fund Dr. Siobhon Egan was fortunate to attend the 72nd meeting in Medicine and Physiology in June 2023. Here is **Dr. Siobhon Egan's** story.

Being a PhD student that begun in 2018, the final years of my project were overshadowed by the COVID-19 pandemic; as all international conferences moved virtual in 2020, it was a great opportunity to meet with world leading researchers face-to-face. I began the trip by combining it some much needed R&R (the first since I started my PhD) in the Swiss town of Lucerne and the historic city of Prague. With the support of the Academy of Science the Australian delegates spent a week in Berlin. Starting with a private tour, learning Berlin's rich history helped understand the context of the ungiue research environment in Germany. Our jammed packed itinerary included Charité University,

Humbolt University, Max Plank Institutes (Human Development, Infection Biology), the German Rheumatism Research Centre, the Charité Medical History Museum and a visit to the Australian Embassy welcomed by Ambassador Green. Highlights for me included Nobel laureate Prof. Emmanuelle Charpentier's Laboratory and of course fellow parasitology Laboratory led by Dr. Elena Levashina - which included meeting some friendly mosquitoes. We then made our way down to the town of Lindau for the 72nd meeting. It was a full and busy week, between lectures, delegate presentations, open exchange sessions (small break out groups with Noble laureates) and lots of food and drink it was hard to even call loved ones back at home. Meeting with Nobel laureates and fellow early career researchers provided some much-valued inspiration and motivation to get back to lab and make some discoveries. My personal highlight for the week was the final session on Climate Change and Implications on Health - the diverse panel consisting of Nobel laureate Prof. Peter Agre, professionals and early career researches provided some great thoughts on the challenges we face and also the innovative solutions. I really enjoyed this once in a life-time experience - as young scientists can only attend one Lindau Nobel meeting, we have been told the only way to return is to win a Nobel prize!

The inaugural Medical, Molecular and Forensic Science Research Showcase at Murdoch University

Students from Murdoch University's Parasitology group, presented (presentations or posters) at the inaugural Medical, Molecular and Forensic Science Research Showcase at Murdoch University. This day is an opportunity to communicate the research being conducted within the discipline. Ashleigh Peck, Andrew Larkins, Breanna Knight and Sandamalie Ranasinghe presented on their projects. Ash Peck won an award for a poster prize





Top: Ash Peck accepting her poster presentation award

Below: 72nd Lindau Nobel Meeting in Physiology and Medicine, with Siobhon Egan on the right

State News continued



Women in STEMM 2023 Research Symposium

This event provides a platform for women excelling in science at Murdoch University to present their research, emphasizing the diverse and inclusive research environments that foster exceptional scientific achievements. Ash Peck, Murdoch University, won the runner up oral presentation award.

Freeing the freezer of foxes

Have you ever had a deadline to get samples completed? How about losing your storage space? This was the conundrum faced by Dr Narelle Dybing from Murdoch University. Urban red foxes were collected for a project investigating significant parasites of urban red foxes including mange, heartworm and gastrointestinal helminths. The freezer space they were being kept in was being removed and they had to be either completely analysed, thrown away or condensed into smaller packages that could be kept in a smaller area. In order to clear the freezer of just over 50 foxes, Narelle put a call out for volunteers at the Murdoch University Vet School and beyond for a weeklong necropsy workshop. Each day was composed of an AM and PM session and ranged from 3 to 12 volunteers a session. Volunteers ranged from vet and animal science students wanting to learn more necropsy skills/experience, to workers from a regional biosecurity group who wanted firsthand understanding of the importance of controlling feral animals.

During the sessions, the foxes were thoroughly examined for ectoparasites, measured and weighed, then an internal

Right: Ashleigh Peck with her poster presentation award.



Narelle with some of her students volunteers

necropsy was conducted to examine internal organs then collect tissues samples and put the GI tract and head aside for later analysis. So that nothing went to waste, the rest of the body was then utilised for another project investigating the muscle anatomy of predators.

The volunteers all said they gained a lot out of the week with vet students saying their past necropsy experience had been limited to cats, dogs, chickens, and pigs. The officers from Peel Harvey Biosecurity Group said the experience was beneficial to them to demonstrate to landholders the importance of controlling red foxes in their region given the parasites red foxes can carry can spread to wildlife, pets, livestock, and humans. Some volunteers came for multiple sessions with one even cancelling her plans to come help on the final day. In the future, this may prove to be a valuable tool for getting through samples whilst providing valuable experience for students (albeit planning for a lot less samples to go through at a time).

South Australia

Gerrut Norval had great success with outreach for National Science Week with the SA libraries with talks and making clay parasites top activities enjoyed by everyone!

SA Outreach activities



State News continued



WA State news: Selection of pics from WAAVP Chennai conference including the fun run (yellow shirts)

State News continued

Victoria

University of Melbourne

Congratulations to Dr Clare Anstead who has been promoted to Associate Professor. Dr Neil Young has also been promoted to Associate Professor and has had a number of grant successes including recently becoming an Australian Research Council Future Fellow. His project will explore the genetic composition of Fasciola hepatica liver fluke populations and unravel the genetic determinants underlying triclabendazole resistance, a key drug in the armoury of those used to treat this parasite. The curation of data for Fasciola hepatica populations will underpin the development of diagnostic tests, drugs and vaccines to deliver a new generation of intervention strategies to control liver fluke disease.

Dr Vito Colella has recently been promoted to Senior Lecturer at the Melbourne Veterinary School's. In this role he continues his research investigating One Health and intervention strategies to mitigate the impact of zoonotic parasites on human populations in regions of the Asia-Pacific within the school's Parasitology Group.

Dr Luca Massetti working within the Translation Research in Parasitology Group (TRiP) at Melbourne Veterinary School has now had his PhD conferred. Supervised by Dr Vito Colella, Prof Rebecca Traub and Dr Anke Wiethoelter he has been exploring the epidemiology of canine gastrointestinal parasites from across Australia, whilst also developing numerous molecular diagnostic tools for identification of canine hookworms and lungworm.

The Translation Research in Parasitology Group (TRiP) also has a new addition;

Thi Thuy Nguyen whose PhD project is exploring the use of nanopore sequencing for the development of diagnostic tools to characterise Leishmania diversity from canines and unpick transmission dynamics in Israel and Brazil.

Recent publications from the TRiP group include one from Ushani Atapattu: Atapattu, U., Koehler, A. V., Huggins, L. G., Wiethoelter, A., Traub, R. J., & Colella, V. (2023). Dogs are reservoir hosts of the

zoonotic Dirofilaria sp. 'hongkongensis' and potentially of Brugia sp. Sri Lanka genotype in Sri Lanka. One Health, 100625.

Patsy Zendejas:

Zendejas-Heredia, P.A., Colella, V., Huggins, L. G., Schaper, R., Schunack, B., & Traub, R. J. (2023). An Integrated Coproscopic and Molecular Method Provides Insights into the Epidemiology of Zoonotic Intestinal Helminths of Dogs across Cambodia. Transboundary and Emerging Diseases, 1–15.

And Lucas Huggins:

Huggins, L. G., Baydoun, Z., Mab, R., Khouri, Y., Schunack, B., Traub, R. J., & Colella, V. (2023). Transmission of haemotropic mycoplasma in the absence of arthropod vectors within a closed population of dogs on ectoparasiticides. Scientific Reports, 13(1), 1-8.

ASP members **Professor Stuart Ralph**

and Dr Cam Raw, University of Melbourne have recently published an article on the University's website describing how "the impact of preventable parasites and infectious diseases for some Indigenous and remote communities is a national shame". https://pursuit.unimelb.edu.au/articles/ parasites-may-be-gross-but-so-is-australia-sattitude-to-indigenous-health

WFHI

Congratulations to Alan Cowman named American Society for Tropical Medicine and Hygiene Distinguished International Fellow and Alan was also awarded a lifetime achievement award at the 2023 Molecular Parasitology Meeting at Woodshole, USA.

Alex Loukas and Paul Giacomin JCU (top right)





Queensland James Cook University

Congratulations to **Dr Kate Miller** who has been promoted to Associate Professor. Congratulations to Patricia G raves for being named an American Society for Tropical Medicine and Hygiene Distinguished International Fellow.

Parasites in Focus – Halloween Hookworms

One of the scariest parasites I can think of is the hookworm, it's a perfect parasite to profile for Halloween because not only does it look terrifying up close, but also - it feeds on blood!

Hookworms are roundworms that live in the intestine of their host, once in there they feed on blood and cause helminthiases infections. Hookworm infection is found in many parts of the world, with an estimated 576-740 million people in the world infected with hookworm.

Are they always a "horror story"?

Professor Alex Loukas at James Cook A/Prof Neil Young (below) and Hookworm SEM University research focusses on parasitic worms, like hookworms. Initially developing vaccines against them, in recent years he has been investigating their possible therapeutic uses. Professor Alex Loukas and Dr Paul Giacomin are the co-founders of Macrobiome Therapeutics, a start-up biotech company that is developing helminth-derived biologics for the treatment of inflammatory diseases.

> Parasitic worms have always been here with us as we have evolved—and they are exquisitely designed to be invisible to the human immune system, despite (in the case of hookworms) implanting themselves deeply into the wall of the intestine for a blood feed. Professor

State News continued

Loukas and Dr Giacomin and their teams have discovered that hookworm secretions help to dampen the human body's immune response, by just the right amount to remain invisible, but not so much that the body becomes dangerously susceptible to other pathogens. By administering a small number of hookworms to patients with gastrointestinal autoimmune diseases, such as coeliac disease, this improves tolerance to dietary gluten by boosting the numbers of regulatory immune cells in the gut.

"We have found that, hookworm secretions (saliva) are useful for supressing all sorts of immune diseases in animal models, including inflammatory bowel disease and asthma. Using secretions has shown us that you don't need the worm. We have identified a family of lead therapeutic proteins within the saliva, and the goal now is to understand how they exert their anti-inflammatory properties, and produce them in recombinant form using standard pharmaceutical industry approaches," says **Professor Loukas and Dr Giacomin.**

OK so maybe not so much of a Halloween Hookworm after all. (ed)

NSW University of Sydney

Last week, **Nichola** (who has become quite a jetsetter) and our HDRs, **Emily, Rose, Phoebe and Thomas,** were up in sunny Darwin for the 2023 Australian Society for Parasitology conference.

Before the conference started, the team kicked off their week with a tour of the local attractions, including croc spotting on the Adelaide River and swimming under the pristine waterfalls at Litchfield National Park.(*would definitely recommend doing the croc tour AFTER any swimming activities).

At the conference, **Nichola** presented her super exciting research on the in vitro growth and development of *Fasciola hepatica* with spheroids. **Rose** presented her findings so far on the genetic diversity and population structure of canine heartworm in Australia. (FYI - to complete this exciting story...she needs more samples! So if anyone has adult heartworms from ANYWHERE in the world, please send them over!). **Phoebe** presented her research on the active larval emergence of rat lungworm from bubble pond snails into water! And last, but not least - **Emily** spoke about her 3 in 1 molecular approach to detect drug resistance to levamisole and benzimidazole in *Haemonchus* spp. Big congrats to **Em** for being awarded second most meritorious 5 minute student presentation.

We'd like to thank the Australian Society for Parasitology for hosting such a wonderful week of events, and for supporting our students with the ASP conference travel grant. See you again next year in New Zealand!





State News continued

Tasmania University of Tasmania

ASP member **Scott Carver** is interviewed about his research on sarcoptic mange in bare-nosed wombats in the Central Highlands, comparing prevalence to population decline.

https://theconversation.com/diseasein-the-dirt-how-mange-causing-mitesdecimated-a-tasmanian-wombatpopulation-211992

Congratulations to **Petra del Rocio Quezada Rodriguez and Khattapan Jantawongsri (Em)** on their graduations which took place in August this year. Further congratulations to both on securing their postdoc positions - **Petra with CSIRO and Em** at Suranaree University of Technology in Thailand. We are hoping to see you both at ASP conferences.

In September, **Petra and Barbara Nowak** attended 21st European Association for Fish Pathologists conference in Aberdeen, Scotland, where they both presented their research. Barbara also organized and run a fish histopathology workshop and a workshop on scientific publishing at that conference.

Barbara attended an Australian Academy of Science Symposium on International Scientific Collaborations in a Contested World, 13-14 November 2023.

AVPH

At the beginning of September, the Australian Society for Parasitology held its annual conference in Darwin. While the conference always boasts a broad array of presentations in the Public Health space, this year's conference had a strong focus on One Health, with presentations from a variety of researchers with topics covering various aspects of parasitology across the veterinary, human and wildlife fields. The conference opened with a One Health workshop – that highlighted the importance of One Health approaches and practices in parasitology. The workshop allowed international researchers and industry professionals to come together to discuss collaborative solutions to parasitic diseases. The conference also included a workshop on "the most neglected of the neglected tropical diseases," hosted by Strongyloides Australia, discussing approaches to Strongyloidiasis – a zoonotic parasite with significant health risks for both people and animals living in rural and remote communities. Next year's conference will take place in New Zealand and may be of interest to veterinarians working across the One Health Space.

Jessica Hoopes AMRRIC





21st European Association for Fish Pathologists conference (above) and Australian Academy of Science Symposium (below)



Petra del Rocio Quezada Rodriguez (far left) and Khattapan Jantawongsri (Em) (left) at their graduations!

www.parasite.org.au

HERMINTHOLOGY



Herminthology is a social media initiative demonstrating the possibilities for young women in science by profiling women parasitologists across all career stages.

If you think you, or something you know, deserves to be featured please contact <u>herminthology@gmail.com</u> for details.



Dr. Cecilia Power is a a postdoctoral researcher at **RMIT University** in Melbourne, Australia. Cecilia's PhD investigated blood fluke infection (*Cardicola* spp.) in the Southern Bluefin Tuna aquaculture industry and included the development of a novel diagnostic test that can be used onsite for rapid detection of blood flukes. Cecilia is passionate about improving aquatic animal health and sustainable outcomes for the aquaculture industry. Cecilia and the research team at RMIT University work on several aspects of fish parasitology, including genomics, diagnostics, epidemiology, and host immune response.

"My interest in parasitology was sparked by my research supervisor, A/Prof Nathan Bott, who has a keen interest in helminths. While working with Nathan, I came to realise that parasites were an integral (and fascinating) part of ecosystems. I love that parasites keep you on your toes. Just when you think you know a great deal about the parasite you study, they go and do something completely unexpected! I also find the people who study parasites equally as fascinating. A highlight of my research career has been joining the Australian Society for Parasitology (ASP), which has allowed me to meet some incredible people in some amazing places."

Blood flukes *Cardicola fors*teri and *C. orientalis* are the obvious choice for Cecilia's favourite parasite, but she enjoys all the weird and wonderful parasites that infect fish, including the 'tongue biting' Cymothoid isopods that masquerade as a living tongue in fish. Genius!

Cecilia was one of three lucky winners of free registration provided by Elsevier to attend the 2023 ASP conference held in Darwin, the Northern Territory. Thank you to Elsevier for supporting Cecilia's attendance, along with PhD students Rose Power (University of Sydney) and Patsy Zendejas-Heredia (University of Melbourne), both of whom have previously been profiled.



"I love that parasites keep you on your toes. Just when you think you know a great deal about the parasite you study, they go and do something completely unexpected!"

Dr. Cecilia Power Posidoctoral Researcher IBMIT University Welbourne, Australia



Herminthology

Elsevier have recently launched a new interdisciplinary journal focussing on First Nations Health and Wellbeing. A blurb on the aims and scope is below:

First Nations Health and Wellbeing - The Lowitja Journal is the official journal of the Lowitja Institute, Australia's first community-controlled research institute. It is a community-controlled, international, community member, inter- and multidisciplinary peer-reviewed open access journal that is dedicated to expanding access to First Nations research. We focus on primary research papers, systematic reviews, and informed short reports and community contributions on all aspects of the science, culture, philosophy and practice regarding health and wellbeing for First Nations communities.

All papers must include substantive contributions of First Nations authors and will be peer reviewed by experts in the field of the submitted work. While we are based in Australia and governed by the Australian National Health Leadership Forum, our Editorial Board is international and we welcome papers from First Nations researchers from all over the world, reflecting our global perspective and reach.



The Youth Mill Performing Arts Company – TYMPAC gave a very special Welcome to Country performance at the 2023 ASP Annual Conference in Darwin

SOCIETY NEWS & JOBS



Lecturer, Microbiology

James Cook University (JCU) is creating a brighter future for life in the Tropics and beyond, through education and research that makes a difference locally and globally.

We now have an exciting opportunity for a research focused **Lecturer**, **Microbiology** to join our discipline.

- Full Time, continuing |36.25 hrs per week
- Based at our Bebegu Yumba campus in Townsville or Cairns Nguma-bada campus.
- ACAD B: \$103,238 \$121,815 plus up to 17% employer superannuation contributions, leave loading and other generous employee benefits.

WHAT YOU CAN ACCOMPLISH IN THE ROLE

This Teaching and Research position, within the Discipline of Biomedical Sciences & Molecular Biology in the College of Public Health, Medical and Veterinary Sciences, and is in the area of advanced microbiology and infectious disease. The appointee supports teaching activities in the Discipline, with a focus on clinical and fundamental microbiology in the Bachelor of Biomedical Sciences and Bachelor of Medicine and Surgery degree, based in Townsville or Cairns. The research component of the role requires considerable expertise in microbiology, including modern techniques and approaches preferably as they relate to infectious disease.

The position requires the appointee to conduct original research within their research focus areas, preferably utilizing modern approaches to study microbiology and infectious disease, with a focus on illnesses which are important to people in the tropics. The appointee will become a member of a team studying and teaching advanced microbiology, with close connections to colleagues working on infectious diseases in the tropics utilizing JCU's excellent PC3 facilities.

WHAT YOU WILL BRING TO THE ROLE

- PhD in a related field.
- Teaching experience at a tertiary institution.
- Demonstrated productivity in primary research activities.
- Strong interpersonal skills and commitment to working as a member of a team.
- Ideally you will have the ability to attract extramural funding for research, either through competitive grant funding or through commercial research contracts.
- Innovative approach to learning and teaching.

WHY JCU?

JCU offers a culturally diverse working environment with opportunities for professional and personal growth – working under the values of **Authenticity, Excellence, Integrity, and Respect**. We support our people through the provision of;

- A generous superannuation scheme with up to 17% employer contributions with UniSuper
- 5 weeks of annual recreation leave
- Annual leave loading
- Cash out annual leave and time in lieu options
- 15 days paid sick/carers leave per year
- Up to 6 months paid parental leave
- 36.25-hour full-time working week
- Flexible working options
- Attractive options for salary packaging
- Staff study assistance and paid study leave
- Ongoing professional development support
- Career enhancement opportunities
- Fitness Passport
- Access to online media subscriptions
- Corporate discount on health insurance
- Free Employee Assistance Program (coaching and counselling)
- Well-equipped facilities including an on-campus childcare centre and primary school, cafes, hairdresser, post office, medical centre and gym.
- Balance of work and life so you can enjoy a lifestyle that supports a diverse range of leisure and sporting interests

HOW TO APPLY

Ready to embark on this exciting journey? Visit the Careers at JCU website and submit your application online.

Vacancy Reference Number 18753 Applications close 7 January 11.59pm



We are enriched by and celebrate our workplace diversity and welcome applications from candidates of all backgrounds and abilities

SOCIETY NEWS & JOBSJOBSSTA member news

Jobs in Parasitology

Research Projects Officer Historic Invertebrate DNA, Insect & Nematode Biosecurity Team

As Research Project Officer, you will join the Insect & Nematode Biosecurity Team located in Canberra to assist with a challenging new project which aims to uncover the historic distribution of root-knot nematodes, a group of plant parasites of economic importance in Australia. The successful candidate will use specialised DNA extraction techniques to obtain genetic information, and species-level identification, from archival museum specimens. The project has a broad customer focus and, as such, the role will involve working collaboratively with CSIRO staff from the National Research Collections Australia as well as the Australian Department of Agriculture, Fisheries and Forestry, state agriculture departments, industry bodies, universities, and consultants.

https://jobs.csiro.au/job/Canberra%2C-ACT-Research-Projects-Officer-Invertebrate-Epigenetics%2C-Insect-&-Nematode-Biosecurity-Team/946943110/

Science & Technology Australia's new President, Professor Sharath Sriram is a research rock star and a dynamic nextgeneration leader. He has an unrivalled understanding of the breadth of Australia's STEM strengths and capabilities. We're honoured to have him lead the

organisation. The STA Board has welcomed Dr Lila Landowski as a newly elected Director

Landowski as a newly elected Director and affirmed its new office bearers – our warmest congratulations to you all:

Vice-President: Jas Chambers

Governance Chair: Mark Stickells

Policy Chair: Dr Kathy Nicholson

Equity Diversity and Inclusion Committee Co-Chair: Dr Jiao Jiao Li

Interim FAR Chair: Mark Stickells (to Feb 2023)

Bench-to-Boardroom initiative Co-Chairs: Prof Mark Hutchinson and Jas Chambers

OPPORTUNITIES FOR SUBMISSIONS

A draft report from a review of pest risk assessments for spider mites. Submissions close on 28 January.

The Department of Climate Change, Energy, Environment and Water is calling for input:

feedback on the First Nations Clean Energy Strategy Consultation paper. Submissions due 31 January.

The Parliamentary Standing Committee on Public Works is conducting an inquiry into the ANSTO Nuclear Medicine Facility project. Submissions due 10 January.

Food Standards Australia New Zealand is consulting on:

the sale of honey produced by Australian stingless bees. Submissions due 17 January.

The Department of Infrastructure, Transport, Regional Development, Communications and the Arts is consulting on the Online Safety (Basic Online Safety Expectations) Amendment Determination 2023. Submissions due 16 February.

Further information: STA Director of Policy and Engagement Sarah Tynan.

GRANTS, FUNDING, AND OPPORTUNITIES

Dream Big Australia launched its STEAM Ahead program for women and non-binary university students.

CSIRO announced the India Australia Rapid Innovation and Startup Expansion Accelerator – a new accelerator program for Australian and Indian SMEs working on circular economy projects. Applications close 7 January.

Applications for Maitri Fellowships are now open for research placements in India and Australia. Applications close 15 January.

The National Centre for Student Equity in Higher Education opened for applications for Visiting Fellowships until 24 January.

The Minister for Industry and Science Ed Husic called for nominations for the Prime Minister's Prizes for Science. Nominations close 8 February.

Applications for Discovery Indigenous grants for funding commencing in 2025 are now open and close on 21 February 2024.

MEMBER NEWS

Science Meets Parliament: 20–21 March 2024

Science Meets Parliament will be even bigger, bolder and brighter in 2024. It will be held on 20–21 March 2024 in person at Australian Parliament House.

STA delivers strong benefits to members, including discounted professional services via our Member Benefits Program. Subscribe to our LinkedIn newsletter - the Science and Technology Update.

https://scienceandtechnologyaustralia.org. au/

EVENTS



Fish Health, Parasites and **Biodiversity Conservation**

January 20-24

Golfo de México Mérida Yucatán Campeche Quintana Roo Estados Unidos de América Golfo de República México exicana Océano Pacífico

XI









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ISFPXI@enesmerida.unam.mx

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EVENTS



XI International Symposium on Fish Parasites

Fish Health, Parasites and Biodiversity Conservation

January 20-24

ISFPXI@enesmerida.unam.mx

ISFPXI@enesmerida.unam.mx



https://www.parasitesrule.com/crypto2024

Volume 34 Issue No.2 December 2023

X Parasitology Summer Course (ParSCo)



Residency Course on PARASITES, ARTHROPOD VECTORS AND TRANSMITTED PATHOGENS IN THE MEDITERRANEAN AREA

29 June to 6 July 2024

A course endorsed by





SPONSORS



Boehringer Ingelheim

and with the participation of





We are pleased to announce the tenth edition of the Parasitology Summer Course (XParSCo) organized by the Parasitology Unit of the Department of Veterinary Medicine, University of Bari (Italy), with the support of the European Veterinary Parasitology College (EVPC) and of Parasites & Vectors. Over the last years, more than 120 attendees from all continents have attended the ParSCo.

https://www.youtube.com/watch?v=qpZ6F V9KQVI&feature=youtu.be

The ParSCo is an intense, one-week long course for parasitologists and postgraduate students working in the field of veterinary parasitology. This course is mostly focused on practical activities, with theoretical lectures making up less than 40% of the whole program. The program includes oral lectures and practical activities on collection, identification and diagnosis of parasites such as Leishmania infantum, TBPs, phlebotomine sand flies (e.g., Phlebotomus perfiliewi), ticks (e.g., Ixodes ricinus and Rhipicephalus turanicus), filarioids and eveworms (Thelazia callipaeda). Participants will also attend clinical examinations of cattle and other domestic animals and sample collection from dogs for the diagnosis of arthropod-borne diseases. Attendees will also have the opportunity to participate in tick collection from the environment and clinical examination of dogs, cattle, sheep, goats and reptiles.

The course traditionally takes place in Basilicata, southern Italy, in the heart of the

Mediterranean region <u>https://</u> www.youtube.com/channel/ UCQaKY0wwTxOsz9QiPAqJ0tA

For any information and the application form, please refer to the secretariat parscobari@gmail.com

Course applicants should fill the provided registration form accompanied by a motivation letter (no more than 500 words) and a recent photo to be sent to parscobari@gmail.com by the 16th January 2024.

EVENTS





LORNE, VIC

Thanks to its fresh air, white beaches and buzzing arts community along with nearby otways and relaxed Mediterranean atmosphere, Lorne has always been the favourite destination for the MAM conferences.

The committee is keen to welcome you to Lorne to take part in the knowledge sharing, make connections and network with peers!

https://mam2024conference.com.au/

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CiP Course Coordinator Stuart Ralph University of Melbourne



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