



NEWSLETTER

Volume 35 Issue No.1 April 2024



IMAGE From Pasture to Publication: Fieldwork moments in Horse-Parasites research (selfie by Ghazanfar Abbas and full interview p34)

IN THIS ISSUE

- 2 [From the President's Desk](#)
- 4 [2024 ASP AGM Teaching Excellence Award](#)
- 5 [Parasites in the Pacific 2024](#)
- 7 [The Bridget Ogilvie Medal](#)
- 8 [ASP Seminar Series](#)
- 10 [Outreach: Malaria in Queensland](#)
- 14 [ASP State Outreach NT](#)
- 15 [ASP Outreach Taxonomists](#)
- 16 [Trematodes 2024](#)
- 18 [Outreach in WA](#)
- 20 [Outreach in NSW MAM2024](#)
- 21 [ASP reviewers notice](#)
- 22 [IJP](#)
- 26 [IJP:PAW interviews with Alan Lymbery, Eliza Scott and Anson Koehler](#)
- 34 [IJP:DDR interviews with Ghazanfar Abbas, Harrison Shanley and Aya Taki](#)
- 41 [ASP Network news](#)
- 44 [Events COMBIO, ISFPXI](#)
- 49 [State News](#)
- 53 [Jobs, STA](#)
- 54 [ASP Council](#)

From the President's Desk

Dear Members,

We are well into 2024 with both teaching and research commitments underway for most of us. The new ARC Discovery EOI system will announce those who are asked to submit full applications this week and fingers crossed for those waiting nervously for this early step in the new process. Meanwhile, NHMRC applications are underway, or opening soon, for many and I wish applicants all the best as their applications come together.

Term 1 teaching is in full swing across the country and we have welcomed a new cohort of students to parasitology courses nationwide. ASP members have been leading some outstanding outreach activities to engage with both university and school students such as the Barbeque held at Lake Alexander, Darwin by Kamil Braima and Angelica Tan, Dr Rina Fu's Big DNA Workshop and Radio interviews, providing these students with an exciting entry with which to perk their interests in parasites and highlighting the opportunities available through the ASP. Special congratulations to Alex Maier (Australian National University) who was awarded science teacher of the year in the Universities Australia 2023 Australian Awards for Teaching Excellence.

With everyone being so busy, it's a good time to remind everyone of the 2024 ASP Conference to be held in Auckland New Zealand, Monday the 26th to Thursday the 29th of August. This Parasites in the Pacific Conference is a joint conference between the ASP, the New Zealand Society for Parasitology and the 7th International Conference on Anaerobic Protists. Registrations for PIP2024 are now open, with some great speakers lined up, and we hope to see you there!

It is also a great pleasure to announce the



ASP's new teaching award, The Bridget Ogilvie Medal, which will recognise outstanding teachers in parasitology. The ASP is honoured that Dame Bridget Ogilvie enthusiastically agreed for the teaching award to be named after her in recognition of Dame Ogilvie's contribution to science and parasitology, with an excellent summary of Dame Ogilvie's career available later in this newsletter. I would also like to thank Sarah Preston, Chair of the ASP Education Committee, for working to bring this major ASP award to fruition.

We have two great speakers lined up for the ASP Seminar series on the 19th of April as part of the World Malaria Day Celebrations, Sophie Collier (Uni Melbourne) and Lee Yeoh (Burnet Institute), so please join your co-chairs Stuart Ralph and Emma McHugh online for the event. The first Malaria in Queensland Symposium will be held on the 30th of April on the University of Queensland Campus. Symposium co-organisers Danielle Stanisic and Carla Proietti were also interviewed about the Symposium and their own careers in this Newsletter, which provides a great read and

From the President's Desk continued

information for EMCRs. The small, but productive, group of Taxonomists whose work underpins our understanding of the relationships between parasites and other organisms around us were recognised on Taxonomist Appreciation Day (March 19) and thanks to all those ASP members who have contributed to defining the parasites in Australia and beyond.

Our IJP Journals are going strong, and in this issue we highlight how we can help our IJP Journals and Journal Editors through contributing to peer review and taking advantage of open access agreements to publish with these world class Journals at a discounted rate. Several publications from our IJP Journals are highlighted in this newsletter along with interviews with key authors, so you can learn not just about the science but also the people behind the science.

Its been a big start to the year in science with Science Meets Parliament just completed, with ASP Secretary Ghizal Siddiqui representing the ASP and involved in some important discussions with our political leaders. Science and Technology Australia are also pressing the case for Government to increase spending on research and development to 3% of Australia's GDP, a milestone that would benefit across the sector. As part of ASPs contribution to the discussion, we will establish a Parliamentary Friendship Group that will advocate on behalf of our members diverse interests.

Finally, thank you to the ASP Executive, Council, Secretariat, Network Convenor and Education Committee for your tireless work over the last several months. Thanks also to all our amazing members and I look forward to seeing you at the Parasites in the Pacific Conference starting August 26th in Auckland New Zealand!

Best regards,

Danny Wilson

President of the ASP

www.parasite.org.au

www.facebook.com/ASPParasitology

www.twitter.com/AS_Para



A snapshot of the April 2024 ASP newsletter, lots of interviews with our early and mid career researchers, research news, events and more!

2024 Australian Society for Parasitology Annual General Meeting

The 2024 Australian Society for Parasitology Annual General Meeting will be held as a hybrid face-to-face (at the Parasites in the Pacific 2024 Conference) and online Zoom meeting on Wednesday 28 August 2024 at 5pm NZST.

Business conducted

The following business will be conducted at the 2024 Annual General Meeting of the Society. The minutes and reports for all previous ASP meetings are available on WildApricot / members / resources section. To access them please login to your Wildapricot account (<https://asp.wildapricot.org/memberresources>) and check the members resources or email the Secretary (secretary@parasite.org.au):

- receiving the Society's financial statement, and audit report, for the last reportable financial year;
- presenting the financial statement and audit report to the meeting for adoption;
- electing members of the Council (see positions vacant and nominating for ASP Council <https://www.parasite.org.au/the-society/join-the-asp-council/>);
- appointing 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.



Teaching Excellence Award for Alex Maier

Congratulations to ASP member Alex Maier, Australian National University, named "science teacher of the year" in the 2023 Australian Awards for Teaching Excellence, announced by Universities Australia <https://reporter.anu.edu.au/all-stories/anu-parasite-expert-named-science-teacher-of-the-year>

Alex was our 2023 ASP Conference Education Symposium Invited Speaker and we will feature an interview with Alex in the next ASP newsletter.



Parasites in the Pacific 2024 Conference

Please join us at the Parasites in the Pacific 2024 Conference (PiP2024) in Auckland, New Zealand from Monday 26th – Thursday 29th August 2024 at The University of Auckland, Engineering Building 401, 20 Symonds Street, Auckland, New Zealand.

Parasites in the Pacific 2024 Conference (PiP2024) is a joint meeting of the Australian and the New Zealand Societies for Parasitology and the 7th International Conference on Anaerobic Protists. You can now register for the PiP2024 Conference and submit your abstract online before the deadline 26 May 2024. See the conference website:

<https://www.parasite.org.au/aspconference/>

For the best conference rates register and submit your abstract by the early-bird deadline 26 May 2024 online <https://www.conftool.org/parasitology2024/>

The conference registration desk will open from 2pm on Monday 26 August 2024, with the Welcome Reception taking place at The University of Auckland on Monday August 26 from 6pm. The Conference scientific program will run across three full days from, Tuesday August 27, 2024, 830am and the Conference will conclude with dinner at Wintergarden at The Civic, Auckland on the evening of Thursday August 29, 2024.

Discuss the latest research and state-of-the-art technologies in parasitology and anaerobic protozoology. 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. On the first full day of the Parasites in the Pacific 2024 Conference we start

with a networking breakfast event for our research students and early career researchers. Select this event through your conference registration. The 2024 ASP AGM is scheduled to take place during the conference.

The following Invited Speakers have been confirmed;

- Professor Carmen Faso, University of Bern, Switzerland, Plenary Speaker, Elsevier Plenary Lecture Series, International Journal for Parasitology (IJP) Invited Lecturer
- Dr Ralph Vanstreels, Institute of Research and Rehabilitation of Marine Animals, Espírito Santo, Brazil, and University of California, Davis, Plenary Speaker, Elsevier Plenary Lecture Series, IJP: Parasites and Wildlife (IJP:PAW) Invited Lecturer
- Dr Petra Matoušková, Charles University, Prague, Elsevier Plenary Lecture Series, IJP: Drugs and Drug Resistance (IJP:DDR) Invited Lecturer
- Prof Upinder Singh, Stanford University, USA, Plenary Lecturer for the 7th International Conference on Anaerobic Protists
- Professor Raina Fichorova, Professor of Obstetrics, Gynecology and Reproductive Biology, Harvard Medical School, Plenary Lecturer for the 7th International Conference on Anaerobic Protists
- The 2024 Bancroft-Mackerras Medal for Excellence Winner

For social media posts please use #PiP2024

We would like to acknowledge the generous support of our Parasites in the Pacific 2024 Conference sponsors, thanks to Elsevier Parasitology and the International Journal for Parasitology (IJP), IJP DDR and IJP PAW, Elanco, New England Biolabs, Tourism New Zealand and Tātaki Auckland Unlimited.

Parents or carers with children will be able to watch and listen to the conference presentations live online during the conference in a room separate from the lecture theatres.

A multi-faith prayer room will be available during the conference.

If delegates are unable to attend due to



PiP2024 invited speakers from top, Prof Carmen Faso, Dr Ralph Vanstreels, Dr Petra Matoušková, Prof Upinder Singh, Prof Raina Fichorova.

#PiP2024 Conference

illness (like COVID-19) they will be able to watch the conference sessions live-streamed.

Please book your travel and accommodation for Auckland early so that you get the best travel deals. Check out the accommodation section on the conference website for details and always do your own research first to see if you can get a better deal. <https://www.parasite.org.au/aspconference/advice/accommodation/>

The Parasites in the Pacific 2024 Conference embraces the values of inclusiveness, social justice, environmental sustainability, scientific advancement, and education within the broader life science community. See our policy documents and code of conduct on the Conference website <https://www.parasite.org.au/aspconference/advice/policy/>

To be eligible for the 2024 ASP Student Conference Funding Scheme you must have a valid ASP Student membership by 26 May 2024 and meet all of the other criteria. Please apply for the ASP Student Conference Funding Scheme online through your Parasites in the Pacific 2024 Conference registration.

<https://www.parasite.org.au/aspconference/advice/asp-student-travel-grant/>
COVID-19

We advise all attendees (over the age of 16) to ensure that they are fully up-to-date with their COVID-19 vaccination and other relevant vaccinations prior to arrival.

We look forward to seeing you in Auckland in August!

on behalf of the Parasites in the Pacific 2024 Conference Scientific Committee Organisation

Conference Scientific Committee:

Augusto Simoes-Barbosa (University of Auckland) Conference Chair

Kathryn McRae (AgResearch NZ & NZSP President)

Danny Wilson (University of Adelaide & ASP President)

Stephanie Godfrey (University of Otago)

Una Ryan (Murdoch University)

Parasites in the Pacific 2024 Conference Sponsors



ELSEVIER



IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



Our Parasites in the Pacific 2024 Conference sponsors, thanks to Elsevier Parasitology and the International Journal for Parasitology (IJP), IJP DDR and IJP PAW, Elanco, New England Biolabs, Tourism New Zealand and Tātaki Auckland Unlimited.

Carmen Faso (University of Bern)

Upinder Singh (Stanford University)

Nick Smith (Australian Society for Parasitology)

Conference Coordinator

Lisa Jones (Australian Society for Parasitology)

Student Volunteers

Connor McHugh (James Cook University)

Maxine Smith (James Cook University)

Ashton Kelly (University of Queensland)

The Bridget Ogilvie Medal of the Australian Society for Parasitology

The Society is excited to announce the launch of a new award in honour of Dame Bridget Ogilvie. The Bridget Ogilvie Medal of the Australian Society for Parasitology is an award for an Ordinary member or Fellow of the ASP who, in the opinion of the selection committee appointed by Council, has made an outstanding contribution to parasitology education.

Nominations are now open for The Bridget Ogilvie Medal. The applicant can be nominated or self-nominated, please see the ASP website for more information about the award and how to apply.

<https://www.parasite.org.au/awards/the-bridget-ogilvie-medal/>

Please download the guidelines and complete this Bridget Ogilvie Medal Nomination 2024 and email this nomination to the ASP Secretary (secretary@parasite.org.au).

Applications for The Bridget Ogilvie Medal close 22nd April 2024.

The recipient of the Bridget Ogilvie Medal will deliver an oration at the annual conference of the Society showcasing their excellence in parasitology education, receive reimbursement of reasonable travel costs to the conference at which the medal is presented and will be a guest of the Society for the duration of the conference. The procedure for selection of the recipient is detailed in Guidelines. Diversity is an essential part of the mission of the Australian Society for Parasitology so nominations of colleagues from gender and culturally diverse backgrounds are encouraged.

Dame Bridget Ogilvie is arguably Australia's most important parasitologist having led the Wellcome Trust for many years. Her contributions to parasitology and science more broadly are immense. She is an Australian and British Scientist, born in NSW and educated in Armidale. She completed a Bachelor of Rural Science (Hons I) at the



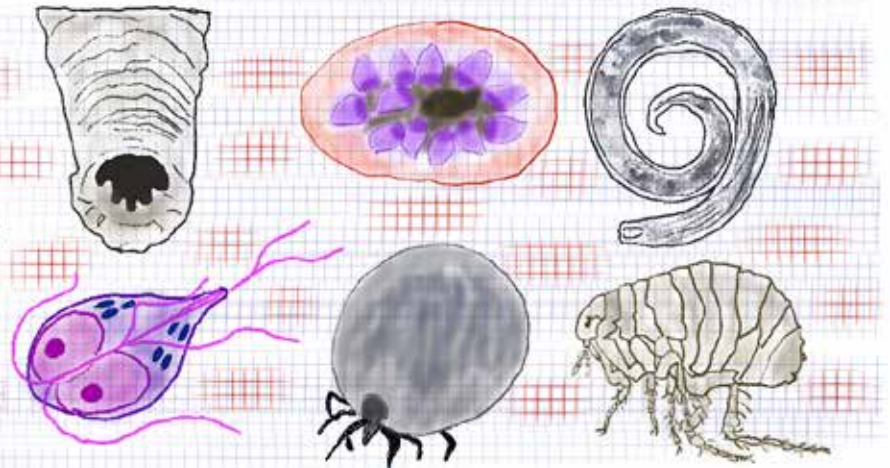
Dame Bridget Ogilvie

University of New England, graduating with the University Medal in 1960. She was awarded a Commonwealth Scholarship to attend Girton College, Cambridge, where she earned a PhD for her pioneering immunological work on *Nippostrongylus brasiliensis*. In 1981, she was appointed to the staff of the Wellcome Trust, becoming the director in 1991, retiring in 1998. During her time as the director, she established the Sanger Institute. Dame Bridget Ogilvie was the first Chairperson of the Medicines for Malaria Venture (MMV) Board. Since her retirement, she has played a significant role in public engagement with science and science in education as a trustee of the Science Museum and chair of the AstraZeneca science teaching trust. Dame Bridget Ogilvie was awarded a Companion of the Order of Australia in 2007 for services to science policy and

parasitology. Although she has achieved so much outside of the parasitology field, she has, in her own words, "remained a parasitologist though few outside this community now know this as life has led me in unexpected other directions."

We look forward to receiving nominations for The Bridget Ogilvie Medal of the Australian Society for Parasitology.

ASP Seminar Series



Seminar Series

Join our next ASP Online Seminar on Friday 19th April 2024, 1pm AEST, featuring Sophie Collier, The University of Melbourne and Lee Yeoh, Burnet Institute. This Seminar Series is part of our World Malaria Day celebrations.

Join our online ASP Seminar Series Friday 19th April 2024, 1pm AEST, featuring Sophie Collier, The University of Melbourne presenting "Locked Out and Left Behind: A Study of Organellar Inheritance in *P. berghei*" and Lee Yeoh, Burnet Institute presenting "Monoclonal antibodies and targeted vaccine design against malaria." with co-chairs Stuart Ralph and Emma McHugh, University of Melbourne. This Seminar Series is part of our World Malaria Day celebrations.

Please register online using the link below for your unique passcode to join the seminar.

<https://us02web.zoom.us/join/register/tZYkf--spj4vH90Ja2a93ZDkrrW9LoJ1YeYR>

After registering, you will receive a confirmation email containing information about joining the meeting.

Sophie Collier completed an honours

project under the supervision of Dr. Matthew Dixon and Prof. Leann Tilley at the University of Melbourne, characterising the role of formin proteins in *P. falciparum* invasion and gametocytogenesis. She is currently wrapping up her PhD project in Prof. Geoffrey McFadden's lab at the University of Melbourne. Her PhD project has focused on organellar inheritance and paternal leakage of the apicoplast and mitochondrion in *P. berghei*.

"Locked Out and Left Behind: A Study of Organellar Inheritance in *P. berghei*"

Plasmodium parasites harbour a single mitochondrion and a single relic plastid (apicoplast) at each stage of their life cycle. Both organelles are essential and used as drug targets. Previous genetic cross studies indicate that both organelles are maternally inherited during mating, but the precise mechanisms underpinning such uniparental inheritance remains unknown. To investigate organellar inheritance in a sex-specific manner, we

have developed single sex *P. berghei* lines with fluorescently tagged apicoplasts and mitochondria. Using lattice light-sheet and expansion microscopy, we show that the mitochondrion and apicoplast are absent from newly formed male microgametes through exclusion and degradation mechanisms executed during exflagellation. In turn, live-cell microscopy reveals the presence of an elongated, perinuclear positioned apicoplast and an expanded mesh-like mitochondrial network that cradles the nucleus in activated female gametocytes. To explore whether the organellar genome is degraded prior to elimination, we used digital droplet PCR analysis to show there is a substantial decrease in the copy number of the apicoplast and mitochondrial genomes in male gametocytes compared to females. Maternal inheritance systems sometimes fail—a bit of 'Adam' mitochondrial DNA occasionally gets through in humans for instance. To test for paternal leakage in malaria parasites, we set up a forced cross with a selectable polymorphism in the

ASP Seminar Series continued

Right: Our seminar speakers (from L-R)
Sophie Collier, The University of Melbourne
and Lee Yeoh, Burnet Institute



mitochondrion of the male parent. After screening 1.9 million sporozoites across seven crosses, we identified a single male leakage event, thus demonstrating for the first time that drug resistance encoded by the mitochondrial genome of malaria parasites can, very infrequently, be inherited from the male parent. Overall, this work helps to better inform future therapeutic strategies targeting these organelles and improves our understanding of how organelle encoded resistance mutations are transmitted and how this might impact malaria treatment.

Lee Yeoh is a post-doctoral Fellow at Burnet Institute in Melbourne. Lee completed a BSc(Hons) at the University of Melbourne, majoring in Botany. He then completed a PhD in the laboratories of Associate Professor Stuart Ralph and Professor Geoff McFadden, followed by a postdoctoral position with Dr Michael Duffy, both at the University of Melbourne. His research has combined equal parts bioinformatics and wet-lab work, including transcriptomics, whole-genome sequencing, molecular and cell biology, and CRISPR-Cas9. His projects have investigated the role and mechanism of alternative splicing in apicomplexans, and the function of histone modifications and epigenetic regulation of transcription in the malaria parasite.

He joined Professor James Beeson's lab in 2021 to research the immune response to *Plasmodium vivax* malaria, including research into monoclonal-antibody

technology.

"Monoclonal antibodies and targeted vaccine design against malaria"

Monoclonal antibodies have recently emerged as effective therapeutics against various diseases including cancer, autoimmune diseases, and COVID-19. *Vivax* malaria has been understudied, and there are limited prophylactics or therapeutics available. Monoclonal antibodies have been touted as a new breed of weapon against *vivax* malaria.

We recently cloned and expressed over 20 monoclonal antibodies specific to a malaria invasion ligand (PvAMA1). Promisingly, a number of these strongly inhibit parasite invasion *in vitro*. We identified an antibody that was most potent against different strains *in vitro*. Further structural studies suggest that this antibody prevents a conformation change necessary for the ligand to bind to its partner during invasion.

We also tested these antibodies with assays that test downstream immune responses, which are better associated with protection compared to invasion assays *in vitro*. Many of the inhibitory antibodies were also capable of stimulating strong downstream immune responses, suggesting that many of our monoclonal antibodies are also effective *in vivo*.

Monoclonal antibodies can allow precise

identification of specific epitopes of antigens. We observed high reactivity to a poorly-characterised part of our antigen. We speculate that this may demonstrate a novel ligand important in invasion. While this antigen has previously been investigated as a vaccine target, these developments imply the existence of an important novel region of an existing essential invasion apparatus; this may be an additional target for new vaccines or drugs.

We have identified promising novel monoclonal antibodies with potent activity, which can be prioritised as potential therapeutics. We are also elucidating the role of various domains of the antigen, potentially identifying additional drug targets or targets of immunity.

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



The Institute for Molecular Bioscience,
The University of Queensland

1st Malaria in QLD Symposium

30 April 2024



REGISTER!

<https://hsu.imb.uq.edu.au/MSQLD>

Organizers:



Denise Doolan

d.doolan@imb.uq.edu.au



Danielle Stanisc

d.stanisc@griffith.edu.au



Carla Proietti

c.proietti@uq.edu.au



Malaria in Queensland Symposium

Welcome to ASP members A/Prof Danielle Stanisic (Griffith University) and Dr Carla Proietti (University of Queensland), who are both co-chairs of the Malaria in Queensland research symposium along with Professor Denise Doolan (University of Queensland), at the Institute for Molecular Biosciences, University of Queensland, 30th April 2024.

Tell us more about the program and themes of Malaria in Queensland?

Carla: The Malaria Symposium in Queensland is a pioneering initiative designed to unite researchers in the region who are dedicated to combating malaria. Our program fosters collaboration and exchange among groups engaged in various aspects of malaria research, such as vaccine development, drug discovery, diagnostics, immunology, and parasite biology. The symposium will take place annually or biannually, rotating between host institutions to ensure inclusivity and accessibility. Our primary goal is to create a vibrant environment that encourages meaningful interactions and partnerships. At our inaugural meeting, we invited lab heads to deliver presentations, while also providing a platform for students and postdoctoral researchers to share their work through poster presentations during breaks. Looking ahead, we aim to expand participation by offering presentation opportunities to early and mid-career researchers, nurturing the next generation of leaders in malaria research. I am incredibly excited about the potential of this symposium to spark impactful collaborations and drive innovation in the fight against malaria.

Danielle: As this is the inaugural Malaria in Queensland meeting, we thought it would be helpful to “set the stage” by inviting research leaders to present a summary of their research program and highlight opportunities for collaboration. Ample time is also being provided for discussion. Research scientists and students will also have the opportunity for networking and engagement through poster presentations in the tea and lunch breaks. The symposium will conclude with an informal dinner for those who wish to attend. We would like to thank the Australian Society for Parasitology for supporting this symposium.

Tell us about the research groups that will be involved in the program?

Danielle: We are fortunate in Queensland, particularly South East Queensland, to have a critical mass of malaria research with different research groups based at University of Queensland, Griffith University (Nathan and Gold Coast campuses), QIMR Berghofer Institute of Medical Research and the Australian Defence Force Malaria and Infectious Diseases Institute and James Cook University. The scope of research covered by the different groups includes: malaria vaccine and drug development, malaria diagnostics, malaria parasite biology and malaria immunology.

Carla: Yes, we are privileged to have a plethora of world-leading researchers contributing to the fight against malaria in Queensland. Our program is enriched by the participation of experts in various fields including: i) Development of Novel Malaria Vaccines: Denise Doolan (University of Queensland); Danielle Stanisic and Michele Good (Griffith University); ii) Anti-Malarial Drug Discovery and Development: Bridget Barber (Queensland Institute of Medical Research and Biomedical Innovation - QIMRB), Kathy Andrews, and Vicky Avery (Griffith University); iii) Immune Response to Malaria Parasite: Michele Boyle and Chris Edwenga (QIMRB); iv) Drug Resistance and Diagnostics: Dr. Qin Cheng and Mike Edstein (Australian Defence Force Malaria and Infectious Disease Institute - ADFMIDI). These researchers represent just a fraction of the diverse groups working at the forefront of malaria research in Queensland.

World Malaria Day, 25 April, aims to keep malaria high on the political agenda, mobilize additional resources, and empower communities. How is this symposium helping that cause?

Danielle: I think we all recognize how

important collaboration is in science and that we cannot all be experts at everything. Collaboration allows acceleration of research and fast-tracking of projects by bringing together a strong research team with relevant expertise. This is also looked upon favorably by funding groups. We hope that this symposium will allow malaria researchers to network, discuss their research programs, identify key opportunities for collaboration which will benefit their malaria research and hopefully this will translate into some new collaborative funding applications. We hope that this will become a bi-annual or annual event, enabling sustained engagement between Australian malaria researchers.

Carla: The Malaria Symposium in Queensland is instrumental in supporting the goals of World Malaria Day by ensuring that malaria remains a top priority in research discussions and grant applications. Through dynamic presentations and robust exchanges of ideas, we cultivate innovative collaborations among experts from various interdisciplinary research fields. Our objective is to develop cutting-edge malaria research programs that drive advancements in prevention, diagnosis, and treatment, ultimately accelerating progress in the fight against this disease.

Taking on volunteer leadership positions can be challenging with a full academic career, how do you balance the two and what are the rewards of volunteering your time?

Danielle: It can be very challenging, and I won't pretend that I always get the balance right. I just try my best to work according to priorities and deadlines. This can often mean some late nights and work on the weekend, but I like to be able to give back to the research community and create opportunities for professional development for other researchers.

Malaria in Queensland Symposium cont...

Carla: Balancing volunteer leadership roles alongside a demanding academic career can indeed be quite challenging, especially when managing other responsibilities such as parenting, navigating life as an expatriate without familial support, and carving out personal time. To manage these obligations effectively, I rely on multitasking and strict prioritization. I recognize the invaluable nature of time and ensure that every moment is dedicated to endeavours crucial for my professional growth, family well-being, or personal development. While I prioritize tasks essential for career advancement, such as grant applications and publications, I also make room for volunteering activities such as reviewing papers, grants, and organizing symposiums and conferences. While it's crucial to avoid overcommitment, engaging in some volunteer work can be enriching and enjoyable. For example, reviewing papers and grant applications not only sharpens my writing abilities but also helps me develop critical thinking, which I then apply to my research to write better papers or draft more successful grant proposals. Additionally, as someone who enjoys social interactions, I find immense satisfaction in organizing symposiums and conferences and fostering connections within the academic community.

Danielle, please tell us more about your background, what exciting research are you working on currently?

Danielle: My entire research career has been focused on malaria and I have been fortunate to work in many different places, including Papua New Guinea, New York and Melbourne, as my career has progressed. My current research program, which I co-lead with Professor Michael Good, is primarily focused on developing novel malaria vaccine candidates and spans the entire spectrum from pre-clinical vaccine development through to early phase clinical trials. As part of this, I have had the opportunity to lead 6 malaria-focused clinical studies in collaboration with clinicians at the Gold Coast University Hospital. Our lead vaccine malaria candidate is a whole parasite



A/Prof Danielle Staniscic (Griffith University) co-chair of Malaria in Queensland Symposium

blood-stage vaccine that is formulated with liposomes. We will be evaluating this in a Phase I clinical trial later this year. I am also applying this same vaccine platform to other pathogens of medical and veterinary importance. We have completed pre-clinical development for a vaccine targeting the Babesia parasite, which is closely related to the malaria parasite. We are now focused on progressing this technology to develop a next-generation babesiosis vaccine for cattle and a human babesiosis vaccine. In collaboration with researchers at the Tick Fever Centre and Professor Al Tabor, we will be evaluating our babesiosis vaccine in cattle later this year.

Danielle, what led you to become a malaria researcher and what continues to inspire you?

Danielle: I first knew I wanted to work on the malaria parasite during a lecture in one of my 3rd year parasitology subjects at the University of Queensland. I was fascinated by how clever the parasite was – how it had evolved over millennia to co-exist with the human host. I approached the guest lecturer – Professor Michael Good – about undertaking a 3rd year research project in his laboratory which then led to an honours degree and a PhD. For my second post-doc position, I had the privilege of being

based at the Papua New Guinea Institute for Medical Research in Madang. It was here, in this malarious region of PNG, that I truly comprehended the reality of those devastating statistics that we all quote in every research paper we write. It really highlighted for me how important it is to develop new ways to prevent and control malaria, including developing a highly effective vaccine. That led me to where I am today.

Carla, please tell us more about your background, what exciting research are you working on currently?

Carla: My background consists of a master's degree in physics and a PhD in Molecular Pathogenesis and Immunology of Malaria. Following my Physics degree, I have been fortunate to secure a prestigious international PhD scholarship, which enabled me to receive training at world-leading institutions such as Imperial College London and The London School of Hygiene and Tropical Medicine. Throughout this period, I gained expertise in statistics, bioinformatics, and molecular immunology and epidemiology.

One significant aspect of my research involved conducting fieldwork in malaria-

Malaria in Queensland Symposium cont...

endemic areas of Uganda, where I studied the impact of malaria transmission on acquired immunity. Inspired by the pioneering work of Denise Doolan in malaria immunology, I joined her team at QIMR Berghofer for a post-doctoral position after completing my PhD. For the past 12 years, I have led the computational aspect of her research, using omics technology and artificial intelligence to identify promising vaccine candidates from vast datasets. Some of these candidates are currently undergoing testing in animal models, funded by NHMR and the National Foundation. While my primary focus has been on malaria, my expertise in omics analysis has led me to explore other research areas. Recently, I have applied my expertise in the identification of serological biomarkers for virus infection-related cancers. I am now transitioning into autoimmune and neurodegenerative diseases, particularly Multiple Sclerosis, with a project recently funded by MS Australia.

Carla, what lead you to become a malaria researcher and what continues to inspire you?

Carla: My journey into malaria research began unexpectedly during my post-degree travels in Australia. While there, I came across a Nature Biotechnology paper discussing gene-drive technologies for combating malaria, which deeply fascinated me. This prompted me to reach out to the corresponding author and inquire about a PhD position in his group. Shortly after my return to Europe, I secured the position through an international PhD scholarship, which allowed me to train and perform my research in several institutions in Europe and Africa.

What continues to inspire me is the opportunity to make a tangible impact on malaria research and global health. Malaria remains a significant burden, particularly in developing countries, and I am driven by the potential to contribute to innovative solutions that can alleviate this burden. Additionally, the collaborative nature of scientific research, the challenges associated with understanding and combating this resilient parasite, and



Dr Carla Proietti (University of Queensland) co-chair of the Malaria in Queensland Symposium

the prospect of working alongside passionate researchers fuel my motivation to push boundaries and advance our understanding of malaria prevention and treatment strategies.

Do you have any advice for our ASP members who are early career researchers, or just starting their PhD?

Danielle: I would recommend building a good support network – both in your personal and professional life. Find a good mentor (or mentors) early in your career. They can provide important and helpful support and advice relating to your career goals and aspirations. Research can be incredibly rewarding but it can also be very challenging. Working on something that you are passionate about will help you get through the frustrating and challenging times which we all have.

Carla: For early career researchers embarking on their PhD journey, my advice is straightforward: follow your passion, seize opportunities, and set high goals. Before committing to a PhD or postdoc position, it's crucial to research your options thoroughly. Look for reputable institutes and groups with a strong publication record, and most importantly,

choose research topics that genuinely interest you.

Be open to change along the way. My own journey began with Physics, then moved through molecular biology, epidemiology, and immunology, eventually focusing on multi-omics technologies and Artificial Intelligence for vaccine and biomarker discovery. Each shift broadened my understanding and skill set. So, my advice is to stay open-minded and adaptable to new opportunities and directions.

Thanks so much Danielle and Carla, and best wishes for the Malaria in Queensland Symposium!

Northern Territory

Report on ASP Outreach Event in Darwin, NT.

Outreach activity in the Northern Territory

ASP members Kamil Braima and Angelica Tan (Menzies School of Health Research, Charles Darwin University) organised a parasitology outreach at Lake Alexander (East Point Reserve, Darwin) on Saturday 16th March 2024.

The ASP Outreach Event aims to promote the Australian Society for Parasitology (ASP) among students, staff and the general public in the Northern Territory. It is designed as a fun and informative gathering to increase awareness about the ASP and encourage membership within the community.

Informational materials including a giveaway of 'History of Parasitology in Australia' books and distribution of ASP membership flyers. Participants were given additional incentive to join ASP as student Members for the opportunity to secure travel grants for the 2024 ASP conference in Auckland.

Event activities included a sausage sizzle, Parasitology BINGO game, and "Pun(n)y Parasite Puns" by Richard Lew (Menzies HDR student).

The event was attended by Menzies HDR students, Research Assistants, and staff from the Menzies Ramaciotti Centre.

Vetoquinol kindly provided the resources for the Parasitology BINGO game.



Above: Images from NT ASP Members event in Darwin.

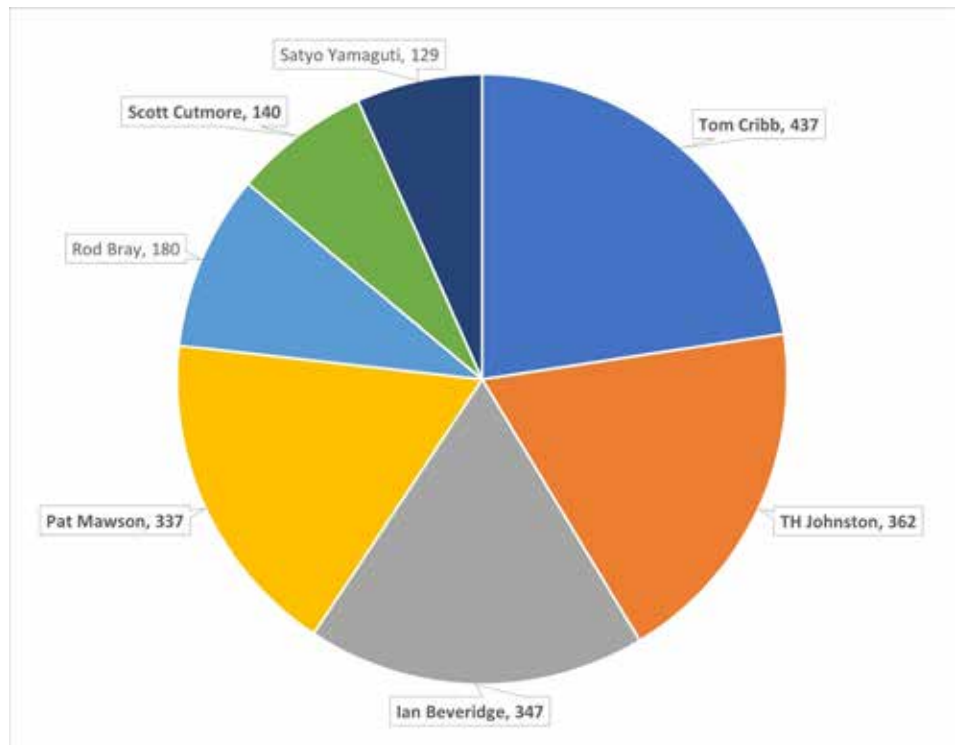
Remarkable Taxonomists

Taxonomist Appreciation Day, March 19: let's celebrate our parasite taxonomists, says ASP Archivist Dr Haylee Weaver.

Did you know that there's a special day to celebrate taxonomists, and the work they do? Taxonomy is the science of discovering, describing and classifying species, and the work of taxonomists provides the cornerstone of our understanding of biodiversity – and the flow-on application of that knowledge for ecological management, conservation, biosecurity, human and veterinary medicine, agriculture and fisheries, and even research and discovery for drug targets and diagnostics. Taxonomist Appreciation Day was initiated as a tongue-in-cheek event in 2012, but has grown to become a global movement to recognise the increasingly small, and often under-resourced and under-valued, group of scientists that bring order to the world by providing the framework for how we understand biodiversity.

In Australia, there is a small but highly industrious group of parasite taxonomists who have named most of our known species to date. This analysis was restricted to the phylum Acanthocephala, the parasitic orders Rhabditida and Spirurida within the Nematoda, and the platyhelminth classes Cestoda, Monogenea and Trematoda (let's call them the 'wormy group'). There are many more parasite groups (e.g., pentastomes, ectoparasites, protozoans, dicyemids etc), but the wormy group is where most of the taxonomic research has been centred in recent years.

For our wormy group, there are at least 3,392 named species present in Australia (data as of 14/02/2024, from <https://biodiversity.org.au/afd/home>). The chart to the right shows the number of species from the wormy group named by the most prolific of parasite taxonomists who have described over 100 species. The Australians in the chart (Tom Cribb, TH Johnston, Ian Beveridge, Pat Mawson and Scott Cutmore) have collectively described and classified 47% of the overall wormy fauna in Australia. Other notable parasite taxonomists



Above: The number of species from the wormy group named by the most prolific of parasite taxonomists who have described over 100 species. The Australians in the chart (Tom Cribb, TH Johnston, Ian Beveridge, Pat Mawson and Scott Cutmore) have collectively described and classified 47% of the overall wormy fauna in Australia.

including Lesley Smales (Warner), Terry Miller, Dave Spratt, Ian Whittington, Hugh Jones, Storm Martin, Matthew Nolan and Leslie Chisholm, and many more, have named a further 31% of the total known species. In total, Australian parasite taxonomists have named 78% of our known wormy group in Australia.

It's a truly mammoth job to discover, describe and name species. It is estimated that over 70% of Australia's overall biodiversity is yet to be discovered, and for parasitic nematodes and helminths the estimates are similar, with approx. 32% described so far. The work of our Australian parasite taxonomists is truly remarkable, for having such strong productivity despite a relatively small, often already retired, workforce spread across a diverse range of parasite taxa. Australian parasite taxonomists, enjoy your day of recognition :)



Above: ASP Archivist and taxonomist Dr Haylee Weaver, Director, Biodiversity Science & Knowledge Section, Department of Climate Change, Energy, the Environment and Water



The inaugural international meeting for trematodology

Trematodes 2024

Brisbane, Australia

8th–13th Sept.

Themes: taxonomy, evolution, biogeography, life cycles, physiology, systematics, ecology, genetics, challenges & opportunities.

Program

- Four days of trematode talks
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- Topical discussion-based symposia sessions
- Non-hybrid: live only, no tech interruptions

Social: reception, dinner and excursion

We want your talk or poster!

<https://www.trematodes2024.com>

Trematodes 2024 is kindly supported by the Australian Society for Parasitology and the Queensland Museum



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Prof. Vasyl Tkach U North Dakota

Dr Tom Cribb Queensland Mus.

...and more to be confirmed!

Registration includes visit to Australia Zoo



Trematodes 2024

Interview with the Trematodes conference committee members.

Welcome to ASP members Storm Martin, Murdoch University and Scott Cutmore, Queensland Museum who are both on the organizing committee for Trematodes 2024, 8th–13th September, Queensland Museum, Brisbane, Australia <https://www.trematodes2024.com/>

Tell us about the conference program.

Trematodes 2024 is the inaugural conference specifically for trematode researchers. We anticipate an exciting, collegial and productive meeting. The programme is dual format, with invited and submitted presentations in the mornings and symposia in the afternoons. At the symposia sessions we will discuss pressing challenges and opportunities and develop global strategies and collaborations to galvanise the community. Our meeting emphasises promotion and facilitation of new collaborations and mentorships. The sessions will be a single stream, so all participants will have the opportunity to present to all attendees. The themes of the meeting are broad, and will include taxonomy, evolution, ecology, biogeography, physiology and life cycles.

Tell us more about your background, what lead you to become a trematode researcher?

Storm: I arrived at trematodes through affinities for taxonomy and the sea, rather than a background in parasitology. It seems to me that a typical undergraduate biology student is exposed to few dedicated taxonomists during their degree. My experience was two. Both happened to specialise on parasite faunas, but it was Tom Cribb's propensity for conducting field expeditions to remote tropical islands that convinced me to pursue trematodes in marine fishes. There remains enormous trematode richness waiting to be discovered and described, to be found in all vertebrate lineages and all habitats worldwide; the task ahead is exciting.

Scott: I have always had a passion for everything marine. My entire youth was spent at the beach on or the mudflats of Moreton Bay, fishing every day that I had free. When deciding on a direction for my

university studies, I was squarely focused on marine biology; what aspect of marine biology was less clear though. I developed a real interest in marine parasites during my undergraduate degree, principally due to the enthusiasm for the subject delivered by one of my lecturers at the University of Queensland, Tom Cribb. I completed my PhD under the supervision of Tom, documenting the rich cestode fauna infecting sharks of Moreton Bay. Since then, I have continued my collaboration with Tom, first at the University of Queensland and now at the Queensland Museum, with my focus shifting to the diverse but largely undescribed fauna of Australian trematodes.

Storm, can you tell us more about your career as an academic and do you have any advice for our ASP members who are early career researchers, or just starting their PhD?

I am approaching the end of my first postdoctoral appointment, funded by an ABRS taxonomy fellowship. My project proposal was ambitious. I completed my PhD in Queensland, under Tom and Scott. The contribution to trematode research from their team has been substantial, and the Queensland fauna is now perhaps the best known worldwide. Instead of continuing there, I decided I needed to venture out from the shadow cast by my supervisors. The Western Australian fauna is a veritable frontier, and taxonomic progress in the Indian Ocean lags far behind the Pacific and Atlantic. Starting a new, independent research programme at a new institute, finding my place in the community, growing a new team, acquiring equipment and figuring out field logistics has been challenging, demanding and expensive, and has temporarily disrupted my productivity. Simultaneously, the demands have propelled my maturation as an independent researcher, and there is great opportunity to lead the Indian Ocean region. My broad, long-term objectives are to characterise the Indian Ocean fauna, build taxonomic capacity around the region, and contribute novel insights to trematode biogeography and evolution through comparisons with Queensland. Freedom, independence, adventure and ambition have driven my career narrative, and so far, more sensible, secure and lucrative paths have eluded me. I'm not sure I am yet in a position to offer advice, and I wouldn't necessarily recommend others follow a path similar to mine, but I

can say that I enjoy what I do, have enjoyed the journey here, and look forwards positively.

Scott please tell us more about your career within the Queensland Museum, what sort of work do you do day-to-day?

I still consider myself a bit of a newcomer to the Queensland Museum, only joining the museum in July 2022 as a Senior Scientist and the Curator of Parasitology. I am very lucky in that my position is completely research focused, so my day-to-day work is primarily spent in the laboratories here at the museum, processing specimens we have collected from the Great Barrier Reef and elsewhere in the tropical Indo-west Pacific. While I work broadly on the trematodes infecting Australian fishes, my currently research focus is one of the least-studied group of trematodes in Australia, those infecting herbivorous reef fishes. Herbivory is a secondarily derived diet in fishes, shared convergently by several key fish families common on coral reefs. The dietary overlap of these fishes leads them to share a distinct guild of trematodes, most of which have received little attention in Australian waters. Because they have received little focus to date, I needed to start from scratch for a lot of the fauna. This meant new sampling on the Great Barrier Reef; in the last two years I have had the pleasure of conducting trips with my usual partners in crime, Tom, Storm and Nick Wee, as well as other talented parasitologists such as Rod Bray and Tim Littlewood from the Natural History Museum (London) and Delane Kritsky from Idaho State University. On these trips we have examined over 700 fishes, from which we collected a wide range of trematodes. These new specimens add to Tom's enormous collections (held here at the Queensland Museum) from over 20,000 fishes. So, with this gigantic dataset in front of me, my day-to-day varies from staining and mounting permanent morphology specimens, sequencing specimens from around the Pacific to inform biogeography, deciphering morphometric differences in almost cryptic species, and writing papers to formally describe the species we found. While there are certainly too many new species in these collections for me to describe (likely hundreds of new species just in the Australian material), I will at least try to make a dent in the collection.

Outreach activities in Western Australia

Let's find out what our fabulous outreach extraordinaire ASP member Dr Rina Fu has been up to in Western Australia!

The Big DNA Workshop

As part of the City of Belmont's 'STEAMing' hot Summer Holiday Program, Dr Rina Wong (Fu) was invited to run a 'The Big DNA Workshop' for families with children aged 5 to 12 years. The event was held on the 20th January 2024, where Rina designed a family-centred workshop featuring an interactive presentation, games and experiments using authentic scientific equipment. Rina also highlighted her real-world research using DNA. Keeping to her musical style, Rina took on board her engaging children in science (ECIS) team's suggestion to compose a DNA song. It was a whirlwind of packing the van, song-writing on the drive to her university work, figuring out the chords at 11pm and performing within 24-hours! Grown-up volunteers from the audience pitched in to play percussion whilst little scientists jumped in to be back-up singers. It was abit of crazy-fun with a good laugh as Rina taught the kids, parents (and herself) to sing about 'Deoxyribo, nucleic acid'.

"The workshop was catered for 100 participants, so there were many test tubes to count! But it was all worthwhile and so heart-warming to see how grandparents, parents and kids were bonding through doing fun science together", Rina recalls fondly.

Rina was joined by her ECIS team members, comprising of lecturers and undergraduate students from Edith Cowan University and Curtin University, PhD candidates from Curtin Health Innovation Research Institute, retired scientist from The University of Western Australia and lab technician from PathWest. For the first time, the team comprised of two bright young STEAM advocates from Scotch College (15 years old) and Takari Primary School (8 years old). It was a wonderful collaborative effort across universities and three (possibly four) generations of



Photo: The inaugural (and totally unrehearsed) performance of Rina's new song 'Brainiac's DNA' at The Big DNA Workshop, City of Belmont.

scientists.

The event also served as a platform for sharing about Rina's picture storybook, My Mad Scientist Mummy, a project supported by the ASP since 2018. Seven years on, it is still having an impact in the community.

Dr Rina on Radio talking about Poop, Teeth & More

This year, 98.5 Sonshine FM is introducing a Science segment on Monday at 5pm. Show producer Telana Kruger has invited Rina back on the show on a fortnightly for this term. Her latest topic was all about poop with a take home message about washing your hands after gardening or playing in the dirt to avoid ingesting parasite eggs into your tummy!

"I remember arriving in Cairns for the first time to attend my first ASP public talk, it was a memorable one by Prof. Peter O'Donoghue, that's when I extended my vocab to include 'coprology'!" Rina giggles as she reflects on her inspiration for her radio interview topic. "I'm so proud to be a parasitologist, and there's no shame in talking about poop on air! In fact, the host did a survey asking the radio station's staff about science topics they might be interested in, and poop was right at the top! So, she was so pleased to receive my email suggesting we talk about poop!"

The radio station says if they receive good audience engagement, they will consider keeping this science segment. So any ASP members please help spread the word and do join us via the live radio player. Take a moment to sms or email through your positive feedback!

SMS: 0429 985 985. Email: reception@sonshine.com.au

Listen to Live Radio: <https://sonshine.com.au/player/?station=fm>

Article link:

<https://sonshine.com.au/why-is-poop-brown-dr-rina-fu-explains-the-science-behind-poop/>

Outreach activities in Western Australia cont...



Clockwise from top left: Intergenerational team challenge – who can build the longest DNA ladder.

Dr Rina, as she is affectionately known, celebrating with participating little scientists about their successful DNA extraction.

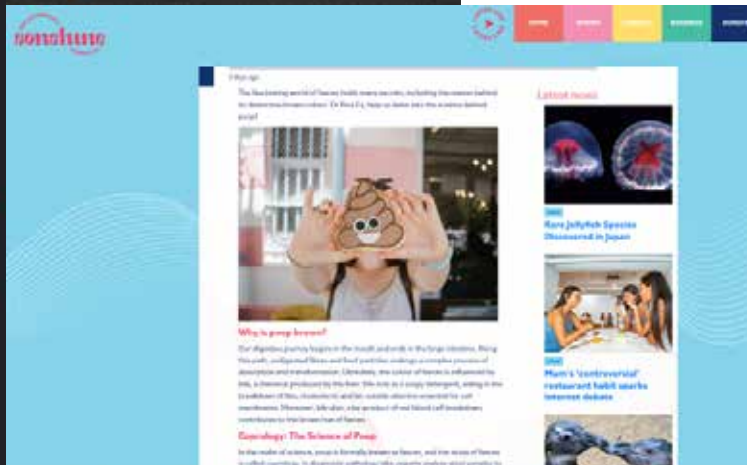
Dr Rina posing with little scientist Caden with holding his new, author-illustrator-signed book.

Producer Telana Kruger and Dr Rina at 98.5 Sonshine FM.

On Air with Bec at 98.5FM, for the Bec Show.



A post-pack-up Kodak-moment. Scientists from Rina’s Engaging Children & Community in Science (ECIS) Team (left) Dr Padraig Strappe, Corina Ionescu, Hannah O’Mahony, Dr Rina Fu, Astrida Fu, Oscar Ho, Maharshi Bhavani, Dr Krystyna Haq.



Provocations Public Lecture Event

Parasites, Australia's silent threat: Coincidence, nature's hand, or policy complacency?

Shokoofeh Shamsi

Charles Sturt University

Australia is facing a surge in parasitic incidents that have increasingly captured news headlines: Australia gives up the fight against eradication of bee mites; Oyster farms are under siege from deadly parasites; native fish fall victim to gut-burrowing invaders, and the country's unique native wildlife faces the deadly threat of cat-borne parasites. Most shockingly, a python worm was recently extracted from a human brain. Despite this growing wave of parasitic challenges, Australia's tendency to downplay their significance is surprising.

This public lecture explores the heart of this enigma, exploring the origins, implications, and possible human factors contributing to Australia's parasitic predicaments. Are these occurrences mere coincidences, driven by the forces of Mother Nature, or do they serve

as stark reminders of complacency within the policymaking domain?

Charles Sturt University - TEQSA Provider Identification: PRV12018 (Australian University). CRICOS Provider: 00005F

Watch this presentation: <https://youtu.be/CrJOnNLOdv4?si=tniOH5j1UCNZuzvP>

Listen also to a recent interview with ABC Illawarra where Shokoofeh discusses the fascinating world of parasites and their impact on both humans and animals. Click the link below to listen to the interview from 2:07:30 to 2:19:15 and learn more about these often-overlooked organisms.

https://www.abc.net.au/listen/programs/illawarra-breakfast/illawarra-breakfast/103562910?utm_campaign=abc_listen&utm_content=link&utm_medium=content_shared&utm_source=abc_listen



Shokoofeh Shamsi

MAM 2024



The ASP sponsored the Drug Discovery lunch time workshops at MAM2024. (L-R) Ghizal Siddiqui at MAM2024; Workshop presenter Dr David Olsen, Merk, Ghizal Siddiqui, Hayley Bullen, Brian Cooke; Ghizal Siddiqui, Hayley Bullen.





ELSEVIER

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



IJP INTERNATIONAL JOURNAL FOR PARASITOLOGY

Drugs and Drug Resistance



IJP INTERNATIONAL JOURNAL FOR PARASITOLOGY

Parasites and Wildlife

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Please accept ASP Journals review requests where you can or provide a suitable alternative reviewer (including EMCRs that will aid career development).

If you an ECR looking to build a track record in peer review, get a head start with the IJP suite of journals by logging in or creating a profile at the Elsevier "Reviewer Hub" (<https://www.elsevier.com/reviewer>). Then simply select the IJP journals you would like to review manuscripts for and editors will be notified when looking for suitable reviewers!

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IJP

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[November \(53:13\)](#)

[Grecco, A., Macchiaroli, N., Pérez, M.G., Casulli, A., Cucher, M.A., Rosenzvit, M.C., 2023. microRNA silencing in a whole worm cestode model provides insight into miR-71 function. Int. J. Parasitol. 53, 699-710.](#)

<https://doi.org/10.1016/j.ijpara.2023.08.002>

[Cover caption: Mesocostoides vogae infection in mice. Original image created by Andrés Grecco, Universidad de Buenos Aires, Argentina.](#)

International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



[December \(53:14\)](#)

[Gupta, A., Duncan, M., Sweeny, A.R., de Araujo, L.S., Kwok, O.C.H., Rosenthal, B.M., Khan, A., Grigg, M.E., Dubey, J.P., 2023. The same genotype of *Sarcocystis neuronae* responsible for mass mortality in marine mammals induced a clinical outbreak in raccoons \(*Procyon lotor*\) 10 years later. *Int. J. Parasitol.* **53**, 777-785.](#)

<https://doi.org/10.1016/j.ijpara.2023.08.001>

[Cover caption: Artistic rendition of *Sarcocystis neuronae* sarcocyst in muscle of a naturally infected raccoon.](#)

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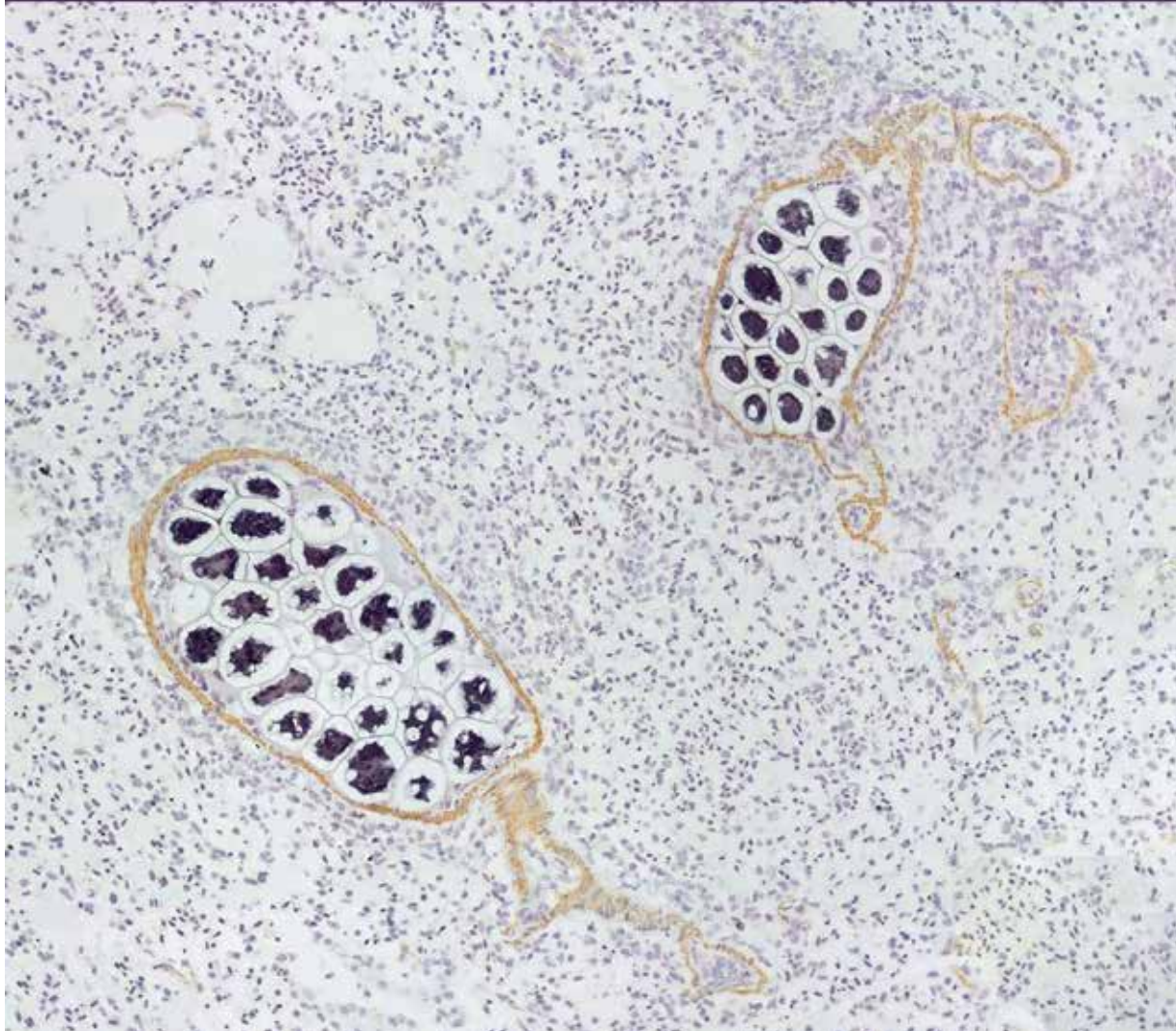
[January \(54:01\)](#)

[Himmel, T., Harl, J., Matt, J., Nedorost, N., Lunardi, M., Iqūnas, M., Iezhova, T., Valkūnas, G., Weissenböck, H., 2024. Co-infecting Haemoproteus species \(Haemosporida, Apicomplexa\) show different host tissue tropism during exo-erythrocytic development in *Fringilla coelebs* \(Fringillidae\). *Int. J. Parasitol.* 54, 1-22.](#)

<https://doi.org/10.1016/j.ijpara.2023.07.004>

[Cover caption: Massive intravascular merogony of an avian Haemoproteus parasite in lung blood vessels.](#)

ISSN 0020-7519 VOLUME 54 ISSUE 1 JANUARY 2024



International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



ISSN 0020-7519

VOLUME 54 ISSUE 2 FEBRUARY 2024

[February \(54:02\)](#)

[van der Schoot R.J., Hoeksema B.W. 2023. Host specificity of coral-associated invertebrates and its relevance for coral-reef biodiversity. *Int. J. Parasitol.* 54, 65-88. <http://dx.doi.org/10.1016/j.ijpara.2023.09.002>](#)

[Cover caption: The barnacle *Cionophorus soongi* as a parasite of the coral *Astreopora myriophthalma*. Photograph provided by Bert W. Hoeksema.](#)





<https://www.sciencedirect.com/journal/international-journal-for-parasitology-parasites-and-wildlife>

Editor: R.C. Andrew Thompson

Facebook: www.facebook.com/IJPPAW/

Please enjoy three fabulous interviews from ASP members Alan Lymbery, ASP Student member Eliza Scott, and Anson Koehler about their recently published IJP:PAW papers.

Alan J. Lymbery, Nico J. Smit, Conservation of parasites: A primer, *International Journal for Parasitology: Parasites and Wildlife*, Volume 21, 2023, Pages 255-263, ISSN 2213-2244, <https://doi.org/10.1016/j.ijppaw.2023.07.001>

<https://www.sciencedirect.com/science/article/pii/S2213224423000536>

Abstract: Although parasites make up a substantial proportion of the biotic component of ecosystems, in terms of both biomass and number of species, they are rarely considered in conservation planning, except where they are thought to pose a threat to the conservation of their hosts. In this review, we address a number of unresolved questions concerning parasite conservation. Arguments for conserving parasite species refer to the intrinsic value conferred by their evolutionary heritage and potential, their functional role in the provision of ecosystem services, and their value as indicators of ecosystem quality. We propose that proper consideration of these arguments mean that it is not logically defensible to automatically exclude parasite species from conservation decisions; rather, endangered hosts and parasites should be considered together as a threatened ecological community. The extent to which parasites are threatened with extinction is difficult to estimate with any degree of confidence, because so many parasite species have yet to be identified and, even for those which have been formally described, we have limited information on the factors affecting their distribution and abundance. This lack of ecological information may partially explain the under-



Native fish (*Galaxias maculatus*) with a nematode and trematode infection (photo credit: David Morgan).

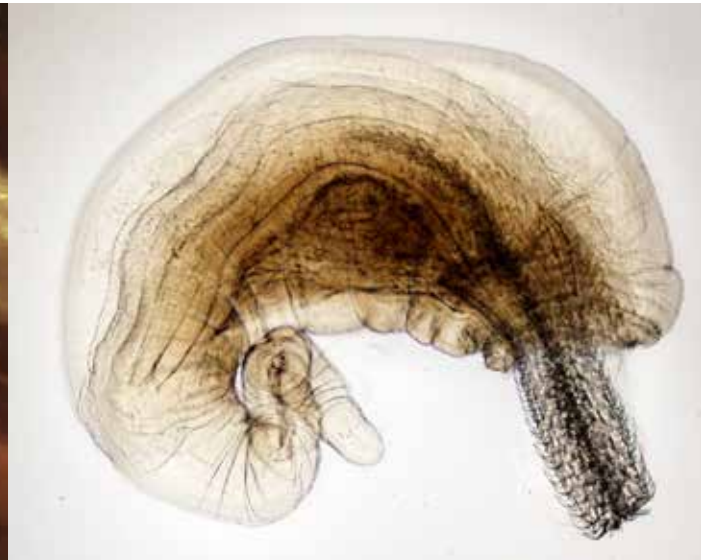
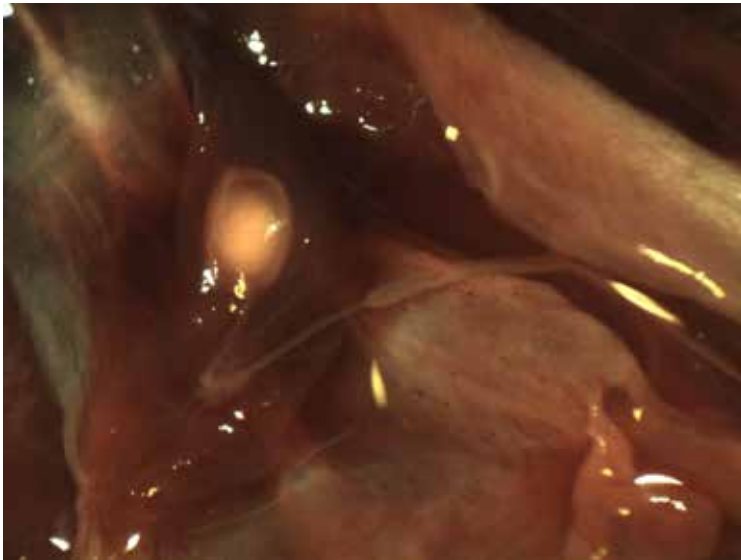
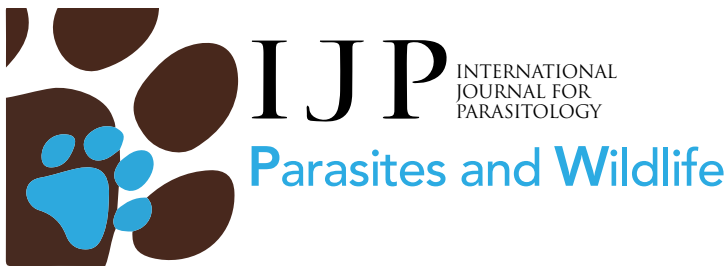
representation of parasites on threatened species lists. Effective conservation of parasites requires maintaining access to suitable hosts and the ecological conditions that permit successful transmission between hosts. When implementing recovery plans for threatened host species, this may be best achieved by attempting to restore the ecological conditions that maintain the host and its parasite fauna in dynamic equilibrium. Ecosystem-centred conservation may be a more effective strategy than species-centred (or host-parasite community-centred) approaches for preventing extinction of parasites, but the criteria which are typically used to identify protected areas do not provide information on the ecological conditions required for effective transmission. We propose a simple decision tree to aid the identification of appropriate conservation actions for threatened parasites.

Alan and Nico, please tell us about why it is important to include parasites in conservation planning and how planners would achieve this?

Parasites are integral components of a properly functioning ecosystem because of the way they influence community structure and the flow of energy through the system. For example, parasites can regulate host population size, maintain genetic diversity within host populations and influence the outcomes of predatory and competitive interactions among free-living species. Therefore, if an important aim of conservation is to maintain ecosystem services, i.e. those functions of an ecosystem that benefit people, then parasites are just as important as their free-living hosts.

What does it mean to attempt to “restore the ecological conditions that maintain the host and its parasite fauna in dynamic equilibrium” when implementing recovery plans for threatened host species and how can you tell if it has been successfully restored?

Parasites and their hosts are involved in an ongoing evolutionary arms race. Host species have evolved many defences, behavioural, physiological



Left: Larval mussel (*Westralunio carteri*) on the gills of a native freshwater cobbler (*Tandanus bostocki*) (Credit: Michael Klunzinger). The larval stages of freshwater mussels are fish parasites, before they drop off and begin their long life as an adult. Freshwater mussels can live for over 100 years and play a vital role in maintaining water quality and transporting nutrients between the water column and sediment.

Right: Undescribed acanthocephalan from a catfish in northern Australia (Credit: Aileen Elliot). As with most parasitised wildlife, there were no pathological signs associated with this parasitic infection.

and immunological, against parasites, and parasite species have evolved ways of overcoming these defences. These continuous actions and reactions balance host and parasite population sizes. When ecological conditions change, however, the balance might be tipped in the parasites favour, for example if environmental stress reduces host immune function or if inbreeding reduces host fertility. We argue that, rather than using parasiticides to restore the balance between parasite and host populations, a more sustainable, long-term approach is to restore the ecological conditions that enable host defences to work properly. How can we tell if it has been successfully restored? Good question. We need to continually monitor the threatened host population, not only for demographic parameters, but also for parasite prevalence.

You have proposed using a “Decision tree for conservation management of threatened parasite species” please tell us what will be the next stage for promoting its use?

There is a lot more support these days for the idea of parasite conservation. Most work to date, however, has been directed at getting parasites recognised as important components of ecosystems and including them in threatened species listings. This is vitally important, but we have yet to see much on-ground action. The decision tree we proposed was to try and create a logical way of thinking about how we can decide what sort of management actions to implement. To promote this approach we need to work closely with conservation managers. For example, in Western Australia, the Department of Biodiversity, Conservation and Attractions is responsible for the development and implementation of species recovery plans. We have a number of collaborative projects with DBCA and I hope that we can start to

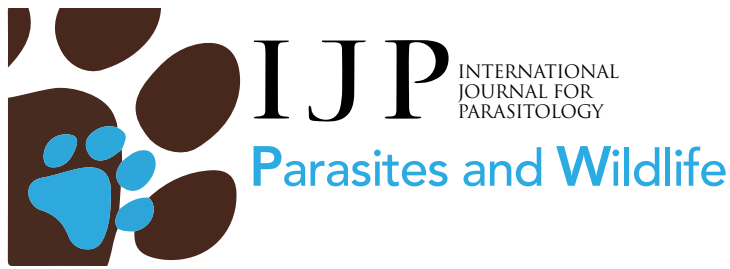
incorporate this decision tree thinking into their conservation actions.

This sounds like a bit of a call to action – so you have any ideas about how ASP members can help to “celebrate more widely the amazing diversity of parasites and the fundamental roles they play within ecosystems.”?

Changing the negative attitudes that people (including conservation managers) have towards parasites is likely to be challenging. Parasites do provoke attitudes of fear and disgust and this may be something that has been selected for to minimise the risk of infectious disease. But attitudes can be changed by reason. Many people fear wolves and sharks, but there is now a widespread understanding that apex predators such as these are essential for a healthy ecosystem. I think we need to promote the research that is demonstrating that parasites play roles that are no less important.



Eliza with the very first wombat she ever worked with that inspired her research, Georgie!



Eliza K. Stott, Shuai Nie, Nicholas A. Williamson, Lee F. Skerratt, Free drug percentage of moxidectin declines with increasing concentrations in the serum of marsupials, *International Journal for Parasitology: Parasites and Wildlife*, Volume 23, 2024, 100899, ISSN 2213-2244, <https://doi.org/10.1016/j.ijppaw.2023.100899>

<https://www.sciencedirect.com/science/article/pii/S2213224423001001>

Abstract: Moxidectin (MOX) is a macrocyclic lactone used to eliminate endo and ectoparasites in many mammalian species. It is notably the active ingredient of the anti-parasitic drug Cydectin[®], manufactured by Virbac, and is frequently used to treat sarcoptic mange in Australian wildlife. Protein binding plays a significant role in the efficacy of a drug, as the unbound/free drug in plasma ultimately reflects the pharmacologically relevant concentration. This study aimed to investigate the free drug percentage of Moxidectin after *in vitro* spiking into the sera of four sarcoptic mange-susceptible Australian wildlife species; the koala (*Phascolarctos cinereus*), the bare-nosed wombat (*Vombatus ursinus*), the eastern grey kangaroo (*Macropus giganteus*), and the mountain brushtail possum (*Trichosurus cunninghami*). Three concentration points of MOX were tested for each individual: 20 pg/μL, 100 pg/μL and 500 pg/μL. Serum from five individuals of each species underwent an equilibrium dialysis followed by liquid chromatography tandem mass spectrometry (LC-MS/MS). The results showed an atypical concentration dependent binding across all species, where free drug percentage decreased as MOX concentration increased. In addition, wombats showed significantly lower free drug levels. These findings call for further research into the mechanisms of moxidectin protein binding to help

understand MOX pharmacokinetics in marsupials.

Eliza, please tell us about Moxidectin (MOX) and why it is important to study?

Moxidectin is a macrocyclic lactone (ML) anti-parasitic drug used to treat a range of parasites in domestic, livestock, and wild animals. It is also currently the most frequently used drug for treatment of sarcoptic mange in Australian wildlife. It is most widely and frequently used to treat sarcoptic mange in bare-nosed wombats due to the disease's substantial animal welfare and conservation concerns. However, regimes for treating wombats for mange using moxidectin have been recommended and approved based on extrapolation from studies of moxidectin in other species, along with anecdotal reports of treatment regime success. Due to substantial inter-species variation, it is unclear whether permitted doses are both effective and safe, therefore further investigation into species-specific pharmacokinetics is essential for treatment safety and success.

Tell us more about the management of sarcoptic mange in Australian wildlife?

Treatment of sarcoptic mange in Australian



Hanging out with healthy wild wombat on Maria Island, Tasmania, photo courtesy Eliza Scott

wildlife is currently based on the use of multiple antiparasitic drugs with varying associated permits. Aside from Cydectin[®] (active ingredient: moxidectin), Bravecto[®] (Fluralaner) has also been used in the last few years following a pharmacokinetic trial and a new permit. Additionally, ivermectin has been used in the past. Treatment of sarcoptic mange in bare-nosed wombats is conducted *in situ* (i.e. in their natural habitat) largely by the wombat care community, most of which are volunteers. Two main topical application methods are used; 'pole and scoop' which utilises a small scoop attached to a long pole which enables the treater to pour the medication directly onto the wombat's back, or via indirect application; 'burrow flaps' where the medication is put into a flap and dispensed when wombats enter or leave the burrow. There is significant debate within the wombat care community regarding appropriate treatment regimens in treating sarcoptic mange in wombats. The definition of treatment success is broad, and without oversight and clinical testing by veterinarians, it is difficult to identify successful treatment with complete resolution of infestation. Ideally, a once off treatment would be best, as relocating wombats weekly for treatments is highly time consuming, and often leads to treaters being unable to relocate the wombat and



completing their treatment.

What is the significance of research into the mechanisms of moxidectin protein binding to help understand MOX pharmacokinetics in marsupials?

Although the results from my paper were certainly interesting, the implications can only be speculative and require significant further investigation. The atypical concentration dependent protein binding across all marsupial species tested showed that free drug percentage decreased as moxidectin concentration increased. One of the more interesting points was that wombats showed significantly lower free drug levels compared with the other species, which may suggest that there is indeed higher drug-protein binding and significantly different pharmacokinetics of moxidectin in wombats. There is actually no way of definitively saying this from our results, so it does call for future research into species-specific pharmacokinetic work for moxidectin in marsupials.

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

This paper was part of my work from my honours year a few years ago, and I am currently now completing my PhD in veterinary science, looking more broadly at treatment of sarcoptic mange in bare-nosed wombats using Cydectin. Currently I am undertaking a pharmacokinetic trial of moxidectin in healthy bare-nosed wombats, to understand the ways in which the drug is absorbed, metabolised, and excreted within the body through investigation of different routes of administration. The later stages will involve field trials using wild wombats infested with sarcoptic mange, looking at treatment success and a variety of parameters that may influence treatment outcomes. The information from these studies will better inform treatment regimes of moxidectin in wombats affected by sarcoptic mange.



Top: Hanging out with healthy wild wombat on Maria Island, Tasmania

Taking blood from captive wombats for the current moxidectin pharmacokinetic work with veterinarian Brett Gardner.

Middle: Two of the wombats enrolled in the current pharmacokinetic work. Images taken 6 months ago during the recruitment phase- they have grown a lot since then!

Photos courtesy Eliza Scott



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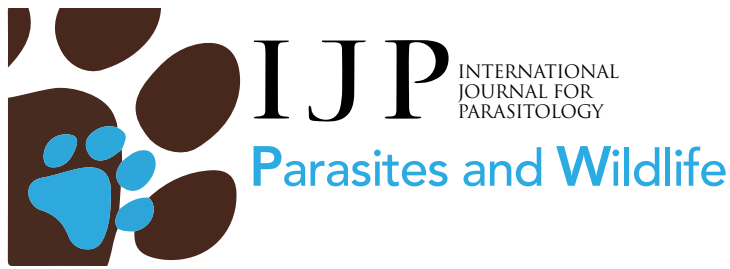
Taking blood from captive wombats for the current moxidectin pharmacokinetic work



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Image of Kangaroos from a recent trip courtesy Anson Koehler



Anson V. Koehler, H.M.P. Dilrukshi Herath, Ross S. Hall, Stephen Wilcox, Robin B. Gasser, Marked genetic diversity within *Blastocystis* in Australian wildlife revealed using a next generation sequencing–phylogenetic approach, *International Journal for Parasitology: Parasites and Wildlife*, Volume 23, 2024, 100902, ISSN 2213-2244, <https://doi.org/10.1016/j.ijppaw.2023.100902>

<https://www.sciencedirect.com/science/article/pii/S2213224423001037>

Abstract: *Blastocystis* is a genus of intestinal stramenopiles that infect vertebrates, and may cause disease of the alimentary tract. Currently, at least 40 genotypes (“subtypes”) of *Blastocystis* are recognised worldwide based on sequence data for the small subunit of the nuclear ribosomal RNA (SSU-rRNA) gene. Despite the numerous studies of *Blastocystis* worldwide, very few studies have explored *Blastocystis* in wild animals, particularly in Australia. Here, we used a PCR-based next generation sequencing (NGS)–phylogenetic approach to genetically characterise and classify *Blastocystis* variants from selected wildlife in the Australian state of Victoria. In total, 1658 faecal samples were collected from nine host species, including eastern grey kangaroo, swamp wallaby, common wombat, deer, European rabbit, canines and emu. Genomic DNA was extracted from these samples, a 500 bp region of the SSU-rRNA gene amplified by polymerase chain reaction (PCR) and, then, a subset of samples sequenced using Illumina technology. Primary PCR detected *Blastocystis* in 482 of the 1658 samples (29%), with the highest percentage in fallow deer (63%). Subsequent, Illumina-based sequencing of a subset of 356 samples revealed 55 distinct amplicon sequence variants (ASVs) representing seven currently-recognised subtypes (STs) [ST13 (prominent in marsupials), ST10, ST14, ST21, ST23, ST24 and ST25 (prominent in deer)] and two novel STs

(ST45 and ST46) in marsupials. Mixed infections of different STs were observed in macropods, deer, emu and canids (fox, feral dog or dingo), but no infection was detected in rabbits or wombats. This study reveals marked genetic diversity within *Blastocystis* in a small number of species of wild animals in Australia, suggesting complexity in the genetic composition and transmission patterns of members of the genus *Blastocystis* in this country.

Anson, please tell us about how Blastocystis was detected in Australian wildlife and why it's important to study?

Pioneering work on *Blastocystis* was conducted by Unaiza Parkar, Andy Thompson and Rebecca Traub. As *Blastocystis* has not been well studied in Australian wildlife, we conducted an investigation of our extensive animal faecal sample collection (~ 15,000 samples) from Melbourne’s drinking water catchments, going back to 2009. It important to study *Blastocystis* to gain a better appreciation of the extent of its genetic variability and to identify potential reservoirs for transmission to humans given that it can cause gastrointestinal symptoms in human, particularly immune-deficient or -suppressed individuals.

What is the advantage to using a PCR-based next generation sequencing (NGS)–phylogenetic approach to genetically characterise and classify Blastocystis variants from selected wildlife?

Blastocystis is an organism where multiple subtypes are routinely found in an individual host. In fact, we have found that it is rare to have a sample consisting of a single subtype. Therefore, methods that can detect multiple subtypes in the same sample are crucial when studying *Blastocystis*. Targeted amplicon sequencing detected a wide range of subtypes. Our targeted amplicon sequencing data was already generated by the time Santin’s

method was published, otherwise we would have probably gone with that method. We are finding with *Blastocystis* that the more you look the more you are likely to find novel sequences, especially in wildlife in their natural habitat.

What is the significance of the findings of marked genetic diversity within Blastocystis in a small number of species of wild animals in Australia?

We found a range of novel subtypes, but we only sampled a tiny population of Australia’s wildlife. I’m sure there are many unique subtypes waiting to be discovered in Australia’s diverse fauna. One just has to look.

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

I will continue with our long-term collaboration with Melbourne Water, monitoring waterborne pathogens in the wildlife found in the drinking water catchments. We are also expanding this research to humans as part of a collaboration with other groups in Melbourne. I also enjoy working up case reports from wildlife and humans. Of note was a recent case of the python nematode, *Ophidascaris*, from the brain of a human. Sanger sequencing coupled with phylogenetics still has a place in diagnostics, but I am keen to explore the use of third-generation (long-range and long-read) sequencing approaches for various diagnostic and analytical applications as well as improved informatic approaches for data analyses.



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**Drugs and
Drug Resistance**

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Editors In Chief: Andrew Kotze & Kevin Saliba

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Please enjoy two interviews with ASP early career researchers Ghazanfar Abbas, Harrison Shanley, and Aya Taki with recently published IJP:DDR papers.

Ghazanfar Abbas, Abdul Ghafar, Emma McConnell, Anne Beasley, Jenni Bauquier, Edwina J.A. Wilkes, Charles El-Hage, Peter Carrigan, Lucy Cudmore, John Hurley, Charles G. Gauci, Ian Beveridge, Elysia Ling, Caroline Jacobson, Mark A. Stevenson, Martin K. Nielsen, Kristopher J. Hughes, Abdul Jabbar,

A national survey of anthelmintic resistance in ascarid and strongylid nematodes in Australian Thoroughbred horses, International Journal for Parasitology: Drugs and Drug Resistance, Volume 24, 2024, 100517, ISSN 2211-3207, <https://doi.org/10.1016/j.ijpddr.2023.11.006>

<https://www.sciencedirect.com/science/article/pii/S2211320723000398>

Abstract: This study quantified the extent of anthelmintic resistance (AR) in ascarid and strongylid nematodes against commonly used anthelmintics in Australian Thoroughbred horses. Faecal egg count reduction tests (FECRTs, n = 86) and egg reappearance period (ERP) tests were conducted on 22 farms across Australia. Faecal egg counts (FECs) were determined using the modified McMaster technique, and percent faecal egg count reduction (%FECR) was calculated using the Bayesian hierarchical model and hybrid Frequentist/Bayesian analysis method. The results were interpreted using old (published in 1992) and new (2023) research guidelines of the World Association for the Advancement of Veterinary Parasitology (WAAVP). The species composition of strongylid nematodes was detected utilising a DNA-metabarcoding method using pre- and post-treatment samples.



Saddle Up for Science: Ghaz collecting horse faecal samples in the field (Selfie by Ghazanfar Abbas)

Resistance was observed in strongylid nematodes to commonly used single-active and combination anthelmintics, including ivermectin (IVM %FECR range: 82%–92%; 95% lower credible interval (LCI) range: 80%–90%), abamectin (ABM: 73%–92%; 65%–88%), moxidectin (MOX: 89%–91%; 84%–89%), oxfendazole (OFZ: 0%–56%; 0%–31%) and its combination with pyrantel (OFZ + PYR: 0%–82%; 0%–78%). Resistance in *Parascaris* spp. was observed to IVM (10%–43%; 0%–36%), ABM (0%; 0%) and MOX (0%; 0%). When the new thresholds recommended by the WAAVP were used, AR was detected in six additional FECRTs for strongylids and three more tests for *Parascaris* spp., introducing resistance to OFZ and OFZ + PYR in the latter. Shortened ERPs (4–6 weeks) of strongylids were observed in 31 FECRTs in which AR was not detected at 2 weeks post-treatment for all the anthelmintics tested. Among cyathostomins, *Cylicocycclus*

nassatus, *Cylicostephanus longibursatus* and *Coronocycclus coronatus* were the most prevalent species at 2 weeks post-treatment, whereas the main species appearing at five weeks following treatments with macrocyclic lactones were *Cylicocycclus nassatus*, *Cylicostephanus longibursatus* and *Cylicocycclus ashworthi*. After treatment with OFZ + PYR, the latter three, plus *Coronocycclus coronatus* and *Cyathostomum catinatum*, were detected at 5 weeks post-treatment. Overall, the study highlights the prevalence of AR in both ascarids and strongylid nematodes against commonly used anthelmintic products to control worms in Australian horses. The results indicate that ML combination products provided acceptable efficacy at 2 weeks. However, ERP calculations suggest that products work less effectively than previously measured. It is suggested to regularly monitor the efficacy of the anthelmintics and consider changing the



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Drugs and Drug Resistance

worm control practices to better manage worms and AR in Australian horses.

Ghaz, please tell us about anthelmintic resistance (AR) in ascarid and strongylid nematodes against commonly used anthelmintics in Australian Thoroughbred horses and why it's important to study?

Ascarids and strongylids are the most important nematode parasites of horses. In contemporary horse parasite management, the persistent challenge of effective parasite control has gained significant attention due to the escalating concern of anthelmintic resistance (AR). Historically, the main strategy for combating horse parasites has relied heavily on the regular administration of broad-spectrum anthelmintics. However, this approach has resulted in the emergence and spread of AR among the major horse parasites, notably ascarids and cyathostomins.

Currently, there are only three drug classes available, namely benzimidazoles (BZs), tetrahydropyrimidines (THPs), and macrocyclic lactones (MLs). AR has been reported in major horse parasites against all available anthelmintics.

In this study, we conducted the first national comprehensive survey to ascertain the efficacy of dewormers against major parasites of horses. AR was observed in ascarid and strongylid nematodes against almost all commonly used anthelmintics in Australia, where resistance was not developed, its imminence was indicated by a reduced egg-reappearance period (ERP).

Suppose a horse property uses deworming products without monitoring their efficacy. In that case, they may be using a drug that does not remove the worms, compromising the horses' health and welfare and increasing pasture larval burden. On the other hand, a parasite population on a farm may be susceptible to anthelmintics. Still, AR can be introduced to this farm when

new horses carrying resistant parasites are introduced. Such a case has been demonstrated in the USA, where US-bred horses were initially free from resistant worms, but imported horses from Ireland harboured the resistant population of worms. Later on, after a couple of years, US-bred horses also showed a resistant population of worms. Therefore, horse managers should regularly assess the efficacy of anthelmintics against horse parasites.

What is the significance of your research into the efficacy of the anthelmintics?

Australia has the second-largest population of Thoroughbred horses globally, but more comprehensive studies on the efficacy of commonly used anthelmintics and resistant species utilising advanced molecular methods were required. This study aimed to fill this critical gap by quantifying the extent of AR in ascarid and strongylid nematodes. Such investigation was paramount as AR can lead to ineffective treatments and persistent parasite challenges, impacting horse health, welfare and performance.

Moreover, this study pioneered the use of DNA metabarcoding in field studies to discern resistant and susceptible populations of strongylid nematodes. This innovative approach enhanced our ability to accurately identify and monitor resistance parasite species in horses.

The insights gleaned from this research will be invaluable to the equine industry. They will aid in the selection of appropriate anthelmintics and facilitate timely adjustments in treatment protocols. By recognising early indicators of resistance, such as ERPs, veterinarians can optimise parasite management strategies, mitigating the risk of treatment failure and preserving equine health and welfare.

Tell us what will be the next stage of your

research?

Moving forward, the next stage of our research entails the ongoing monitoring of AR trends to inform the adaptation of appropriate treatment strategies. This will necessitate conducting longer-term assessments of the efficacy of anthelmintic drugs to gain a comprehensive understanding of ERPs and the dynamics of resistance over time. Additionally, it will be imperative to disseminate these findings widely and educate equine veterinarians and horse breeders/owners about the importance of evidence-based parasite control in horses. By fostering awareness and promoting informed decision-making using faecal egg counts, we aim to contribute to the sustainable management of equine parasites and safeguard the health and welfare of horses.



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Drugs and Drug Resistance



Clockwise from top left: Abdul and Ghaz attending 2022 ASP Annual Conference 4-7 July in Cairns, Australia (PC: Lisa Jones)

From Field Findings to Lab Insights: Ghaz processing horse faecal samples for parasite detection at Melbourne Veterinary School, University of Melbourne (PC: Abdul Ghafar)

From Pasture to Publication: Fieldwork moments in Horse-Parasites research (Selfie Ghazanfar Abbas)

Gallop to Discover: Fieldwork adventures in horse faecal sampling (Selfie Ghazanfar Abbas)



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Drugs and Drug Resistance

Harrison T. Shanley, Aya C. Taki, Nghi Nguyen, Tao Wang, Joseph J. Byrne, Ching-Seng Ang, Michael G. Leeming, Shuai Nie, Nicholas Williamson, Yuanting Zheng, Neil D. Young, Pasi K. Korhonen, Andreas Hofmann, Bill C.H. Chang, Tim N.C. Wells, Cécile Häberli, Jennifer Keiser, Abdul Jabbar, Brad E. Sleebs, Robin B. Gasser, Structure-activity relationship and target investigation of 2-aryl quinolines with nematocidal activity, *International Journal for Parasitology: Drugs and Drug Resistance*, Volume 24, 2024, 100522, ISSN 2211-3207, <https://doi.org/10.1016/j.ijpddr.2024.100522>

<https://www.sciencedirect.com/science/article/pii/S2211320724000034>

Abstract: Within the context of our anthelmintic discovery program, we recently identified and evaluated a quinoline derivative, called ABX464 or obefazimod, as a nematocidal candidate; synthesised a series of analogues which were assessed for activity against the free-living nematode *Caenorhabditis elegans*; and predicted compound-target relationships by thermal proteome profiling (TPP) and in silico docking. Here, we logically extended this work and critically evaluated the anthelmintic activity of ABX464 analogues on *Haemonchus contortus* (barber's pole worm) – a highly pathogenic nematode of ruminant livestock. First, we tested a series of 44 analogues on *H. contortus* (larvae and adults) to investigate the nematocidal pharmacophore of ABX464, and identified one compound with greater potency than the parent compound and showed moderate activity against a select number of other parasitic nematodes (including *Ancylostoma*, *Heligmosomoides* and *Strongyloides* species). Using TPP and in silico modelling studies, we predicted protein HCON_00074590 (a predicted aldo-keto reductase) as a target candidate for ABX464 in *H. contortus*. Future work aims to optimise this compound as a



Profile photo of Aya Taki

nematocidal candidate and investigate its pharmacokinetic properties. Overall, this study presents a first step toward the development of a new nematocide.

Please tell us about the anthelmintic discovery program and why it's important?

Aya: This is a research program between the University of Melbourne (Prof. Robin B. Gasser, Dr Aya C. Taki and Prof. Abdul Jabbar, Melbourne Veterinary School) and the Walter and Eliza Hall Institute (Drs B.E. Sleebs and Nghi Nguyen, Medicinal Chemistry) funded by the

Australian Research Council together with industry and philanthropic partners including YourGene, Oz Omics (Dr Bill Chang), Medicines for Malaria Ventures (Dr Timothy Well), Boehringer Ingelheim (Drs Paul Selzer and Richard Marhoefer) and PhyumTECH (Dr Sergio Simonetta), focused on discovering new drugs (anthelmintics) against parasitic nematodes of animals. This focus is of particular relevance because of the widespread problems with anthelmintics in nematodes of livestock animals.

Recently, we established a high-throughput



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Drugs and Drug Resistance

screening (HTS) platform for the parasitic nematode, *Haemonchus contortus* (barber's pole worm), and the model nematode, *Caenorhabditis elegans*, to assess the activity of hundreds of thousands of compounds against these nematodes. Our aim is to identify compounds with new and unique mechanisms of action and then optimise their bioavailability and efficacy using medicinal chemistry and complementary tools ('omics and informatics).

What is the significance of and your recently identified and evaluated quinoline derivative, called ABX464 or obefazimod, as a nematocidal candidate for the development of a new nematocide?

Harry: Recently, there have been only a limited number of novel anthelmintics with unique mechanisms of action developed, and very few have come on to the market over the past decade. Although one vaccine (Barbervax) has been developed against haemonchosis, there is no highly effective vaccine against a broad spectrum parasitic nematode species. Thus, there is significant demand for novel, safe and effective anthelmintics to support helminth control programs, to the benefit of animal health and welfare.

Towards the development of new anthelmintics, we screened the Pandemic Response Box (Medicines for Malaria Venture) and identified a new chemical scaffold known as ABX464. We demonstrated that ABX464 (and analogues) exhibited potent activity across all *in vitro* pathogenic stages of *H. contortus*, as well as showing moderate broad-spectrum activity across other related nematodes, such as *C. elegans*, *Heligmosomoides polygyrus* and *Strongyloides ratti*. We also undertook a preliminary evaluation of the interactions of ABX464 with *H. contortus* proteins, using proteomic and *in silico* methods to

begin to understand how ABX464 achieves anthelmintic effect. This chemical scaffold is a sound candidate to be assessed further as a relatively broad-spectrum nematocide.

The next phase of this study will focus on improving the activity and undertaking pharmacokinetic property optimisation. We will also seek to establish complementary and/or orthogonal target deconvolution studies in *H. contortus*, in order to validate the drug-protein interactions identified

through this work. These steps will be crucial in evaluating animal model efficacy, towards the pre-clinical development of an efficacious anthelmintic with a defined mechanism of action, with the goal of extending this work to *in vivo* models in the future.

Please can you tell us what will be the next stage of your research?

Harry: My current focus is the completion



Profile photo of Harry Shanley



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Drugs and Drug Resistance

of my PhD candidature! I am coming to the end of what has been a fantastic first few steps into the world of science. Before I began this project, my experience was limited to medicinal chemistry – however, now my eyes have been opened to the many facets of drug discovery, such as high-throughput screening, structural biology and (most excitingly, obviously) parasitology. I have been very fortunate to have incredibly supportive supervisors, co-workers and collaborators, who have enabled me to learn and grow over the last few years. After submission of my thesis, I plan to stay in the realm of drug discovery and parasitology, and look forward to continuing to contribute to the control of infectious diseases.

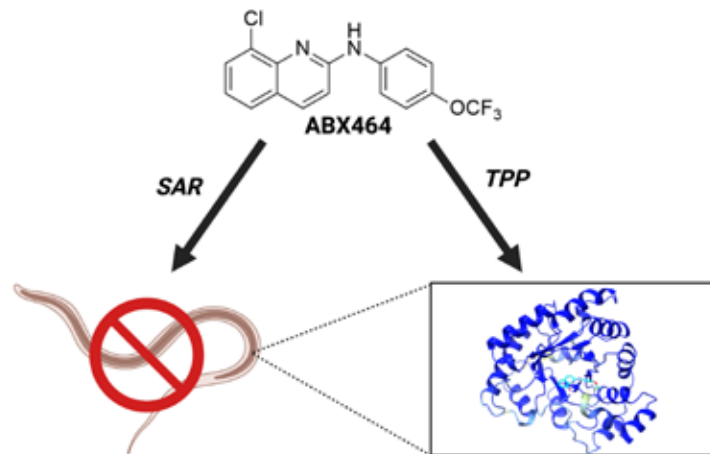


Image 1: ABX464 as a nematocidal candidate

Aya: As a co-lead of the Anthelmintic Discovery Program, my role in the next stage of our research is to coordinate detailed investigations into the mechanisms of action of our compounds and conducting in vitro and in vivo studies to understand their efficacy and safety. We will also be focusing on optimising the pharmacokinetic properties of these compounds to improve their absorption, distribution, metabolism, and excretion (ADME) characteristics, ensuring they are not only effective but also safe for animal use. Perfecting these compounds' profiles is not just about achieving scientific excellence; it sets the stage for our next leap forward – partnerships with industry experts. I'm particularly enthusiastic about collaborating with industry leaders to bring our lab's discoveries right to the forefront of veterinary practice. It's all about taking our hard work and making sure it does not just stay in the lab, but gets out there to make a tangible difference in people and animals' lives. Turning our research into products that can help improve animal health is the big dream for us!

We recently identified and evaluated a quinoline derivative, called ABX464 or obefazimod, as a nematocidal candidate. We tested a series of 44 analogues for the anthelmintic activity against larvae and adults of *Haemonchus contortus* (barber's poleworm) – a highly pathogenic nematode of ruminant livestock, to investigate the nematocidal pharmacophore of ABX464. One compound was identified with greater potency than the parent compound and showed moderate activity against a select number of other parasitic nematodes (including *Ancylostoma*, *Heligmosomoides* and *Strongyloides* species). Using thermal proteome profiling (TPP) and in silico modelling studies, we predicted protein HCON_00074590 (a predicted aldo-keto reductase) as a target candidate for ABX464 in *H. contortus*. (Image taken from Shanley et al., 2024. *Int. J. Parasitol.: Drugs Drug Resist.* 24, 100522.)



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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.

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ASP Researcher Exchange, Travel and Training and JD Smyth Postgraduate Student Travel Funding Scheme, Mentorship scheme and Celebrations in 2024

ASP Researcher Exchange, Travel and Training Funding Scheme

Funding Assistance is available to members of the ASP for Researcher Exchanges, Training Courses, Visiting International Lectureships, Workshops and Grant Writing Retreats.

The ASP aims to: promote and facilitate interaction between colleagues, peers and potential research partners; communicate the scientific achievements of its members; and create professional development opportunities for them, in particular for postgraduate students and early career postdoctoral fellows. Therefore, the ASP provides funding assistance for its members to undertake important, relevant travel. This may include exchanges between laboratories (ranging from a few weeks up to a year); or training courses (like the annual Biology of Parasitism Course at Woods Hole); or to finance lecture tours by esteemed international scientists; or to organise and host workshops and/or grant writing retreats that promote or foster significant collaboration between ASP members (e.g. for NHMRC Programs, ARC Centres of Excellence and other large scale research undertakings). This funding scheme does not support travel to attend conferences, with the exception of the JD Smyth Postgraduate Student Travel Award.

JD Smyth Postgraduate Student Travel Award

Financial assistance is to be provided to full-time postgraduate student members of at least 6 months standing who are enrolled at a recognised Australian University for the purpose of travelling overseas to gain knowledge on techniques that may not be available in Australia, to form liaisons that

may benefit their careers in the longer term and to promote the cause of parasitology in Australia. The fellowship is not provided for the primary purpose of attending a conference. The maximum value of the fellowship is to be determined annually by the Council. Recipients are to be chosen by a selection committee appointed by Council.

Applications should include details of the travel to be undertaken, the applicants research, evidence of the supervisor’s support and an abbreviated CV. If attendance at a conference is to form part of the travel then a copy of the conference abstract should also be included. The application must include a CV.

Awardees will be required to provide a report of their trip within three months of return from their travel.

<https://www.parasite.org.au/awards/jd-smyth-postgraduate-travel-awards/>

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.

International Day of Women and Girls in Science 2024

The International Day of Women and Girls in Science, celebrated on 11 February, is implemented by UNESCO and UN-Women, in collaboration institutions and civil society partners that aim to promote women and girls in science. This Day is an opportunity to promote full and equal access to and participation in science for women and girls. “Gender equality has always been a core issue for the United Nations. Gender equality and the empowerment of women and girls will make a crucial contribution not only to economic development of the world, but to progress across all the goals and targets of the 2030 Agenda for Sustainable Development, as well.” <https://www.unesco.org/en/days/women-girls-science>

“Tackling some of the greatest challenges of the Agenda for Sustainable Development – from improving health to combating climate change – will rely on harnessing all talent. That means getting more women working in these fields. Diversity in research expands the pool of talented researchers, bringing in fresh perspectives, talent and creativity. This Day is a reminder that women and girls play a critical role in science and technology communities and that their participation should be strengthened.

Although Science, Technology, Engineering

Closing dates

- ASP Fellowships**
1 January 2024
- ASP Researcher Exchange, Travel and Training Awards & JD Smyth**
30 September 2024
- John Frederick Adrian Sprent Prize**
30 September 2025
- Bancroft-Mackerras Medal for Excellence**
30 September 2024

More information
www.parasite.org.au

News from the ASP Network for Parasitology

and Mathematics (STEM) fields are widely regarded as critical to national economies, so far most countries, no matter their level of development, have not achieved gender equality in STEM.” from Women in Science Leadership: A New Era for Sustainability, United Nations <https://www.un.org/en/observances/women-and-girls-in-science-day>

See their website for Gender Equality Tools

International Women’s Day 2024

Happy International Women’s Day 2024. UN Women state that “Women’s economic empowerment is central to a gender equal world. When women are given equal opportunities to earn, learn and lead – entire communities thrive.” The ASP celebrate all #WomenInSTEM and want to highlight three of our awesome #womeninparasitology #ASPfellows their achievements and how they are changing the world one parasite at a time!

Mary Cremin, Assistant Editor for the International Journal for Parasitology (IJP) from 1974 – 1994, was awarded a Fellow of the ASP in 1994. Dr Lesley Warner was awarded a Fellow of the ASP in 2001. Lesley joined the ASP in 1973 and attended her first conference in Adelaide that same year. Lesley’s first appointment as a parasitologist in 1981 was to the South Australian Museum to work on the helminthological collection. In 1997 Lesley was the first female to be elected as President of the Australian Society for Parasitology. To read more about Dr Lesley Warner see our ASP Fellow’s pages <https://www.parasite.org.au/the-society/fellows-of-the-society/lesley-warner-fasp-2001/> Dr Emanuela Handman was awarded a Fellow of the ASP in 2006. Emanuela has been a member of the ASP since the early 1970s and worked in a team at the Walter and Eliza Hall Institute who developed an excellent mouse model for leishmaniasis and elucidated key elements in the genetic and immunological mechanisms of susceptibility and resistance. To read more about Dr Emanuela Handman

see our ASP Fellow’s pages <https://www.parasite.org.au/the-society/fellows-of-the-society/emanuela-handman-fasp-2006/>

The theme for International Women’s Day 2024 is Count Her In: Invest in Women. Accelerate Progress.

Based on the priority theme for the United Nations 68th Commission on the Status of Women, Count Her In will examine the pathways to greater economic inclusion for women and girls everywhere.

While important progress has been made, women face significant obstacles to achieving equal participation in the economy.

Without equal access to education, employment pathways, financial services and literacy, how can we ever hope to reach gender equality?

We must ensure women and girls are given equal opportunity to build their capabilities and strengthen their capacity to learn, earn and lead.

<https://unwomen.org.au/get-involved/international-womens-day/>

World Neglected Tropical Diseases Day 2024

Neglected tropical diseases (NTDs) are a diverse group of conditions¹ caused by a variety of pathogens (including viruses, bacteria, parasites, fungi and toxins) and associated with devastating health, social and economic consequences. NTDs are mainly prevalent among impoverished communities in tropical areas, although some have a much larger geographical distribution. It is estimated that NTDs affect more than 1 billion people, while the number of people requiring NTD interventions (both preventive and curative) is 1.6 billion. (source World Health Organisation https://www.who.int/health-topics/neglected-tropical-diseases#tab=tab_1)

Focus on Neglected Tropical Disease: Strongyloidiasis

Strongyloides stercoralis, a soil transmitted intestinal nematode infects 30–100 million people worldwide and although good treatment options exist for infection and control of this infection, *S. stercoralis* remains largely neglected. From a public health perspective, the estimated size of the population affected and “at risk” and its relationship to poverty and lack of adequate water and sanitation, puts strongyloidiasis squarely in the Neglected Tropical Disease (NTD) camp. (Krolewiecki A, Nutman TB. Strongyloidiasis: A Neglected Tropical Disease. *Infect Dis Clin North Am.* 2019 Mar;33(1):135-151. doi: 10.1016/j.idc.2018.10.006. PMID: 30712758; PMCID: PMC6367705. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6367705/>)

At the 2023 ASP Conference in Darwin, Strongyloides Australia invited speaker Dr Wendy Page (MBBS, FRACGP, FACRRM, MPH&TM, GCHPE, FACTM) gave her plenary talk about Strongyloides highlighting this most neglected of NTDs. Dr Page described how closing the health inequity gap on strongyloidiasis in endemically infected remote First Nations communities is possible.

Dr Wendy Page is a general practitioner who has worked for Aboriginal Controlled Health Organisations since 1986, and for Miwatj Health Aboriginal Corporation in northeast Arnhemland from 1993. In 1995, Rick Speare and Wayne Melrose travelled to Gove to teach parasitology as part of a Masters in Public Health and Tropical Medicine through James Cook University. Of all the human helminths identified locally, *Strongyloides stercoralis* was the most clinically important for impacting on morbidity and mortality.

In September 2001, the First National Workshop on Strongyloidiasis was held in Gove, and dedicated to a senior Aboriginal Health Worker, a traditional owner, who passed away from disseminated strongyloidiasis. Wendy has been a founding member of the National Strongyloides Working Group, a special interest group of the Australasian College of Tropical Medicine. This multidisciplinary group of committed members has grown to become Strongyloides

Australia with the vision to eliminate strongyloidiasis from endemically infected Indigenous communities in Australia

In November 2020, Wendy was awarded 2021 Northern Territory Australian of the Year, increasing the opportunity to raise awareness of strategies to close the health inequity gap on this treatable and preventable chronic infectious disease, and to advocate for notifiable status.

Currently QIMR Berghofer researchers are leading an effort to eliminate strongyloidiasis, a potentially fatal disease caused by a parasitic worm. Listen to QIMR Berghofer BodyLab, where Professor Darren Gray and team member Dr Catherine Gordon discuss their new project tackling the condition, which has a devastating impact on some of Australia’s most vulnerable people.

<https://www.qimrberghofer.edu.au/news/bodylab-podcast/new-project-to-eliminate-deadly-neglected-tropical-disease/>

On World Neglected Tropical Disease Day 2024, WHO is calling on everybody, including leaders and communities, to unite and act to address the inequalities that drive neglected tropical diseases (NTDs) and to make bold, sustainable investments to free the estimated 1.62 billion people, in the world’s most vulnerable communities, from a vicious cycle of disease and poverty.

The purpose of World Neglected Tropical Diseases Day is to raise the profile of neglected tropical diseases, the suffering they cause and to garner support towards their control, elimination and eradication, in line with the programmatic targets set out in the NTD road map 2021–2030 and the commitments of the 2022 Kigali declaration on neglected tropical diseases.

Unite. Act. Eliminate.

Together we can improve the health and wellbeing of 1.62 billion people worldwide.

Your voice, your action, can change lives.

Neglected tropical diseases are preventable

and treatable.

<https://www.who.int/campaigns/world-ntd-day/2024>

With best wishes,

Nick and Lisa

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

Wildlife Health Australia survey

Wildlife Health Australia invite you to participate in the Feral Animal Disease and Surveillance Survey. The purpose of the survey is to explore who is undertaking feral animal disease preparedness, surveillance, and management activities. The results from this survey will be used to provide a starting point for mapping feral animal disease activities in Australia with a view to:

Using the results to inform discussions on policy development, funding, and resource allocation.

Exploring the level of interest from participants in forming a feral animal disease network to share knowledge, resources and understanding feral animal disease preparedness, surveillance, and management activities.

Identify where there is consistency or gaps in feral animal disease surveillance and management to further inform early warning (surveillance) and management of potential risks posed by feral animal populations, for example through development of principles and practices that these activities, such as sampling

methods, and appropriate interventions.

Identify any targeted/specific communications requirements relevant to these priority activities.

Identify areas for workforce development.

Who should participate in this survey?

The survey is open from Thursday 1st February-Friday 12 th April 2024. The survey is aimed at anyone involved in feral animal disease preparedness, surveillance and management activities.

Link to Survey here:

<https://forms.office.com/r/JxJCWpKa9w>

For more information, please contact Jo Walker : jwalker@wildlifehealthaustralia.com.au

BIOMOLECULAR HORIZONS2024:

DISCOVER CREATE INNOVATE

ComBio

2024 MELBOURNE

22nd COMBIO CONFERENCE

22 TO 26 SEPTEMBER 2024

MELBOURNE CONVENTION AND EXHIBITION CENTRE

www.bmh2024.com

COMBIO RETURNS TO MELBOURNE!

Join us at ComBio2024 which is part of Biomolecular Horizons 2024 to be held in Melbourne from 22-26 September 2024.

Hosted by ASBMB, this important forum will bring together three prestigious congresses, each with a strong history of attracting the bioscience and biotechnology communities to discuss and examine the latest developments and research:

- » 22nd ComBio Conference
- » 26th Congress of the International Union of Biochemistry and Molecular Biology (IUBMB)
- » 17th Congress of the Federation of Asian & Oceanian Biochemists & Molecular Biologists (FAOBMB)

ComBio has a rich history and ASBMB is proud to be hosting ComBio2024 along with fellow societies: the Australian Society of Biophysics, the Australian Physiological Society, the Australian Microbiology Society and the New Zealand Society for Biochemistry and Molecular Biology. And of course, our international colleagues from IUBMB and FAOBMB.

This truly global forum will bring together renowned scientists from across the world, from Nobel Laureates to early career scientists. An outstanding array of international presenters will be leading the program which will feature 6 plenary speakers, 27 keynote speakers, 77 symposia, Society Award sessions, hot topics, lightning talks, posters, technical workshops as well as Late Breaking sessions and satellite meetings.

The overarching theme: *Biomolecular Horizons 2024: Discover, Create, Innovate* will be examined across the key themes:

- » Cell, Developmental and Stem Cell Biology
- » Biotechnology and Synthetic Biology
- » Microbial World
- » Cell Signalling and Metabolism
- » Genomics, Gene Regulation and Epigenetics
- » Bioinformatics, Computational Biology and 'Omics
- » Structural Biology and Biophysics
- » Molecular Basis of Disease
- » Molecular Physiology
- » Education
- » Career Development

In-Program Focus Days include:

- » Gene Editing
- » RNA Technology
- » Climate Change
- » Indigenous Perspectives in Biomolecular Science
- » Education

Join colleagues from across the world to exchange ideas and research and build valuable professional networks that will extend beyond the Congress itself. To complement the scientific program, you will also be able to experience a showcase of the latest products and services in the exhibition, an integral element of the Congress.

Early bird savings are now on offer and are closing soon - visit www.bmh2024.com for further information and to view a preliminary program.

VISIT
WWW.BMH2024.COM
FOR MORE INFORMATION

EARLY BIRD
REGISTRATION
CLOSING
SOON

PLENARY SPEAKERS:



BRIAN KOBILKA
Stanford University
USA
Nobel Prize in Chemistry 2012
Grinwade Award Lecturer



PAMELA SILVER
Harvard University
USA
IUBMB Jubilee Award Lecturer



SERGEY OCVHINNIKOV
Harvard University
USA



PETRO TERBLANCHE
Afrigen Biologics & Vaccines
SOUTH AFRICA



CAIXIA GAO
Chinese Academy of Sciences
CHINA

INCORPORATING THE



26th Congress of the International Union of Biochemistry and Molecular Biology (IUBMB)

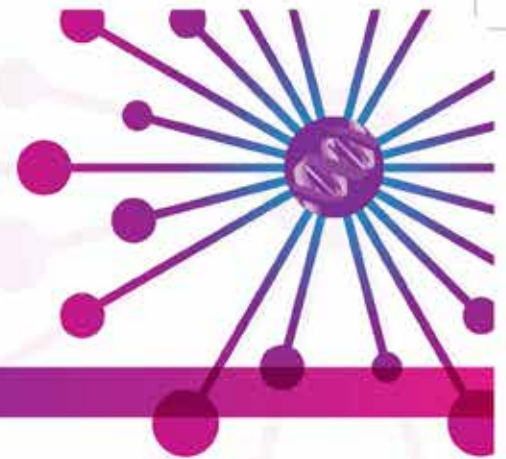


17th Congress of the Federation of Asian & Oceanian Biochemists & Molecular Biologists (FAOBMB)

PARTNERING SOCIETIES



REGISTER YOUR INTEREST



INVITED KEYNOTE SPEAKERS:



KEI SATO
The University of Tokyo
JAPAN



MARIAN WALHOUT
University of Massachusetts
USA



YUE WAN
Genome Institute of Singapore
SINGAPORE



WEI XIE
Tsinghua University
CHINA



NORBERT PARDI
University of Pennsylvania
USA



ALEXIS KOMOR
UC San Diego
USA



ALEXANDRA NEWTON
UC San Diego
USA



NICK BARKER
Institute of Molecular
& Cell Biology
SINGAPORE



JENNIFER LISTGARTEN
UC Berkeley
USA



SHOSHNA KAPOOR
Indian Institute of Technology
INDIA



ELIZABETH MCKINLEY
University of Melbourne
AUSTRALIA



RICHARD J ROBERTS
New England Biolabs
USA



PETER FINERAN
University of Otago
NEW ZEALAND



ROMMIE AMARO
UC San Diego
USA



HOZUMI MOTOHASHI
Tohoku University
JAPAN



JOB DEKKER
University of Massachusetts
USA



VICTOR NIZET
UC San Diego
USA



SEIGO SHIMA
Max Planck Institute
GERMANY



NIENG YAN
Tsinghua University
CHINA



GREG COOK
University of Otago
NEW ZEALAND



DREW BERRY
WEHI
AUSTRALIA



HEATHER CHRISTOFK
UC Los Angeles
USA



LEO EBERL
University of Zurich
SWITZERLAND
FEBS Worldwide Award Lecturer



MICHAEL BARRETT
University of Glasgow
UNITED KINGDOM



YOU-ME KIM
KAIST
KOREA



JOHN CHAMBERS
Nanyang Technological University
SINGAPORE



MICHAEL FUNK
Science
USA

CONGRESS THEMES: Cell, Developmental & Stem Cell Biology; Biotechnology & Synthetic Biology; Microbial World; Cell Signalling & Metabolism; Genomics, Gene Regulation & Epigenetics; Bioinformatics, Computational Biology & Omics; Structural Biology & Biophysics; Molecular Physiology; Education

CONGRESS FOCUS DAYS: RNA Technology; Gene Editing; Climate Change; Indigenous Perspectives in Biomolecular Science; Education

COMBIO 2024

Interview with ASP member Cameron Raw, Program Theme Leader for the ComBio2024/ IUBMB2024/ FAOBMB2024 Congress - Biomolecular Horizons: Discover, Create, Innovate in Melbourne, 22-26, Sept 2024.

Can the congress by-line is: "The Future is BioMolecular" what does that mean for the world in general and how does it relate to parasitology researchers?

As the world's population edges towards 9 billion people, we face great challenges around sustaining food and energy resources, while keeping people healthy. BioMolecular Science offers enormous potential for redressing the effects of climate change and meeting the world's needs, without destroying the planet.

For parasitologists, one of the exciting developments in the field is the recent revolution in RNA technology, whereby our bodies can be harnessed as powerful factories for the production of vaccines. Parasitologists are also making use of gene editing techniques, such as CRISPR, to advance in health care and veterinary science. Exciting bioengineering approaches are also being used to redress climate change and to increase sustainability.

My own work is in the area of One Health, which emphasises the connections between human, animal, and environmental health. Biomolecular techniques are critical to efforts to understand host-parasite relationships and the role of the environment.

BMH2024 brings together ComBio2024, FAOBMB2024 and IUBMB2024, three very large biannual conferences. Tell us about your scientific program and in particular themes of interest to ASP members.

The Program is broad-based, covering the interests of BioMolecular Scientists from around the world. The Themes of particular interest to parasitologist include in 1) The Microbial World, 2) Molecular Basis of Disease, 2) Biotechnology and Synthetic Biology, 3) Genomics, Gene Regulation and Epigenetics, 4) Cell Signalling and Metabolism, and 5) Molecular Physiology.

The Program also focuses in on particular areas



Photo of Cameron Raw

of interest to parasitologists, with One-Day In-Conference Symposia on 1) RNA Technology, 2) Gene Editing, 3) Climate Change and, a particular interest of mine, 4) Indigenous Perspectives in Biomolecular Science.

Parasitologists will be excited to hear Marian Walhout, University of Massachusetts, USA, talk about her studies using worms and their bacterial diets as models of host/ microbiota and gene regulatory networks.

Another keynote, Mike Barrett, University of Glasgow, UK, is interested in One Health, particularly with respect to the Trypanosomiasis and Leishmaniasis, which are zoonotic diseases at the interface of human and animal health.

The One Health Theme is also explored as part of the Indigenous Perspectives in Biomolecular Science Stream. Keynote speaker, Michael-Shawn Fletcher, University of Melbourne, is interested in interactions between humans, climate, disturbance, and vegetation at local, regional, and global scales. Vanessa Sewel, University of New England, is developing technology to mass-produce synthetic antigens for drench-resistant sheep parasites. I will talk about my work on applications of biomolecular techniques in controlling and eliminating

zoonotic soil-transmitted helminths in Australian Indigenous communities.

Can you tell us more about the Indigenous Perspectives in Biomolecular Science Stream within the congress program? Do you hope to inspire more Indigenous researchers to follow a career in science?

The Indigenous perspectives in molecular biology stream recognises the important contributions that Indigenous researchers are making to different themes of the Congress, such as Genomics, Human Health and Cancer and Immunology.

We're really excited to have an entire stream of Indigenous presenters. While those presenting in the stream are leaders in Indigenous methodology in science, they are also leaders in the science itself, and we will be covering a wide range of topics with subject experts. We know that the topics included will have something for everyone, and we hope that the breadth of experience in this stream will really highlight the brilliant work that Indigenous researchers are doing and encourage more Indigenous students to pursue these exciting fields.



XI International Symposium on Fish Parasites

**Fish Health, Parasites and
Biodiversity Conservation**

January 20-24

ISFPXI@enesmerida.unam.mx

<https://site.unibo.it/international-symposium-on-fish-parasites/en>

COMBIO 2024 interview with Cameron Raw continued

As well as a wonderful scientific program you have put together an excellent number of public events, events for schools, Art and Science events and Career Development Events. Can you tell us more about these?

The High School Outreach program (targeting Years 9 – 12 students) will feature highly engaged international scientists communicating what makes them excited about research science. Students, teachers and parents will also be invited to tour the exhibition hall and view posters presented by young investigators.

The Art and Science events includes a collaboration with Microscopy Australia to display ‘Stories & Structures – New Connections’ an art exhibition in which 60,000 Years of Indigenous tradition collaborates with the microscopic world.

The Career Development Forum will cover areas such as Strengthening your Curriculum, Strategic Publishing, Alternative and Academic Careers and Research Commercialisation, followed by an Academic Panel Discussion that explores the ‘myths’ of academia and answer questions about a successful academic career.

Can you are a Palawa man; Lecturer and Assistant Dean (Indigenous) in the Faculty of Science at The University of Melbourne. Tell us more about your background, what lead you to become a veterinary parasitologist? Can you tell us more about your career as an academic?

Earlier in my career as a veterinarian I searched for a way to connect the work that I was so passionate about with establishing connections with and serving Indigenous communities. I was fortunate to find that in the Western Arnhem Land Dog Health Program led by Professor Liz Tudor at the Melbourne Veterinary School. I’ve now been part of the program for over ten years, spending significant periods of time based in remote communities who otherwise don’t have the easy access to veterinary care that we enjoy in urban areas. Through this work I learnt more and more about what is known as One Health, both from a western scientific perspective as well as an Indigenous one. I learnt about the intricacies of interconnectedness of human, animal and environmental health through culture, practices and epidemiology and biomolecular science. This led me to look deeper into what issues are present in these settings and how we can develop policy and refine practices to improve health for everyone through my research.

My work at the University of Melbourne extends beyond this research. I’m fortunate to be involved in teaching the next generations of veterinarians and scientists about parasitology, epidemiology, communication and cultural competence. As Assistant Dean (Indigenous) for the Science faculty I’m involved in advancing Indigenous strategy in incorporating Indigenous Knowledges in curricula, enhancing Indigenous community partnerships in research, and conducting outreach activities with young Indigenous scientists in schools and communities.

Do you have any advice for our ASP members who are early career researchers, or just starting their PhD?

The best part of my research has been working with communities both across Arnhem Land and the Torres Strait Islands. This is where the impact happens. I’ve been able to see for myself how powerful the human-animal bond and relationships with the environment are, as well as the realities of some of the challenges faced when it comes to health. Knowing what community priorities are, listening to people and forming relationships are so important. Our science does not exist in a vacuum. How we serve society is the point of it all!

ISFP conference 20-24 January, 2025

XI

International Symposium on Fish Parasites



Fish Health, Parasites and Biodiversity Conservation

January 20-24



Mexico, Yucatán



Local Organizing Committee

ISFPXI@enesmerida.unam.mx

Gerardo Pérez Ponce de León, Presidente

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Leopoldina Aguirre Macedo. Centro de Investigación y Estudios Avanzados-IPN, Unidad Mérida (CINVESTAV)

Martín García Varela. Instituto de Biología, UNAM

Mayra Grano Maldonado. Universidad Autónoma de Sinaloa (UAS)

Sergio Guillén Hernández. Universidad Autónoma de Yucatán (UADY)

Ma. Amparo Rodríguez Santiago. Consejo Nacional de Humanidades, Ciencia y Tecnología (CONAHCYT)

Miguel Rubio Godoy. Instituto de Ecología, A.C. (INECOL)

Víctor Vidal Martínez. Centro de Investigación y Estudios Avanzados-IPN, Unidad Mérida (CINVESTAV)



ESCUELA NACIONAL DE ESTUDIOS SUPERIORES UNIDAD MÉRIDA



Cinvestav



Instituto de Biología UNAM



UADY UNIVERSIDAD AUTÓNOMA DE YUCATÁN



State News

WA

Murdoch University

In February 2024, **Dr Aileen Elliott** was awarded an Honorary degree of Doctor in Science at Murdoch University in recognition of her contributions to the university and to Parasitology in Australia. Surrounded by some of her past colleagues, students and friends, Dr Elliott gave an evocative and inspirational speech.

“Life is a voyage of discovery, we are constantly learning and evolving,” she said to her fellow graduates last night. Never be afraid to question even if you think it is silly; never fear failure, we all fail at some point and quite often from failure comes learning and success; never be scared to move out of your comfort zone and take on new challenges; respect and be respected in return. If I can achieve this, so can you. To quote my favourite author again, Sir Terry Pratchett, ‘the world is your mollusc!’”

Dr Elliott is regarded as an important researcher in the field of wildlife parasitology and her work has helped Murdoch University to achieve a pre-eminent research position among Australian universities in Animal and Veterinary Science.

Aileen’s employment at Murdoch began in 1989 as an Animal House Assistant. Later she transferred to become a lab assistant for the Parasitology department. Aileen’s role included laboratory teaching support, research support and also examination of specimens for the parasitology diagnostic service, including samples from TAHMU, Perth Zoo and numerous other sources. Over the following 30 years Aileen’s uncanny eye for spotting patterns and anomalies coupled with accumulated skill and experience as a microscopist became quite irreplaceable.

With her willingness to apply them, Aileen’s skills became a sought-after commodity across the institution, state, country, and region. Consequently, Aileen quietly amassed an impressive publication record, co-authoring 53 peer reviewed journal articles with a citation record and h-index of 24, rivalling many of her Academic



Dr Aileen Elliott

colleagues. In addition, Aileen’s contribution is acknowledged in a further 19 journal publications. Aileen has provided significant support to HDR students at Murdoch and has been acknowledged in at least 20 PhD Dissertations, and a further 6 Masters or Honours Theses.

Aileen’s managed this substantial contribution

while diligently supporting an increasing course and unit load, supporting the laboratory teaching activities not only in Veterinary Science but expanding include Biomedical Sciences and more recently the Bachelor of Laboratory Medicine. Over 30 years Aileen has given unrelenting service to undergraduate and postgraduate students as well as the facilities and resources that

State News continued

they need for success in their studies, a contribution to which she attached the highest priority.

Other notable highlights in Aileen's service to Murdoch University include:

- 2009 Awarded a Senate Medal, in recognition of her contribution to our institution.
- 2011 Position reclassification (Technician – Parasitology).
- 2015 Second place at the Australian Museum Eureka Prizes – Science Photography.

(<https://www.parasite.org.au/blog/new-scientist-eureka-prize-for-science-photography-2015-finalist-aileen-elliott-murdoch-university/>)

In addition to her substantial contribution and support to research activities at Murdoch, Aileen has applied her substantial skill as a microscopist to the generation of an extensive digital catalogue of images of organisms that she has collected and identified over her extensive career. Upon retirement Aileen had succeeded in creating pictorial keys to assist future generations of Parasitology students and researchers in their identification of species. Clearly identifying morphological features and translating complex morphological terms to leave an easily accessible legacy for not only today's students and scholars but those to come.

After 30 years of diligent service Aileen retired late in 2022. Aileen's story is an outstanding example of what can be achieved by any individual in an environment where mutual respect and collaboration endures. Aileen came into the Murdoch workforce with a high school education. She joined a team of educators and researchers who recognised and acknowledged the value of her contribution and encouraged her to continue to learn and grow into her role. As a result, Aileen's contribution to Murdoch University, her colleagues, and countless students over the past three decades has amounted to far more than what might typically have been expected from an individual in a Professional role.



Photos (top) Dr Aileen Elliott with ASP members from Murdoch University, Una Ryan, Russ Hobbs, Amanda Ash, Aileen Elliot, Narelle Daly and Alan Lybery (bottom) Dr Aileen Elliot receiving her Honorary degree of Doctor in Science at Murdoch University

State News continued

ACT

ACT news

2024-2027 NHMRC Ideas Grant
(Chief Investigator A: Adele Lehane,
Chief Investigator B: Giel van Dooren,
Chief Investigator C: Kieran Kirk): Na⁺-
dysregulating antimalarials: blocking the
roads to resistance by understanding PfATP4
and its place in parasite physiology. \$837,718

2024-2027 ARC DP (Alex Maier, (Chief
Investigator), Todd Mitchell (Chief
Investigator) Benjamin Mordmueller (Partner
Investigator)): Targeting the host lipid
environment to disrupt malaria transmission
\$664,654

Outreach:

National Youth Science Forum January 2024:
19 Year 12 students from across Australia
visiting Centre for Advanced Microscopy
(ANU) for a lecture and hands-on session (3
hours): Microscopy in Parasitology-

How imaging tools reveal hidden secrets in
many parasitology enquiry contexts

Parasite life cycles for research and teaching:

3 week ethical proposal every 3 years to
sustain a 3 hour prac is not sustainable from
an administrative point of view.

We will shut down the *Hymenolepis diminuta*
(Cestoda) and *Heligmosomoides polygyrus*
(Nematoda), life cycles that had been
sustained at ANU over the last 40 years.

Publications

Gao, X. et al. (2024) Zeb2 drives the formation
of CD11c + atypical B cells to sustain germinal
centers that control persistent infection;
Science Immunology; Feb 2024; DOI:
10.1126/sciimmunol.adj4748 (Cockburn lab,
JCSMR ANU)

Dian C. Ningtyas, Florentina Leitner, Huma
Sohail, Yee Lin Thong, Sarah M. Hicks, Sidra
Ali, Megan Drew, Kiran Javed, Jiwon Lee,
Enny Kenangalem, Jeanne R. Poespoprodjo,

Nicholas M. Anstey, Melanie Rug, Philip Y.-I.
Choi, Steven Kho, Elizabeth E. Gardiner,
and Brendan J. McMorran (2024) Platelets
mediate the clearance of senescent red blood
cells by forming phagocytic platelet-cell
complexes; *Blood* 143, (6)

Victoria

State Outreach event

We had a really good turn out from Fed Uni,
and Melbourne Uni – Stuart's group at Bio21
and the Gasser/Colella labs. There were a
few honours students keen to join the society
and attend the ASP conference in Auckland
Overall, a very nice time had by all!

NSW

University of Sydney

In December we bid farewell to **Professor
David Emery**, who has retired after two
impactful decades at the University of

Sydney. His dedication to parasitology and his
signature shorts, no matter the weather, will
be fondly remembered. Enjoy cicada chasing
and grandparent duties, David!

We're thrilled to welcome **Dr. Nichola Calvani**
back to the Sydney School of Veterinary
Science after three years in Professor John
Dalton's laboratory. She is replacing **David
Emery** as the new lecturer in parasitology.
We also congratulate **Nichola** on her ARC
Discovery Early Career Researcher Award.
Her project on 'Unlocking the helminth
'early infection gap'' aims to unravel the
secret life of parasites in their mammalian
hosts by developing 3D cell culture invasion
models, paving the way for innovative control
methods.

Congratulations to PhD student **Emily
Francis** for submitting her PhD thesis in
January! Her research has developed a
workflow to expedite parasite identification
and drug-resistance monitoring in livestock,
transforming weeks of analysis into mere days,
enhancing on-farm parasite management and
animal welfare.

Kudos to Master's student **Thomas Stocker**
for publishing his re-analysis of US hookworm
data in *Veterinary Parasitology* (<https://doi.org/10.1016/j.vetpar.2024.110118>). His work



Victoria ASP Members outreach event

State News continued

demonstrates the hidden gems in public data by clarifying hookworm species in dogs in the USA, contributing valuable insights to our understanding of parasitic distributions.

With the new semester starting this week we extend a warm welcome to our new honours students **Crystal Elliott, Ariel Chen, Sean Burhop, and Chelsie Uthayakumar**. With projects covering topics such as drug resistance, streamlining 3D cell culture and wildlife disease outbreaks, we look forward to learning more about them and their research as the year unfolds

Professor **Jan Šlapeta** entered a conversation on how to call 'ovale' malaria and how best to preserve the name *Plasmodium ovale*. Jan comments in Trends in Parasitology (Calling them names: variants of *Plasmodium ovale*; <https://doi.org/10.1016/j.pt.2023.12.010>) on caveats with recently proposed renaming. Stay tuned for ongoing discussions in this area.

Finally, 1st prize for the best title of an article goes to **Emily** for "The proof is in the pooping: Benefits of the longitudinal molecular surveillance of drug resistance demonstrated in a New South Wales cattle herd" (<https://doi.org/10.1016/j.vetpar.2024.110118>). Congrats!



Images from top: Professor David Emery retires after two decades at The University of Sydney
Congratulations to PhD student Emily Francis for submitting her PhD thesis in January
Victoria State outreach event for ASP members and potential members

JOBS

Jobs in Parasitology

Murdoch University research projects through Honours or PhD study with ASP members Dr Charlotte Oskram and Dr Amanda Ash.

<https://www.murdoch.edu.au/study/study-levels/research/your-research-project/research-projects>

STA member news

Science Technology Australia, Science Meets Parliament 2024:

360 delegates, 90 Parliamentarians, 540 attendees at the gala dinner and more than 50 incredible speakers – this year's Science Meets Parliament wasn't just the biggest ever, it was the best ever, smashing records everywhere you look.

We are so deeply grateful to everyone who took part, partnered with us, donated their time and shared their expertise to provide a once-in-a-lifetime professional development opportunity to the nation's STEM professionals. A massive thank you to everyone who attended – I hope you found it illuminating, that it gave your science communication skills a powerful boost, and that it helped you create connections that will last with you through a lifetime. You can read more about SMP2024 here, along with more about the huge cast of generous and supportive organisations and individuals that made it possible. We are so very thankful for you all.

While SMP2024 was happening three other very important things happened. Firstly, the Australian Research Council Amendment (Review Response) Bill 2023 was passed in Parliament. The moment the vote outcome was announced received a roar of appreciation from everyone at SMP. This bill establishes an independent board that will have final approval for a significant proportion of research grants and – crucially – puts an end to ministerial meddling in grant application approvals.

This is something that STA has long advocated on behalf of our now 225,000 members. It's a welcome step in the right direction. Congratulations to Education Minister Jason Clare for putting these important changes through Parliament, and to the review team led by Professor Margaret Shiel AO working with Professor Susan Dodds and former STA President Professor Mark Hutchinson for developing a comprehensive and thoughtful blueprint for modernisation of the legislation governing the ARC. Applications are open now for a Board Chair, Deputy Chair, and seven members of the new Australian Research Council Board.

The second important thing to happen while SMP was on was the announcement that Ryan Winn is to lead STA as its new CEO. Ryan will join the organisation in May from the Australian Council of Learned Academies (ACOLA). He is a highly experienced and deeply respected Chief Executive and Australian policy leader with extensive experience working in the public service. We are thrilled to have him as our incoming CEO and look forward to welcoming him in the role.

The other important thing that happened during SMP was – because who doesn't love a bit of romance? – Industry and Science Minister Ed Husic announced his engagement during his speech at the gala dinner. Huge congratulations to the Minister on this wonderful news and best wishes to the happy couple from the entire STEM community.

This week the Defence Trade Controls Amendment Bill 2024 was passed in the Senate. You can read our policy submission on the amendments here. STA strongly welcomes and supports the definition of fundamental research that's in the primary legislation – this is essential to ensuring scientists can continue their important work with international collaborators. We will continue to work closely with the Department of Defence to ensure that education and communication materials are comprehensive and effective, so that the research community is aware of its obligations and compliance requirements.

Finally, Education Minister Jason Clare this week announced 10 new university Study Hubs for regional Australia, as well as additional funding to two existing Study Hubs. The announcement is part of the Government's response to the Universities Accord report, and applications for the next 10 Study Hubs to be funded will be open in coming months. Locations for the new Study Hubs include East Arnhem Land in the NT, Warwick in Queensland, and The Pilbara in WA – places without easy close access to a university. STA welcomes these and any initiatives that remove barriers for students wishing to study STEM subjects – particularly those from a low socio-economic background, Aboriginal and Torres Strait Islander students, and students with disability.

The Australian Senate has recently established a Select Committee on Adopting Artificial Intelligence (AI). Submissions are due on the 10th of May and STA will be making one. The Committee's Terms of Reference are https://www.apf.gov.au/Parliamentary_Business/Committees/Senate/Adopting_Artificial_Intelligence_AI/AdoptingAI/Terms_of_Reference

We would welcome feedback on these Terms of Reference and how this relates to your discipline, including recent or future developments and/or specific case studies to inform the submission. Email hari.konchada@sta.org.au by 22 April 2024.

All the best,

Sandra Gardam

Acting CEO, Science & Technology Australia

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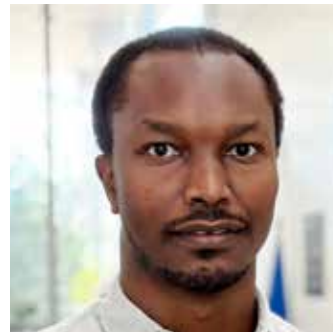
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