

NEWSLETTER

Volume 34 Issue No.1 June 2023





NEWSLETTER

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Dear Members,

We are already halfway through 2023! Many are just recovering from last semester's teaching, and hopefully, some are looking forward to a well-deserved break over the inter-semester break and school holidays. Whatever the case, I know that everyone is looking forward to the 2023 ASP Conference in Darwin which is a mere three months away! This year's conference has a strong One Health and Tropical Medicine theme with a stellar array of national and international invited speakers. Three workshops will take place within the conference programme - the One Health workshop generously sponsored by Elsevier, "A deep dive into One Health approaches and practices in parasitology", dedicated to the late Prof Don McManus. As part of this workshop, the ASP Disadvantaged Researcher Fund and the Australian Centre for International Agricultural Research (ACIAR) have sponsored four early-career academics to participate in this workshop from Vietnam, Malaysia, Laos PDR and Ukraine. The workshop will feature Elsevier-sponsored plenary lectures by Prof Banchob Sripa (Tropical Disease Research Center, Khon Kaen University, Thailand) and Prof Colleen Lau (School of Public Health, The University of Queensland). In addition, our ASP Affiliate Strongyloides Australia will host a workshop on the 'most neglected of neglected tropical diseases' featuring plenary lectures by Dr Wendy Page (2021 Northern Territory Australian of the Year) and Professor Zeno Bisoffi, (Department of Infectious Tropical Diseases and Microbiology, IRCCS Sacro Cuore Don Calabria Hospital, Verona, Italy). Finally, a Bioinformatics workshop will take place, organised by our very own ASP Travel Award and ID Smyth Postgraduate Travel Awards recipients Maree Widdicombe (RMIT) and Clarisse Louvard (RMIT) in collaboration with Dr Jacob Westaway



(Menzies School of Health Research). These workshops are just part of the exciting line-up of plenary and invited speakers and themes ranging from malaria to Vetoquinoland Elanco-sponsored sessions on feline and canine parasites respectively, and a Virbac-sponsored session on livestock parasitology! Fear of missing out? Don't register now and be there for all the action, excitement and making of wonderful memories!

We celebrate the achievements of our many ARC and NHMRC grant awardees (Pg 36) and extend an extra special congratulations to Prof Leann Tilly, who was recently awarded the prestigious Lifetime Achievement Award at the 2023 EMBL Biology and Pathology of the Malaria Parasite (BioMalPar) Conference in Heidelberg, Germany.

The ASP Council has formed a working group to nominate members from diverse fields of research to represent the Society as part of the Parliamentary Friendship Group. It is intended that this will provide the ASP with an avenue to meet

From the President's Desk continued

and interact with parliamentarians on highlighting the integral role parasitology plays in veterinary, medical, fish and wildlife health, and the risks climate change and anthelmintic resistance pose. Watch this space!

And speaking of climate change, I am delighted to announce that the ASP has now successfully transferred its investments into companies and funds that derive their income from ethical sources. This was a lot of work, and I thank Vito for his role as ASP Treasurer to finally see this through to completion. Thank you too to Lisa for helping coordinate this major task!

We farewell and pay our deepest respects to colleague Dr Ifor Owen, a highly respected parasitologist who dedicated most of his working life (and retirement) at the National Veterinary Laboratory (NVL) in Port Moresby, Papua New Guinea. For me, Dr Owen will always be remembered for his discovery of *Trichinella papuae* in deep, remote areas of western PNG, where he also demonstrated 10% of traditional hunters seropositive for this food-borne zoonosis. We thank Dr Owen for his dedication and contributions to the field of tropical parasitology.

Finally, I'd like to thank the entire ASP Executive, Council Members and Officers that volunteer and work tirelessly behind the scenes to ensure the smooth operation and success of our Society, the ASP Network and our prestigious Journals.

See you all in Darwin!

Best regards, Rebecca Traub

President of the ASP

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









ASP AGM

2023 Australian Society for Parasitology Annual General Meeting

The 2023 Australian Society for Parasitology Annual General Meeting will be held as a hybrid face-to-face (at the 2023 ASP Conference) and online Zoom meeting on Wednesday 6th September. All ASP members will receive an email invitation to attend the AGM once the time has been confirmed.

Business to be conducted

The following business will be conducted at the 2023 Annual General Meeting of the Society. The minutes and reports for ASP meetings are available on WildApricot / members / resources section. To access them please login to your Wildapricot account (https://asp.wildapricot.org/ 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 details below);
- 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.

If you have any trouble registering for the AGM or if you want to test out Zoom before the AGM to make sure it works for you please email <u>secretary@parasite.org.au</u> or phone 07 42321311.

The 2023 ASP AGM will be recorded. Other

participants will be able to see and hear you if your microphone is on and your video is on. When you first join this meeting your microphone will be muted and your video will be off. We will use raised hands for in-person voting and online polls to vote for AGM matters. If you can't access the poll then you need to let me know straight away so I can give you another option to vote. There is also a chat option so that you can send a message to all. The Executive will address all questions. This chat will also be recorded and saved for viewing afterwards. Please be respectful of everyone when participating in this meeting.

Shape the future, join the ASP Council

Every year the Australian Society for Parasitology (ASP) seeks nominations for positions on the ASP Council. Nominations for the ASP Council for terms beginning 6th September 2023 have opened. To nominate someone you must be a member of the ASP. To be a member of the ASP Council you must be an eligible (under section 61A of the Act) adult and a member of the ASP. Check whether you are a financial member on the ASP membership site (https://asp.wildapricot.org/).

Please see www.parasite.org.au/joincouncil to read about the positions on Council that we will be voting on at the 2023 ASP AGM. We invite you to seek and encourage appropriate candidates. Nominations should be emailed to <u>secretary@parasite.</u> <u>org.au</u> and will close on 6th August 2023. The candidates will be announced by 29th August 2023 on the ASP website and by email and ASP members will vote for ASP Council positions online at the 2023 ASP AGM. We already have some candidates for Council positions, you can check these on



the ASP website.

The ASP is an inclusive organisation. We encourage nominations from Indigenous Australians, people with disability, people from diverse cultural and linguistic backgrounds, parasitologists of all ages and career stages and LGBQTI people. The Society is also committed to achieving gender equality across all its Committees including, but not limited to, the ASP Council. The Society recognises and values the wealth of talent, creativity and discoveries achieved by women in parasitology. We acknowledge that women continue to be under-represented in the field, particularly at senior levels. The Society is, therefore, committed to gender equality in our discipline and in the Society and hence we encourage nominations from women for ASP Council positions. (Read about Gender Equality within the ASP Principles, By-Laws and Guidelines https://www.parasite.org.au/the-society/ <u>constitution/)</u>.

Please don't hesitate to get in touch if you have any questions. We look forward to electing strong and enthusiastic representatives to the ASP Council.

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SOCIETY NEWS

Vale Ifor Owen

Remembering Dr Ifor Owen.

OBITUARY

lfor Lunt Owen 1934-2022

Ifor was born on the 13th of March, 1934 in Penybontfawr - a small village in Montgomeryshire, Wales. After his primary education in Penybontfawr, he went to Llanfyllin for his secondary education, and then on to Aberystwyth College of Wales where he graduated in Zoology. His interest in the subject led him to a postgraduate degree (PhD) at Aberystwyth on the parasites of fish with Gwendolyn Rees. He was appointed assistant lecturer in Parasitology at the Royal Veterinary College in London, then a position as a Lecturer at the Chelsea College of Science and Technology, University of London.

He was attracted by the possibility of a two year Research Fellowship funded by the Australian Government to work in Papua New Guinea (PNG) (at that time an Australian Protectorate). After the completion of his two year Fellowship, he stayed there for the next forty years, first as Parasitologist and later Senior Veterinary Parasitologist at the National Veterinary Laboratory (NVL) in Port Moresby. His life in PNG was an adventurous one, as he would have to travel to remote areas by small plane and/or by canoe into the interior with several interpreters because of the numerous languages spoken (his native Welsh was of limited use in PNG). During his tenure at the NVL, Ifor performed diagnostic and research work in parasitology, training and instructing staff, and advising and briefing senior departmental staff on aspects of parasitology affecting animal health and production in the country. During this period, he published papers on parasites affecting domestic animals in PNG. From March 1990 to March 1993 he served as Acting Officer-In-Charge of the NVL in the absence of a Chief Veterinary Pathologist. This involved maintaining overall supervision of all sections of the laboratory. Ifor retired from his government post in 1994.

Retirement did not alter Ifor's level of activity and if anything provided the opportunity to increase his scientific output given that over half of his papers were published after 1994. The vast majority of activities in this phase of his career were completed as an unpaid "volunteer" often using his own personal funds. In addition, lfor continued to provide a diagnostic service in PNG through daily visits to the NVL where he remained the only parasitologist. During this time he was also a part-time Lecturer in Parasitology in the Medical Laboratory Sciences Department at the School of Medicine and Health Sciences, University of Papua New Guinea. Duties involve lecturing students on human gastrointestinal parasites and methods of laboratory diagnosis.

The work that provides one of the best examples of Ifor's dedication and contribution to the field of parasitology was associated with the discovery and characterisation of a new nematode, Trichinella papuae, a project involving significant hardship in one of the most remote and underdeveloped parts of the country along the PNG/Papua border. This feat would be a challenge for a young enthusiastic person. The fact that Ifor organised, funded and completed these surveys in his 70's is testament to his dedication to parasitology research.

Ifor published approximately 36 papers in peer-reviewed journals, which includes the massive 163 page compendium in Zootaxa entitled "Parasites of animals in Papua New Guinea recorded at the National Veterinary Laboratory: a catalogue, historical review and zoogeographical affiliations" and included parasites of both domestic animals, wildlife and fish. A substantial part of our current knowledge of the parasite fauna of PNG is due to Ifor's careful, assiduous collecting.

Ifor continued his association with the NVL into his 80s, working to ensure that the veterinary laboratory had resource material that was up to date and country-specific to use as a reference for the training of future generations of parasitologists. He produced a unique manual for the NVL technicians that includes many hand-drawn images (by Ifor) that do not exist in any other form. In 2015, Ifor was elected as an Honorary member of the World Association for the Advancement of Veterinary Parasitology. He had close connections with a number of Australian parasitologists and attended several scientific meetings of the ASP.

Ifor returned to live in a retirement village at Llandudno in Wales and died in December 2022.



While Ifor would have resolutely refused to allow his colleagues in PNG to submit any nominations for awards in recognition of his work for the PNG Government, we are sure that he would have approved of the posthumous plan to name the renovated parasitology laboratory at the NVL in his honour, as a mark of his contribution to the country.

Simon Reid

lan Beveridge

#2023ASP Annual Conference

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

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

Delegates will be able to attend the following workshops held during the conference:

- 6th September 2023 One Health workshop sponsored by Elsevier "A deep dive into One Health approaches and practices in parasitology", dedicated to the late Prof Don McManus.
- 8th September 2023 Strongyloides Australia workshop
- Bioinformatics workshop

We profile our fantastic invited speakers in this newsletter, see pages 6-8.

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



Our conference logo was created by Aboriginal artist based in Darwin, Jayde Hopkins, read her interview on page 6

(Menzies School of Health Research, NT) IJP Invited Plenary Lecturer

- The 2023 Bancroft-Mackerras Medal for Excellence Winner
- Dr Rintis Noviyanti, (Eijkman Institute for Molecular Biology in Jakarta, Indonesia & BRIN)
- ProfessorTomáš Scholz (Institute of Parasitology, Biology Centre of the Czech Academy of Sciences, Czech Republic) IJP:PAW Invited Plenary Lecturer
- Associate Professor Melanie Rug (Australian National University)
- Dr Rachel Korman Invited Speaker sponsored by Vetoquinol
- Professor Alexander Maier, (Australian National University)
- Dr Wendy Page (Strongyloides Australia

and 2021 Northern Territory Australian of the Year) Strongyloides Workshop Plenary Lecturer

- Professor Jacquin C. Niles, (MIT Center for Environmental Health Sciences, MIT Department of Biological Engineering, U.S.A.) IJP:DDR Invited Plenary Lecturer
- Professor Ala Tabor, (QAAFI Centre for Animal Science, University of Queensland) Livestock Parasitology Invited Speaker sponsored by Virbac
- Professor Zeno Bisoffi, (IRCCS Ospedale Sacro Cuore Don Calabria, Italy) Strongyloides Workshop Plenary Lecturer
- Associate Professor Sarah Auburn, (Menzies School of Health Research)
- Professor Rebecca Traub, Invited speaker sponsored by Elanco

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ASP Conference

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 COVID19 or something else that stops them from being able to attend in-person we will be able to offer delegates virtual attendance options with all sessions livestreamed.

There are lots of accommodation options in Darwin, the conference venue DoubleTree by Hilton Esplanade Darwin and their sister hotel nearby, DoubleTree by Hilton Darwin, are both offering excellent early bird accommodation rates but these special conference room rates will only be available until 5th July 2023 so please make your bookings by then; they are subject to availability and please check the cancellation policy before booking. Other hotels near to the conference venue are also offering special conference rates, Novotel Darwin, Palms City Resort and Travelodge Darwin, 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 policy on gender equality is on the Conference website https://www.parasite. org.au/aspconference/advice/policy/

For social media posts please use #2023ASP









Virbac



A huge thanks to our 2023 ASP Conference sponsors!



Conference logo - interview with Jayde Hopkins

Our conference logo was created by Aboriginal artist based in Darwin, Jayde Hopkins, and we were able to interview Jayde about her work.

Jayde thank you for being the artist for the 2023 ASP Conference logo. Please tell us a little more about yourself.

I am a proud Gurindji and Woolwonga woman born and raised in the NT. I am studying a Bachelor of Biological Sciences with aims to become an infectious disease researcher. I am passionate about science communication and love using art as a teaching tool. As an artist I specialise in vibrant colours, utilising dot painting and more contemporary techniques to paint the natural world. Since 2020 I have been creating artwork with my business Nawula Almaren Aboriginal Art.

Jayde what a lovely logo for the ASP 2023 conference, can you tell us the story behind the painting?

After looking at previous conference logos, my aim for this painting was to marry place with parasite. I wanted to include elements of the Top End with parasites relevant to the area. In the painting background I have included an iconic Territory sunset with rich, vibrant colours. In the foreground, to the left of the wording, is a local helminth (Strongyloides stercoralis) wrapped around a tropical palm tree. (Size not to scale - but could you imagine!). Crawling from the palm to the words detailing the conference is a scabies mite, ready to burrow its way into our hearts...or skin.

I understand that some of your work involves drawing on your scientific background to interpret and represent research findings through art. Can you tell us a bit about some of the work that you have done in this space?

Through my work at Menzies School of Health Research this year, I have been undertaking a major project entitled,



2023 ASP Conference logo

'Menzies Art Gallery of Scientific Discovery'. I've created a series of paintings based on new discoveries by Menzies researchers. This has been an incredible opportunity as a scientist and artist, I was able to meet most of the researchers and work directly with the novel organisms in the lab, growing bacteria on agar and Gram staining for reference images to inform my artwork. I was honoured when my painting of Staphylococcus argenteus was chosen for the cover image of the October 2022 edition of Microbiology Australia.

Thank you Jayde, are there places in Darwin that people can view your other work?

Yes! If you would like to visit in person, I have a few paintings displayed for sale at Saltwater @ Bundilla, the cafe/restaurant

located at the Museum and Art Gallery of the Northern Territory (19 Conacher Street, The Gardens). Otherwise to view my full collection online you can check out my website, https://www.nawula-almarenaboriginal-art.com.au/

ASP Conference Invited Speakers





Professor Banchob Sripa, (Tropical Disease Research Center, Khon Kaen University, Thailand) Elsevier One Health Workshop Plenary Lecturer

Professor Banchob Sripa is a KKU Senior Research Scholar, Head of the WHO Collaborating Centre for Research and Control of Opisthorchiasis (Southeast Asian Liver Fluke Disease), and Director of the Tropical Disease Research Center, Faculty of Medicine, Khon Kaen University, Thailand. Currently, Dr.Sripa is a panel member of the WHO Foodborne Disease Burden Epidemiology Reference Group (FERG II). He has been working on human liver flukes including their related cholangiocarcinoma as well as other tropical diseases for over 35 years. Dr.Sripa's expertise includes biology, immunology, pathology, pathogenesis, carcinogenesis, and control of the liver fluke infection. His integrated liver fluke control program using EcoHealth/ One Health approach named the "Lawa model" is one of the two showcases with success helminth control of WHO/ NZD4 (2014). Dr. Sripa was ranked among world top 2% scientists in Mycology and Parasitology by Stanford University (2022). He sits on the Deputy Editor of PLOS Neglected Tropical Diseases, Associate Editor of Tropical Medicine & International Health, and editorial boards of several tropical disease journals. Dr. Sripa received several scientific research awards, the most prestige the Thailand Outstanding Scientist Award from the Foundation for the Promotion of Science and Technology under the Patronage of H.M. the King, the King Award (2013) and the Thailand Research Fund Senior Research Scholar (2013).



Professor Colleen Lau, (School of Public Health, The University of Queensland) Elsevier One Health Workshop Plenary Lecturer

Prof Colleen Lau is an NHMRC Fellow and Professorial Research Fellow at the University of Queensland School of Public Health. Her areas of expertise include emerging infectious diseases, neglected tropical diseases, and clinical travel medicine. Her wide range of research interests include infectious disease epidemiology, environmental drivers of disease transmission, spatial epidemiology, disease mapping, disease surveillance and elimination, vaccinations, travel health, and digital decision support tools. Professor Lau's research projects focus on answering practical questions in clinical management of infectious diseases and operational questions on improving strategies to solve public health problems.



IJP

Associate Professor Matthew Grigg (Menzies School of Health Research, NT) IJP Invited Plenary Lecturer

Matt is a NHMRC Emerging Leader II who has experience conducting and leading studies related to the epidemiology, diagnostics, and clinical drug trials of malaria and other tropical infectious diseases in Southeast Asia, with a focus on zoonotic malaria due to the monkey parasite Plasmodium knowlesi.

Matt also works as a clinician in Indigenous health in remote communities in East Arnhem Land.



ASP Conference Invited Speakers





ProfessorTomáš Scholz (Institute of Parasitology, Biology Centre of the Czech Academy of Sciences, Czech Republic) IJP:PAW Invited Plenary Lecturer

Prof. Tomáš Scholz is Head of the Laboratory of Helminthology and former Director of the Institute of Parasitology, Biology Centre of the Czech Academy of Sciences, Ceské Budejovice, Czech Republic (2002–2012).

His professional interests include helminthology, fish parasitology and fish-borne parasitic diseases, especially systematics, phylogeny and life cycles of tapeworms (Cestoda) and other parasitic flatworms (Neodermata), including human broad tapeworms (Diphyllobothriidea) and small liver and intestinal flukes (Opisthorchiidae and Heterophyidae). He has been working on fish and other parasites in Latin and North America for several years (3 years in Mexico, 1 year in Brazil, 1 year in USA).

Prof. Scholz has published over 360 scientific publications, 5 monographs and 16 chapters in books. His papers have been cited 6,532 times; h-index = 39] He is Editor-in-Chief of Folia Parasitologica and has been P.I. or Co-P.I. of numerous grant projects. He was a group leader in a National Science Foundation-funded project "A Survey of the Tapeworms (Cestoda: Platyhelminthes) from Vertebrate Bowels of the Earth" (program Planetary Biodiversity Inventory; 2008–2017). He has presented 12 invited lectures at parasitological conferences, including ICOPA (3), EMOP (2) and WAAVP (1).



Dr Wendy Page (Strongyloides Australia and 2021 Northern Territory Australian of the Year) Strongyloides Workshop Plenary Lecturer

Dr Wendy Page has worked in Aboriginal health for more than 30 years, in communities in North East Arnhem Land. In 2021, she was recognised for her work as the recipient of the Northern Territory Australian of the year.

In 1993, Wendy took up a position at the newly established Miwatj Health Aboriginal Corporation in Nhulunbuy, where she is now medical director.

'To me, it was the epitome of Aboriginal health to be able to come to Arnhem Land. It always ... held a lot of interest.'

'I just feel incredibly privileged to have able to live and work here, and the amount that I've learned ... you never stop learning. It's ongoing. I don't understand why more people don't put up their hand and say, yes, I want to come out and let's work out there.'

Dr Page has pursued her own journey in researching and raising awareness about strongyloidiasis, which she considers probably the most neglected of neglected tropical diseases. Dr Page also values the opportunity to work as part of a team in a primary care environment, especially the important role of Aboriginal health workers and practitioners. Dr Wendy Page pictured here with staff at Miwatj Aboriginal Health Clinic says "As a Strongyloides Australia member, we seek to highlight this most neglected of NTDs to a wider audience.

Closing the health inequity gap on strongyloidiasis in endemically infected remote First Nations communities is possible."

rongvloides Australia





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

Prof. Niles obtained his Bachelor's degree in Chemistry at MIT before pursing an M.D./ PhD through the HST program between Harvard and MIT, working in Prof. Steve Tannenbaum's lab. Niles then conducted his postdoctoral work in the Department of Chemistry at UC Berkeley in Prof. Michael Marletta's group. Niles returned to MIT in 2007 to join the Department of Biological Engineering where his research group consists of Biological Engineers, Chemists, and Microbiologists focused on developing novel biomolecular tools to better enable the study of the malaria parasite *Plasmodium falciparum*.





ASP Invited Speakers





Professor Zeno Bisoffi, (IRCCS Ospedale Sacro Cuore Don Calabria, Italy) Strongyloides Workshop Plenary Lecturer

Professor Zeno Bisoffi (MD, PhD, DTM&H) is the Director of the Department of Infectious - Tropical Diseases and Microbiology, IRCCS Sacro Cuore Don Calabria Hospital, Negrar (Verona), and Associate Professor of Infectious and Tropical Diseases at the University of Verona. Coordinator of TropNet (European Network for Tropical Medicine and Travel Health). His main areas of interest are Malaria, Neglected Tropical Diseases (in particular strongyloidiasis) and Clinical Logic.







Dr Rintis Noviyanti, (Eijkman Institute for Molecular Biology in Jakarta, Indonesia & BRIN)

Dr Noviyanti is a leading researcher in the study of malaria with expertise in pathogenesis, genomics, cell biology, and gene expression studies of malaria parasites.

Dr Noviyanti is currently Principal Investigator, Head of Malaria Pathogenesis Laboratory Unit, the Eijkman Institute for Molecular Biology in Jakarta, Indonesia.

Since 2011, she has been involved in research advancing malaria vaccine development under the coordination of the Ministry of Research and Technology in the Republic of Indonesia. She was also a member of Expert Panels of Laboratory Working Group, the National Commission for Malaria Eradication as part of the Ministry of Health.

Dr Noviyanti graduated with a PhD in Molecular Biology of Malaria Parasites from the University of Melbourne in Australia and has spent her working life researching in this field. She has headed many investigations and received prestigious awards and internationally competitive grants including the L'Oreal for Women in Science Fellowship. This fellowship was auspiced by the L'Oreal-UNESCO Special Programme for Research and Training in Tropical Diseases which is hosted by the World Health Organization (WHO) and the Asia Pacific Malaria Elimination (APMEN), Where Rintis studied the genetic diversity of malaria parasites in Indonesia. She has also received support from the Malaria Transmission Consortium-UNICEF, funded by the Bill and Melinda Gates Foundation to develop a plasmodium database in Indonesia.



Associate Professor Melanie Rug (Australian National University)

Melanie is a parasitologist with a research focus on molecular, biochemical and cell biological investigation of host-parasite interactions of the malaria parasite. She completed her studies in Biology with a Masters degree (Dipl. Biol.) on parasitic diseases in European crayfish and a PhD investigating the toxic activities of Jatropha curcas against intermediate snail hosts and larvae of schistosomes, the causative agent of Bilharziosis, both at Ruprecht-Karls-University of Heidelberg, Germany.

Melanie's interest in parasitology brought her to La Trobe University, Melbourne on a Postdoctoral Research fellowship from the DAAD. She later moved to The Walter and Eliza Hall Institute of Medical Research as a Senior Research Fellow where she studied different aspects of malaria parasiteinduced trafficking pathways in the human red blood cell gaining extensive experience in the application of a wide range of light, atomic force and electron microscopy techniques.

In February 2012, Melanie joined the Centre for Advanced Microscopy (CAM) at the ANU and has been appointed as Director of the facility and the Microscopy Australia (link) Node in 2014. Melanie shares her passion for the "Inner Space" with researchers from various science disciplines across the Life and Material Sciences.

ASP Invited Speakers





Professor Alexander Maier, (Australian National University)

Professor Alex Maier's passion for Molecular Parasitology was ignited during his studies at the University of Tuebingen (Germany) and Southern Colorado (USA). During his doctorate he investigated protein trafficking and membrane proteins of an energy generating organell in *Trypanosoma brucei*, the causative agent of the African sleeping sickness. This work was conducted under the supervision of Professor Christine Clayton at the ZMBH (Center for Molecular Biology) in Heidelberg, Germany.

In 2000 he was awarded a Postdoctoral fellowship from the German research council (Deutsche Forschungssgemeinschaft) to join the Walter and Eliza Institute of Medical Research (WEHI), Melbourne. Here he established and headed the WEHI Malaria Functional Genomics Facility from 2002-2008 focussing on the mechanism of how malaria parasites invade red blood cells and the transport and display of malaria molecules on the surface of infected red blood cells. Prof. Maier moved to the Department of Biochemistry at La Trobe University as ARC Australian Research Fellow and lab head in 2008 and then in 2012 he joined the Division of Biomedical Sciences and Biochemistry at The Australian National University in 2012. The Maier lab is focussed on the identification of molecules involved in malaria pathogenesis and transmission and to understand the underlying biological principles. His research activites have been recognised by several awards including being a finalist at the Eureka Awards and a Laureate of the Khwarizmi International Award. He is an Alexander-von-Humboldt Fellow, a Senior Fellow of the Higher Education Academy and a Fellow of the Australian Society for Parasitology.



Associate Professor Sarah Auburn is a molecular biologist, whose passion is using genetics/genomics to learn about the biology and the epidemiology of pathogens and their hosts. In pursuit of this interest, she obtained a PhD in genetic epidemiology from Oxford University, and has acquired research skills transcending field work, molecular laboratory techniques and bioinformatics. In her first post-doc (2007-10), A/Prof Auburn facilitated the establishment of the Sanger Institute's first Plasmodium laboratory and gained expertise in malaria genomics. In 2010, she joined Menzies where she leads the genomic studies on Plasmodium vivax (P.vivax).

A/Prof Auburn's current research program incorporates molecular biology, population genomics and software development to generate laboratory and analytical tools for molecular surveillance of *P. vivax* towards elimination of this species. This work leverages on a unique network spearheaded by A/Prof Auburn in partnership with global collaborators - the vivax Genomic Epidemiology Network (vivaxGEN). This network is made up of more than 16 partner countries and has generated more than 1000 global *P.vivax* genomes.

In recognition of her translational and capacity building work in vivaxGEN and the Asia Pacific Malaria Elimination Network (APMEN), Dr Auburn has been invited to join highly reputable committees including the Australian Centre of Research Excellence in Malaria Elimination and the Centre for Genomics and Global Health.



Associate Professor Kamala Ley-Thriemer (Menzies School of Health Research)

Kamala Thriemer is a clinical researcher committed to public health and tropical medicine. She holds a Medical Degree, a Master of Public Health and a PhD. She has more than fifteen years' field experience in Africa and Asia, coordinating large scale and multi-centred clinical trials to inform treatment of infectious diseases. Her research focuses on optimising the treatment of P. vivax and developing public health strategies for malaria elimination. Her research program spans from clinical trials and epidemiological studies to policy and implementation research. She also teaches in Menzies Postgraduate Public Health programs for Charles Darwin University.

Kamala graduated from the Medical University Vienna (MUV), Austria in 2005 where she first began researching antimalarial drug resistance in Thailand and Bangladesh. Kamala graduated with a Master of Public Health from the University of Liverpool in 2011 and received her PhD degree from the University Antwerp, Belgium.

She is an Associate Member of the Australian Academy of Health and Medical Sciences.



SOCIETY NEWS

ASP Invited Speakers





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

Prof Ala Tabor joined QAAFI's Centre for Animal Science in October 2010, after 18 years of conducting research with the Queensland Government. She is a research focussed academic with a strong background in industry engagement associated with animal health and agricultural biotechnologies. Her research interests are associated with the application of genomic sequence data to improve animal disease management through: 1) the development of molecular diagnostic and genotyping methods to better identify pathogens; and 2) the study of gene function in relation to virulence and host pathogenicity of infectious diseases, to develop new effective vaccines. Areas studied to date include bovine reproductive diseases (in particular bovine genital campylobacteriosis), Australian paralysis tick (Ixodes holocyclus), cattle tick (Rhipicephalus microplus species complex), and tick-borne diseases (babesiosis and anaplasmosis). Some key outputs of her work include the application of reverse vaccinology for the development of a novel cattle tick vaccine and paralysis tick vaccine (patents pending), and commercialized diagnostic tools for bovine reproductive diseases. Current research includes paralysis tick vaccines/treatments, bovine biomarkers for disease resistance, cattle tick commercial vaccine trials, bioinformatics/genomics of ticks and bovine venereal Campylobacter spp., tick fever genotyping/detection, and diagnostic assay development for bovine genital campylobacteriosis. Prof Tabor has a strong focus on diversity, inclusion and gender equity initiatives.





Dr Rachel Korman Invited Speaker sponsored by Vetoquinol

Rachel is a feline medicine specialist working Brisbane, Australia. After graduating from the University of Queensland in 2000 in veterinary science, Rachel worked in small animal practice in Australia and the United Kingdom and received a "Cynthia Award" by the Feline Advisory Bureau for her dedication to cats. She was the Feline Advisory Bureau Senior Clinical Training Scholar at the University of Bristol. She is a member of the Feline Expert Panel, the Australian Heartworm Panel, a reviewer for the Journal of Feline Medicine and Surgery, and a contributing author to the British Small Animal Veterinary Association Manual of Feline Practice. Rachel is director of Cat Specialist Services in Brisbane, Australia. Rachel has lectured extensively in the United Kingdom, Europe and Asia, and areas of interest include feline haematological disease, geriatric medicine and liver disease. She is a ring master of 3 cats, a dog and two kids. She divides her spare time between them!





Professor Rebecca Traub Invited Speaker sponsored by Elanco

Dr Rebecca Traub is a veterinarian and Parasitologist and works as a freelance consultant. Prior to this, she worked as a Professor of Veterinary Parasitology and an ARC Future Fellow at the University of Melbourne. Dr Traub's research covers the field of veterinary public health, with a focus on the diagnosis, epidemiology and control of parasitic and rickettsial zoonoses. She has published over 170 peer reviewed papers and book chapters on the epidemiology, zoonotic potential and geographical distribution of parasites of veterinary and public health importance in Asia and Australia.

Rebecca's research expertise in direct and food-borne parasitic zoonoses, canine vector-borne diseases and neglected tropical diseases has been formally recognized through consultations for the World Health Organization, Food and Agricultural Organisation, Australian Council for International Agricultural Research, the Pharmaceutical Industry, and not-for-profit organisations.

In 2019 Dr Traub's achievements were recognised by the Australian Society of Parasitologists Inc., when she was awarded the Bancroft Mackerras Medal Of Excellence in Parasitology and in 2005, the John Frederick Adrian Sprent Medal for the most outstanding PhD thesis in parasitology.

Dr Traub is also a the Founding Director of the Tropical Council for Companion Animal Parasites (TroCCAP©). TroCCAP (http:// www.troccap.com) and currently serves as the President of the Australian Society for Parasitology.

SOCIETY NEWS

From the ASP Treasurer

The ASP have now establish an Environmental Social Governance and Socially Responsible Investing focused portfolio setting us up for the future!

News from the ASP Treasurer, Vito Colella, who states "The ASP's commitment to a sustainable future is stronger than ever! I'm thrilled to announce that @AS_Para has successfully completed the ethical investment transition, directing investments towards companies/funds from ethical sources.

Jeremy Morrison from @firstavewealth was engaged by the ASP to advise and carry out the ethical investment transition so that the ASP is now investing in companies and funds aligned with our mission to combat climate change. #SustainableFuture #ClimateAction #EthicalInvestment #EnvironmentalSocialGovernance #ESG #SRI #SociallyResponsibleInvesting #SustainableInvesting #FutureProof

Further details about the investment portfolio will be available to ASP members through the WildApricot Members Resources webpage with the 2023 ASP AGM files.

\$400 Undergraduate Prizes

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

The course(s) must be taught by a financial member of the ASP (of more than one year standing), and must comprise at least 30% parasitology. **Requests for 2023 prizes must be made by the eligible University to the ASP Treasurer by the 30th September 2023. Please complete the online application form:**

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

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

If you would like a copy, please send your name and address to Maureen Engler ASP Secretariat maureen.engler@parasite.org.au Ph # 0488139155 If you have any questions, don't hesitate to contact me. All the best Maureen



SOCIETY NEWS

#PrideMonth

The ASP is committed to sustaining a diverse, culturally inclusive membership and strives to achieve equality in all aspects of its governance, administration, awards and conference participation.

Happy Pride Month to our LGBTQIA+ members! We join you in celebrating the diversity of the LGBTQIA+ community.

Let's look back on the ASP and IJP's commitment to supporting diversity. The ASP aims is to ensure a socially inclusive membership. We support multiculturalism and anti-discrimination including non-discrimination on the basis of gender, sexual orientation, race, religion, age, or disability and these are stated in the ASP Principles By Laws and Guidelines https://www.parasite.org.au/the-society/constitution/. This includes supporting our LGBTQIA+ colleagues by encouraging our members to become part of institutional ALLY Networks. Our Inclusivity Principles can be found in the ASP Principles By Laws and Guidelines https://www.parasite.org.au/the-society/constitution/

In 2021 the IJP turned 50 and celebrated this milestone by recognising biodiversity with a Rainbow Cover of Vol 51issue 13-14 Dec 2021 (https://www.sciencedirect.com/journal/international-journal-for-parasitology/vol/51/issue/13). A rainbow cake replicate of the cover was presented (and consumed) at the annual conference to celebrate the diversity within our ASP community!

If you would like more information or have some suggestions on how we can further support our LGBTQIA+ members please email Lisa at secretary@parasite.org.au





IJP 50th anniversary rainbow cake (L) and ASP members celebrating the diversity of the LGBTQIA+ community at the 2022 ASP Conference in Cairns.

Women in Parasitology

Nichola Calvani founder of *Her*minthology co-authored an article on gender equity in parasitology which was published in Trends in Parastiology, and awarded the cover image in celebration of the International Day of Women and Girls in Science.

Many ASP members participated in this initiative and can be seen in the collage of all 100 women profiled through Herminthology. Nichola Eliza Davies Calvani, Carolina De Marco Verissimo, Cinzia Cantacessi, Eva Clark, Esther Kanduma, "*Her*minthology: promoting gender equity in science and parasitology", Trends in Parasitology, Volume 39, Issue 2, 2023, Pages 73-79, ISSN 1471-4922, https://doi.org/10.1016/j.pt.2022.11.013. Here is the link to "*Her*minthology: promoting gender equity in science and parasitology": https://www.sciencedirect.com/science/article/pii/ S147149222002860

The ASP recognises and values the wealth of talent, creativity and discoveries achieved by women in parasitology. We acknowledge that women continue to be underrepresented in the field,

particularly at senior levels. The Society is, therefore, committed to gender equality in our discipline and in the Society. This goal of gender equality is important for two reasons. The first reason relates to the science we conduct. We recognise that women are underrepresented at conferences, particularly as invited speakers. Thus, the important contributions and discoveries made by a significant portion of our community remain under-recognised. Second, career development in the sciences is driven not only by publication output but also by prestige measures; thus, equal representation at conferences and recognition through awards is important for women to thrive and develop in their careers.

See the Gender Equality Principles in our ASP Principles By Laws and Guidelines https://www.parasite.org.au/the-society/constitution/

EDUCATION



Over 25 experts in the field share their passion







25 November -

UQ Moreton Bay

Research Station

Queensland

8 December 2023

Concepts in Parasitology

Application deadline

24th July 2023

For more information, see our website parasite.org.au/education/concepts-in-parasitology or e-mail saralph@unimelb.edu.au





A two-week course for Postgraduates and Early Career Researchers

Concepts covered: Evolution, Drug discovery Cell biology, Immune responses, Diagnostics, Bioinformatics and many more



Join us for a two-week course at UQ's Moreton Bay Research Station offering students a unique opportunity to work with prominent Australian parasitologists and learn state-of-the-art research techniques.

The next Concepts in Parasitology (CiP) course will take place between Saturday 25th November and Friday 8th December 2023. To apply download the course application form. The deadline for applications to attend the course is 24th July 2023.

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

Cost to attend the CiP2023 Course is AUD \$1,750 plus GST for Members of the Australian Society for Parasitology, which includes tuition, accommodation and meals. Participants must organise and cover the cost of their travel to and from the Moreton Bay Research station. The research station is about 60-90 minutes travel from Brisbane airport: https://www.uq.edu.au/moreton-bay-research-station/plan-your-visit/travel-and-island-information. Applicants must be ASP members at the time of application deadline to qualify for the discount. Full Course fee: AUD \$2,750 plus GST.

Find out more and download an application form (<u>https://www.parasite.org.au/education/concepts-in-parasitology/</u>) https://www.parasite.org.au/blog/applications-open-for-the-2023-asp-concepts-in-parasitology-course/

ASP Seminar Series



Our recent ASP Online Seminar featured Jill Chmielewski (University of Adelaide), Xavier Barton (Murdoch University), Ben Liffner (Indiana University School of Medicine) and Zala Gluhić (Humboldt-Universität zu Berlin and the Australian National University).

Our online ASP Seminar Series on Friday 21st April featured Jill Chmielewski, University of Adelaide presenting her research "Gene-editing reveals an essential role for merozoite surface protein 5 of P. knowlesi expressing and highlights its potential as vaccine candidate" and Xavier Barton, Murdoch University presenting "Parasitic Landscapes: An Infesting View" discussing his project on tick populations genetics and his iNaturalist project with co-chairs Sarah Preston (Federation University) and Stuart Ralph (University of Melbourne).

Jill Chmielewski is a PhD candidate at the University of Adelaide who works on Plasmodium knowlesi a zoonotic malaria parasite species which has been adapted to culture and is amenable to gene editing. Jill's research utilises CRISPR-Cas9 gene editing to determine the function of merozoite surface proteins 4 and 5 in Plasmodium knowlesi, and how it differs from the foremost human species P. falciparum. Another prominent human malaria parasite, P. vivax, has yet to be adapted to long term in vitro culture. This creates a challenge in solidifying antigen candidates for vaccine development. Jill has gene-edited P. knowlesi to express P. vivax MSPs in order to determine the importance of these antigens for development of immunity to P. vivax malaria.

Xavier Barton is a PhD student at Murdoch University in the Cryptick Lab and the Harry Butler Institute researching the ecology of ticks. Xavier is interested in how they move through a landscape and how different environmental factors effect how they move. He will be presenting "Parasitic Landscapes: An Infesting View" discussing his project on tick populations genetics and his iNaturalist project https://www. inaturalist.org/projects/tick-exploration/

journal

Our ASP Online Seminar Series on Friday 9th June featured Ben Liffner, Indiana University School of Medicine presenting his research "Investigating sporozoite development through the mosquito" and Zala Gluhić a student of a dual PhD program at the Humboldt-Universität zu Berlin and the Australian National University presenting her research "Cardiolipin at the heart of Toxoplasma mitochondrial membranes." with co-chairs Jill Chmielewski (University of Adelaide) and Stuart Ralph (University of Melbourne).

Ben did his PhD at the University of Adelaide, studying host cell invasion by malaria parasites with Danny Wilson, and is currently a postdoc in Sabrina Absalon's lab at Indiana University School of Medicine. Broadly, Ben studies the fundamental cell biology of malaria parasites, trying

EDUCATION

ASP Seminar Series continued



Above: Our seminar speakers (from L-R) Xavier Barton, Murdoch University, Ben Liffner, Indiana University School of Medicine , Zala Gluhić Humboldt-Universität zu Berlin and the Australian National University.and ill Chmielewski, University of Adelaide

to understand the unique ways these organisms undergo processes like nuclear division and organelle biogenesis in both the mosquito and human-infecting stages of their lifecycle. This presentation will discuss recent findings on how highly organised and polarised sporozoites are formed in the mosquito midgut from a comparatively disorganised oocyst, and how these sporozoites get from the mosquito midgut to the salivary gland, ready for transmission to their next host. Ben's work is underpinned by advanced microscopy techniques, particularly expansion microscopy and this presentation will show how expansion microscopy can be used to study parasites in 3D from whole-tissue architecture to parasite ultrastructure on the same sample.

Zala is a student of a dual PhD program at the Humboldt-Universität zu Berlin and the Australian National University. For her PhD Zala joined the lab of Prof. Christian Schmitz-Linneweber where she is investigating mitochondrial RNA processing and the role of cardiolipin synthase in Toxoplasma gondii. She is currently completing her 1-year research stay at ANU working collaboratively in the labs of Assoc. Prof. Giel van Dooren, Assoc. Prof. Melanie Rug and Prof. Alex Maier. In her research Zala combines molecular biology techniques and microscopic approaches to gain a better understanding of the intriguing biology of T. gondii mitochondria.

"Cardiolipin at the heart of Toxoplasma mitochondrial membranes."

Mitochondria are double-membrane organelles found ubiquitously in eukaryotes and are vital in many cellular processes and biosynthetic pathways. Cardiolipin is an unusual cone-shaped phospholipid containing four fatty acyl tails. It is enriched in the inner mitochondrial membrane, predominantly in regions of high membrane curvature. Cardiolipin synthesis is catalysed by the enzyme cardiolipin synthase (CLS), which is localised to the mitochondrial inner membrane. The genomes of apicomplexan parasites such as Toxoplasma gondii encode a bacterialtype CLS, which is fundamentally different from the eukaryotic-type CLS enzyme found in humans and other host species, suggesting that it could serve as a potential drug target. Little is known about the role and importance of cardiolipin and CLS in apicomplexans. To address this gap in knowledge, I sought to elucidate the role of TgCLS in T. gondii parasites. I employed a range of microscopic approaches to investigate the role of TgCLS and CL in mediating mitochondrial morphology. In my seminar, I will tell you more about these results, which demonstrate that cardiolipin lies at the heart of mitochondrial biology in Toxoplasma parasites.

Our seminar series image was created by Thorey Jonsdottir from the Burnet Institute.

If you have ideas for speakers, themes or chairs for future ASP Seminar Series presentations please email secretary@ parasite.org.au with suggestions. See the ASP website and social media channels for information about the ASP Seminar Series, the next one is planned for late July.

OUTREACH

Monsters or Medicine?

ASP Members feature in the latest CATALYST production.

Parasites are gross – they feed on us and often cause disease – but pioneering Australian research shows they might be used to create new medicines. Veterinarian Garnett Hall investigates these complex little creatures, and the many ways scientists are trying to harness their powers for good.

Don't miss this awesome show!

Watch Monsters or Medicine? on Tuesday 16 May 9:30pm at ABC TV or stream on ABC iview

Image courtesy of ABC



OUTREACH

Outreach activities in Western Australia

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

LabRats Schools Out! Jan 2023

As part of a 4-day high school outreach program at Edith Cowan University, Rina delivered two parasitology workshops to teenagers from diverse backgrounds.

"To be able to run the workshop at ECU's state-of-the-art superlab provided an authentic and thrilling experience for the teens" - Rina Wong (Fu)

From ticks, mosquitoes to malaria, Rina grossed out and fascinated participants with the weird and wonderful, crafty parasites. The stop motion produced as part of the ASP Outreach project, "Crafty Parasites - Malaria" was showcased as part of the workshop, coupled with a display of original pipe-cleaner artwork of Plasmodium intraerythrocytic life stages and hands on parasite-feeding-actions in the biosafety cabinet.

"I loved the Bloody Parasites and Dr Rina was amazing." - Participant Evaluation Feedback

After the session, a number of girls stayed back for an extended conversation about career pathways and wanting to hear the malaria song.







Cahoots - Holidays Program for Children with Special Needs

Rina was invited by Cahoots to deliver science workshops tailored for children living with disabilities. She designed handson activities for non-verbal participants who require one-to-one support, as well as workshop content for participants who can engage in class discussions and follow basic steps to perform experiments.

Cahoots is a Perth-based registered NDIS provider, running a variety of inclusive services, catering to people of all abilities aged 5+. It was the first time for Cahoots to run a science program.

"It is fantastic to be able to include participants with high support needs, as it is often challenging to find presenters who are comfortable with the unpredictable nature of the high needs group." - High Support Service Coordinator

From touching bubbles oozing out of a measuring cylinder to seeing parasites under the microscope or floating in a jar, the children were immersed in the joy of science. One participant liked the parasitic worms so much that he swiftly carried some of the sealed specimens, sat down in a quiet corner and held each jar up for a closer look, smiling at each creature.

"I love having fun and doing science with this special community, I feel right at home!" says Rina. "As a sister and carer to my younger brother who lives with nonverbal autism, I'm very comfortable with and used to managing sudden tantrums and squeals. I also use different strategies to reduce the inherent stress relating to doing any non-routine activities - such as meeting a stranger and doing science experiments! The unpredictability is such a small part, compared to the delight and enjoyment on their faces - it really warms my heart."

OUTREACH

Outreach activities in Western Australia cont...

Rina thanks the ASP for paving the way to make science inclusive for all abilities.

Donate your parasites to support this work: Rina's parasite specimens (many from the generosity of ASP members) have now travelled to over 160 events and some are no longer in great shape.

If your lab has any dead & preserved parasites (in a jar or on a slide) that you can donate to this cause, please contact Rina: rina@rinafu.com

https://www.parasite.org.au/outreach/ craftyparasites/







International Journal for Parasitology continued

Call for Expressions of Interest for a Deputy Editor (Strategy and Advancement) for The International Journal for Parasitology.

The Australian Society for Parasitology.

The Australian Society for Parasitology is seeking a highly motivated, enthusiastic and hard-working individual to join our team as a Deputy Editor of our flagship journal, The International Journal for Parasitology. Specifically, the appointee will work with the Senior Editorial team and play a key role in the strategic development and growth of the journal and help to advance the discipline of parasitology.

The first step of the search process is an open call for nominations of candidates. Self-nominations are welcome and encouraged. The IJP Search Committee welcomes nominations of a diverse pool of candidates without regard to race, ethnicity, religion, gender identity, sexual orientation, parental status, national origin, country of residence, age, disability, or any other category protected by law.

The successful appointee will report directly to the Editor-in-Chief of the IJP (currently Brian M. Cooke).

Responsibilities:

Work with the journal's Senior Editorial team (Editor-in-Chief, Deputy Editor and Editorial Assistant) to implement and further develop the journal's strategic vision and goals for the future.

Commission and oversee the publication of Original Research papers, Succinctus articles, Current Opinions, Reviews and Special Issues that align with current trends and developments in the general field of parasitology.

Assist in the management and mentorship

of early career Editorial Board interns.

Promote the journal and the discipline of parasitology to both Australian and international audiences, using a variety of platforms and strategies.

Work with the Editor-in-Chief to ensure to that all submissions to the journal are reviewed and processed in a timely and efficient manner and that the quality and rigour of the published articles are maintained.

Qualifications and selection criteria:

A Ph.D. in parasitology or a closely related field, with a strong research record and an established international reputation as an outstanding researcher in the field of parasitology.

Demonstrated experience in editing and publishing in scientific journals.

Intellectual curiosity and enthusiasm for the field of parasitology as a whole and passion for promoting and advancing the field of parasitology.

An interest in remaining abreast of issues and developments in the diverse fields of parasitology and scientific publishing.

Strong leadership and management skills, including experience working with teams and mentoring early career researchers.

Excellent interpersonal and communication skills, with the ability to communicate effectively and diplomatically with a range of stakeholders, including authors, reviewers, and other members of the IJP Editorial team, Editorial Board members and Editors of the IJP suite of journals (IJP:PAW and IJP:DDR).

An unwavering commitment to quality, integrity, and the principles of academic

freedom.

INTERNATIONAL JOURNAL FOR PARASITOLOGY

A willingness to work within an online manuscript handling system and handle email correspondence in a timely manner.

Have no major conflicts of interest and adequate support from the applicant's institution or other societies of parasitology.

Not be associated with any other parasitology journal as an Editor or Deputy Editor.

Nomination and Selection Process.

30 June 2023 is the deadline to submit a nomination. Prospective candidates are asked to send a complete curriculum vitae and a cover letter (max 1 page), detailing their interest in the position.

Please email your documents to

editor@ijp.org.au

We look forward to hearing from you!

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY

www.journals.elsevier.com/internationaljournal-for-parasitology

Editor In Chief: Brian Cooke

Facebook: <u>www.facebook.com/IJPara</u> Twitter: @IJPara Instagram: ijpara

53:05/06 (May)

Peterkova, K., Vorel, J., Ilgova, J., Ostasov, P., Fajtova, P., Konecny, L., Chanova, M., Kasny, M., Horn, M., Dvorak, J., 2023. Proteases and their inhibitors involved in Schistosoma mansoni egg-host interaction revealed by comparative transcriptomics with Fasciola hepatica eggs. Int. J. Parasitol. 53, 253-263.

https://doi.org/10.1016/j. ijpara.2022.12.007

Image courtesy of L. Jedlickova, Czech University of Life Sciences Prague, Czech Republic.

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International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



<u>53:01 (January)</u>

Száz, D., Takács, P., Egri, Á., Horváth, G. 2023. Blood-seeking horseflies prefer vessel-imitating temperature gradients on hostmimicking targets: <u>experimental</u> corroboration of a new explanation of the visual unattractiveness of zebras to tabanids. Int. J. Parasitol. 53, <u>1-11.</u>

http://dx.doi. org/10.1016/j. ijpara.2022.10.001

International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



Papaiakovou, M., Fraija-Fernández, N., James, K., Briscoe, A.G., Hall, A., Jenkins, T.P., Dunn, J., Levecke, B., Mekonnen, Z., Cools, P., Doyle, S.R., Cantacessi, C., Littlewood, D.T.J., 2023. Evaluation of genome skimming to detect and characterise human and livestock helminths. Int | Parasitol. 53, 69-79.

https://doi. org/10.1016/j. ijpara.2022.12.002

Image designed by Marina Papaiakovou (Natural History Museum and <u>Cambridge</u> University, UK), with images from Servier Medical Art (Creative **Commons Attribution** 3.0 Unported license) and OpenClipart. org(CC0 1.0 Universal [CC0 1.0] Public Domain Dedication), with additional edits made by Dr Tim Littlewood (Natural History Museum, <u>UK).</u>





International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY





53:03 (March)

Gutiérrez-Galána, A., Martínez-Fernández, V, 2023. Low parasite infestations in high densities: the paradox of woodpigeons in urban areas. Int. J. Parasitol. 53, 127-132.

https://doi. org/10.1016/j. ijpara.2022.11.008

Cover design courtesy of Dr. Alejandro Gutiérrez-Galán, Madrid, Spain. Original image of Columba palumbus obtained via Pixabay, modified and reproduced with permission under Pixabay License.

International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY



53:04 (April)

Megía-Palma, R., Martínez, J., Fitze, P.S., Cuervo, [.]., Belliure, J., Jiménez-Robles, O., Cabido, C., Martín, J., Merino, S., 2023. Genetic diversity, phylogenetic position, and co-phylogenetic relationships of Karyolysus, a common blood parasite of lizards in the western Mediterranean. Int. J. Parasitol. 53, 185-196.

https://doi. org/10.1016/j. ijpara.2022.12.006

Image courtesy of Octavio Jiménez Robles, Australian National University, Australia.

International Journal for Parasitology continued

IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY





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

Editor: R.C. Andrew Thompson

Facebook: www.facebook.com/IJPPAW/

Please enjoy recent IJP:PAW articles from ASP members

Md Shafaet Hossen, Diane P. Barton, Skye Wassens, Shokoofeh Shamsi,

"Molecular characterisation of the Monogenea parasites of blue mackerel *Scomber australasicus* (Perciformes: Scombridae) in Australian waters", International Journal for Parasitology: Parasites and Wildlife, Volume 19, 2022, Pages 115-127, ISSN 2213-2244, https:// doi.org/10.1016/j.ijppaw.2022.08.007

(https://www.sciencedirect.com/science/ article/pii/S2213224422000797)

Abstract: This study describes the occurrence and molecular identification of Monogenea from blue mackerel Scomber australasicus (Cuvier) (Perciformes: Scombridae), an edible fish, from Australian waters. Previous studies have provided either morphological or genetic results, whereas this study combines both methods of species identification. A total of 50 fish sourced from the waters off the southeastern Australian coastline were examined and 71 Monogenea were recovered from the gills. The overall prevalence, mean intensity, and mean abundance were 64%, 2.22, and 1.42, respectively. Monogenea were initially classified morphologically as five species belonging to two families. Family Mazocraeidae was represented by Kuhnia scombri (Kuhn, 1829) Sproston, 1945, K. scombercolias Nasir & Fuentes Zambrano, 1983 and Pseudokuhnia minor (Goto, 1894) Rohde & Watson, 1985 and family Gastrocotylidae by Gastrocotyle kurra Unnithan, 1968 and Allogastrocotyle bivaginalis Nasir & Fuentes Zambrano, 1983. Molecular identification of Monogenea was conducted through sequencing of the mitochondrial cytochrome c oxidase subunit 1 (cox1) gene. The host S. australasicus was

barcoded (cox1) to confirm the specific identity. There was no comparable sequence available in GenBank for K. scombercolias. Also, limited sequences were available in GenBank for the gastrocotylid Monogenea identified in this study. However, phylogenetic analyses of cox1 sequences of the Monogenea identified in this study clustered according to their familial groups. Gastrocotyle kurra and A. bivaginalis were identified for the first-time on S. australasicus in Australian waters. This study provides the first sequencing of cox1 gene for K. scombercolias. The outcomes of the study provide a basis for future Monogenea research in Australian waters, as well as for other Scomber spp.



Molecular characterisation of the Monogenea parasites of blue mackerel Scomber australasicus (Perciformes: Scombridae) in Australian water

Meredith Lane, Mitra Kashani, Joel LN. Barratt, Yvonne Qvarnstrom, Michael J. Yabsley, Kayla B. Garrett, Richard S. Bradbury, "Application of a universal

parasite diagnostic test to biological specimens collected from animals", International Journal for Parasitology: Parasites and Wildlife, Volume 20, 2023, Pages 20-30, ISSN 2213-2244, https://doi. org/10.1016/j.ijppaw.2022.12.003

(https://www.sciencedirect.com/science/ article/pii/S2213224422001092)

Abstract: A previously described universal parasite diagnostic (nUPDx) based on PCR amplification of the 18S rDNA and deep-amplicon sequencing, can detect human blood parasites with a sensitivity comparable to real-time PCR. To date, the efficacy of this assay has only been assessed on human blood. This study assessed the utility of nUPDx for the detection of parasitic infections in animals using blood, tissues, and other biological sample types from mammals, birds, and reptiles, known to be infected with helminth, apicomplexan, or pentastomid parasites (confirmed by microscopy or PCR), as well as negative samples. nUPDx confirmed apicomplexan and/or nematode infections in 24 of 32 parasite-positive mammals, while also identifying several undetected coinfections. nUPDx detected infections in 6 of 13 positive bird and 1 of 2 positive reptile samples. When applied to 10 whole parasite specimens (worms and arthropods), nUPDx identified all to the genus or family level, and detected one incorrect identification made by morphology. Babesia sp. infections were detected in 5 of the 13 samples that were negative by other diagnostic approaches. While nUPDx did not detect PCR/ microscopy-confirmed trichomonads or amoebae in cloacal swabs/tissue from 8 birds and 2 reptiles due to primer template mismatches, 4 previously undetected apicomplexans were detected in these samples. Future efforts to improve the utility of the assay should focus on validation against a larger panel of tissue types and animal species. Overall, nUPDx shows promise for use in both veterinary diagnostics and wildlife surveillance, especially because species-specific



PCRs can miss unknown or unexpected pathogens.



Application of a universal parasite diagnostic test to biological specimens collected from animals

Dayana Barker, Samuel Kelava, Owen D. Seeman, Renfu Shao, James R. Seaniger, Malcolm K. Jones, Maria A. Apanaskevich, Ryo Nakao, Dmitry A. Apanaskevich, Stephen C. Barker, "Rediscovery of *lxodes confusus* in Australia

with the first description of the male from Australia, a redescription of the female and the mitochondrial (mt) genomes of five species of *Ixodes*, International Journal for Parasitology: Parasites and Wildlife, Volume 18, 2022, Pages 1-11, ISSN 2213-2244, https://doi.org/10.1016/j. ijppaw.2022.03.006

(https://www.sciencedirect.com/science/ article/pii/S2213224422000232)

Abstract: We: (i) report the rediscovery of *Ixodes* (*Sternalixodes*) *confusus* Roberts, 1960 in Australia; (ii) redescribe the male and female of *I. confusus*; (iii) describe the mitochondrial (mt) genome of *I. confusus* from five ticks from four localities in Far North Queensland; and (iv) present the first

substantial phylogeny of the subgenera of the Ixodes. The mt genomes of *I. confusus, I. cornuatus, I. hirsti, I. myrmecobii and I. trichosuri* are presented here for the first time. In our phylogeny from entire mt genomes (ca. 15 kb), the subgenus *Endopalpiger* was the sister-group to subgenera *Sternalixodes* plus *Ceratixodes* plus *Exopalpiger* whereas *Exopalpiger* was the sister to *Sternalixodes* plus *Ceratixodes*. [i.e. ((*Endopalpiger*) (*Sternalixodes, Ceratixodes* and *Exopalpiger*)]. Finally, we show that *Ixodes* anatis, the kiwi tick, may be closely related to the ticks of marsupials of Australia and Papua New Guinea.



Rediscovery of *Ixodes confusus* in Australia with the first description of the male from Australia, a redescription of the female and the mitochondrial (mt) genomes of five species of *Ixodes*

Leah Botten, Amanda Ash, Bethany

Jackson, "Characterising a sarcoptic mange epizootic in quenda (*Isoodon fusciventer*)", International Journal for Parasitology: Parasites and Wildlife, Volume 18, 2022, Pages 172-179, ISSN 2213-2244, https://doi.org/10.1016/j. ijppaw.2022.04.010.

(https://www.sciencedirect.com/science/ article/pii/S2213224422000426) Abstract: Sarcoptic mange, a parasitic skin disease caused by Sarcoptes scabiei, is an emerging conservation threat to some Australian wildlife species. As a zoonotic and multi-host disease, it has the capacity to exploit different hosts, creating management challenges for susceptible wildlife populations that may suffer high rates of morbidity and mortality. Sarcoptic mange was identified in quenda (Isoodon fusciventer) in a peri-urban region of Perth, Western Australia in 2019. By mid-2021, reported cases were distributed across 107ha. This retrospective study reviews the spatiotemporal distribution, clinical signs and risk factors for sarcoptic mange in quenda from a metropolitan region. Preliminary epidemiological parameters for the outbreak are described, including period prevalence of infested individuals, spatiotemporal analyses, clinical signs of mange, and preliminary risk factor analyses. The period prevalence of sarcoptic mange between July 1, 2019 and June 30, 2021 was 26.9% (CI 95%; 21.2, 33.5) with a mortality rate of 39.6%, owing to severity of disease or secondary complications. Sarcoptic mange was detected more frequently in adult quenda than juveniles (OR: 176.8, CI 95%: 10.7, 2930.1), with adult males more affected than adult females (OR: 3.5, CI 95%: 1.5, 8.4). Clinical signs of disease presented on the rump and tail (100%), followed by the limbs and digits (61.5%). The most common clinical signs recorded were alopecia (92.3%), erythema (46.2%) and open wounds (42.3%). This is the first documented example of a geographically expanding and propagating epizootic of sarcoptic mange in quenda, with implicit welfare and conservation concerns for the species, alongside potential for cases in humans and domestic species that cohabit with or handle guenda in the urban environment. Further, the detection of cases through wildlife rehabilitation centres highlights the critical role such

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organisations play in conservation and passive surveillance for wildlife diseases of conservation or public and domestic animal health importance.



Characterising a sarcoptic mange epizootic in quenda (Isoodon fusciventer)

Diane P. Barton, Bridgette Shackelford, Shokoofeh Shamsi, David Jenkins,

"Are feral goats intermediate hosts for Linguatula (Pentastomida) in Australia?", International Journal for Parasitology: Parasites and Wildlife, Volume 18, 2022, Pages 283-286, ISSN 2213-2244, https:// doi.org/10.1016/j.ijppaw.2022.07.004

(https://www.sciencedirect.com/science/ article/pii/S2213224422000669)

Abstract: Feral goats, Capra hircus (Bovidae), currently occur across 28% of Australia, and are found in all states and territories as well as some offshore islands. Feral goats are harvested for live export or processed as game meat, with feral goats making up approximately 90% of goats sent to slaughter in Australia. Nymphs of the pentastomid parasite, Linguatula serrata, are common parasites of goats elsewhere in the world, where they cause Halzoun or Marrara disease in humans through the consumption of nymphs in raw or semi-cooked edible offal. Despite being commonly encountered in cattle at slaughter in Australia, L. serrata nymphs have never been reported from feral goats

in Australia. Goats at slaughter, however, commonly show infections of lymph nodes, the majority of which are diagnosed as caseous lymphadenitis caused by bacteria, although a small number have no known aetiology. Examination of 33 feral goats from locations in New South Wales and South Australia found a Linguatula sp. nymph encased in the mesenteric lymph node of one goat from the Cooma region of New South Wales. The potential risk of transmission of Linguatula sp. to humans and other domestic animals is discussed. This study has highlighted the importance of continued surveys of feral animals for infection with parasites, especially as their distribution changes.



Are feral goats intermediate hosts for Linguatula (Pentastomida) in Australia?



Please enjoy recent IJP:DDR articles from ASP members

Mark W. Robinson, Bob Hanna, Philip Skuce, Gerry Brennan, OBITUARY- Ian Fairweather, International Journal for Parasitology: Drugs and Drug Resistance, Volume 21, 2023, Page 96, ISSN 2211-3207, https://doi.org/10.1016/j. ijpddr.2023.02.003

(https://www.sciencedirect.com/science/ article/pii/S2211320723000076)

Ian Fairweather obituary

12th October 1946-4th November 2022

Ian Fairweather was Professor of Parasitology within the School of Biological Sciences, Queen's University, Belfast until his retirement in 2014. After gaining a BSc (Hons) degree in Zoology from the University of London and an MSc from the University of Liverpool, Ian was awarded a PhD for "Studies on the nervous system of Hymenolepis nana (Cestoda, Cyclophyllidea)" from the Queen Mary University of London in 1978. It wasn't just lan's fascination with all things parasitic that drew him to this topic, he was also fascinated by the Wild West, including a certain Apache Chief Nana, who shared a name with his favorite tapeworm. It was around this time that lan first moved to Queen's University, Belfast to take up a Wellcome Trust Postdoctoral Fellowship within the Zoology Department, under the mentorship of the late Professor LT Threadgold. Soon afterwards, he was appointed Lecturer in Zoology (1980) and progressed to Reader (Associate Professor) in 1991 and to Full Professor of Parasitology within the School of Biological Sciences in 2008.

lan was a much-valued member of the School, making major contributions to both research and education, in a career spanning four decades. In research, he was a globally recognized authority on liver fluke, making seminal discoveries on fluke development, flukicide action and drug resistance. Towards the end of his career, he led a very successful work package on flukicide resistance in the EU DELIVER research programme (2006-2009) and, testament to his wider contributions to parasitology research, Ian authored well over 200 peer-reviewed research papers/ invited review articles. He leaves an impressive body of work and knowledge for the next generation of parasitologists to build on.

He was also a gifted and committed postgraduate student supervisor and undergraduate teacher, serving as convener for the undergraduate Zoology pathway and coordinating the Animal Physiology and Cell Biology modules for many years. Several generations of undergraduate students will remember him holding aloft a magenta-stained index finger to warn of the perils of being splashed with Schiff's reagent during his Histochemistry practical class, an ironic nod to the value of personal protective equipment that would have appealed to his dry sense of humor. As a PhD supervisor, lan had legendary attention to detail. Students would recoil at the volume of red ink that adorned chapter or manuscript drafts, but it was always for their benefit and, in the end, very much appreciated.

Ian was devoted to his late wife and soul mate, Anne, who he sadly lost in 2014. He was also immensely proud of the achievements of their four children, Jamie, Helen, Susie and Simon, and became a doting grandfather in later years, which brought him great joy. Very much a private, introverted figure, Ian would rarely join lab

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

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nights out. However, he generously opened his home to the team every Christmas and, after hosting a lively evening, would (no doubt with a sigh of relief!) wave the rest of us off into the night to continue the festivities. Ian was not an enthusiastic traveler, especially to exotic destinations, always preferring to board the plane for the return, rather than the outward journey. Nevertheless, he attended and participated in numerous international conferences and workshops, where his erudite, comprehensive and succinctly delivered reviews and research communications were widely appreciated by international experts in his area, and by students keen to apply his methods in local situations, and to avail of any possible opportunities to work under his tutelage in Belfast. He had a wide circle of professional friends and collaborators throughout the world, including North and South America, Canada, Australasia and Europe. He hosted many overseas research students, and was a prime mover in the establishment of international collaboration in research on anthelmintic resistance mechanisms of parasites - 'parasitology sans frontières'! However, unless Anne or other family members were co-travelers, he tended to eschew the opportunities for local tourism. On one occasion, when he had been invited as a keynote speaker at the University of Madras, in South India, his hosts kindly organized a tour to the vast temple complex of Madurai. The monsoon was in full flood, and in deference to local custom, the party went barefoot, wading ankle-deep along the ancient walkways and cloisters. While Anne bounded on ahead, enthusing on the colorful fabrics and patterns displayed in the stalls along the walls, Ian was observed to follow glumly in the rear muttering darkly about Ancylostoma infection.

Although he officially "retired" in 2014, lan kept abreast with research in the field and published a broad-ranging, and well



received, review of drug resistance in liver fluke in this journal in 2020. A fitting end to a long and distinguished career. Ian was buried beside Anne at St. Mary's Church Ambleside in November 2022. He will be fondly remembered by many as a friend, mentor and teacher.



Ian Fairweather

Qiao Su, Louise Baker, Samantha Emery, Balu Balan, Brendan Ansell, Swapnil Tichkule, Ivo Mueller, Staffan G. Svärd,

Aaron Jex, "Transcriptomic analysis of albendazole resistance in human diarrheal parasite *Giardia duodenalis*", International Journal for Parasitology: Drugs and Drug Resistance, Volume 22, 2023, Pages 9-19, ISSN 2211-3207, https://doi. org/10.1016/j.ijpddr.2023.03.004

(https://www.sciencedirect.com/science/ article/pii/S221132072300012X)

Abstract: Benzimidazole-2-carbamates (BZ, e.g., albendazole; ALB), which bind beta-tubulin to disrupt microtubule polymerization, are one of two primary compound classes used to treat giardiasis. In most parasitic nematodes and fungi, BZ-resistance is caused by beta-tubulin mutations and its molecular mode of action (MOA) is well studied. In contrast, in Giardia duodenalis BZ MOA or resistance is less well understood, may involve target-specific and broader impacts including cellular damage and oxidative stress, and its underlying cause is not clearly determined. Previously, we identified acquisition of a single nucleotide polymorphism, E198K, in beta-tubulin in ALB-resistant (ALB-R) G. duodenalis WB-1B relative to ALB-sensitive (ALB-S) parental controls. E198K is linked to BZ-resistance in fungi and its allelic frequency correlated with the magnitude of BZ-resistance in G. duodenalis WB-1B. Here, we undertook detailed transcriptomic comparisons of these ALB-S and ALB-R G. duodenalis WB-1B cultures. The primary transcriptional changes with ALB-R in G. duodenalis WB-1B indicated increased protein degradation and turnover, and up-regulation of tubulin, and related genes, associated with the adhesive disc and basal bodies. These findings are consistent with previous observations noting focused disintegration of the disc and associated structures in Giardia duodenalis upon ALB exposure. We also saw transcriptional changes with ALB-R in G. duodenalis WB-1B consistent with prior observations of a shift from glycolysis to arginine metabolism for ATP production and possible changes to aspects of the vesicular trafficking system that require further investigation. Finally, we saw mixed transcriptional changes associated with DNA repair and oxidative stress responses in the G. duodenalis WB-1B line. These changes may be indicative of a role for H2O2 degradation in ALB-R, as has been observed in other G. duodenalis cell cultures. However, they were below the transcriptional fold-change threshold (log2FC > 1) typically employed in transcriptomic analyses and appear to be contradicted in ALB-R G. duodenalis WB-1B by down-regulation of the NAD scavenging and conversion pathways required to support these stress pathways and up-regulation of many highly oxidation sensitive iron-sulphur (FeS) cluster based metabolic enzymes.

Vanessa M. Howieson, Joy Zeng, Joachim Kloehn, Christina Spry, Chiara Marchetti, Matteo Lunghi, Emmanuel Varesio, Andrew Soper, Anthony G. Coyne, Chris

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

Editors In Chief: Andrew Kotze & Kevin Saliba

Facebook: www.facebook.com/IJPDDR/



Transcriptomic analysis of albendazole resistance in human diarrheal parasite *Giardia duodenalis*

Abell, Giel G. van Dooren, Kevin J. Saliba,

"Pantothenate biosynthesis in *Toxoplasma* gondii tachyzoites is not a drug target", International Journal for Parasitology: Drugs and Drug Resistance, Volume 22, 2023, Pages 1-8, ISSN 2211-3207, https:// doi.org/10.1016/j.ijpddr.2023.03.003

(https://www.sciencedirect.com/science/ article/pii/S2211320723000118)

Abstract: Toxoplasma gondii is a pervasive apicomplexan parasite that can cause severe disease and death in immunocompromised individuals and the developing foetus. The treatment of toxoplasmosis often leads to serious side effects and novel drugs and drug targets are therefore actively sought. In 2014, Mageed and colleagues suggested that the T. gondii pantothenate synthetase, the enzyme responsible for the synthesis of the vitamin B5 (pantothenate), the precursor of the important cofactor, coenzyme A, is a good drug target. Their conclusion was based on the ability of potent inhibitors of the M. tuberculosis pantothenate synthetase to inhibit the proliferation of T.



gondii tachyzoites. They also reported that the inhibitory effect of the compounds could be antagonised by supplementing the medium with pantothenate, supporting their conclusion that the compounds were acting on the intended target. Contrary to these observations, we find that compound SW314, one of the compounds used in the Mageed et al. study and previously shown to be active against M. tuberculosis pantothenate synthetase in vitro, is inactive against the T. gondii pantothenate synthetase and does not inhibit tachyzoite proliferation, despite gaining access into the parasite in situ. Furthermore, we validate the recent observation that the pantothenate synthetase gene in T. gondii can be disrupted without detrimental effect to the survival of the tachyzoite-stage parasite in the presence or absence of extracellular pantothenate. We conclude that the T. gondii pantothenate synthetase is not essential during the tachyzoite stage of the parasite and it is therefore not a target for drug discovery against T. gondii tachyzoites.



Pantothenate biosynthesis in Toxoplasma gondii tachyzoites is not a drug target Kotaro Takano, Lachlan de Hayr, Scott Carver, Robert J. Harvey, Kate E. Mounsey, "Pharmacokinetic and pharmacodynamic considerations for treating sarcoptic mange with cross-relevance to Australian wildlife", International Journal for Parasitology: Drugs and Drug Resistance, Volume 21, 2023, Pages 97-113, ISSN 2211-3207, https:// doi.org/10.1016/j.ijpddr.2023.02.004

(https://www.sciencedirect.com/science/ article/pii/S2211320723000088)

Abstract: Sarcoptes scabiei is the microscopic burrowing mite responsible for sarcoptic mange, which is reported in approximately 150 mammalian species. In Australia, sarcoptic mange affects a number of native and introduced wildlife species, is particularly severe in barenosed wombats (Vombatus ursinus) and an emerging issue in koala and quenda. There are a variety of acaricides available for the treatment of sarcoptic mange which are generally effective in eliminating mites from humans and animals in captivity. In wild populations, effective treatment is challenging, and concerns exist regarding safety, efficacy and the potential emergence of acaricide resistance. There are risks where acaricides are used intensively or inadequately, which could adversely affect treatment success rates as well as animal welfare. While reviews on epidemiology, treatment strategies, and pathogenesis of sarcoptic mange in wildlife are available, there is currently no review evaluating the use of specific acaricides in the context of their pharmacokinetic and pharmacodynamic properties, and subsequent likelihood of emerging drug resistance, particularly for Australian wildlife. This review critically evaluates acaricides that have been utilised to treat sarcoptic mange in wildlife, including dosage forms and routes, pharmacokinetics, mode of action and efficacy. We also highlight the reports

of resistance of S. *scabiei* to acaricides, including clinical and in vitro observations.



Treatment of Sarcoptic Mange

- · Pharmacokinetics
- · Pharmacodynamics
- · Emerging drug resistance
- · Considerations for wildlife

Pharmacokinetic and pharmacodynamic considerations for treating sarcoptic mange with cross-relevance to Australian wildlife

Stephanie L. Macdonald, Ghazanfar Abbas, Abdul Ghafar, Charles G. Gauci, Jenni Bauquier, Charles El-Hage, Brett Tennent-Brown, Edwina J.A. Wilkes, Anne Beasley, Caroline Jacobson, Lucy Cudmore, Peter Carrigan, John Hurley, Ian Beveridge, Kristopher J. Hughes, Martin K. Nielsen, Abdul Jabbar, "Egg reappearance periods of anthelmintics against equine cyathostomins: The state of play revisited," International Journal for Parasitology: Drugs and Drug Resistance, Volume 21, 2023, Pages 28-39, ISSN 2211-3207, https://doi.org/10.1016/j. ijpddr.2022.12.002

(https://www.sciencedirect.com/science/ article/pii/S2211320722000355)

Abstract: Cyathostomins are the most common and highly prevalent parasites of horses worldwide. Historically, the control of cyathostomins has mainly relied on the routine use of anthelmintic products. Increasing reports on anthelmintic resistance (AR) in cyathostomins



are concerning. A potential method proposed for detecting emerging AR in cyathostomins has been estimating the egg reappearance period (ERP). This paper reviews the data available for the ERP of cyathostomins against the three major classes of anthelmintics, macrocyclic lactones, tetrahydropyrimidines, and benzimidazoles. Published peer-reviewed original research articles were obtained from three databases (PubMed, CAB Direct and Web of Science) and were evaluated for their inclusion in a systematic review. Subsets of articles were then subjected to a review of ERP data. A total of 54 (of 134) studies published between 1972 and 2022 met the criteria for inclusion in the systematic review. Until the beginning of 2022, there was no agreed definition of the ERP; eight definitions of ERP were identified in the literature, complicating the comparison between studies. Additionally, potential risk factors for the shortening of the ERP, including previous anthelmintic use and climate, were frequently not described. Reports of shortened ERP for moxidectin and ivermectin are frequent: 20 studies that used comparable ERP definitions reported shortened moxidectin and ivermectin ERPs of 35 and 28 days, respectively. It is unclear whether the ERPs of these anthelmintics reduced to such levels are due to the development of AR or some biological factors related to horses, cyathostomin species, and/ or the environment. The ERPs for other anthelmintics, such as fenbendazole and pyrantel, were frequently not reported due to established resistance against these drugs. Future research in horses is required to understand the mechanism(s) behind the shortening of ERP for cyathostomins. Based on this systematic review, we propose recommendations for future ERP studies.

Matthew P. Challis, Shane M. Devine,

Darren J. Creek, "Current and emerging target identification methods for novel antimalarials", International Journal for Parasitology: Drugs and Drug Resistance, Volume 20, 2022, Pages 135-144, ISSN 2211-3207, https://doi.org/10.1016/j. ijpddr.2022.11.001

(https://www.sciencedirect.com/science/ article/pii/S2211320722000288)

Abstract: New antimalarial compounds with novel mechanisms of action are urgently needed to combat the recent rise in antimalarial drug resistance. Phenotypic high-throughput screens have proven to be a successful method for identifying new compounds, however, do not provide mechanistic information about the molecular target(s) responsible for antimalarial action. Current and emerging target identification methods such as in vitro resistance generation, metabolomics screening, chemoproteomic approaches and biophysical assays measuring protein stability across the whole proteome have successfully identified novel drug targets. This review provides an overview of these techniques, comparing their strengths and weaknesses and how they can be utilised for antimalarial target identification.



Above: Egg reappearance periods of anthelmintics against equine cyathostomins: The state of play revisited

> Below: Current and emerging target identification methods for novel antimalarials

Antimalarial Target Identification Methods



News from the ASP Network for Parasitology

Travel Awards and JD Smyth Postgraduate Travel Awards

Travel Awards

Congratulations to the March 2023 winner of the JD Smyth Postgraduate Travel Award scheme, Shatabdi Paul, Macquarie University.

Shatabdi Paul, PhD Student

Macquarie University for a Researcher Exchange to Department of Biology, Free University of Berlin, Germany for training in immune-assays specific to insects including hemolymph protein concentration, numeration of hemocytes, and phenol oxidase enzyme activity and to meet pioneering researchers in insect immunology, Professor Dr. Jens Rolff and Dr. Sophie Armityage.

Congratulations to the March and 2023 winners of the ASP Researcher Exchange, Travel and Training Award scheme.

Phoebe Rivory, PhD Candidate, University of Sydney for a Researcher Exchange at the University of the Balearic Islands, Mallorca, Spain to Dr Paredes Esquivel's laboratory to learn new techniques to develop a sound surveillance strategy for infective Angiostrongylus contamination in human food/water sources.

Luke Hall, PhD Candidate, UTS, for a Researcher Exchange to the London Natural History Museum to review by microscopy the *D. fragilis* collection at the NHM to investigate those cells Dobell described as degenerate and to determine the presence of what are now known as cysts or pseudocysts.

Abdul Ghafar, Postdoctoral Fellow Melbourne Veterinary School,

University of Melbourne for a Researcher Exchange Researcher Exchange to the Institute for Parasitology and Tropical Veterinary Medicine, Freie University, Berlin, Germany to learn and perform processes involved in In vitro feeding of tick and then to the Faculty of Veterinary Medicine, Zaragoza, University of Zaragoza, Spain to learn ecological modelling of vectors and vector-borne diseases for future climate scenarios.

Nathan Bott, RMIT for a Researcher Exchange from Associate Professor Sho Shirakashi (Kindai University, Japan), a world expert on parasites in mariculture, to RMIT and the University of Melbourne and to deliver training for PhD students and researchers on blood flukes including effective sampling of Cardicola orientalis from Southern bluefin tuna in Port Lincoln, South Australia.

Swapnil Tichkule, Research Officer, Jex Laboratory, Walter & Eliza Hall Institute for a training Workshop and grant writing retreat: WORKSHOP ON GENOMICS https:// evomics.org/2023-workshop-on-genomicsceskykrumlov/ at Český Krumlov, Czech Republic.

Congratulations to the JD Smyth Travel Award winner and all of the ASP Network Travel Award winners!

The next deadline for applications is 30 September 2023.

Please ensure that you read the updated guidelines before applying for an ASP Travel Award. <u>https://www.parasite.org.au/awards/</u> jd-smyth-postgraduate-travel-awards/

Grant winners

Congratulations to recipients of recent ARC and NHMRC Parasitology Grants 2023

NHMRC Parasitology Ideas, Development and International Grants 2022

NHMRC Ideas Grants

Assoc Prof Jennifer Flegg University of Melbourne

NHMRC Ideas Grant, \$866,114

Improving estimates of antimalarial drug

resistance

Antimalarial drugs are essential for the elimination of malaria. Resistance to all currently available antimalarials, including the pivotal artemisinin derivatives, has emerged and is spreading. This project aims to generate the first datadriven, predictive maps of the changing landscape of artemisinin resistance in Asia. These maps fill in the gaps where no information is available and can be used by health agencies to guide new polices about where and when the drug is appropriate to use.

Dr Angela Devine, Menzies School of Health Research

NHMRC Ideas Grant, \$1,041,499

Multi-species malaria transmission modelling to inform policy decisions

Most malaria cases are caused by two parasite species. While many countries with malaria have both species, decisions about treatment and control of malaria rely on data and mathematical models on one species. Working with policy makers, we have built a novel model that includes both species. This model will explore how species interact and determine how to allocate money on strategies that will maximise health benefits, ensuring that we reach malaria elimination as quickly as possible.

Dr Steven Kho, Menzies School of Health Research

NHMRC Ideas Grant, \$1,564,456

The newly-discovered splenic *Plasmodium* reservoir as a target to reduce global malaria burden

We have recently discovered that the spleen is the major reservoir for malaria parasites in natural human malaria infections. There are significant concerns that this previously-unrecognised reservoir underlies the major challenges we face to eliminate this disease. We will use the world's only collection of spleen

and blood samples from untreated human infections, to study the splenic malaria reservoir, uncover its biology and identify new ways to improve malaria elimination strategies.

Prof Leann Tilley, University of Melbourne

NHMRC Ideas Grant, \$758,942

Hijacking enzymes that charge tRNAs: a new strategy for development of antimalarials

New drugs are desperately needed to treat drug-resistant pathogens. We have discovered a class of inhibitor molecules, called "nukes", that target enzymes powered by the energy molecule, ATP. "Nukes" induce the enzymes to generate their own inhibitors, via a mechanism that we call "reaction hijacking". This project will investigate the design principles for making bespoke "nukes", which will have applications in curing malaria, as well as infections with antimicrobial resistant bacteria.

Prof Stephen Rogerson, University of Melbourne

NHMRC Ideas Grant, \$707,364

Monoclonal antibodies to placental malaria antigen VAR2CSA

Placental malaria parasites express VAR2CSA protein on the red blood cell surface. From the blood of pregnant women with strong antibody to VAR2CSA, we will isolate antibody-producing B cells. We will test the antibodies produced by the B cells to find antibodies which can block placental infection, can clear or kill infected cells, and react with many strains. The best ones will be tweaked to further improve activity. Optimised monoclonal antibody to VAR2CSA may prevent placental malaria.

Prof Stuart Ralph, University of Melbourne

NHMRC Ideas Grant, \$858,736

Does finite slowing of feeding cause artemisinin resistance in malaria?

Drug resistance to the frontline antimalarial artemisinin is a major challenge to addressing the global burden of malaria. Deteriorating artemisinin resistance could lead to this drug becoming unusable, or could be manageable if drug resistance doesn't worsen and spread. We have determined the mechanism that underlies resistance and will test whether this is a finite and manageable process or instead is an escalating system that likely presages worsening prospects for global artemisinin use.

Dr Yorgi Mavros, University of Sydney

NHMRC Ideas Grant, \$1,244,248

Optimising sleep quality inside insecticide treated mosquito nets in hot overnight environments

Nine-five percent of all Malaria transmission occurs within the African region, causing approximately 600 000 deaths per year. Insecticide-treated bed nets are one of the primary interventions used to stop the spread of malaria. However, sensations of feeling too hot to sleep comfortably is the primary reason for not using bed nets. By simulating real-world conditions, this project will determine how fans can be used to improve thermal comfort and sleep quality within the bed net enclosure.

Dr Danny Wilson, University of Adelaide

NHMRC Ideas Grant, \$901,642

4D molecular characterisation of C-RIP proteins required for malaria host-cell entry

We have identified proteins that control the dynamic release of essential antigens required for malaria parasite infection of host red blood cells and will identify druggable interactions between these proteins that can be targeted to kill malaria.

NHMRC Development Grants

Prof Leann Tilley, University of Melbourne

NHMRC Development Grant, \$514,089

Mechanistically and chemically novel reaction-hijacking pro-inhibitors for malaria

Diseases caused by drug-resistant infectious agents, such as the malaria parasite, represent an enormous global health threat. New drugs are desperately needed to overcome drug resistance. We have discovered a new "Trojan horse" method to induce malaria parasites to make their own toxic molecules – making them the instruments of their own demise. In this project we will work with a major pharmaceutical company toward developing these new therapeutics.

Prof Ivo Mueller, WEHI

NHMRC Development Grant, \$945,941

Development of a Plasmodium vivax multi-analyte lateral flow assay to accelerate malaria elimination

Closing dates

ASP Fellowships 1 January 2024

ASP Researcher Exchange, Travel and Training Awards & JD Smyth 30 September 2023

John Frederick Adrian Sprent Prize
30 September 2025

Bancroft-Mackerras Medal for Excellence ³⁰ September 2023

More information www.parasite.org.au

News from the ASP Network for Parasitology

To efficiently eliminate *Plasmodium vivax* (Pv), malaria control programs require novel, easyto-use tools to identify and treat people with hidden dormant Pv liver-stage infections. We have developed the first test to meet this requirement: a novel serological test that recognises specific patterns in a person's immune response to malaria. We are now developing a field-deployable rapid diagnostic test to ensure translation of this public health opportunity to accelerate malaria elimination.

NHMRC International Collaboration Grants

Dr Rhea Longley, WEHI

NHMRC International Collaboration Grant, \$361,877

Applying novel serological exposure markers to quantify residual malaria transmission in the Philippines

Malaria is an infectious disease that still affects millions of people worldwide, including in the East Asian region. In the Philippines, recent outbreaks of malaria caused by *Plasmodium vivax* have occurred. *Plasmodium vivax* is difficult to eliminate due to hidden liver-stage parasites, known as hypnozoites. We will apply our novel surveillance tools to understand how these outbreaks are occurring; to identify the hidden hypnozoite reservoir; and to accelerate malaria elimination.

Network Mentorship Scheme

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

communication and outreach and other areas of professional development.

With best wishes,

Nick and Lisa

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

ASP Researcher Exchange Reports

Michaela Bulloch

My research exchange (17th September – 1st October 2022)

My PhD project aims to determine whether the anti-malarial doxycycline has a secondary mechanism of action by inhibiting mitochondrial translation in the malaria parasite *Plasmodium falciparum*. The mitochondria itself possesses a reduced genome, encoding only three proteins which comprise subunits of the electron transport chain. Directly detecting these proteins has proved challenging where only one protein can be identified by mass spectrometry and unreliably at that. I therefore needed another way to measure the consequences of mitochondrial translation inhibition.

The purpose of my research exchange was to learn how to perform experiments measuring mitochondrial oxygen consumption rate (OCR) which can inform on perturbations in the electron transport chain. This can be done using a Seahorse Bioscience XFe24 Flux Analyzer, with protocols for *P. falciparum* having been adapted only recently. The Australian National University houses the labs of both Alex Maier and Giel van Dooren, who have experience performing Seahorse assays on P. falciparum and the related apicomplexan parasite Toxoplasma gondii. With the support of the Australian Society for Parasitology through the Researcher Exchange award, I travelled to Canberra for a twoweek visit (luckily for me coinciding with the Spring festival Floriade) where I learned the Seahorse assay under the guidance of the Maier and van Dooren labs. I'm extremely grateful to both labs for how welcoming they were, particularly Sai Ramesh from the Maier lab who generously dedicated his time to helping me with these assays over the two weeks.

Though our experiments we collected convincing evidence that the secondary target of doxycycline in *P. falciparum* parasites is mitochondrial translation. Complexes III and IV of the electron transport chain are dependent on mitochondrially encoded subunits. We observed that parasites pre-treated with doxycycline had negligible basal OCR consistent with an impaired

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electron transport chain. Furthermore, by-passing downstream complexes and directly donating electrons to complex IV only partially increased the OCR. Short incubations with doxycycline did not affect the OCR, which is in-line with a slower mechanism of action such as translation inhibition as opposed to direct protein inhibition. Together these data show that doxycycline results in complex IV impairment. Alternative assays will be required to directly determine whether this is the case for complex III as well, which we predict. This data will contribute to both my thesis and a journal article we hope to publish this year (2023).

Overall, the trip was a fantastic success. Though support and collaboration with the Australian National University we were able to show that doxycycline impairs the electron transport chain in *P. falciparum*. This exchange was a rewarding experience both professionally and personally. The opportunity to learn a new laboratory technique, connect with other scientists and push my comfort zones by working in an unfamiliar environment was invaluable. I am extremely grateful to the Australian Society for Parasitology for enabling this experience.

Khattapan Jantawongsri

Mr Khattapan Jantawongsri, PhD student, University of Tasmania.

During my trip to Norway (19 November 2022 – 12 January 2023), I visited my collaborators, Dr Tomasz Maciej Ciesielski and Professor Bjørn Munro Jenssen, at Department of Biology, Norwegian University of Science and Technology (NTNU), Trondheim, Norway (1 – 9 December 2022) to network and discuss future research training (e.g., Arctic Environmental Toxicology) with them at The University Centre in Svalbard. I attended the "Environmental aspects on soft tribology" with Dr Ciesielski (invited speaker - Environmental risk associated with use of lubricants) on 5 December 2022 organised by SINTEF (Norwegian: Stiftelsen for industriell og teknisk forskning) - a close partnership with NTNU. This workshop gave me a chance to extend my connections and develop new collaborations, including Dr Julia Farkas (Senior researcher at SINTEF Ocean in Trondheim) and her PhD student at Nord University in Bodø (Juliane Annemieke Riedel), working on effects of rare earth elements on different fish species. We (I and Juliane) met in Bodø and discussed further collaboration and the potential to share my research with her lab group in a zoom seminar (the ASP will be introduced, promoted, and acknowledged in my presentation).



Dr Farkas and Dr Ciesielski kindly gave me a chance to visit and explore laboratories and facilities at SINTEF (e.g., Ecotoxicology laboratory and environmental and biochemical analysis at SINTEF SeaLab) and NTNU SeaLab (Versatile Facilities for experiments on marine and freshwater organisms).

Unfortunately, I did not get a chance to meet Associate Professor Dr Courtney Alice Waugh due to her sickness (during the time I was in Norway) and maternity leave. However, we were discussing and started preparing for the postdoc application via Marie Skłodowska-Curie Postdoctoral Fellowships 2023 at Nord University (immune-related microRNAs expression and epigenetic regulation of gene networks by environmental factors potentially supervised by Professor Jorge Manuel de Oliveira Fernandes and co-supervised by Associate Professor Waugh).

I attended the 4th Congress of International Society of Fish and Shellfish Immunology in Bodø, Norway (12-15 December 2022; Oral Abstracts published in Journal Fish & Shellfish Immunology: https://doi.org/10.1016/j. fsi.2022.10.042 where I presented an oral presentation, (picture attached) . At this conference, I had a great opportunity not only to present my research on immune responses of the melanised sand flathead, but also to meet and expand my networks which can improve my future career opportunities including:



From left to right: Emma McHugh tulips from the Floriade festival, Emma McHugh and Michaela Bulloch on a hike in the national parks surrounding Canberra, 4th Congress of International Society of Fish and Shellfish Immunology.

News from the ASP Network for Parasitology

ASP Researcher Exchange Reports

- Professor Kenneth Söderhäll (Uppsala University, Sweden – invited speaker) who studies the innate immune reactions in invertebrates and compares these reactions with those present in vertebrates. One example is melanisation; a reaction that is present in virtually all organisms, but detailed studies on this reaction is mainly performed in crustaceans and a few insects.

- Professor Irene Salinas (University of New Mexico, USA – invited speaker) who studies mucosal immunity and its evolution in vertebrates using trout, zebrafish, lungfish, mice, and humans. Professor Salinas also has specialised in the understanding of nasal immunity and the neuroimmune interactions that occur in the olfactory-central nervous system axis in response to microorganisms.

- Assistant Professor Natalie Steinel (University of Massachusetts Lowell, USA - invited speaker) who studies the interplay and co-evolution of host and pathogens using threespine stickleback as a model organism. Her Lab also studies teleost adaptive immunity (e.g., the role of the melanomacrophage centre (MMC) in the fish adaptive immunity), the manipulation of adaptive immunity by parasites, and the co-evolution of host and parasite factors. At the conference Dr Steinel presented her research on threespine stickleback (Gasterosteus aculeatus), naturally infected with Diphyllobothriid tapeworm, Schistocephalus solidus, and highlighted genes associated with initiation and regulation of fibrosis evidence for strong selection on this anti-parasite mechanism and identifying potential pathways involved in the regulation of the fibrotic response using Quantitative trait loci (QTL) mapping of the fibrosis phenotype.

- Professor Erling Olaf Koppang,

(Norwegian University of Environmental and Life Sciences (NMB), Norway) who is a co-project leader in the research project "Dark spots in salmon fillets: Cause of formation and measures that inhibit development" presented his research about "Melano-macrophages and their relation to muscle inflammation in the Atlantic salmon (Salmo salar)" at the ISFSI conference.

- Associate Professor Louise von Gersdorff Jørgensen (University of Copenhagen, Denmark) who works on white spot disease caused by a protozoan parasite, Ichthyophthirius multifiliis, presented her research about "The role of neutrophils and macrophages in resistance against a fish parasite in zebrafish (Danio rerio)" revealing novel insights into the host/ parasite interaction and new knowledge on the zebrafish immune defences against an *I. multifilis* infection.

Petra R. Quezada-Rodriguez

Analysis of gill health status of Atlantic salmon smolts from recirculation aquaculture system (RAS) and Flowthrough hatcheries during sea water transfer in Ireland

Petra R. Quezada-Rodriguez

(PhD Supervisors Dr James Wynne and Dr Richard Taylor, CSIRO; Prof. Barbara Nowak, University of Tasmania)

This report summarises the results of a research exchange grant (2019_ ASPA_PDRQR2019) which involved collaborative work between CSIRO (The Commonwealth Scientific and Industrial Research Organisation, Australia) and the Marine Institute (MI) Galway. This study compared the effects of hatchery production system on gill health of two genetic strains of salmon prior to and during seawater transfer by analysing gill histology and associated microbiota (interaction between parasites and microbiome). Despite Covid-19 related operational and travel restrictions, the project was completed in November 2022. The major changes to the original proposal consisted in travel cancelation and develop a contingency plan to carry on this experiment with the support of the Marine Institute collaborators. This research was enabled by regular online meetings to organise sampling, transport of equipment (peristaltic pump) from Australia to Ireland, initial sample processing by the MI collaborators, transport of samples from Ireland to Australia. I would like to thank the ASP for the generous support not only for the funding but its substantial support on adapting the timelines, aligning the items during the 2020 pandemic. Most importantly, two chapters of my doctoral thesis were produced from this research and the ASP played a pivotal role on facilitating it.

Introduction

Salmon aquaculture involves two production stages: the hatchery production in fresh water and the grow out stage in marine water. When salmon smolt are transferred from fresh to sea water, mucosal microbial communities of salmon (gill, skin and intestine) are reshaped. And the fish are exposed to marine parasites after seawater transfer, including Neoparamoeba perurans, marine Ichthyobodo spp. and Desmozoon Iepeophtherii.

Despite broad adoption of recirculation aquaculture system (RAS) technology in the hatchery production of salmon, there is concern that RAS produced smolt may be less robust than flow-through (FT) fish during seawater transfer (Bugten, 2018;

ASP Researcher Exchange Reports

Johansson et al., 2016). Differences in the fish and system microbiology have been observed in previous studies in commercial salmon farms (Fossmark et al., 2020; Minich et al., 2020), among others, morphological and functional gill health indicators including bacterial microbiota may be impacted by differing hatchery production systems (Kolarevic et al., 2014), but there have been no replicated-commercial equivalent studies to assess the legacy impact of hatchery system on eventual gill health of marine transferred smolt. This study compared gill morphology and microbiology across two cohorts from different genetic origin: an Irish strain (Fanad, Ireland) and an Icelandic strain (Stofnfiskur, Iceland) of Atlantic salmon. Both cohorts were reared in replicated RAS and FT systems and then stocked to a common marine site in small research pens.

Methods

Samples were obtained at seven time points over a period of eight weeks prior to and following sea transfer between November 2020 and January 2021. Fresh water timepoints were week 3 pre-transfer (1), week 2 pretransfer (2), week 1 pre-transfer (3) in Newport, Co. Mayo, Ireland (Figure 1).

Seawater sampling was done immediately after transfer (4), week 1 (5),2 (6) and 5 (7) after marine input in the Lehanagh Pool, Co. Galway research site (Figure 2). Samples: At each time point, ten Icelandic fish reared in RAS, ten Icelandic fish reared in FT, ten Irish fish reared in RAS and ten Irish fish reared in FT were sampled. Anaesthesia and necropsy were performed, gill microbiological samples were obtained by swabbing both sides of the first (left side) gill arch and fixed in RNA later [®] followed by storage at -80°C and used for microbiome analysis. Subsequently, 30mg of gill lamellae were obtained, snap frozen and RNA extracted for gene expression analysis and the second gill arch was collected and fixed in 10% formalin for histological analysis. Other samples were taken for microbiome analysis including tank wall and pen surface biofilm and triplicates of filtered water from each rearing system or pen.

Analysis: histological analysis of gills was performed to identify morphological changes and to detect gill parasites in both cohorts and microbiome analysis was done by sequencing bacterial 16s rDNA region V1-V3 in the Ramaciotti Centre for genomics at the University of New South Wales, Sydney, Australia.

Due to travel restrictions related to COVID, the sampling and initial processing of gills, DNA and RNA extractions were done by our collaborators from MI. Samples were imported to Australia under full biosecurity and subsequent, histology analysis was done at the Fish Health laboratory, Institute for Marine and Antarctic Studies (IMAS), University of Tasmania, Launceston and metagenomic analysis was done at CSIRO in Hobart, Tasmania.

Bioinfomatics on 16s rDNA region V1-V3 sequencing data was performed as detailed in (Quezada-Rodriguez et al., 2023). The microbiome analysis was done using different programming packages such as Phyloseq (v1.32.0) (McMurdie et al., 2020), Vegan (Oksanen et al., 2019), Decontam (Callahan and Davis, 2018) and microbiome (Lahti and Shetty, 2019). In total, 386 samples from 403 experimental samples were retained in the analysis. Evenness indices such as Shannon and Simpson were used together with richness to estimate bacterial alpha diversity. Beta diversity was analysed using Bray-Curtis distance (Bray and Curtis, 1957) and metric multi-dimensional scaling.



Figure 1 (L) Freshwater hatcheries systems in Newport, Co. Mayo, Ireland. Image courtesy Marine Institute (MI) Galway.

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The results of this research showed the rearing system alone did not drive the gill microbiome under parallel RAS and FT with a shared water source and that genetic fish strain played a bigger role in the susceptibility of gills to epitheliocystis instead of driving the gill microbiome profile.

Acknowledgments

The Australian Society for Parasitology is acknowledged for the award that helped to support this study, as well as the Fisheries Society of the British Isles Salmon. Smolt (17/KGS/009) is funded through the Knowledge Gateway Scheme, operated by Bord Iascaigh Mhara (BIM) established under the European Maritime Fisheries Fund (EMFF) and co-funded by the Irish Government and the EU. We thank Neil Ruane, Jamie Downes, Fintan Egan, Cathy Hickey, Liz Ryder, Suzanne Kelly, Joanne Casserly, Frank Kane, Tom McDermott and Megan Rigby for their help with sampling and initial samples processing.



Petra processing samples at the Histology Lab from UTAS in Launceston

Below: Figure 2 Sea pens at Lehanagh Pool research site in Co. Galway, Ireland image courtesy Marine Institute (MI) Galway.



ASP Researcher Exchange Reports

Clarisse Louvard

Clarisse Louvard

JD Smyth Postgraduate Travel Award

This travel was undertaken by myself in collaboration with Maree Widdicombe. Research was hosted by Professor Cinzia Cantacessi at the Department of Veterinary Medicine, University of Cambridge, UK. Day-to-day technical and analysis support was provided by Dr Oliver White from the Natural History Museum of London and the University of Cambridge.

The one-month travel to Cambridge led to many positive outcomes.

First, a manuscript resulting from the work undertaken in the UK is currently being drafted. This manuscript presents the novel transcriptome of a marine fish trematode, the first of its suborder. The transcriptome was assembled in Australia and annotated in the UK under the supervision of Dr White and Prof. Cantacessi. Work on this manuscript and the analyses is still ongoing in collaboration with both researchers. This paper is expected to be submitted for publication in a peer-reviewed journal between November and December 2023.

In addition, I made considerable progress in both bioinformatics and general transcriptomics. In bioinformatics, I developed and refined a transcriptome analysis workflow in collaboration with Dr White, who provided the main technical support during our stay. I learned several widely-used programs essential for the analysis of de novo transcriptomes, such as Blobtools, CD-HIT, InterProScan, OrthoFinder and TransDecoder. I also greatly increased my general fluency in the bash shell, which is essential for performing analyses on High Performance Computers (HPCs). The scripts and workflows written with Dr White's help will be useful well beyond this project.

In transcriptomics, I benefitted from Dr White's and Prof. Cantacessi's experience to acquire essential theoretical knowledge, not only in transcriptomics but also in genomics, proteomics and cell biology applied to my project. This knowledge has been critical in my understanding of the theory behind the analyses and the interpretation of my results, and will be necessary for future omics work on any metazoan system.

The analyses on the transcriptome have been restricted to the study of two types of proteins. However, a considerable amount of data remains to be mined from that assembly. As this transcriptome was assembled without a genome or any other omics resources from that trematode order, this so-far unused data represents the only insight currently available for the suborder Hemiurata, one of the largest groups in the Trematoda. In addition, this transcriptome can be used in the future for assembling its corresponding genome. Thus, I expect the remaining transcriptome data and the future genome to be a valuable basis for fruitful long-term collaborations with researchers in the UK and Australia.

This travel to the UK also allows Maree and me to propose a bioinformatics and transcriptomics workshop at the 2023 ASP Conference, bringing together various experts affiliated to the ASP. Organising this workshop represents a unique opportunity to work closely with omics researchers in Australia, further improve my knowledge in the field, gain visibility as a parasitologist, and make valuable contacts for future international collaborations.

Rosemonde Power

ASP Travel Award Report

Name of researcher: Rosemonde Power

II. Outcomes linked to the program:

Outcome 1. Collaborated with Dr Stephen Doyle from the Wellcome Sanger Institute, UK and visited Professor Cinzia Cantacessi's lab at the University of Cambridge During the researcher exchange, I was mentored by Dr Stephen Doyle, who is a UKRI Future Leaders Fellow & Sanger Career Development Fellow in the Parasite Genomics Group at the Wellcome Sanger Institute. I collaborated with Dr Doyle on the population genomics analysis of canine heartworm in Australia, which will form the next chapter of my PhD thesis and ideally result in a publication. During my stay in Cambridge, I also visited Professor Cinzia Cantacessi and her lab at the Cambridge Veterinary School. I formed meaningful relationships with both Dr Doyle and Professor Cantacessi, as well as their fellow lab members.

Outcome 2: Developed new skills in bioinformatics

This researcher exchange enabled me to develop new skills to analyse my whole-genome sequencing data. I greatly benefited from working closely with Dr Doyle, as he possessed extensive knowledge and experience in bioinformatics and parasite population genomics. I gained experience in using the command line and high-performance computing to store and analyse large amounts of sequencing data. I also learnt how to document my data analysis to ensure that all work was thoroughly recorded for myself and others. Specific bioinformatics skills I obtained in Cambridge include quality control, trimming sequencing reads, mapping reads to a reference genome, evaluating genome coverage, extracting reads which mapped to a desired parasite, calling variants in the genome, filtering variants, checking for missingness, and population genomics analyses.

Outcome 3. This work is supported by a grant from the Canine Research Foundation and Dogs Victoria

All work conducted on this researcher exchange was supported by a grant from the Canine Research Foundation and Dogs Victoria. The grant was awarded prior to embarking on the trip to cover the costs of whole genome sequencing and lab consumables.

ASP Researcher Exchange Reports

Rosemonde Power on her ASP Researcher Exchange





STATE NEWS

State News ACT

Australian National University

Congratulations to ASP Member Professor Kiaran Kirk, Dean, College of Science, ANU, who has been made a Member of the Order of Australia "For significant service to science education and research, and to professional organisations."

Kiaran Kirk carried out his PhD in the Department of Biochemistry at the University of Sydney (1985-1988). In 1989 he went to the Oxford University Laboratory of Physiology where he held an Oxford Nuffield Medical Fellowship, the Staines Medical Research Fellowship (Exeter College) and a Lister Institute Senior Research Fellowship. He returned to Australia in 1996 to head the Department of Biochemistry and Molecular Biology in the ANU Faculty of Science, holding this post until June 2009 when he took up the position of Director of the newly-created ANU Research School of Biology. From 2014 to 2017 Kiaran served as the Dean of the ANU College of Medicine, Biology and Environment. Since August 2017 he has been Dean of the ANU College of Science.

Kiaran was elected a Fellow of the Australian Academy of Health and Medical Sciences (FAHMS) in 2017 and appointed Member of the Order of Australia (AM) in the 2023 Australia Day Honours.

https://honours.pmc.gov.au/honours/ awards/2012475



WA

Murdoch University

Ticks suck, but that's not all – Ockham's Razor podcast by **Dr Charlotte Oskam**

On the 22nd of February, 10 WA scientists took part in the live recording for Ockham's Razor Podcast, produced by Tegan Taylor and Rose Kerr from the Australian Broadcasting Corporation (ABC), at the Western Australian Museum underneath the skeleton of Otto the Blue Whale. Charlotte noted it was incredible to present some of her research on ticks and tick borne disease in a light hearted way.

https://www.abc.net.au/radionational/ programs/ockhamsrazor

Everything you ever (or never) wanted to know about ticks

https://www.abc.net.au/radionational/ programs/ockhamsrazor/everything-youever-never-wanted-to-know-ticks/102212186

They're the unwanted hiking companion that is trying to suck your blood.

On Perth Ockham's Razor show. Charlotte Oskamtells us about why ticks want to follow us home.

Speaker: Dr Charlotte Oskam, Researcher, Harry Butler Institute Congratulations to **Dr Amanda Barbosa** on her new appointment as Senior Lecturer in One Health at MU. Amanda is keen to start new projects and collaborations in the parasitology space.

More Cryptick lab news

PhD student, **Wenna Lee** published her first review article detailing how a multi-omic approach can be used to further investigate tick borne illnesses.

Lee W, Barbosa AD, Irwin PJ, Currie A, Kollmann TR, Beaman M, Lee AH, Oskam CL (2022) A systems biology approach to better understand human tick-borne diseases. Trends Parasitol 39:53–69. https://doi. org/10.1016/j.pt.2022.10.006

Lilian's paper

Leong C-C, Oskam CL, Barbosa AD, Aleri JW (2023) Distribution and Prevalence of Theileria orientalis Genotypes in Adult Lactating Dairy Cows in South West Region of Western Australia. Pathogens 12:125. https://doi. org/10.3390/pathogens12010125

Amanda's paper

Barbosa AD, Long M, #Lee W, Austen JM, Cunneen M, Ratchford A, Burns B, Kumarasinghe P, Ben-Othman R, Kollmann TR, Stewart CR, Beaman M, Parry R, Hall R, Tabor A, O'Donovan J, Faddy HM, Collins M, Cheng AC, Stenos J, Graves S, Oskam CL, Ryan UM, Irwin PJ (2022) The Troublesome



Left, Professor Kiaran Kirk, ANU, AM Right, Ockham's Razor podcast by Dr Charlotte Oskam

State News continued

Ticks Research Protocol: Developing a Comprehensive, Multidiscipline Research Plan for Investigating Human Tick-Associated Disease in Australia. Pathogens 11:1290. https://doi.org/10.3390/pathogens11111290

International Day of Women and Girls in Science

PhD student, **Samantha Gunasekera** (supervised by Prof Una Ryan) was profiled by the Harry Butler Institute to celebrate IDWGS

Dr **Charlotte Oskam** was profiled by Trends in Parasitology - To celebrate the #WomenAndGirlsInScience day, Trends in Parasitology created a collection of Reviews and Opinions published in the past year which have women as corresponding authors. These authors are from 12 countries on 6 continents and are at different career stages. By highlighting their articles, Trends in Parasitology would like to acknowledge their outstanding contributions to our journal and to the parasitology research community.

PhD student, **Xavier Barton** has set up an iNaturalist project Tick Exploration to update the map of ticks around Australia. iNaturalist is a website where people upload pictures/ recordings of organisms around them; the online community then determines what species it is, which often leads to a research grade observations. This site will allow Xavier to identify locations where he can collect ticks for his project, as well as providing information on the species of ticks present and the seasons in which they emerge. Seen a tick? We encourage everyone to join this project https://www.inaturalist.org/projects/ tick-exploration



Samantha Gunasekera



Murdoch University Institute Picking up a few biology units 'out of interest' led Samantha to realise the right career path for her was in molecular biology and parasitology, not her original major. Samantha loves her chosen field and can't wait to build a career as a parasitologist, having already mapped out her post-doctoral research focus. Her current research is centred on Cryptosporidium, a gastrointestinal parasite of children, particularly in developing countries, for which there is currently no vaccine. "It would be amazing to be involved in the global effort working towards better prevention and treatment outcomes."



Left: Amanda Barbosa

Above: Samantha Gunasekera

Right and above: Xavier Barton and the

Exploration

iNaturalist project Tick

FOUND BIG TICKS?

Going out in the environment? Going where ticks might be?

GRASS?! BUSHLAND!?! KANGAROOS!!?!!

Join this iNaturalist project, then if you see any ticks, take a tick pic and upload it.

You'll be helping research into how ticks move through the environment and spread their diseases.

Get ready! Peak tick season is coming up between September and March.



Create an iNaturalist account to get started!

Want some more info on the project?

Email me at x.barton@murdoch.edu.au

PROJECT BY CRYPTICK LAB IN ASSOCIATION WITH THE HARRY BUTLER INSTITUTE

STATE NEWS

State News continued

Victoria

Burnet Institute



Dr Michelle Boyle

Working Group head of Cellular Responses to Disease and Vaccination at Burnet Institute

As a Snow Fellow, Dr Boyle will aim to transform our understanding of immune development to malaria by using best unique human samples and cutting-edge technologies. Malaria is a parasitic disease which remains one of the biggest killers in children under five years of age globally. In areas of high malaria transmission, disease also drives social and economic hardships. Part of the difficulty in malaria control is the lack of an effective vaccine for children. Dr Boyle's research will shed light on how immunity to malaria develops and is disrupted in children who are infected with malaria. Using new tools to study the human immune system, Dr Boyle's team will then identify and test drugs that can be used to improve protection. Immune boosting therapeutics may have application to other intractable infections and in vulnerable communities such as the elderly.

https://snowmedical.org.au/fellow/ michelle-boyle/

University of Melbourne

Prof Leann Tilley wins Lifetime Achievement Award

Congratulations to Professor Leann Tilley from the Department of Biochemistry and Pharmacology based at Bio21, The University of Melbourne, who was awarded a Lifetime Achievement Award at the 19th international conference of BioMalPar XIX: biology and pathology of the malaria parasite held at The European Molecular Biology Laboratory (EMBL) in Heidelberg, Germany.

The award recognises her research breakthroughs that have had sustained impact, as well as her contributions to mentoring and career development and her leadership in the international malaria community.

Leann has made major contributions to understanding the molecular and cellular biology of the malarial parasite, Plasmodium falciparum, and using this understanding of the basic biology to develop new treatments for the disease.

https://biomedicalsciences.unimelb.edu. au/news-and-events/prof-leanne-tilleywins-lifetime-achievement-award



Congratulations Dr Michelle Boyle (L) image courtesy Snow Medical and Prof Leann Tilley (R) image courtesy Uni Melb Bio21

VIC MEMBERS EVENT

Victorian ASP members recently enjoyed a state members and friends social event.



Above: ASP VIC Members social event

Tasmania University of Tasmania

November 22-23 2022 saw the first meeting of the **Tasmanian One Health mini-conference** sponsored by the ASP. In total, 21 people attended the miniconference in person and 8 online from across the state. Topics ranged from fish parasites to Tasmanian devils and disease modelling. One of the highlights was Kate Hutson (our new Tassie member, see photo) giving a great and visually spectacular talk about how fish manage disease using self-remedy.

Congratulations to **Khattapan Jantawongsri** and **Petra Quezada** who submitted their PhD theses.

Khattapan Jantawongsri presented his research on Immune response in southern sand flathead, Platycephalus bassensis, affected by muscle melanisation from Deceitful Cove in the Tamar Estuary (Tasmania, Australia) at the 4th Congress of International Society of Fish and Shellfish Immunology in Bodø, Norway (12-15 December 2022). His travel to Norway was supported by ASP Researcher Exchange, Travel and Training Award, Full scholarship for a student travel bursary supported

State News continued

by the 4th Congress of the International Society of Fish & Shellfish Immunology and University of Tasmania College of Science and Engineering HDR COVID-recovery mobility scheme 2022.

While **Barbara Nowak** was doing some work at the University of Copenhagen this April, Barbara was lucky to attend Danish Society for Parasitology /Danish Society for Tropical Medicine and International Health Spring Symposium, which celebrated **50th anniversary of the Danish Society for Parasitology**. Danish Society for Parasitology was founded in Copenhagen on 17 April 1972, so it was really 51st anniversary, but Covid and ICOPA most likely delayed celebrating this occasion.

The Symposium was opened by the President of Danish Society for Parasitology, Dr Lars Hviid and the President of World Federation of Parasitologists Dr Pikka Jokeleinen, followed by Dr Kurt Buchmann (University of Copenhagen) who talked about "The history behind the Danish Society for Parasitology: Implications for the 21st Century Health and Ecology", including contributions of Danish parasitologists to descriptions of fish parasites (for example sea lice Lepeophtheirus salmonis was first described in 1837 by Henrik Nikolai Krøyer) and discoveries of their life cycles (for example experimental confirmation of the involvement of sticklebacks and birds in the life cycle of the tapeworm *Schistocephalus solidus*, was published by Peter Christian Abildgaard in 1790).

The first keynote lecture, "An integrative and inclusive approach towards studying and controlling snail-borne diseases" was presented by Dr. Tine Huyse (KU Leuven, Belgium). This was a really inspirational example of using citizen science to address public health issues. Sixteen presentations, including virtual posters and flash talks were given during the main sessions. These presentations covered diverse topics such as malaria, schistosomasis, trypanosomiasis, swimmer's itch and toxoplasmosis. The second keynote was on "A malaria-free World by 2050: Can we make it?", given by Dr. Roly Gosling (LSHTM, London, UK). This presentation was an update on progress of eradication of malaria, still on course to be achieved by 2050 if only financing, progress in high burden settings and the risks of drug and insecticide resistance can be addressed. This keynote closed the formal proceedings of the Symposium and was followed by socialising over celebratory drinks.



Tasmanian ASP members social event

Tasmanian ASP Members recently enjoyed a members social event and recruited one new ASP member whilst farewelling **Scott Carver.**











50th anniversary of the Danish Society for Parasitology

State News continued

New South Wales

Charles Sturt University

Congratulations to ASP Member **Tiggy Grillo**, COO, Wildlife Health Australia (WHA) and Adjunct Lecturer at CSU who has been made a Member of the Order of Australia "For significant service to conservation through education, research and leadership roles".

https://honours.pmc.gov.au/honours/ awards/2013914

"Researchers have detected a high degree of a parasite, which can burrow into the gut of infected humans, in freshwater fish species across New South Wales."

"Key points:

The invasive parasite was found inside freshwater fish from across New South Wales

It has previously killed native birds by burrowing inside their stomachs

Researchers say fully cooking fish can reduce or remove the chance of infection

The invasive parasite species, Eustrongylides excisus, was found in native fish, including Murray cod, galaxiids, and trout cod during a two-year study.

The research was a collaboration between Charles Sturt University (CSU), the Department of Primary Industries and Narrandera Fisheries."

"**Shokoofeh Shamsi**, a professor in veterinary parasitology at CSU, said the fish were collected from Cataract Dam, near Sydney, and other waterways across New South Wales.

"We found this large worm inside the flesh of the fish, which is quite concerning because this is where usually people consume the fish," she said.

"Professor Shamsi said further DNA research of the parasite revealed it was the same as parasites previously found to have killed native Australian birds."

This article was directly sourced from the ABC news

https://www.abc.net.au/news/2023-04-16/dangerous-parasite-found-in-fishacross-nsw/102221202



Congratulations Tiggy Grillo, AM, COO, Wildlife Health Australia (WHA) and Adjunct Lecturer at CSU photo courtesy WHA.

Herminthology

ASP member and Herminthology founder Nichola Calvani launched the Equity in Parasitology (EQUIP) Scholarships along with her colleague Esther Kanduma. The scholarships are intended to support four women parasitologists from low- and middleincome countries to attend an international parasitology conference each year. This year's conference is the 29th International Congress of the World Association for the Advancement of Veterinary Parasitology (WAAVP) coming up in Chennai, India in August. The scholarships are supported by Elsevier, the WAAVP and the WAAVP African Network. Twenty-one women from 10 countries applied. The winners were selected by a geographically-diverse and gender balanced panel of assessors and were scored based on their career achievements, commitment to female empowerment and their descriptions of how attending the conference will help with their career progression. The four winners were Somayeh Bahrami from Iran, Candela Canton from Argentina, Glory Enjong Mbah from Cameroon and Namirembe Daisy from Uganda (pictured). We can't wait to hear more about them and their work in their upcoming Herminthology profiles!



EQUIP scholarship recipient Candela Canton from Argentina

HERMINTHOLOGY



Professor Shokoofeh Shamsi leads the Parasitology Teaching and Research Team at Charles Sturt University, Australia. Her research has the potential to improve disease diagnosis and treatment through fundamental identification and molecular characterisation of parasites. Her qualifications in veterinary and medical parasitology, combined with skills in conventional morphological and molecular parasite identification methods have led to the discovery of 40 new species, and in Australia it led to detecting the first case of human infection with anisakids, characterising several introduced parasites, and determining natural transmission patterns and life cycles of parasites affecting critically endangered species.

"I'm passionate about my work to better understand parasitism, their role in our environment and how they interact with fish, birds, other animals and people. I was always interested in science and how the natural world works. As an undergraduate biology student, I became hooked on taxonomy. The exciting part is that when you start to group parasites you learn so many other fantastic aspects, such as their anatomy, behaviour and phylogeny. I have learnt many weird and wonderful things and investigated the deepest layers of nature, animals, plants and humans, through studying parasites."

"My first taxonomy work was on snakes! But in my country, it was impossible for a woman to find a job working on snakes, so I started working in aquatic animal health and diseases when an opportunity came up. It was there that I saw parasites with new eyes. I wanted to know what they are, so I learnt how to identify them; then I was curious what drives their presence or absence in/on a host or in an ecosystem. This has been the journey of my life! I end up with more questions than answers, which take me to new research areas, wonderful people/collaborators and an amazing job."

"I was born and raised in Iran. My schooling was during the revolution and war, in a society with many barriers for girls in science and academia. I could never picture myself being where I am today. Australia is a country that offers immense opportunities but even in Australia, women are significantly underrepresented in my research fields (i.e., parasitology, aquaculture, aquatic animal health, fisheries, and veterinary science). My lecturers, supervisors, line managers and mentors have all been males, so I have a strong passion for mentoring early career researchers through their career path and toward a more inclusive society."

Our next #WomenBehindTheWork profile in collaboration with the International Journal for Parasitology: Drugs and Drug Resistance comes from Rose Power, a PhD student in the Veterinary Parasitology Research Group at the University of Sydney. Her research focuses on drug resistance in Australian canine heartworms (Dirofilaria immitis). In her recent work she utilised phenotypic and genotypic approaches to examine the sensitivity of Australian heartworms to currently used preventative drugs. Next, she hopes to generate some local representative genomes of heartworm and define the genetic diversity of this parasite along the east coast of Australia.

"My parasitology journey began during my undergraduate degree Honours project, where I used next generation sequencing technology to resolve mixed Bartonella infections in fleas. Here, I discovered a strong passion for parasitology and scientific research, which inspired me to pursue a PhD, and continue expanding our current understanding of infectious diseases."

"The thing I love most about parasitology is the opportunity to learn from others. I have found the parasitology world to be a very supportive environment, which really helps young researchers like myself grow. Although people may be working on different parasites and topics, I love how I can always learn something new from others, which can turn out to be very useful in my own research!"

"My favourite parasite is canine heartworm of course! In particular, the unknown drug resistance status of this parasite in Australia really fascinates me."

Check out her recent paper in IJP: DDR here: https://doi.org/10.1016/j.ijpddr.2022.11.003

Dr. Rina Fu is a lecturer and author-artist at Edith Cowan University. Trained as a medical scientist, Dr. Rina loves the macroscopic and microscopic workings of the body and how microbes - the good and bad, can affect human and animal health. She teaches microbiology and haematology (parasitology included) in creative ways to inspire and mentor scientists-in-training. Her current research explores the antimicrobial effects of indigenous medicine. In the community, Rina is frequently invited to design and deliver STEAM workshops for toddlers, primary and high schoolers, the elderly and children with disabilities. She makes science accessible through original songs, interactive presentations and microscopy.

Rina completed a PhD and post-doc on malaria drug resistance and novel treatments and has been hooked since. To share her research, Rina composed a song 'Fight Against Malaria'. It featured on ABC Catalyst, and she has since performed the piece at public events around Australia including the 1st Malaria World Congress. Adding to her artistic streak, Rina and her team created parasite iewellery as means to support science outreach for kids with special needs. Rina is also a producer, director, scriptwriter & presenter for screenworks.

Rina's love of sharing parasites with the community (not literally) is embraced by The Australian Society for Parasitology (ASP), who commissioned her to create 'Crafty Parasites: Malaria'. The 15-minute video features award-winning research footage (fluorescent malaria babies) and craft instructions from little scientists to create malaria parasites from sporozoites to intraerythrocytic schizonts using pipe-cleaners!

Rina is currently working on a new episode of 'Crafty Parasites: Hookworm' and a picture book 'My Mummy's Pet Parasites' as a prequel to her first storybook 'My Mad Scientist Mummy'.









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SOCIETY NEWS STA member benefits

The STEM Career Pathways survey will close in less than a week. We've had more than 2500 people respond to the survey so far, but we are keen to hear from more people. The survey is for anyone who has a STEM qualification. Please encourage your members to complete and share the survey with their broader networks before the survey closes on 14 June.

Opportunities to join STA's Policy Committee or Equity, Diversity and Inclusion Committee are now open for applications. These positions offer a chance to contribute to STA's mission. Interested candidates must be members of or employed by an STA member organisation. Aboriginal and Torres Strait Islander candidates are especially encouraged to apply. Applications close 19 June.

STA hosted the latest briefing for the Parliamentary Friends of Science group last week. Leading Australian AI experts called for Australian legislators to swiftly grapple with the implications of the recent explosion in generative AI tools like ChatGPT. These events are organised by Science & Technology Australia on behalf of the group's Co-Chairs Karen Andrews MP and Deputy Prime Minister Richard Marles.

The day after the Parliamentary Friends of Science event, Minister for Industry and Science, Ed Husic launched the Safe and responsible AI in Australia discussion paper – calling for consultation on AI regulation in Australia. Public commentary on these issues is increasing (see the Reports and Policy section below) and the House of Representatives Standing Committee on Employment, Education and Training is conducting an inquiry into the use of generative artificial intelligence in the Australian education system.

The National Industry PhD Program will open applications for Round 2 on 26 June! This exciting program aims to deepen links between industry and the university/research sectors. Employers, industry researchers, PhD students and supervisors, and university staff can prepare by attending the Round 2 information session on Wednesday 14 June at 12 noon to 1 pm AEST.

The Department of Industry, Science and Resources is keen to hear your thoughts on the Diversity in STEM review. As part of the second part of this review – Let's talk solutions – they want to hear about your experiences, stories and ideas, and case studies and interventions that work. These insights will help to shape the Government's vision to increase diversity, engagement and skills in STEM. You can make a submission or simply email your thoughts to DiversityInSTEM@industry.gov.au

The Department of Defence announced its intent to implement a fifty per cent target for women's participation across key research and innovation career pathways, including their STEM Cadetship Program, the Research and Innovation Pathway of the Defence Graduate Program, and the NAVIGATE program. This move is a positive step towards providing career opportunities for women and creating a more diverse Defence workforce. Applications for the NAVIGATE program are currently open to mid-career researchers who would like to consider a career in Defence.

We extend our warmest congratulations to the newly appointed CEO of the NHMRC, Professor Steve Wesselingh – a highly skilled leader whose qualifications and experience place him well to lead the NHMRC. At STA, we are particularly keen to see the NHMRC continue under Steve's leadership to champion fundamental discovery science and invest strategically in research while striving to improve gender equality across health and medical research.

EVENTS AUSTRALIAN ENTOMOGICAL SOCIETY



It's the 54th Australian Entomological Society conference and you are all invited! It will be held 12th-15th Nov 2023 in Albany, WA, with the theme Megadiversity.

Check the conference website with draft program and two of the plenary speakers

https://www.aesconferences.com.au/



Dear colleagues and friends in microbiology,

Tristate meetings have been initiated and supported by ASM branches in SA, WA and NT for over 20 years. They aim to provide social networking opportunities and an engaging scientific program for those working within microbiology in the Northern Territory. The global pandemic impeded our ability to hold Tristate over the past few years, but we are now very excited to promote the 2023 meeting this 8th-10th September, with the theme "Technology in the Top End to Advance Health". Technology sits at the forefront of pathogen detection and diagnosis, and we are delighted to showcase how technological advances in the microbiology field contribute to better health outcomes. Please join us together at the Novotel Darwin this September!

WEBSITE & BOOKING: https://www.asmwabranch.com/tristate-2023

EARLY BIRD OPEN NOW CLOSING 7th JULY

The Tristate Local organizing Committee, on behalf of the WA ASM Branch

Dr Janessa Pickering, Justin Morgan, Dr Ritika Kar Bahal, Dr Megan Lloyd, Miss Ella Dickie

EVENTS





TRI-STATE SCIENTIFIC MEETING

DARWIN, SEP 8-10 2023 The Australian Society for Microbiology

bringing Microbiologists together



EVENTS



Save the Date







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

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

et Involved

Join the Mailing List: https://leishman.eventsair.com/mam2024/contact

Discuss Partnership Opportunities

Kim@laevents.com

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