



# NEWSLETTER

Volume 28 Issue No.5 December 2017



## OUTREACH SPECIAL

Pictured: a Federation University outreach event for schools called The Science Experiment (with thanks to Sarah Preston)

ANNUAL  
CONFERENCE

# ASP

# St.Kilda 2018

September 24th – Thursday 27th 2018  
Novotel Hotel, St Kilda, Melbourne, Victoria

**Registration and abstract submission will open early in 2018. Visit the conference website for more information [www.parasite.org.au/2018conference](http://www.parasite.org.au/2018conference)**

Please contact the Conference Coordinator, Lisa Jones ([lisa.jones1@jcu.edu.au](mailto:lisa.jones1@jcu.edu.au)) or 07-42321311 with any queries.

Confirmed speakers include

ASP Invited International Lecturers

- **Kai Matuschewski** (Humboldt-Universität zu Berlin, Germany)
- **Staffan Svärd** (Uppsala University, Sweden)

Plenary Lectures – Elsevier Parasitology

- **Annapaola Rizzoli** (Fondazione Edmund Mach, Italy) – IJP-PAW Invited Lecturer

Plenary Lectures – ASP Kioloa Concepts in Parasitology Course Alumni Showcase

Drugs and Drug Resistance

- **Kathy Andrews** (Griffith University, Australia)

Parasites and Wildlife

- **Alan Lymbery** (Murdoch University, Australia)

Public Outreach and Parasitology

- **Tony Chiovitti** (Gene Technology Access Centre GTAC, Australia)

General Parasitology

- **Jan Slapeta** (University of Sydney, Australia)



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### Dear Members,

It has been a wonderful year for the ASP. I would like to thank the outgoing president David Emery for his support in my new role. I would also like to thank the ASP Exec, Charlotte Oskam (Executive Secretary), Amanda Ash (Treasurer) as well as the current ASP council members for all their hard work. Their support is invaluable.

In June this year, we had a very successful ASP Annual Conference in Leura in the Blue Mountains. Many thanks to Lisa and Nick and the Conference Organising Committee for organising yet another fantastic conference. The next ASP conference will be in St Kilda, Melbourne 24-27 September 2018. The Malaria in Melbourne conference chaired by Daniel Fernández-Ruiz and Dean Goodman was

held in October and Ala Tabor (UQ) chaired the 9th Tick and Tick-borne Pathogen Conference in Cairns in August/September. Both conferences were very successful and the next Tick and Tick-borne Pathogen Conference will be in Romania in 2020.

At the Leura conference, Dr Sarah Preston, from Federation University chaired the first ASP Outreach Forum for parasitologists interested in outreach activities to discuss avenues of communications, ideas for programs and sharing ideas. Since then we have had numerous fantastic outreach activities including Alpaca parasites in Victoria, the UTAS Open Day and the Griffith Institute for Drug Discovery (GRIDD) Brisbane Ekka parasitology stands and the very successful Parasites in Focus display and associated outreach activities at the WA Royal Show in September (more details

## *From the President's Desk continued*

later in the newsletter). Many thanks to all Members for their outreach efforts throughout the entire year.

I am delighted to announce that Brian Cooke will continue as Editor-in-Chief for IJP and Maria Meuleman will continue to do an outstanding job in her role as the IJP Editorial Assistant. On behalf of the ASP, I would like to thank Brian and Maria, and the Deputy Editors Alex Loukas and Jan Šlapeta, and the IJP Editorial Board members, for all their hard work, which is greatly appreciated.

I would also like to thank Andrew Kotze and Kevin Saliba, the editors of International Journal for Parasitology: Drugs and Drug Resistance (IJP-DDR), and the editors of IJP-Parasites and Wildlife (IJP-

PAW), Andy Thompson and Susan Kutz (who has replaced Lyden Polley) as well as the Editorial Board members for their major contributions.

In December this year, Alex Maier ran another very successful Concepts in Parasitology (CIP) Course where world-experts across a wide range of disciplines shared their knowledge and insights with PhD students and early career researchers, equipping them with the conceptual framework, technological know-how and skills to meet the challenges of the future. A huge thank you to Alex for all the work he has put into this and for establishing CIP as a world-recognised course. The society is very appreciative. Many thanks also to the CIP committee and to all the contributing lectures and participants.

Thank you Lisa and Ian, for the newsletter and for all the member contributions. Thanks Lisa too for always being so helpful and efficient and wonderful!

I wish you all a relaxing and peaceful Christmas and New Year and hope that 2018 will see the society continue to foster our discipline both nationally and internationally.

**Best regards,**

**Una Ryan**  
**President of the ASP**

[www.parasite.org.au](http://www.parasite.org.au)  
[www.facebook.com/ASParasitology](https://www.facebook.com/ASParasitology)  
[www.twitter.com/AS\\_Para](https://www.twitter.com/AS_Para)



# The 2017 ASP Outreach Forum

**Dr Sarah Preston, a Lecturer in Veterinary Bioscience at Federation University Australia chaired the first ASP Outreach Forum at the 2017 ASP Annual Conference in June.**

The purpose of this forum was to bring together parasitologists who were actively involved in outreach programs or who wanted to become involved so that they could discuss avenues of communications, ideas for programs and sharing ideas.

Fifteen ASP members had a round table discussion and discussed their own outreach programs, which included;

- Development of parasite and science related school books
- Development of outreach programs for extension/end-users
- Parasite discussions in the pub
- Wild-science networks/zoo outreach programs
- Citizen science-“Scoop the poop” program
- University based outreach programs for national science week (face-painting, tattoos, badges, parasite games)
- Development of a theatre performance based on parasites

- Development and distribution of outreach packs

The group discussed how they might develop a collaborative outreach network to help leverage future government funding, become more connected as a network, have access to shared resources, and how they might set up a calendar of parasitology events.

The group agreed on the following outcomes:

- Formation of a special interest group called POWS (parasite outreach working session).
- Set up a Facebook special interest group through ASP social media
- Develop a conference session next year based on outreach programs.

**If you are interested in joining POWS please contact Sarah by email [sj.preston@federation.edu.au](mailto:sj.preston@federation.edu.au)**

**Below: Dr Sarah Preston chairs the first ASP Outreach Forum**

**Bottom left: Kathy Andrews' *That's RAD! Science* project**

**Bottom right: Rina Fu's *My Mad Scientist Mummy* book**



## Student presentation competition at UTAS

**A unique opportunity at the University of Tasmania for ASP student members to present to a diverse audience.**

The Annual Fish Histopathology workshop at the University of Tasmania conducted by Professor Nowak offered a unique opportunity for outreach and to showcase parasitology research by our ASP student members to an audience of veterinarians, pathologists, university lecturers, researchers, students and government agency workers. The workshop participants attending the outreach event included participants from Australia and New Zealand.

This outreach event, consisted of a lunchtime oral presentation session. The opening of the session included brief presentation about ASP. ASP banner was displayed and ASP leaflets distributed to all attendees.

In total 4 talks were presented to the workshop participants during their ASP sponsored lunch break. Presenting students were invited to attend the lunch to discuss their research with the participants. To encourage discussions and active participation the workshop

participants were asked to vote for the best presentation. The winner was UTAS PhD student Tina Oldham who was presented with a \$100 Coles-Myer voucher as a prize and History of Parasitology in Australia book, the second place went to Flinders University PhD student Jessica Buss. Following the competition Assoc Prof Shokoofeh Shamsi gave a presentation on nematode detection in fish. The parasitology lunch session was attended by 20 workshop participants, tutors, the event organiser as well as the ASP student members. ASP funds were used to sponsor the lunch and partially support the poster prize. The event was advertised to the workshop participants on the first day of the workshop. This event has created

a greater awareness of fish parasitology and the research that is conducted by Tasmanian ASP student members.

**Report by Barbara Nowak**



**Above: Participants of Fish Histopathology Workshop examining slides under conference microscope**



**Far Left: The winner of the competition Tina Oldham**



**Near Left: Second place winner Jessica Buss**

# The UTAS Open Day

As has become a bit of a tradition, the University of Tasmania's Open Day on 12th August included a stand hosted by the ASP.

As in previous years, there were activities for children including colouring of pictures of fish parasites.

However, this year "molecular mystery" station was the primary attraction, this activity was directed at teenagers and adults. There was a steady stream of people throughout the whole day, and they all enjoyed getting into solving the mystery. The basic idea was to solve the mystery of "Who killed Sammy the salmon?" Everybody got a worksheet and could view the necropsy photos and background information. Then they would move on and read about 6 'suspects' – pathogens potentially responsible for Sammy's fate. Based on the photos of Sammy and background information on suspects, the participants had to narrow down the chase to three pathogens for further molecular analysis. At the next station PCR was explained including what it is used for and how it works. The participants had to do some calculations on the worksheet and prepared their "master mix". The solutions were just water with food colouring, which allowed us to see if they used the wrong solution or put the wrong volumes because their master mix wouldn't look right. So the participants got lots of pipette practice. Then the next station we had a gel, and some molasses loading dye, and we explained how gel electrophoresis works and let them practice loading a gel. Finally, we had DNA fingerprint banding patterns for each of the suspects and the killer, and they would use those results to determine who killed Sammy.

At the end of the day the winners of both competitions received prizes. The stand was really popular and everybody enjoyed the activities. The activities were run by PhD students Tina Oldham, Jessica Johnson-Mackinnon with help from Mai Dang and Mei Ooi.

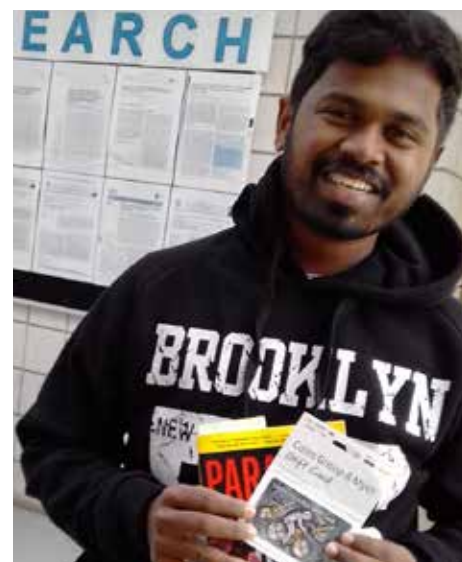


**Above, top left:**  
The winner of the colouring competition gets her prize from Jessica Johnson-Mackinnon

**Above, top right:**  
Participants busy solving mystery "who killed Sammy"

**Directly above:**  
Reading the background information while Tina Oldham (in the background) supervises the station.

**Right:**  
The winner of the mystery solving competition with his prize.



## The Science Experiment

These images, from a Federation University outreach event for schools called The Science Experiment, were submitted by Sarah Preston



### ASP Outreach Funding

ASP members are encouraged to apply for ASP funding to support outreach in their state. Up to \$500 per event is available with a total per state or territory of \$2000 per calendar year. Initiatives should foster outreach by members and advance the field of parasitology. The funds can be used to support a wide range of activities - from seminars and symposia to "beer and nibbles" networking sessions of State members or any other parasitology-related event.

**Submit your proposal to your ASP State/Territory Representative for consideration.**



# GRIDD at the EKKA

**Griffith Institute for Drug Discovery (GRIDD) worked in collaboration with the Street Science team on a stall at the Brisbane Ekka.**

Our target audience was the general public, research institutes staff and students, schools and any organisations that will be interested. We had thousands of Ekka patrons walk through the Agricultural and Educational hall and attracted several hundred interested patrons to the stall. The stall highlighted particularly the drug discovery research at our institute including the incorporation of images from fluorescent and image-based assay technologies developed to assess compound activity against malarial and kinetoplastid parasites. We accomplished our aim by promoting science, engaging young children and adults in various activities such as making molecules from plasticine and straws,

making colourful slime, participating in various competitions, giveaway keyrings of microscopy images captured through our research and showbags. We also gave away signed copies of Prof Katherine Andrews "My Mum is a Parasite Scientist" That's RAD Science children's book.

The event was promoted via GRIDD's Twitter account, GRIDD's Facebook account and GRIDD's website. We sent out emails to stakeholders and contacts. The organisers of Ekka also did their own advertising via

social media, television, newspaper and radio broadcasts. Lastly, the Street Science team also helped to promote the event, encouraging patrons to come to our stall.

Overall, the Ekka outreach event was a big success, which we believed to have benefited the Australian Society for Parasitology by educating the general public of the impact of infectious disease around the world and the importance of our antimalarial and antikinoplastid research. We also acknowledged ASP

through the many keyring parasite images that we handed out and via the ASP banner we used as backdrop for the "Dress up as a Scientist". Lastly, we had many schools and interested general public enquiring about "My Mum is a Parasite Scientist" That's RAD Science children's book, which was great for promoting parasitology science awareness.

Thank you so much for your amazing support ASP!!



Melissa Sykes  
@melissasykes



Day at the EKKA on Sat at the GRIDD stand @GRIDD\_GU. The kids loved learning about our parasites- and the parents did too! @AS\_Para



Mark Coster @MarkCoster\_Chem · Aug 18  
Making SLIME at the Ekka in the Ag Fit pavilion. Researcher from @GRIDD\_GU @GU\_Sciences Kids are having fun too!



Camilla Coburn @camillacoburn3 · Aug 17  
Residents having fun @theEkka @AS\_Para @GRIDD\_GU @ScienceLive1



## Murdoch at the Perth Royal Show

### Murdoch University in conjunction with the Department of Health hosted a number of stalls adjacent to "Parasites - Life Undercover: at the Perth Royal Show

The Perth Royal Show (23rd September – 30th September 2017) hosted the event "Parasites – Life undercover" from the Museum für Naturkunde Berlin, which is a world class exhibition proudly presented by the Royal Agricultural Society of WA and the Department of Agriculture & Food Western Australia (DAFWA), showcasing over 100 years of parasitology. It was a key exhibition at the show and thousands of families went through the exhibition to be fascinated and/or horrified at the fantastic parasites on display.

Murdoch University in conjunction with the Department of Health hosted a number of stalls adjacent to Life Undercover at the Perth Royal Show to raise awareness about parasites and the research conducted in WA. The stalls were manned by volunteer staff/students for the 10 days of the show. Heaps of parasite themed give-aways were available including 'fight the bite' DOH mosquito caps and water bottles, stickers, pamphlets advising on pets, parasites, and mosquito borne disease, and fantastic parasite themed colouring-in sheets which were a hit ( Thanks Dr. Narelle Dybing ). Perhaps the most popular attraction at the booth was the 'fishing for parasite infested fish'. Children were able to fish for plastic fish which had the introduced parasite *Lernaea cyprinacea* (anchor worm) attached to them. It was so loved that some parents had great difficulties dragging them away – some little ones stayed for hours just to keep fishing!!! Another hit was the 'pin the parasite to the right body part' display. This was a human anatomy mannequin, which people were able to pin a parasite to where they thought it would be found in the body.

Rina Fu was also there helping with the displays and promoting her upcoming

book. She said of the event "It was a fantastic opportunity to connect with families and teachers in early childhood from Perth and regional areas in WA at the Perth Royal Show. I am very encouraged by the overall support and excitement towards "My Mad Scientist Mummy", as there are very few storybooks for young children that talk about science, and 'have a woman as the central character'. At the Murdoch booth, young children were particularly drawn to the blueberry cupcakes and 'Seto' the plush toy quokka who is a lab technician in the storybook. Over 170 families with young children and educators have expressed their interest in attending the book launch next year, at which I hope to include a sing-along and fun activities to engage young children in science. I would love to hear from anyone who might be interested to be involved at the book launch next year! I am grateful to Murdoch University and the fantastic team for their support, particularly Caroline Jacobson and Narelle Dybing for their tremendous efforts in putting together such an attractive and interactive showcase in bringing public awareness to parasitology."

In conjunction with the Royal Show exposure the Sunday Times included a 4 page spread presented as lift-outs of all things parasites aimed at school aged children titled 'Parasites suck'. Sunday Times staff worked closely with Murdoch parasitology and DOH staff to develop the content which was run over two weeks. One lift-out focussed on parasites affecting humans, and one on those affecting animals. In addition to this 'Parasites suck' was delivered to around 250 schools in WA. Thankyou you to all the team involved for providing their time, resources and fantastic images, especially Caroline Jacobson for all her hard work and for

bringing us all together.

Over the 10 day period the awesomeness of parasites was highlighted to thousands. Narelle Dybing also paraded these fabulous resources for the public at the Murdoch open day, and for Science week this year.

### Images on the following page:

**Top Row: Left ASP executive council members Charlotte Oskam, Amanda Ash, and President Una Ryan with a giant Flea cutout at the Perth Royal Show. (Amanda's photo) Middle: Promoting parasite awareness at the show with a giant flea cutout. (Narelle) Right: the Murdoch stand (Narelle)**

**The remaining Images are all courtesy of Rina Fu.**

### Below: The Parasites Suck liftout

**Wildlife**  
Wildlife in the great Australian bush are often infected with parasites. The worry is that wildlife populations of threatened species which are stressed will not be able to cope with their parasites and decline, either temporarily or forever.

**Forries for Woyleys**  
Woyley is a critically endangered kangaroo which lives in our South West. As its population and habitat decline, parasites have been identified which may be involved in their decline. One is *Parasitomonas* (a parasite which lives in blood). The full impact these parasites have on the Woyley are not clear, but are likely to be a risk factor when populations are under stress.

**Bad news for bandicoots?**  
Although often deemed by humans as a disgusting sight, ticks are a perfectly normal part of natural ecosystems. Ticks are usually host specific, which means they will not latch onto a species other than their preferred host. One exception is the kangaroo tick, which will crawl onto and bite humans, often leaving a nasty, irritating bite.

**Ticked off in the bush**  
Wildlife are often seen as the original source of parasites that spread to humans or livestock. But in some cases there is evidence to show that some parasites were originally introduced to wildlife populations from humans. Examples include *Gyrodactylus* (a tapeworm), *Echinococcus granulosus*, a tapeworm parasite (hydatid).

**Reptile parasites**  
Reptile parasites reproduce rapidly, causing large infestations and devastating illness. Roundworms, hookworms and pinworms are some common endoparasitic infections, while ticks are a common ectoparasite.

**Reporting on parasites is fun**  
An eel called *Myxobolus* allows the public to report pests to experts at the Department of Primary Industries and Regional Development who will identify it, reply back and map it online. The new pest-monitoring and surveillance community aims to defend WA's agriculture industry and the natural environment from unusual, damaging or suspected exotic pests. Parasitologists will tell you that looking for parasites is fun. Reporting your observations will let you learn more about species in your local area and have a great excuse to get outdoors. Who knows - maybe you will be the first person to have a new parasite named after you! Search online for 'my pest guide' for further information.

**The knock-on effect**  
Exotic parasites are those that have been introduced from another country. When new parasites are introduced, they can cause major health problems for hosts that have never encountered them before. In WA a parasite called an anchor worm (which is not really a worm, but a small crustacean) was introduced with goldfish or carp. The parasite had found its way into our rivers, probably when people released their pet fish, and now attacks native freshwater fish which do not have natural defences against it.

**Discover**  
To know about parasites, you need to know where they come from. The Royal Agricultural Society of WA is the perfect place to find out more about parasites and the Perth Royal Show.

**Logos and Acknowledgments:**  
© Media Centre 2017. Image courtesy of Great South (Department of Fisheries), Murdoch University, Andrew Duggan (Department of Medical Research), NWH Health Pathology, Telethon, Cystic Cystitis, Professor Peter Ross, State Government, Rebecca Pridmore, David Dwyer, WA Newspapers, Perth Zoo, Alan Carter, YouTube and the Centre for Microscopic Observation, and Andrew Duggan.  
Sponsored by: ROYAL AGRICULTURAL SOCIETY OF WA, Murdoch University, Department of Health.  
Supported by: The School of Veterinary and Life Sciences and The Animal Hospital at Murdoch University, Fight the Bite, and the Australian Society for Parasitology.

## Murdoch at the Perth Royal Show continued



# Alpaca parasites in Victoria

## A team from the University of Melbourne have been raising awareness of parasites among alpaca farmers at Hill End Youth Camp

The University of Melbourne's parasitology team comprising a technical lab assistant Dr Léa Indjein, a PhD student Mr Harun Rashid and an Honours student Ms Tana Sukee participated in a Hill End Youth camp in Victoria to raise awareness about the importance of parasites among alpaca farmers.

The small farming community of Hill End is located in the foothills of the Great Dividing Range near West Gippsland. With alpacas the main feature for this year's Hill End Youth Camp, the area became a key meeting point for local alpaca breeders and other members of the alpaca industry. Even the not so local University of Melbourne Molecular Parasitology team came along.

With all eyes on the alpacas, we aimed to educate the kids about all the wriggly parasitic organisms which can be found inside these placid animals. We also demonstrated how to collect and test faecal samples for worm eggs. Needless to

say, we had a rapt audience.

We began the day with a presentation on some important livestock parasites, including liver fluke (*Fasciola hepatica*), tapeworm (*Echinococcus granulosus*) and barber's pole worm (*Haemonchus contortus*), outlining the importance of their life cycles with posters and preserved specimens. In addition, we also showed them some live samples of the free-living roundworm, *Caenorhabditis elegans*. This was followed by lots of excellent questions and discussion mainly focused on potential sources of gastrointestinal parasite infection in alpacas, clinical signs, preventative strategies and drench resistance. Barber's pole worm was the key focus of the discussion due to the higher prevalence and mortality in alpacas.

After a brisk morning tea, we were out in the sunshine and teaching the kids how to collect alpaca faecal material by rectal sampling. We had many volunteers who collected samples from two alpacas whilst Léa and Harun explained the equipment and steps required to perform a faecal egg count (FEC), including substitutes for the flotation solutions that students can prepare themselves (one volunteer quickly figuring how this all could be done in, say,

his mother's kitchen but quickly abandoned the idea when he thought about the scientific implications of his mother's discovery of his newly found hobby). With the help of another volunteer, we obtained another faecal sample which was negative for worm eggs. This was great news and the kids are now determined to keep their animals worm-free. To show the students what to look for in faecal samples, we brought along some alpaca faeces with positive FEC to demonstrate the appearance of strongyle type eggs. No kitchens or alpacas were harmed during these experiments!

Overall, the workshop was a success, with students showing great interest in the topic and asking plenty of relevant questions. We hope that engaging young people from the alpaca industry in the workshop could prove to be an essential step in spreading understanding and methodologies in dealing with parasites. 'I personally got a lot out of the day, as this was my first time doing extension work and I plan to do a lot more of it in the near future', says Tana – an Honours student at the University of Melbourne.



**Clockwise from top left:**

**Harun and Lea demonstrating faecal egg counts to farmers**

**Harun and Lea explaining about parasites using gross and microscopic specimens**

**Harun demonstrating faecal egg count with the help of a young volunteer**

**Collection of faecal samples by alpaca farmers for faecal egg count of worms.**

## Two events in the ACT

### August and September were busy outreach months for parasitologists from the ANU with two events - a stall at SCience in ACTION and Parasite Detectives in the Conocophillips Science Experience

During National Science week in August, parasitologists from the Australian National University (ANU) returned with their popular parasite themed stall to Science in ACTION, a two-day STEM showcase attended by more than 7,200 people. Visitors to the stall were both intrigued and disgusted by the parasite-themed games (including match the parasite with the host, parasite memory, and parasite picktionary) and the specimens on show. Many also took the opportunity to have their face-painted as a parasite and take photos at the parasitology photo booth. Thank you to Melanie Ridgway, who organised the stall, and Merryn Fraser, Richa Harnal, Alex Maier, Meenu Pratap and Meng Zhang (all from the Maier lab), Sanduni Hapuarachchi,

Linden Muellner-Wong, Esther Rajendran, Edwin Tjhin and Giel van Dooren (all from the van Dooren lab), and Christina Spry and Erick Tjhin (both from the Saliba lab), all of whom shared their enthusiasm for parasites and parasitology research, and answered the questions of interested onlookers and budding parasitologists.

In September, ACT parasitologists ran a "Parasite Detectives" prac for high school students from Canberra and Southern NSW participating in the Conocophillips Science Experience. The Science Experience provides Year 9 and 10 students with 3 science-filled days at the ANU. The budding parasitologists used a combination of molecular and microscopic approaches to diagnose their demonstrators, who presented at the prac with a parasitic infection. In a race against time, the students managed to identify the parasites their demonstrators were infected with, and prescribe appropriate treatments. ACT parasitologists participating in the prac included Erick Tjhin (Saliba lab), Esther Rajendran, Sanduni Hapuarachchi, Edwin Tjhin, Linden Muellner-Wong and Giel van Dooren (all from the van Dooren lab). As

always, we received terrific technical support from Peta Moisis and her team from the ANU Research School of Biology Teaching and Learning Centre.

**Below. Outreach activities in the ACT. Top left, Melanie showcases one of the parasite specimens on display at the Science in ACTION parasitology stall. Top centre, a visitor to the stall inspects parasites under the microscope. Bottom left, Sanduni and Esther test out the parasite photo booth. Below centre, a visitor to the stall is transformed into a hookworm! Top right, students participating in the "Parasite Detectives" prac set to work to diagnose their demonstrators. Below right, the students present their diagnosis and treatment plan to the group.**

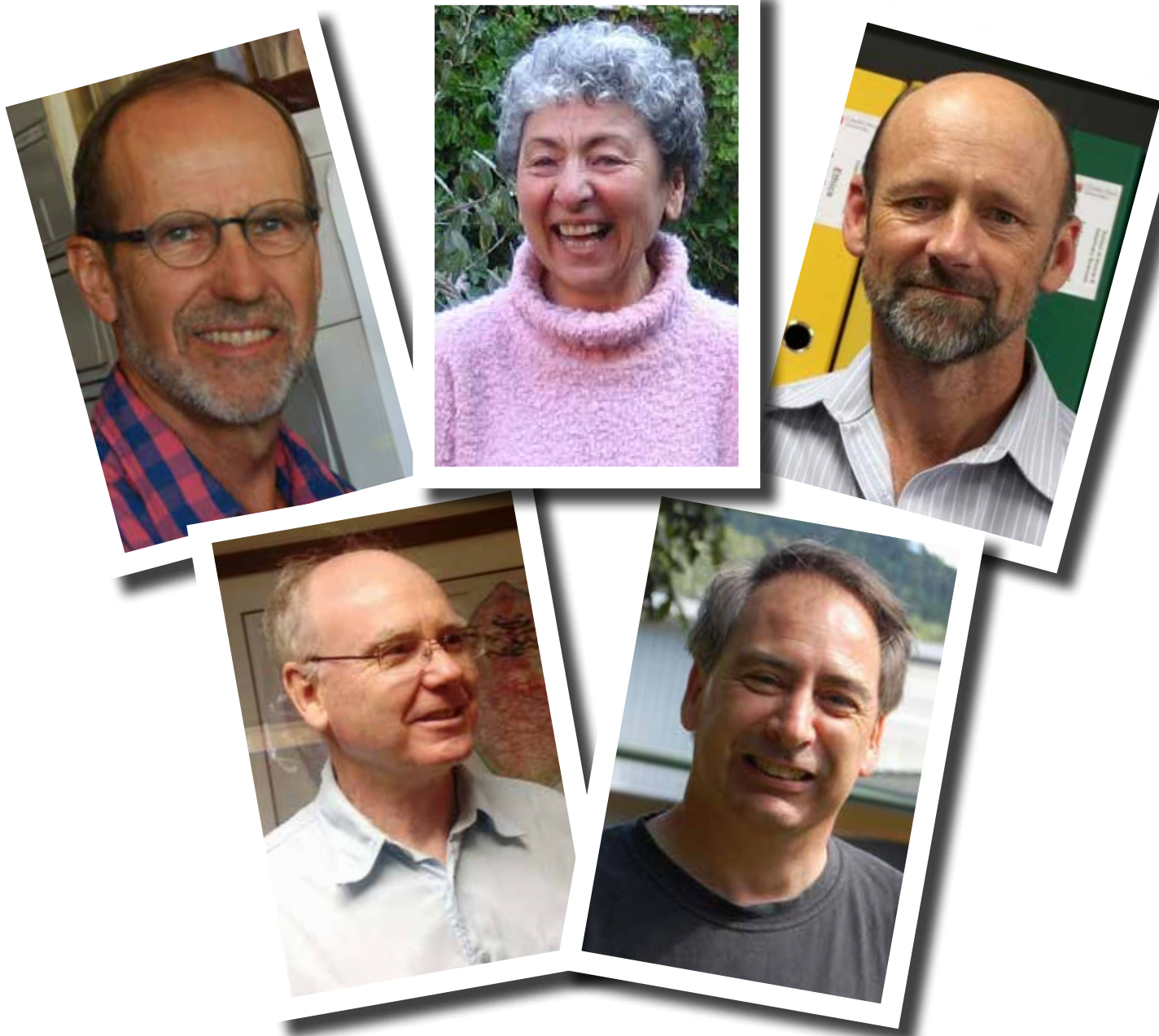


## Can you name these Fellows of the Society?

How time flies! The parasitological luminaries featured in this edition of the newsletter all became Fellows of the Society around ten years ago.

We are continuing to add more detail to our "Fellows of the Society" pages. As they grow over the coming months, these pages should form a fascinating biographical archive of some of the leading Australian Parasitologists of the last fifty years.

If you have any suggestions for the improvement of these pages, please write to Lisa Jones at [lisa.jones1@jcu.edu.au](mailto:lisa.jones1@jcu.edu.au)



To put names to faces and to read a brief biography of each Fellow, visit [parasite.org.au/the-society/fellows-of-the-society/](http://parasite.org.au/the-society/fellows-of-the-society/)

The answers can also be found at the bottom of page 41 of this newsletter

# Concepts in Parasitology

The 2017 edition of the Concepts in Parasitology course took place in Kioloa, NSW, 26th November to 9th December.

As always, the course was a great success, bringing together students from around Australia and a host of luminary figures from the world of parasitology.

**A full review of the course and a gallery of images will be published in the next ASP newsletter, early in 2018.**



# The Australian Helminthological Collection

**Advancing Knowledge: Updating the Australian Helminthological Collection Database. Danny Wilson describes this important ASP-funded initiative which was initiated in October 2017.**

The Australian Helminthological Collection (AHC) at the South Australian Museum (SAM) is the largest in the country and one of the most important in the world.

In October 2017, the Australian Society for Parasitology initiated project funding to clean-up the database that collates the AHC information. The grant was awarded to Dr. Leslie Chisholm (Senior Collection Manager – Parasitology, SA Museum) and Em. Prof. Lesley Warner (SA Museum). It funds technical/data entry assistance to update the helminth and host taxonomy modules of the database that have not been revised in many years.

The AHC contains specimens collected as far back as 1884 and includes helminths collected during Sir Douglas Mawson's Antarctic explorations. The collection is

highly active – it currently contains ~45,000 items (representing ~4500 helminth taxa) preserved in ethanol or on microscope slides and ~1000 new items are deposited annually. Researchers worldwide use the information in the AHC database for various applications including taxonomic, biodiversity and ecological studies.

In the most recent 2 year period there were 325 enquires and 40 publications citing specimens in the collection. Funding from the ASP to clean-up the parasite and taxonomy modules means that the accuracy of all database searches will be vastly improved. The end goal is ultimately to upload the AHC Database onto the Atlas of Living Australia website so detailed searches of the information can be made by researchers and the public globally.

Funding from the ASP ensures that future



South  
Australian  
**Museum**

contributors and users of the collection will have access to an accurate database with extensive cross-referencing allowing easy data extraction for multiple research applications.

## News from the ASP Network for Parasitology

### Welcome

#### 2018 ASP Annual Conference

The 2018 ASP Annual Conference will take place Monday 24th – Thursday 27th September at the Novotel Hotel, St Kilda, Melbourne, Victoria. We hope that you will join us at this lovely venue for another wonderful collegial meeting to discuss the latest research and state-of-the-art technologies in parasitology with our usual outstanding mix of quality international and Australian scientists. The program is being finalised, but the following speakers and sessions have been confirmed:

#### ASP Invited International Lecturers

- **Kai Matuschewski** (Humboldt-Universität zu Berlin, Germany)
- **Staffan Svärd** (Uppsala University, Sweden)

#### Plenary Lectures – Elsevier Parasitology

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#### General Parasitology

- **Jan Slapeta** (University of Sydney, Australia)

The conference will begin with our Welcome Reception at Encore, St Kilda Beach from 630pm Monday 24th September and the presentation of new ASP Fellows and conclude with the Conference Dinner at Luna Park St Kilda on Thursday 27th September just for some fun, following the ASP AGM, both venues are walking distance from the Novotel in St Kilda. This venue has excellent transport links with the airport bus and Melbourne tram stopping regularly at the front of the hotel. Once again we will be organising special events for our Early Career Researchers with details to follow. We would like to acknowledge the generous support of our 2018 ASP conference sponsors, thanks to Virbac, Elsevier Parasitology and the International Journal for Parasitology (IJP), IJP DDR and IJP PAW. Registration and abstract submission will open early in 2018 check out the conference website for more information [www.parasite.org.au/2018conference](http://www.parasite.org.au/2018conference)

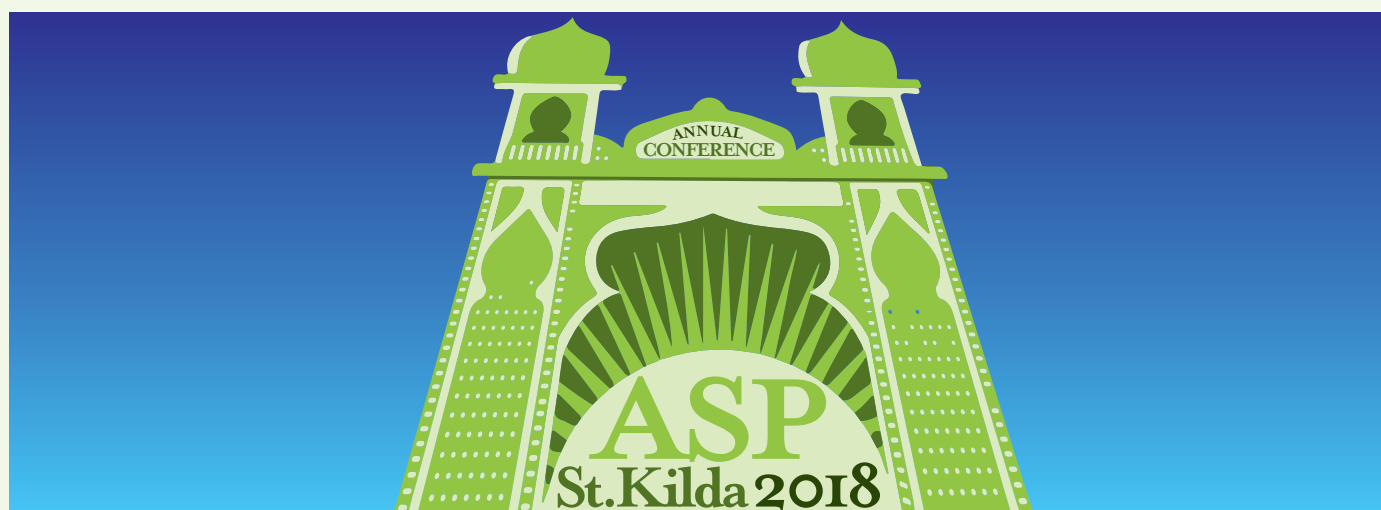
Thanks to Sarah Preston from Federation University for chairing our first ASP Outreach Forum on Thursday 29th June at the 2017 ASP conference. See the ASP Outreach Forum report in this newsletter to see how you can get involved and come to the 2018 ASP Conference with your Outreach ideas to share we will have a Symposium session dedicated to Outreach.

#### Network Researcher Exchange and Travel Awards

Applications for the next Network Researcher Exchange and Travel Awards round close on 23 March 2018 check the ASP website for guidelines and the application form. [www.parasite.org.au/awards/jd-smythpostgraduate-travel-awards/](http://www.parasite.org.au/awards/jd-smythpostgraduate-travel-awards/)

#### Network Mentorship Scheme

Network Mentorship Scheme Early career researchers are encouraged to apply to the Network Convenor ([nick.smith@parasite.org.au](mailto: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 researchers to discuss, plan, prioritise and set targets for their career. Typically, the early career researcher will fly to the institute of a senior parasitologist and spend a day there. Arrangements for professional



development and progress to be reviewed by the pair annually can also be arranged. Importantly, mentors need not be from an individual's home institution but can be drawn from across the Network. The scheme has proved very valuable for several young researchers and their mentors already.

## NHMRC Grants

### NHMRC Postgraduate Scholarships

Ms **Sandra Duffy** (Griffith University), Dora Lush Biomedical Postgraduate Scholarship, *The consequence of Plasmodium falciparum culturing conditions on tolerance to anti-malarial drugs.*

Dr **Genevieve Oliver** (Flinders University), Medical/Dental Postgraduate Scholarship, *Neglected Retinal Infections*

### NHMRC Project Grants

A/Pr **Luke Guddat** (The University of Queensland), *Inhibitors of hypoxanthine-guanine-xanthine phosphoribosyltransferase as versatile*

*drugs to treat infectious diseases*

Dr **Danny Wilson** (The University of Adelaide), *Retargeting the antibiotic azithromycin as an antimalarial with dual modality*

Prof **Stephen Rogerson** (The University of Melbourne), *A novel approach to identify the specific antibody characteristics important for protection from malaria in pregnant women*

Dr **Wai-Hong Tham** (Walter and Eliza Hall Institute of Medical Research), *Molecular Mechanisms of Malaria Parasite Entry*

Prof **Katherine Andrews** (Griffith University), *New antimalarial drug leads targeting multiple species and life cycle stages*

Prof **James Beeson** (Macfarlane Burnet Institute), *Mechanisms and targets of antibody-complement interactions that neutralize malaria*

Dr **Sant-Rayn Pasricha** (Walter and Eliza Hall Institute of Medical Research), *Benefits and safety of IRon supplementation with Malaria chemoprevention to children in Malawi (IRMA) - A randomised controlled trial*

Dr **Tina Skinner-Adams** (Griffith University), *Combating giardiasis by investigating new potent compound series as leads for improved treatment options*

Prof **Leann Tilley** (The University of Melbourne), *Molecular basis of artemisinin action and resistance in Plasmodium falciparum*

Dr **Daniel Fernandez-Ruiz** (The University of Melbourne), *Protecting against malaria through liver-resident memory T cells*

Prof **Edward Holmes** (The University of Sydney), *Using Metagenomics to Determine the Causative Agent(s) of Tick-Borne Disease in Australia*

A/Pr **Justin Boddey** (Walter and Eliza Hall Institute of Medical Research), *Role of plasmepsin V and PTEX complex in Plasmodium liver infection*

Prof **Malcolm McConville** (The University of Melbourne), *Targeting phosphoinositide metabolism in Leishmania*

Dr **Ethan Goddard-Borger** (Walter and Eliza Hall Institute of Medical Research), *The role of protein glycosylation in the malaria parasite*

Dr **Sheila Donnelly** (University of Technology, Sydney), *Understanding how a parasite-derived peptide prevents immune mediated demyelination*

Dr **Ethan Goddard-Borger** (WEHI) *The role of protein glycosylation in the malaria parasite*

### NHMRC Development Grants

Dr **Brad Sleebs** (WEHI) *Optimisation of a potent and fast acting antimalarial class that is orally efficacious in vivo*

Dr **Jack Richards** (Burnet Institute) *Development of a glucose-6-phosphate dehydrogenase/ haemoglobin point-of-care test for malaria elimination*

### NHMRC RD Wright Biomedical Career Development Fellowships

Dr **Darren Creek** (Monash University) *Enhancing anti-parasitic drug discovery with metabolomics*

Dr **Michelle Boyle** (Burnet Institute) *T-follicular helper cell subtypes that induce protective anti-malaria antibodies*

Dr **Stephan Karl** (James Cook University) *Unravelling Plasmodium vivax transmission to Anopheles mosquitoes: Role of naturally acquired transmission blocking immunity and efficacy of novel vaccine and drug candidates*

### NHMRC Centres of Research

## Closing dates for ASP awards

**ASP Fellowships**  
9 January 2018

**ASP Researcher Exchange, Travel and Training Awards & JD Smyth**  
29 September 2017

**Bancroft-Mackerras Medal for Excellence**  
30 September 2017

More information  
[www.parasite.org.au](http://www.parasite.org.au)

## Excellence

**Prof Stephen Rogerson** (University of Melbourne) *Centre for Research Excellence in Malaria Elimination*

## NHMRC Early Career Fellowships

**Dr Sarah Charnaud** (WEHI) *Improving malaria elimination strategies with genomics: tackling the unique problems posed by Plasmodium vivax, and P. falciparum drug resistance*

**Dr Matthew Grigg** (Menzies School of Health Research) *Risk factors, mechanisms, and treatment of knowlesi malaria*

**Dr Daniel Engelman** (Murdoch Childrens Research Institute) *Towards global control of scabies: advances in diagnosis, treatment and community control*

**Dr Lucia Romani** (University of New South Wales) *Optimising large-scale public health interventions to control Neglected Tropical Diseases*

**Dr David Khoury** (University of New South Wales) *Interdisciplinary insights into the rational design of malaria therapy and vaccines*

## NHMRC Early Career Fellowships (Overseas)

**Dr Brendan Elsworth** (University of Melbourne) *Plasmodium knowlesi as a genetic model for Plasmodium vivax drug resistance*

## NHMRC Research Fellowship

**Prof Tania de Koning-Ward** (Deakin University) *Interaction of malaria parasites with their host*

## NHMRC Practitioner

## Fellowships

**Prof Nicholas Anstey** (Menzies School of Health Research) *Pathophysiology and treatment of malaria in our region*

**Prof James McCarthy** (Queensland Institute of Medical Research) *Translational Studies in Malaria*

## NHMRC Research Fellowship and NHMRC Australia/European Union Collaborative Research Grant

Professor **Denise Doolan**, James Cook University – NHMRC Research Fellowship and NHMRC Australia/European Union Collaborative Research Grant  
Denise has been awarded a \$849,540 National Health and Medical Research Council (NHMRC) Principal Research Fellowship to pursue her malaria vaccine research, which also has potential implications for other infectious diseases. In addition Denise has also been awarded a NHMRC-European Union grant (\$488,914) to support one aspect of her research translation.

## ARC Grants

### ARC Discovery Grants

Professor **Brian Cooke**; **Dr Carlos Suarez**; Professor **John Ellis** *This project aims at gaining a deep understanding of the biology of Babesia parasites and how they cause tick fever in cattle. The project expects to discover novel parasite proteins involved in the development and persistence of tick fever and identify their functional role in infection. The main expected outcome is the discovery of parasite proteins that are critical for infection and pathogenesis of cattle tick fever. The findings will contribute to the development of future novel vaccines*

*to control tick fever, with significant economic benefits for the beef and dairy industries worldwide. Monash University \$620,056*

Associate **Professor Aaron Jex**; **Dr Khashayar Khoshmanesh**; **Dr Erich Schwarz**; Professor **Paul Sternberg**; Professor **Dr Frank Schroeder** *This project aims to show the role of chemo-sensation as an equally important target for worm control, and explore pathways to prevent infection. Parasitic worms cost global food/textile industry more than \$100 billion dollars per year, and cause disease in more than 1 billion people and domesticated animals world-wide. This project will use a combination of imaging, systems biology, chemical biology and microfluidic methods to provide significant benefits, such as exploring Ascaris chemo-sensation during larval migration, identify the key host queues and parasite genes regulating this process, and probe helminth chemosensation as a novel target for anti-parasitic treatments. The University of Melbourne*

Professor **Malcolm McConville**; **Dr Stuart Ralph**; **Dr Zoran Nikoloski**; **Dr Audrey John** *This project aims to investigate the origin and function of the large number of chemically undefined metabolites that occur in all cells. The project will utilise advanced analytical techniques, as well as computational and genetic approaches, to characterise the chemical structures of these metabolites and identify the enzymes involved in their synthesis and degradation. It will provide new information on the metabolic capacity of eukaryotic cells and allow the generation of more accurate models of metabolism. These outcomes have important biotechnology applications and will identify metabolic processes that underpin normal and disease states in animals and human cells. The University of Melbourne*

Associate Professor **Bayden Wood**; **Dr Philip Heraud**; Professor **Donald**

**McNaughton**; Professor **Anton Peleg**; Professor **Christian Doerig**; Professor **Royston Goodacre**; Dr **Darren Creek** *This project aims to investigate drug resistance in microbial agents. With the emergence of "super bugs" there is a need to understand the biochemistry of antimicrobial resistance. Combining vibrational spectroscopic approaches and metabolomic techniques, the project will investigate cell populations, single cells and subcellular structures in search of biomarkers for drug resistance. The discovery of such biomarkers could lead to improved disease management and eradication programs through identification and treatment of drug resistant pathogens in individuals that have the potential to re-infect the community.* Monash University

Associate Professor **Alexander Maier**; Professor **Christian Doerig**; Associate Professor **Andrew Tobin**; *This project aims to study the sexual development of apicomplexan parasites, which cause major diseases in humans, livestock and wildlife, including malaria. Only sexually differentiated cells can survive in the mosquito vector and hence this development is essential for the parasite's life-cycle. This project will employ a new approach that separates female from male parasites, thus enabling new information to be gleaned about the development of these parasites. The expected outcomes are an understanding of the mechanisms of sexual differentiation and a functional characterisation of novel sex-specific molecules. This will provide significant benefits, such as pivotal prerequisites for new approaches to parasite intervention.* The Australian National University;

Professor **Miles Davenport**; Dr **Deborah Cromer**; Dr **Ashraful Haque**; Dr **David Khoury**; Dr **Oliver Billker**; *This project aims to understand the molecular and cellular interactions between host and parasite, as well as providing a quantitative framework for analysing infection dynamics in other systems.*

*Infection involves a complex interaction between the host and the parasite, which is very dynamic and therefore difficult to study by traditional sampling and analysis approaches. This project has combined mathematical modelling with a novel experimental protocol to allow the study of kinetics of parasite replication in vivo. Expected outcomes will provide significant benefits, such as new avenues for vaccination and immune intervention* The University of New South Wales.

### ARC Linkage Infrastructure and Equipment Grant

Associate Professor **Rebecca Traub**; Dr **Anson Koehler**; Professor **Mark Stevenson**; Dr **Bettina Schunack**; Dr **Roland Schaper**; Dr **Rachel Lyons** *Chemo-prevention of tropical canine parasitoses and vector-borne diseases. This project will determine the prevalence and diversity of established, emerging and novel canine vector-borne agents and endoparasites in a tropical setting by using conventional and next generation molecular diagnostic tools. It will fill an important gap by providing independently-verified evidence on how well canine anti-parasitic products marketed in Australia and Asia by Bayer Animal Health, perform in high-infection pressure settings, as a chemo-preventative for these disease agents. Tropical regions spanning northern Australia and Southern Asia are highly conducive to a plethora of canine vector-borne and parasitic pathogens that cause significant morbidity and mortality in dogs. Many of these agents also pose a risk to public health. The outcomes will be directly translated to best-practice guidelines for the advancement of companion animal (and indirectly human) health and welfare.* The University of Melbourne, in partnership with Bayer Animal Health GMBH; Bayer Australia Ltd.

Professor **Leann Tilley**; Professor **Staffan Persson**; Professor **Melissa Little**; Dr

**Paul McMillan**; Dr **Alexander Combes**; Professor **Trevor Lithgow**; Dr **Thomas Naderer**; Professor **Michael Ryan**; Associate Professor **Helena Richardson**; Dr **Peter Lock**; Professor **Antoine van Oijen**; Professor **Sarah Russell**; Associate Professor **Marcus Heisler**; Associate Professor **Till Boecking**; Dr **Kirstin Elgass**; *This project aims to establish an adaptive optics, super-resolution optical microscopy facility to image cellular events with the highest possible spatial resolution, in a whole cell or tissue context. Sophisticated computer-controlled deformable mirrors will be used to correct the way light is distorted as it passes through specimens, thereby overcoming aberrations found in thick and complex samples. This adaptive optics system will enable researchers to study complex behaviour of biological specimens, at the optical resolution limit in plant and animal tissues, leading to basic biology and biotechnology outcomes in biofuels, biomaterials and biomedicines.* The University of Melbourne.

\*

Dr **Teresa Carvalho** and colleagues have been awarded a \$1M grant from the Centre for Invasive Species Solutions (CISS) to investigate the presence of virus and parasites in wild deer in Australia. This 4 year project, entitled "The role of wild deer in the transmission of diseases of livestock" is a collaboration between La Trobe University and the Arthur Rylah Institute, during which Teresa, Dr **Karla Helbig** (La Trobe) and Dr **Carlo Pacioni** (ARI) will co-supervise a PhD student

Congratulations to all grant winners.

**With best wishes for Christmas and the New Year**

**Nick and Lisa**

# ASP Network Researcher Exchange, Training and Travel Award Report

## PhD Student Michael Hammond visited the laboratory of Associate Professor Thomas Cribb at the University of Queensland

My research into the bucephalid trematodes of fish from the Great Barrier Reef has introduced me to many new techniques. Thanks to the Australian Society for Parasitology (ASP), I was able to visit the laboratory of Associate Professor Thomas Cribb at the University of Queensland. Over the course of the two weeks I spent in Tom's lab, I was

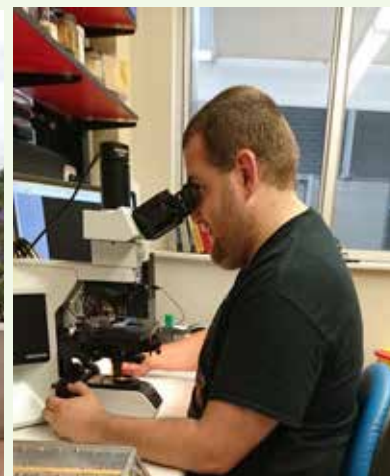
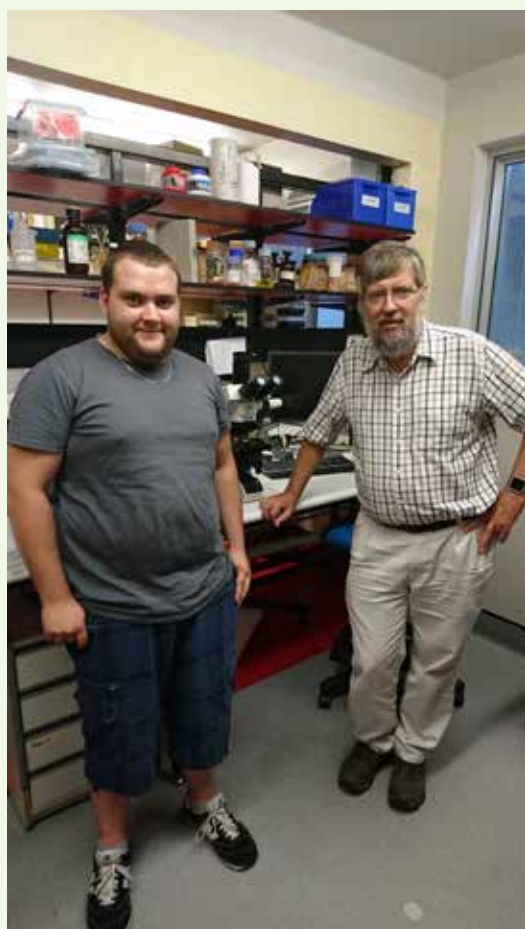
able to learn new techniques in staining and mounting trematodes for use in morphological analyses. I learnt how to undertake scientific drawings for the purposes of publication. I also received feedback on the use of molecular data in trematode systematics from Dr Scott Cutmore. Overall this trip has helped me to focus the direction of my PhD.

While in Brisbane, I also visited the Parasites: Life Undercover exhibit at the Queensland Museum, and enjoyed looking at the samples on display and learning about other parasites. I was glad to see

the public take such an interest in the world of parasites and there was plenty of discussion as I was walking through.

Overall, this trip was very positive for me. Spending time in a lab surrounded by other researchers working in a similar field has helped me to learn and hopefully become a better researcher. I enjoyed my time in Tom's lab and Brisbane was very accommodating. I thank the ASP for providing me the opportunity to partake in this exchange.

**Images by Michael Hammond**



# A CRE for Malaria Elimination in Asia Pacific

Australia will take a leadership role in the Asia Pacific region in a new initiative to help our nearest neighbours get rid of the scourge of malaria, in a new NHMRC \$2.5 million Centre for Research Excellence in Malaria Elimination based at the Peter Doherty Institute for Infection and Immunity.



The Centre will accelerate new drugs to treat malaria and train the next generation of experts in Australia and overseas.

The centre will bring together existing research groups across Australia and in Myanmar, Papua New Guinea, Malaysia, Indonesia and elsewhere, which are already providing high-level advice to the Bill and Melinda Gates Foundation, World Health Organisation, NIH and the Wellcome Trust.

The focus of the CRE is to develop new tools for surveillance, diagnosis and treatment of malaria and to apply advanced mathematical modelling and geospatial mapping approaches to development of tools to help Malaria Control Programs in the Asia Pacific in the battle to eliminate malaria.

University of Melbourne Professor Stephen Rogerson at the Doherty Institute – who will lead the centre and is one of 10 chief investigators – said priorities would include developing better tests and drugs, and understanding more about drug resistant parasites.

“A major challenge in malaria is that we don’t have good information about who has it, because the existing tests are cumbersome and expensive, so one priority is to develop simple, accurate tests that can be used in villages.”

“In South East Asia, our frontline antimalarial drugs are losing their effectiveness, with devastating

consequences for local people, especially children under five, travellers, and armed forces personnel.”

“This centre will bring together many of Australia’s leading malaria researchers, as well as industry partners such as CSIRO, and train up a new generation of experts here and overseas in disease elimination, whose skills will be transferable to other challenges, like HIV, TB, Zika virus and influenza.”

## Chief Investigators

Professor **Stephen Rogerson** (University of Melbourne | Doherty Institute & Department of Medicine), Professor **Ric Price** (Menzies School of Health Research, Darwin), Professor **Julie Simpson** (University of Melbourne School of Population and Global Health), Professor **Nick Anstey** (Menzies School of Health Research), Dr **James Beeson** (Burnet Institute | University of Melbourne), Professor **Archie Clements** (ANU), Associate Professor **Freya Fowkes** (Burnet Institute), Professor James McCarthy (QIMR Berghofer), Associate Professor **James McCaw** (University of Melbourne), Professor **Ivo Mueller** (WEHI)

## Associate Investigators

Associate Professor **Alyssa Barry** (WEHI), **Jeanne Poespoprodjo** (Timika Research Facility, Indonesia), **Jonathan (Jack) Richards** (Burnet Institute), **Leann Tilley**

(University of Melbourne | Bio21), **Leanne Robinson** (WEHI | Burnet | Papua New Guinea Institute of Medical Research), **Moses Laman** (PNG Institute of Medical Research), Dr **Sarah Auburn** (Menzies School of Health Research), Dr **Timothy William** (Queen Elizabeth Hospital, Kota Kinabalu, Malaysia), Dr **Zaw Lin** (Myanmar Department of Public Health, Myanmar)

Story source: <https://www.doherty.edu.au/news-events/news/new-australian-led-malaria-research-powerhouse-gears-up-to-hunt-down-malari>

# Protective proteins for malaria vaccines

Camila T. França from Ivo Mueller's lab at WEHI and collaborators have a new publication in eLife, "Identification of highly-protective combinations of *Plasmodium vivax* recombinant proteins for vaccine development." Camilla has supplied the following reader's digest of the paper.

Malaria, an infectious disease caused by *Plasmodium spp.* parasites, remains a leading cause of morbidity and mortality worldwide. An increase in political commitment and funding over the last 2 decades has given populations at-risk unprecedented access to prevention, diagnostics and treatment, leading to a dramatic decrease in malaria incidence and mortality rates across the world.

For several countries, these reductions in the malaria burden have raised the prospect of elimination, and 35 countries (incl the entire Asia-Pacific region) have now committed to eliminate this disease by the year of 2030. Although numerous countries have managed to eliminate malaria throughout history, it is increasingly recognized that the currently existing malaria control tools will not be sufficient to achieve elimination within the proposed

timeframe in countries situated in its tropical heartland and those with a high burden of *P. vivax*.

The need for a highly efficacious malaria vaccine has, therefore, become paramount - particularly in the era of emerging drug and insecticide resistance. For a non-cultural pathogen like *P. vivax*, a better understanding of the acquisition of immunity in naturally-exposed populations is essential for the identification and prioritization of targets for further functional characterization as potential vaccine candidates.

To address this gap, França and collaborators investigated naturally-acquired humoral immune responses to several known and novel *P. vivax* proteins in samples from a well-designed longitudinal cohort study conducted with 1-3 years old Papua New Guinean children.

The association between the presence and levels of antibodies to individual, as well as combinations of proteins and the risk of having clinical malaria episodes was investigated using mathematical modelling.

The authors found that antibodies to several unknown or poorly studied proteins were associated with a strong reduction on the children's risk of having clinical episodes. Several of these antigens showed strong protective associations at very low levels of antibodies. The protective effect

was higher for any protein combination than to any of the individual components alone, and optimal combinations of five-antigens associated with >90% protection were identified.

With this ambitious study, França and collaborators identified several new targets that should now be prioritized for further functional testing, and demonstrated that synergistic or additive effect of combinations of antibody response to *P. vivax* antigens should be the next approach towards development of a highly efficacious multicomponent *P. vivax* vaccine.

"Identification of highly-protective combinations of *Plasmodium vivax* recombinant proteins for vaccine development", Camila Tenorio França, Michael T White, Wen-Qiang He, Jessica B Hostetler, Jessica Brewster, Gabriel Frato, Indu Malhotra, Jakub Gruszczyk, Christele Huon Enmoore Lin, Benson Kiniboro, Anjali Yadava, Peter Siba, Mary R Galinski, Julie Healer, Chetan Chitnis, Alan F Cowman, Eizo Takashima, Takafumi Tsuboi, Wai-Hong Tham, Rick M Fairhurst, Julian C Rayner, Christopher L King, Ivo Mueller, eLife 2017;6:e28673 <https://elifesciences.org/articles/28673> DOI: 10.7554/eLife.28673

## Image credits:

Left: WEHI, Right: Ivo Mueller



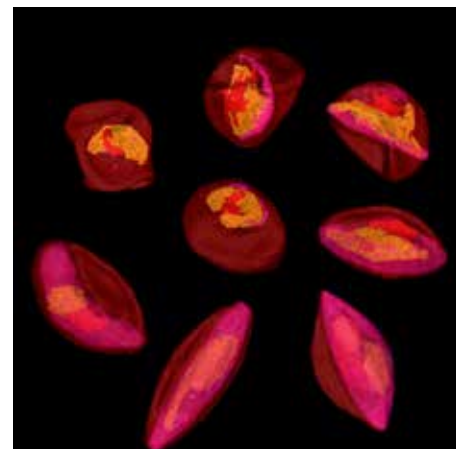
# Why do Parasites go bananas before sex?

The sexual stages of the human malaria parasite *Plasmodium falciparum* form a unique banana shape which is essential for parasites transmission from human host to human host.

In a recent work led by Dr Matthew Dixon and colleagues from the Department of Biochemistry and Molecular biology and published in PLoS Pathogens, his team has discovered how this banana shaped cell is formed. In this work, they use a 3D Electron Microscopy technique called Serial Block Face Scanning Electron Microscopy, in a combination with super-resolution optical microscopy, to elucidate the genesis and expansion of the molecular structures that drive gametocyte elongation. They used protein interaction profiling to identify

some of the proteins that help drive the shape change and employed inducible gene knockdown strategies to show that these proteins play essential roles in remodelling membranes that are essential for gametocyte elongation. This work points to potential targets for the development of transmission-blocking therapies.

Disrupting assembly of the inner membrane complex blocks *Plasmodium falciparum* sexual stage development. Molly Parkyn Schneider, Boyin Liu, et al. PLOS Pathogens: published October 6, 2017, <https://doi.org/10.1371/journal.ppat.1006659>.



**This dramatic metamorphosis is highlighted in these 3D rendered images from Serial Block Face Scanning Electron Microscopy (SBF-SEM). The formation of a membrane structure called the inner membrane complex (magenta) which drives the gametocyte elongation process. The nucleus (yellow), mitochondria (red) and red blood cell (dark red) are also rendered. Image Credit: Boyin Liu and Matthew Dixon, Department of Biochemistry and Molecular Biology, Bio21 Institute, University of Melbourne.**

## Awards

Abdul Jabbar was recently awarded the Peter Nansen Young Scientist Award at the WAAVP conference in Malaysia.

This award has been set up to honour and perpetuate the memory of Professor Peter Nansen for his outstanding contributions to veterinary parasitology and, in particular, his great concern for and the encouragement of young, promising scientists in this field.

More information about the award can be found at: <http://www.waavp.org/page/Peter+Nansen+Young+Scientist+Award/24/#.WclfZ8ig-Uk>



Kiaran Kirk has been elected Fellow of the Australian Academy of Health and Medical Sciences

Professor Kiaran Kirk of The Australian National University (ANU) has been elected as Fellow to the Australian Academy of Health and Medical Sciences for his outstanding leadership and contributions to the field in Australia. He was officially inducted to the Academy on Thursday 19 October 2017 during the Academy's third Annual Scientific Meeting in Adelaide.

Kiaran Kirk is Dean of the ANU College of Science and his primary research interest is in the biology of the malaria parasite, with a particular focus on antimalarial drugs.

His work has had significant impact in relation to the assessment of new potential antimalarial drugs, to ensure that there is not overinvestment in compounds sharing the same molecular target.



Professor Ian Frazer, President of the Academy, congratulated the new Fellows.

"Health and medical research undertaken by the new Fellows of the Academy, and enabled by government and philanthropic funding, will help to ensure quality and equitable health care as we enter the age of precision medicine," he said.

## Malaria in Melbourne 2017

On October 27th and 28th more than 170 scientists attended the 2017 Malaria in Melbourne (MiM) conference at the Peter Doherty Institute in Parkville, Victoria.

Malaria in Melbourne is now a well-established, continuously growing, biennial meeting that brings together the malaria research community in Melbourne and Australia, providing excellent networking opportunities and exciting updates on recent developments in the field.

MiM 2017 included a diverse range of participants from 48 different labs, representing 26 different institutions. The conference saw a broad representation of the Australian malaria research community, with 28 attendees travelling from interstate and 2 coming from overseas.

The program featured 35 talks and more than 50 posters presented by post graduate students and early career researchers. The seven oral presentation sessions covered topics including basic parasite biology, immunology, epidemiology, metabolomics, drug development and mathematical modelling. Fourteen poster presenters were also chosen to give short, 3-minute talks. Overall, the speakers represented 29 of the labs in attendance at the meeting and covered almost every aspect of malaria research.

For the first time in its history MiM also

featured an invited keynote speaker from overseas. With the support of a Georgina Sweet Award for Women, Professor Jean Langhorne from the Francis Crick Institute, London attended the conference and gave a very well received plenary lecture on the latest work on parasite gene families involved in the establishment of chronic Plasmodium infection. Prof. Langhorne additionally provided valuable insights into what key elements influenced her success, during an early morning Career Development Workshop, which was well attended and featured a lively discussion with the attendees.

One of the key strategies of MiM is the focus on postgraduates and early career researchers. The conference aims to foster their integration into the malaria research community, thus strengthening Melbourne's position as the largest and most vibrant malaria research hub in the world.

The ASP sponsored the session on host-parasite interactions and transmission. This session included speakers from Queensland, NSW and Victorian labs and featured the best student talk prize winner, Hayley Buchanan.

All prize winners were:

Kit Kennedy (Ralph laboratory): best oral presentation, overall

Vashti Irani (Richards laboratory): best oral presentation, postdoc

Natalie Spillman (Tilley laboratory) and Louise Randall (Rogerson laboratory): best poster presentation, postdoc (co-winners)

Hayley Buchanan (McFadden laboratory): best oral presentation, student

Thorey Jonsdottir (Gilson laboratory): best poster presentation, student



The next Malaria in Melbourne conference will take place in late 2019. Come join us in Melbourne for an exiting and vibrant malaria conference.

### Organizing committee

Chairs: Daniel Fernández-Ruiz, Dean Goodman

Committee: Elizabeth Aitken, Simon Cobbold, Jakub Gruszczyk, Herbert Opi, Ghizal Siddiqui, Simona John von Freyend



**Left: Young investigators discussing career development questions with Prof. Jean Langhorne (Francis-Crick Institute, London) and chair Dr. Ghizal Siddiqui (MIPS). Photo credit Prof. Brian Cooke.**

**Above: PhD student Kit Kennedy (Ralph lab) won best overall talk and received a guaranteed oral presentation at the upcoming World Malaria Congress in Melbourne**

## TTP9: Tick and Tick-borne Pathogens

Ala Tabor of UQ describes the 9th Tick and Tick-borne Pathogen Conference, of which she was Chair.

The 9th Tick & Tick-borne Pathogen Conference was held in conjunction with the 1st Asia Pacific Rickettsia Conference in Cairns last August Chaired by Prof Tabor and convened by A/Prof Manuel Rodriguez Valle (now University of Melbourne) of the University of Queensland.

We had approximately 240 delegates representing ~30 countries. The conference hosted 9 plenaries including notable parasitologists in the field of ticks and tick borne diseases: Prof Peter Irwin (Murdoch Uni), Prof Stephen Barker (UQ), Prof Cate Hill (Purdue University), Prof Pat Nuttall (Oxford University), Dr Carlos Suarez (USDA), Prof Ulrike Munderloh (University of Minnesota) and a TTP Career award for Prof Jose de la Fuente (University of



Castilla-La Mancha, Spain). The conference theme was 'One Health' with a mix of medical, veterinary, and wildlife researchers ranging across epidemiology, genomics, diagnostics, immunology, taxonomy, evolution, and vaccinology with a further 130 oral presentations and 130 posters.

The Welcome reception had some surprises with animal carers bringing a snake, a baby crocodile and a koala around for selfies with delegates. The conference field trip

included a charter boat to the reef where several delegates took the opportunity to snorkel and some to scuba dive for the first time!

Four countries bid for TTP10 in 2020 which was won by Romania! The conference was a great success and we thank the Australian Society for Parasitology for their support of this event.

**Below: a TTP9 collage**



## David Piedrafita and the WFP

**David Piedrafita is Associate Dean for Research at Federation University in Victoria and Secretary of the World Federation of Parasitologists.**

David Piedrafita is Associate Dean for Research at Federation University in Victoria. David's research interests span immunology and infection; vaccine development and performance; diagnostic development and genetic control of disease resistance. At Federation University, David works on national and international research programs (including Nepal, Thailand, Indonesia, Africa and Spain) and is head of the Parasitology unit.

Self-described as "a scientist working on worm parasites which infect both humans and grazing ruminants, particularly in Asia and Africa" David said, "these parasites result in human death and, enormous economic loss to the agricultural sector including subsistence farmers; and negatively impacts efficient food production in developing countries. My research is centred on understanding disease susceptibility to enable the design of better vaccines or drugs to prevent and treat disease."

Current projects include collaboration with Universities in China to understand water buffalo health problems. Buffalo health is paramount since these important animals are highly valued and used in many ways; to transport loads, to draw ploughs and other machinery as well as providing meat and milk.

David is also collaborating with wildlife

conservation researcher Associate Professor Wendy Wright, also based at Federation University, and Nepal's National Trust for Nature Conservation (NTNC) to keep wild animal populations including elephants, tigers and rhinoceros, free of parasite disease. Wildlife tourism is essential to Nepal and many farming communities located adjacent to Nepal's key national parks supplement their livelihoods by hosting and guiding international visitors. Healthy wildlife populations are also

such terrible outcomes for the animals. Now the students educate the farmers; these new graduates make an impact on the research by implementing and providing the solution.

In these projects, David and his team prioritise research training for local people. The aim is to provide opportunities for local people from resource-poor countries to explore, apply and contribute to the development of the latest science

in parasitology. David says, "Because a lot of opportunities bypass those countries that don't have the resources that we are lucky to have; the infrastructure and opportunities are limited. By training scientists who have all of the potential and little opportunity in these resource-poor countries, we are building local capacity. The scientists themselves can then identify problems and work out the best way to approach and ultimately solve them. These programs build confidence in researchers and they become part of an international network".

The programs are true partnerships with funding from overseas government and non-government agencies, and from Australian sources. Much of the wildlife work is funded by philanthropic organizations and from crowdfunding.

David describes the approach to the programs, "It works because of the strong links between Universities, Government and non-government agencies and charities in both countries and because of an investment

in trust-building with our partners. For example, we run an exchange program where some students and visiting Fellows come to Australia for training and students from Australia travel overseas to work. Australian students are ecologists,



essential to reduce the risk of disease transfer to domestic stock. In Sudan, David delivered an education program about liver fluke, providing students with the knowledge necessary to change habits and to stop this debilitating disease, which has

## David Piedrafita and the WFP continued

veterinarians and biologists; they all have an appreciation for the research and for the ethos of the project. The student exchanges are essential to build trust between collaborators, helping them to identify problems and possible solutions. Working in the field with communities, students try to solve problems using ideas for basic parasitology health that are easy to implement. These include low-cost vaccines and simple diagnostics. The students are so keen to learn, as well as the skills and knowledge they get a different way of thinking - they become global citizens".

David believes that we need to have mutual respect working with resource-poor countries; he says, "The only way to make an impact is through learning and getting benefit both ways".

Early in his career David started working with collaborators in Asia, studying resistance to disease in indigenous breeds from resource-poor countries where animals have adapted to disease without drugs. "Understanding the culture of the people who owned the animals that have adapted makes quite a difference, not just for the science but also for the education," says David. Being passionate about education David found that the scientists and students he worked with through these programs craved knowledge and this helped build successful collaborations.

David has a long history of giving service to the Australian Society for Parasitology; as a student member David was an ASP Council member in 1995; ASP President in 2006 and ASP Executive Secretary from 2014 – 2015. In 2006 David lead the team successful for securing a bid for the ASP to host the International Congress for Parasitology (ICOPA) held in Melbourne in 2010 and he was Co-chair of the congress,

which attracted 1,700 delegates from around the world. David has been the Executive Secretary of the World Federation of Parasitologists since 2014.

David says he views the World Federation of Parasitologists (WFP) as the central pillar, "The WFP is a global representation of all societies, so that societies that can share knowledge. For example, when laboratory groups from different Asian countries

interact, then Asia pacific priorities take place and their own networks build up and take off. Asia are really interested and focused on science that makes a difference".

The World Federation of Parasitologists was founded in Warsaw, Poland in 1960. The Federation promotes and co-ordinates the exchange of knowledge, research and other activities relating to parasitology. Members of WFP consist of scientific organizations concerned with parasitism, mainly national societies related to parasitology or tropical medicine. WFP has an Executive

representing all major countries and ICOPA represents parasitology in the global economy and in the world's health.

The International Congress of Parasitology (ICOPA) takes place every 4 years. The next ICOPA, number XIV, will be held in Daegu, South Korea, August 19-23, 2018. Visit the ICOPA XIV website <http://icopa2018.org/>

ASP is the host of the newly designed WFP site

<http://www.wfpnet.org>

WFP wants to ensure its website is relevant and engaging for its global community and they are looking for input from members on how best to highlight the parasitology research across the globe. Please give your feedback to the president of your parasitology society.

WFP launched a new journal with Elsevier to promote parasitology research. The journal should also generate income to run initiatives.

Parasitology is so important in health; having a world body like WFP representing so many different diseases can make a difference and the combined efforts of parasitology research across the globe will lead to practical outcomes for countries, especially those affected economically by parasites.

The International Journal "Parasite Epidemiology and Control" is published by Elsevier on behalf of the WFP. Professor Marcel Tanner is the editor in chief and Dale Seaton is Elsevier's representative. Submissions have been strong and all information on the journal is available at:

<http://www.journals.elsevier.com/parasite-epidemiology-and-control>

**Image of David Piedrafita courtesy of Monash University. <https://www.flickr.com/photos/50357943@N08/8227960487>**



## IJP

INTERNATIONAL JOURNAL FOR PARASITOLOGY

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

**Editor In Chief: Brian Cooke**

**Facebook:** [www.facebook.com/IJPara](http://www.facebook.com/IJPara)

**Twitter:** @IJPara

**Instagram:** ijpara

## 2017 highlights

The IJP 2016 impact factor continues to hold us in good stead as one of the top-ranked discipline-specific non-review only journals in Parasitology (IJP: 3.73 © Clarivate Analytics Journal Citation Reports 2017) and 4.17 CiteScore © Scopus 2017).

The IJP has continued to prosper under Brian's leadership and the IJP team is looking forward to what lies ahead over the next few years.

Some other highlights from 2017 include:

- IJP continued post to social media accounts, featuring issue contents and 'stories behind the cover' as well as photos from meetings and events supported by IJP and Elsevier. The IJP Facebook page has 2008 followers ([www.facebook.com/IJPara](http://www.facebook.com/IJPara)), the IJP Twitter account has 155 followers (@IJPara) and IJP has 57 followers to date on Instagram (ijpara). Look for the green on black IJP logo (the 'real' IJP page).



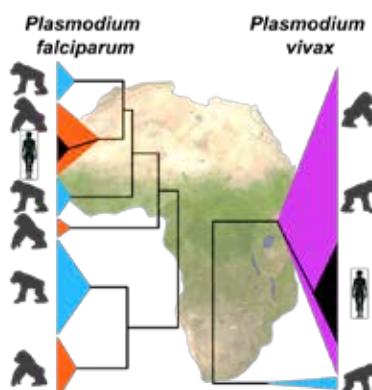
We feature a 'story behind the cover' for each IJP issue, so if you have a paper accepted for publication, see what you can do to create an amazing cover image and submit it to us for consideration. If your submitted image

is selected for the journal cover it, and your article, will be promoted on Facebook, Twitter and Instagram.

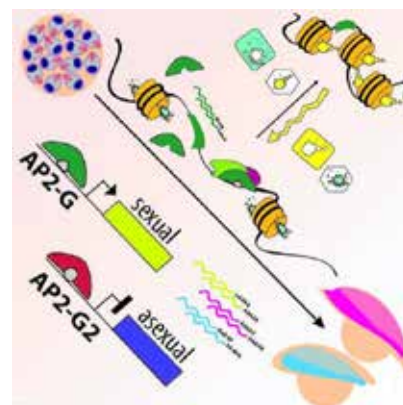
- Together with Dale Seaton of Elsevier, Brian developed a talk, tailored to early-career researchers, based around the Elsevier Publishing Campus on 'how to publish your papers'. Brian and Dale first presented the talk at a very successful ECR breakfast at the joint NZSP+ASP conference in Auckland, then again at MAM2016 in Lorne,, at the ASP parasitology course in Kiola, and at many other meetings. Please let Brian know if you would like him to give this presentation to your institution!

Elsevier now show PlumX Metrics data (captures, mentions, social media, citations) for IJP papers on the journal homepage.

- Dorothy Loy and colleagues have generated the highest level of social media activity with their MAM Special Issue review paper on the origins and evolution of the human malaria parasites *Plasmodium falciparum* and *Plasmodium vivax* (47:2/3, 87-97), with 224 shares, likes, comments and tweets to date.



- Dafni Bechtsi and Andy Waters follow closely with their SingMalNet Special Issue review paper on genomics and epigenetics of sexual commitment in *Plasmodium* (47:7, 425-434), with 221 shares, likes, comments and tweets to date.



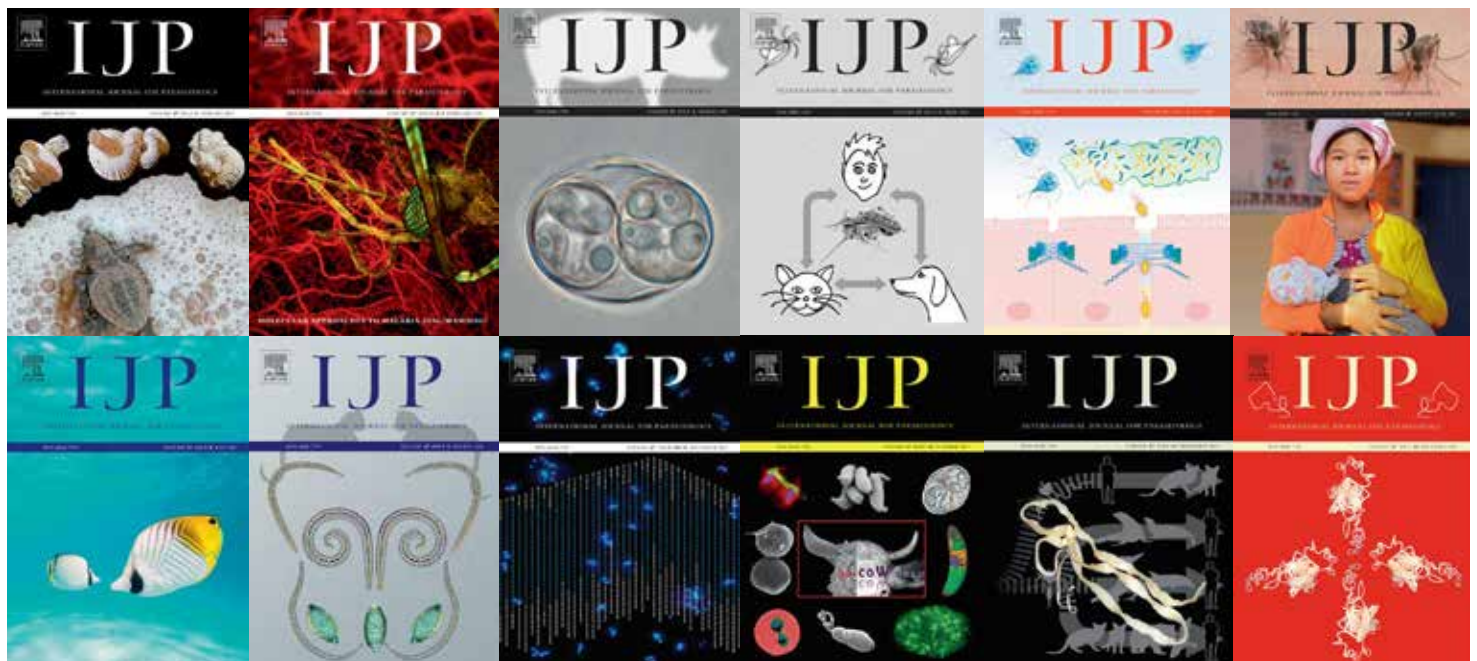
We published three significant Special Issues in 2017; Molecular Approaches to Malaria, featuring highlights from the latest, and increasingly successful MAM Conferences (Lorne, Australia);

ApiCOWplexa 2017, featuring highlights from the 4th International Meeting on Apicomplexan Parasites in Farm Animals (Madrid, Spain); and SingMalNet 2016, featuring highlights from the Singapore Malaria Network Meeting (Singapore). The SingMalNet issue was appropriately bound in hard-copy with a portrait of a young woman and her baby in Mae Sot, Thailand taken by the Singaporean-based photographer, Ms. Pearl Gan, as part of a highly innovative, internationally-supported 'Asia Malaria Images' project that aims to capture and highlight the immense, but relatively invisible burden of malaria in the Asia-Pacific Region.

The Editors are working hard on more Special Issues to look forward to in 2018. Keep your eyes peeled for what is to come!

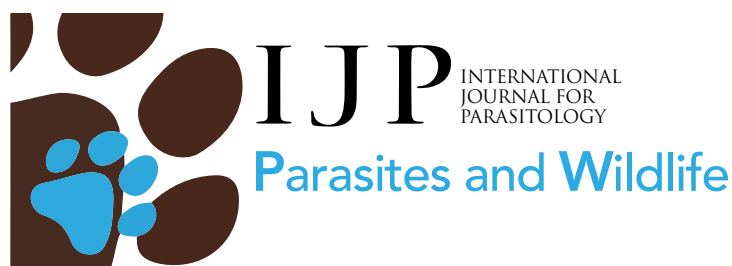
As usual, 2017 has been a busy year for the IJP. We are grateful to our valued Editorial Board members, reviewers and authors who continue to maintain the high quality and reputation of the IJP.

We hope that you all enjoy a well-earned rest over the holiday season and look forward to working with you again in 2018 and beyond.



**Season's Greetings from IJP.  
Wishing you a happy and successful  
2018.**

**Brian, Alex, Jan and Maria**



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

**Editors: R.C. Andrew Thompson, Susan Kutz**

**Facebook: [www.facebook.com/IJPPAW/](https://www.facebook.com/IJPPAW/)**

*IJP-PAW* has a Facebook page, please check it out and like us and some of our articles so we can promote the journal and all of the wonderful research published through *IJP-PAW*

IJP: PAW Editors In Chief Andrew Thompson & Susan Kutz (Editor from April 2018) would like to wish everyone a very Happy Christmas and very best wishes for the New Year. We hope that 2018 brings happiness and success in your research.

### 3rd International Congress on Parasites of wildlife

The Congress was held in a superb location, Skukuza, one of the oldest camps in the Kruger National Park, from 24-27th September, 2017. It was the third in

this series of meetings, all hosted by the Parasitological Society of Southern Africa (PARSA). The first was held in 1991, and the second in 2014 at which it was decided that it would be a triannual event.

Around 180 delegates attended from 23 countries (which included a sizeable contingent from Australia) with the majority of presentations oral contributions. An excellent, diverse scientific programme was offered covering all aspects of parasites in aquatic systems, ecology of terrestrial parasites, evolutionary biology, parasite-host relationships, zoonoses and one health. Given the number of delegates, venue and social programme, there were excellent opportunities for getting together with friends and colleagues.

Of course, a major attraction of having the meeting in Kruger is the opportunity to see a fantastic diversity of wildlife – either early morning before conference sessions or in the late afternoon and evening. Just brilliant! A selection of images of the amazing wildlife, taken by Andrew and Holly Thompson, are shown on a following page.

### Recent papers

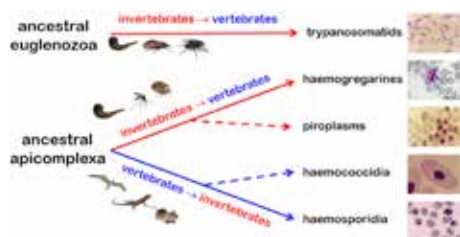
The following articles were recently published by ASP members in *IJP:DDR*

Peter O'Donoghue, *Haemoprotozoa: Making biological sense of molecular phylogenies*, In *International Journal for Parasitology: Parasites and Wildlife*, Volume 6, Issue 3, 2017, Pages 241-256, ISSN 2213-2244, <https://doi.org/10.1016/j.ijppaw.2017.08.007>. (<http://www.sciencedirect.com/science/article/pii/S221322441730069X>)

**Abstract:** A range of protistan parasites occur in the blood of vertebrates and are transmitted by haematophagous invertebrate vectors. Some 48 genera are recognized in blood primarily on the basis of parasite morphology and host specificity; including extracellular kinetoplastids (trypanosomatids) and intracellular apicomplexa (haemogregarines, haemococcidia, haemsporidia and piroplasms). Gene sequences are available for a growing number of species and molecular phylogenies often link parasite and host or vector evolution. This review endeavours to reconcile molecular clades with biological characters. Four major trypanosomatid clades have been associated with site of development in the vector: salivarian or stercorarian for *Trypanosoma*, and supra- or peri-pyloric for *Leishmania*. Four haemogregarine clades have been associated with acarine vectors (*Hepatozoon* A and B, *Karyolysus*, *Hemolivia*) and another two with leeches (*Dactylosoma*, *Haemogregarina sensu stricto*). Two haemococcidian clades (*Lankesterella*, *Schellackia*) using leeches and mosquitoes (as paratenic hosts!) were paraphyletic with monoxenous enteric coccidia. Two major haemsporidian clades have been associated with mosquito vectors (*Plasmodium* from mammals, *Plasmodium* from birds and lizards), two with midges (*Hepatocystis* from bats, *Parahaemoproteus* from birds) and two with louse-flies and black-flies (*Haemoproreus* and *Leucocytozoon* from



birds). Three major piroplasm clades were recognized: one associated with transovarian transmission in ticks (*Babesia sensu stricto*); one with pre-erythrocytic schizogony in vertebrates (*Theileria/Cytauxzoon*); and one with neither (*Babesia sensu lato*). Broad comparative studies with allied groups suggest that trypanosomatids and haemogregarines evolved first in aquatic and then terrestrial environments, as evidenced by extant lineages in invertebrates and their radiation in vertebrates. In contrast, haemosporidia and haemococcidia are thought to have evolved first in vertebrates from proto-coccidia and then incorporated invertebrate vectors. Piroplasms are thought to have evolved in ticks and diversified into mammals. More molecular studies are required on more parasite taxa to refine current thought, but ultimately transmission studies are mandated to determine the vectors for many haemoprotozoa.



Shokoofeh Shamsi, Kate McSpadden, Sara Baker, David J. Jenkins, Occurrence of tongue worm, *Linguatula cf. serrata* (Pentastomida: Linguatulidae) in wild canids and livestock in south-eastern Australia, In International Journal for Parasitology: Parasites and Wildlife, Volume 6, Issue 3, 2017, Pages 271-277, ISSN 2213-2244, <https://doi.org/10.1016/j.ijppaw.2017.08.008>. (<http://www.sciencedirect.com/science/article/pii/S2213224416300475>)



**Abstract:** Pentastomids are obligate zoonotic arthropod parasites utilising canids and vulpids as their definitive hosts and several herbivorous species as their intermediate hosts. Reported only 10 times in Australia over the last 150 years as incidental findings, adult Pentastomids referred to as *Linguatula serrata* have been encountered in nasal cavities of domestic and wild dogs, and foxes. Nymphs have been reported in cattle and rabbits. In the present study, a number of potential definitive hosts, including red foxes (*Vulpes vulpes*), wild dogs (*Canis lupus dingo* and *C. l. dingo* x *C. familiaris*) and feral cats (*Felis catus*), and intermediate hosts cattle (*Bos taurus*), sheep (*Ovis aries*), feral pigs (*Sus scrofa*), rabbits (*Oryctolagus cuniculus*), goats (*Capra hircus*) and a European hare (*Lepus europaeus*), from the highlands of south-eastern Australia were examined. Of the animals examined 67.6% of wild dogs ( $n = 37$ ), 14.5% of red foxes ( $n = 55$ ) and 4.3% of cattle ( $n = 164$ ) were found to be infected with Pentastomids, herein identified as *Linguatula cf. serrata*. The common occurrence of the parasite in wild dogs and less frequently in foxes suggests these wild canids have potential to act as a reservoir for infection of livestock, wildlife, domestic dogs and possibly humans. The unexpected high frequency of the parasite in wild dogs and foxes in south-eastern Australia suggests the parasite is more common than previously realised. Of the potential intermediate hosts in the region, only 4.3% of cattle were found to be infected with pentastomid nymphs which suggest the search for the host(s) acting as the main intermediate host in the region should continue. Future studies should investigate transmission patterns, health impacts on hosts and whether the parasite has zoonotic significance in Australia.

**Right: Professor C. Michael Bull**

**Left and previous page: images from the 3rd International Congress on Parasites of wildlife**



Stephanie S. Godfrey, Michael G. Gardner, Lizards, ticks and contributions to Australian parasitology: C. Michael Bull (1947–2016), In International Journal for Parasitology: Parasites and Wildlife, Volume 6, Issue 3, 2017, Pages 295-298, ISSN 2213-2244, <https://doi.org/10.1016/j.ijppaw.2017.08.010>. (<http://www.sciencedirect.com/science/article/pii/S2213224417300998>)

**Abstract:** Professor C. Michael Bull was a great scientist and mentor, and an Associate Editor of this journal. While his research career spanned the fields of behavioural ecology, conservation biology and herpetology, in this article, we pay tribute to his major contribution to Australian parasitology. Mike authored more than eighty articles on host-parasite ecology, and revealed major insights into the biology and ecology of ticks from his long term study of the parapatric boundary of two tick species (*Amblyomma limbatum* and *Bothriocroton hydrosauri*) on the sleepy lizard (*Tiliqua rugosa*). In this article, we provide an overview of how this research journey developed to become one of the longest-running studies of lizards and their ticks, totalling 35 years of continuous surveys of ticks on lizards, and the insights and knowledge that he generated along that journey.



*IJP:PAW* continued



**Photographs by Andrew and Holly Thompson.  
Kruger National Park, September, 2017**





**IJP** INTERNATIONAL  
JOURNAL FOR  
PARASITOLOGY

## Drugs and Drug Resistance

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

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IJP-DDR has a Facebook page, please check it out and like us and some of our articles so we can promote the journal and all of the wonderful research published through IJP-DDR

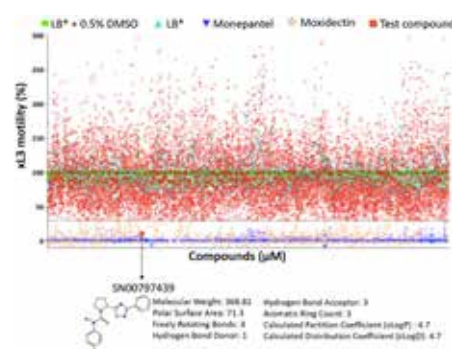
IJP: DDR Editors In Chief Andrew Kotze & Kevin Saliba would like to wish everyone a very Happy Christmas and very best wishes for the New Year. We hope that 2018 brings happiness and success in your research.

The following articles were recently published by ASP members in IJP:DDR

Sarah Preston, Yaqing Jiao, Jonathan B. Baell, Jennifer Keiser, Simon Crawford, Anson V. Koehler, Tao Wang, Moana M. Simpson, Ray M. Kaplan, Karla J. Cowley, Kaylene J. Simpson, Andreas Hofmann, Abdul Jabbar, Robin B. Gasser, Screening of the 'Open Scaffolds' collection from *Compounds Australia* identifies a new chemical entity with anthelmintic activities against different developmental stages of the barber's pole worm and other parasitic nematodes, In International Journal for Parasitology: Drugs and Drug Resistance, Volume 7, Issue 3, 2017, Pages 286-294, ISSN 2211-3207, <https://doi.org/10.1016/j.ijpddr.2017.05.004>. (<http://www.sciencedirect.com/science/article/pii/S2211320717300398>)

**Abstract:** The discovery and development of novel anthelmintic classes is essential to sustain the control of socioeconomically important parasitic worms of humans and animals. With the aim of offering novel, lead-like scaffolds for drug discovery, *Compounds Australia* released the 'Open Scaffolds' collection containing 33,999 compounds, with extensive information available on the physicochemical properties of these chemicals. In the present study, we screened 14,464 prioritised compounds from the 'Open Scaffolds' collection against the exsheathed third-stage larvae (xL3s) of *Haemonchus contortus* using recently developed whole-organism screening assays. We identified a hit compound, called SN00797439, which was shown to reproducibly reduce xL3 motility by  $\geq 70\%$ ; this compound induced a characteristic, "coiled" xL3 phenotype ( $IC_{50} = 3.46\text{--}5.93\text{ }\mu\text{M}$ ), inhibited motility of fourth-stage larvae (L4s;  $IC_{50} = 0.31\text{--}12.5\text{ }\mu\text{M}$ ) and caused considerable cuticular damage to L4s in vitro. When tested on other parasitic nematodes in vitro, SN00797439 was shown to inhibit ( $IC_{50} = 3\text{--}50\text{ }\mu\text{M}$ ) adults of *Ancylostoma ceylanicum* (hookworm) and first-stage larvae of *Trichuris muris* (whipworm) and eventually kill ( $>90\%$ ) these stages. Furthermore, this compound completely inhibited the motility of female and male adults of *Brugia malayi* ( $50\text{--}100\text{ }\mu\text{M}$ ) as well as microfilariae of both *B. malayi* and *Dirofilaria immitis* (heartworm). Overall, these results show that SN00797439 acts against genetically (evolutionarily) distant parasitic nematodes i.e. *H. contortus* and *A. ceylanicum* [strongyloids] vs. *B. malayi* and *D. immitis* [filaroids] vs. *T. muris* [enoplid], and, thus, might offer a novel, lead-like scaffold for the development of a relatively broad-spectrum anthelmintic. Our future work will focus on assessing the activity of SN00797439 against other pathogens that cause neglected tropical diseases, optimising analogs with improved biological

activities and characterising their targets.



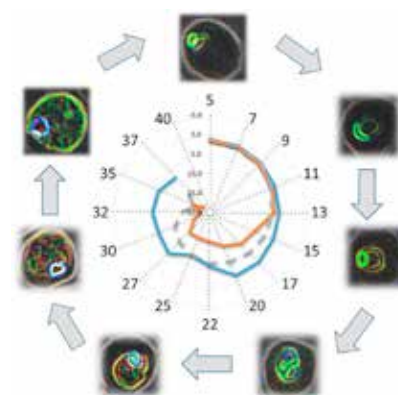
Sandra Duffy, Vicky M. Avery, *Plasmodium falciparum* in vitro continuous culture conditions: A comparison of parasite susceptibility and tolerance to anti-malarial drugs throughout the asexual intra-erythrocytic life cycle, In International Journal for Parasitology: Drugs and Drug Resistance, Volume 7, Issue 3, 2017, Pages 295-302, ISSN 2211-3207, <https://doi.org/10.1016/j.ijpddr.2017.07.001>. (<http://www.sciencedirect.com/science/article/pii/S2211320717300271>)

**Abstract:** The continuous culture of *Plasmodium falciparum* is often seen as a means to an end, that end being to probe the biology of the parasite in question, and ultimately for many in the malaria drug discovery arena, to identify means of killing the parasite in order to treat malaria. In vitro continuous culture of *Plasmodium falciparum* is a fundamental requirement when undertaking malaria research where the primary objectives utilise viable parasites of a desired lifecycle stage. This investigation, and resulting data, compared the impact culturing *Plasmodium falciparum* long term (4 months) in different environmental conditions had on experimental outcomes and thus conclusions. The example presented here focused specifically on the effect culture conditions had on the in

## IJP:DDR continued

vitro tolerance of *Plasmodium falciparum* to standard anti-malarial drugs, including artemisinin and lumefantrine. Historical data from an independent experiment for 3D7-ALB (5% O<sub>2</sub>) was also compared with that obtained from this study. We concluded that parasites cultured for several months in media supplemented with a serum substitute such as Albumax II® or within hyperoxic conditions (21% O<sub>2</sub>), demonstrate highly variable responses to artemisinin and lumefantrine but not

all anti-malarial drugs, when compared to those cultured in human serum in combination with Albumax II® under normoxic conditions (5% O<sub>2</sub>) for the parasite.



## Member access to IJP

Elsevier have supplied the following instructions to ASP members, explaining how to access IJP online.

To access IJP please use your activation code for one-time activation.

Go to: <https://www.sciencedirect.com/science/activate/ijpara>

Please do not bookmark this link. It is only for one-time activation

1. Enter your activation code

After activation, your membership needs to be associated to a ScienceDirect user profile.

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OR

3. Log in using an existing ScienceDirect username

After registration, you can use your ScienceDirect username to access the journal on ScienceDirect.com.

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# Parasites: Friends Without Benefits (Part 5)

We conclude the transcript of Peter O'Donoghue 2013 parasitology outreach event, Science in the Pub, a social interactive occasion where (POD points out) many liberties were taken with content and language in the pursuit of entertainment,

In part 1 to 3, we described eight core concepts of parasitology:

1. Parasites are friends without benefits!
2. The pathology of parasitism is cumulative.
3. Parasites exhibit tissue tropism.
4. Parasites undergo cyclic transmission between hosts!
5. Parasites discriminate!
6. Differential diagnosis is difficult!
7. Parasites are hard to control
8. Parasite biodiversity is vast

In Part 4, POD then looked at the rogue's gallery of protozoa, helminths and arthropods.

In this last episode, POD looks for redeeming features and asks if we should actually be trying to conserve parasites.

presentation. Are parasites useful for anything?

- **Weight loss:** Some 60-70 years ago, there were advertisements announcing the beneficial weight loss qualities of having your own parasites, under the endearing names of Lard-B-Gone, Taeniadex, etc. You could send away for a measured dose of parasites to consume to become infected. The adult tapeworms in your gut would compete for your nutrients and thus you would not become fat, and may even lose weight. There is so much wrong with this, I shudder. Some found that food consumption actually increased, presumably because you were now eating for two, and the worm may have stimulated your appetite.
- **Evolutionary pressure:** It is well documented in text books that there is an evolutionary arms race between the invasive capabilities of microbes and the defence capabilities of their hosts; that is, a war between parasite virulence and host immunity. We are slowly characterizing these interactions so that we can manipulate them to achieve some control by virulence mitigation, immuno-therapy, and vaccination. It is a complex multi-

factorial highly integrated field. It seems that parasites are good at keeping the host immune system busy!

- **Hygiene hypothesis:** Recently, a link was made between the lower incidence of certain diseases in people with mild helminth infections. It was reasoned that worms kept the immune system busy, and when people became more hygienic and eliminated their worms, the immune system turned on itself and led to a whole series of allergic and auto-immune diseases (such as irritable bowel syndrome, Crohn's disease, coeliac disease, ulcerative colitis, asthma, and even multiple sclerosis and diabetes). A backyard industry sprang up, where by "helminthic therapy" was offered. You could order *Necator* hookworm larvae to place on your skin, or *Trichuris suis* whipworm eggs to ingest, thus giving your immune system something to do instead of causing problems. Many people swear by it, but extreme caution is advised. The parasites used are not from clean cultures but originate from all sorts of hosts under all sorts of conditions. I would be worried about other unintended hitchhikers in the inocula (including viral and bacterial pathogens – as these worms can host microbes).

# 10

## Redeeming features?

Well, the foregoing has all been doom and gloom, with gruesome but spectacular parasites causing infections ranging from asymptomatic to mild to severe in disease



## *Parasites: Friends Without Benefits* continued

- **Food sources:** Can you eat parasites as food items without getting infected? This begs the question, do you trust in the concept of host specificity? Humans have human parasites, cows have cow parasites, although a very small number may occur in both. Can you catch a cow parasite if you eat it? Some tribesmen harvest *Monezia* tapeworm segments passed in cow faeces by twirling them on a stick, washing them in low streams and roasting them over an open fire - claiming they taste like chicken!

- **Sexual selection:** Field studies have shown that many females select certain mates based on their apparent health and vigour in resisting parasitic infections, some males even have secondary characters to display their anti-parasite prowess, such as elegant plumage, body size, coat condition. This must include me, as I am very adept at resisting parasites, as evidenced by my:

- receding hairline to resist head lice; reduced muscle mass to resist muscle worms; gnarly skin to resist mites; foot odour to resist Tunga fleas, and dangly scrotum to resist parasitic castration.

If parasites have some uses, or until we better understand their complex interactions with their hosts, maybe we should take steps to protect parasites and stop them from becoming extinct

- People have become concerned about the conservation biology of parasites, along with mutualists and

commensals. They are worried about 'co-extinction' events, where the symbiotes become extinct with their hosts. Various species of bird lice are considered to be extinct, along with their bird hosts. The guinea worm *Dracunculus* is considered rare and may be the next to become extinct, due principally to the efforts of humans to eradicate the worm. Only one parasite is listed on the Red List of Endangered Species: the sucking louse *Haematopinus* found on pygmy hogs. Various countries recognize other parasites as rare and/or threatened, including the tapeworm *Dasyurotaenia* from the Tasmanian devil.

- It is difficult to mount a case for the conservation of parasite species, other than the loss of biodiversity, especially since parasites are blamed for contributing to host extinctions through disease and death. We know relatively little about the significance of other symbiotes, other than by definition that mutualists benefit hosts, while commensals are neutral. Most efforts in conservation biology target host species, and by rescuing them from extinction, we will also conserve their parasites. So, should we cuddle or kill our wildlife? Let's save both hosts and parasites.

- While most scientists have no philosophical or ethical dilemmas with conservation biology, parasitologists may be a breed apart. We often joke that should a live Tasmanian tiger (thylacine) ever be discovered, a parasitologist would shoot it to harvest its parasites. Parasite preservation (in alcohol) would trump wildlife conservation. So, ladies and gentlemen, I propose a final toast:

**"To parasites and their hosts – friends without benefits!"**

# 11

## Conservation Biology



# State News

## New South Wales

### University of Sydney

#### Laboratory of Veterinary Parasitology @ McMaster Building

First DVM Year 3 students (Sydney School of Veterinary Science) have been working on their professionally focused projects. Both students worked on *Neospora caninum*! **Jess McCloud** was elucidating the prevalence in kangaroos and **Ben Kwok** has learned about tricks of running an IFAT to demonstrate vertical transmission. We farewell Ben and Jess, yet more are already lined up for 2018, in fact there will be at least 7 more DVM students completing their projects with us on parasitology!

**David Emery's** student **Sarah George** is busy writing up her PhD thesis. Surely two recent papers make the writing easier. Well done Sarah!

**George SD**, Vanhoff Y, Baker K, Lake L, Rolfe PF, Seewald W, Emery DL (2017). Application of a coproantigen ELISA as an indicator of efficacy against multiple life stages of *Fasciola hepatica* infections in sheep. VETERINARY PARASITOLOGY, 246: 60-69. <http://dx.doi.org/10.1016/j.vetpar.2017.08.028>.

**George SD**, Baker, K, Lake, L, Vanhoff, K, D'Arcy, R., Emery, D., Rolfe, PF 2017. Characterization of multiple life stages of

two Australian *Fasciola hepatica* isolates in sheep. VETERINARY PARASITOLOGY, 248: 4-9. <http://dx.doi.org/10.1016/j.vetpar.2017.10.012>

**Jan Šlapeta** has visited Indonesia as part of IndoBeef preparatory program activities. It was quick but a very busy trip with some valuable insight into parasitological and other infectious diseases affecting cattle (pictured below). In July, Jan has participated at The Culturally Competent Leadership Program (CCLP) hosted by the National Centre for Cultural Competence (NCCC) in Murrumbidgee National Park in South Coast NSW.

A project with Taronga ZOO on the iconic platypus and echidnas that we started in 2012 has finally come to fruition and a census of protozoan parasites has been enabled using NGS. **Stefan Saverimuttu**, the former BSc(Vet) student, has long been practicing vet at Central Coast.

**Šlapeta J**, Saverimuttu S, Vogelneust L, Sangster C, Hulst F, Rose K, Thompson P, Whittington R (2017). Deep-sequencing to resolve complex diversity of apicomplexan parasites in platypuses and echidnas: Proof of principle for wildlife disease investigation. INFECTION GENETICS AND EVOLUTION 55:218-227. [IF=2.89] <https://doi.org/10.1016/j.meegid.2017.09.007>

Never take for granted that things don't change! In fact they do, as demonstrated by **Sarah Sloan** from LaTrobe Uni who has visited our labs last year to do the *Neospora* testing. What a nice collaboration between

NSW and Victoria.

Sloan S, **Šlapeta J**, Jabbar A, Hunnam J, De Groef B, Rawlin G, McCowan C (2017). High seroprevalence of *Neospora caninum* in dogs in Victoria, Australia, compared to 20 years ago. PARASITES & VECTORS 10(1):503. <https://doi.org/10.1186/s13071-017-2464-2>

Another piece by **Jan Šlapeta** is demonstrating that we pretty much know what the species of *Cryptosporidium* are out there and how to identify them - now available from PARASITOLOGY.

Šlapeta J (2017). DNA barcoding of *Cryptosporidium*. PARASITOLOGY (in press) <https://doi.org/10.1017/S0031182017001809>

**Jess Panetta** and **Jessica Panuccio**, two AnimalVet BioScience Honours worked on ticks this year and successfully completed their degrees! And as we heard Jess Panetta will be starting DVM next year.

The wait is almost over and all about the Ctenocephalides fleas will be soon revealed when our PhD student, **Andrea Lawrence**, submits before X-mas this year!

Our PhD students **Shona Chandra** and **Clarencia Lie** are busy sorting through the tick data and establishing diagnostic workflow for *Entamoeba*, respectively.

**Nichola Calvani**, PhD student, *Fasciola* eggs cracking paid off! Her method has been published in PLOS NEGLECTED TROPICAL

**Below: Jan Šlapeta at Lampung DIC, Indonesia discussing parasitology with diagnosticians and veterinary students (top). Michael Ward, Mike Raynolds and Jan Šlapeta (all from University of Sydney) with laboratory staff at Lampung DIC, Indonesia.**



## State News continued



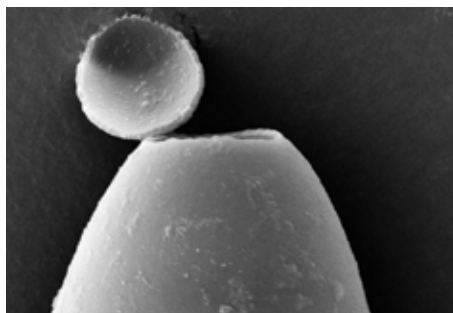
DISEASES and her research scored the September cover <http://journals.plos.org/plosntds/issue?id=10.1371/issue.pntd.v11.i09>

**Calvani NED**, Windsor PA, Bush RD, **Šlapeta J** (2017). Scrambled eggs: A highly sensitive molecular diagnostic workflow for *Fasciola* species specific detection from faecal samples. PLOS NEGLECTED TROPICAL DISEASES 11(9):e0005931. <https://doi.org/10.1371/journal.pntd.0005931>

Nichola visited Malaysia recently to represent the lab and her work on liver fluke at the 26th International Conference of the World Association for the Advancement of Veterinary Parasitology (WAAVP) (above). Here she presented her "Scrambled eggs". The presentation was well received with many people showing interest in the disruption protocol she validated for the extraction of DNA from liver fluke eggs. And if you ever pondered how does fluke egg look under the scanning electron microscope and if the "cap" is real .... look no further! (see above).

**Graeme Brown** has co-authored publication demonstrating presence of *Babesia vogeli* in Aboriginal community dogs.

Shapiro AJ, **Brown G**, Norris JM, Bosward KL, Marriot DJ, Balakrishnan N, Breitschwerdt EB, Malik R (2017). Vector-borne and zoonotic diseases of dogs in North-west New South Wales and the Northern Territory, Australia. BMC VETERINARY RESEARCH 13:238. <https://doi.org/10.1186/s12917-017-1169-2>



## Charles Sturt University

### 3MT Brisbane

On the 29th of September, PhD student and ASP member **Cara Wilson**, Graham Centre, represented Charles Sturt University at the Asia-Pacific 3MT Competition held at the University of Queensland in Brisbane. Cara competed against 54 other finalists from universities throughout the Asia-Pacific. The aim of the competition is to summarise a PhD thesis into an engaging three-minute presentation that can be understood by people throughout all disciplines using only one static slide.

Cara's presentation "War on waste: It's not just plastic bags" described the wastage caused by hydatid disease (*Echinococcus granulosus*) in the Australian beef industry and how she plans to investigate this disease and reduce wastage. Cara was awarded an Editor's Choice award and will be featured in Cosmos Magazine. Cara said "The competition was an amazing experience and I got to meet so many amazing and talented people. I entered the competition just to have a go and build on my presenting skills, and look where I ended up! I will definitely be recommending this competition to others.". Cara's talk can be viewed at the following link: <https://vimeo.com/237011607>.

### Shokoofeh Shamsi's Group

**Eleanor Steller**, who did her honours project on nematoda parasites in Moreton Bay, Australia, graduated in August. **Annie**

**Far left: Nichola Calvani with a fellow University of Sydney PhD student Louisa Olmo at WAAVP**

**Centre left: Fasciola hepatica egg under SEM. Note the opened operculum aka "cap".**

**Stoddart** has also completed her Honours project on parasites of freshwater fish in Murray Darling basin and will be graduated in December. She is a recipient of the Graham Centre for Agricultural Innovations Honours scholarship and the best student presentation award in CSU's 2017 Research Symposium.

**Monica Dickson**, Master of Animal Science is currently investigating the seafood safety training among Australian chefs as part of her Master research project.

**Md Shafaet Hossen** from Bangladesh, has started a PhD under Shokoofeh's supervision. He will be working on taxonomy of nematoda and monogenean from selected commercial fish in Australia.



**Right: Cara Wilson of Charles Sturt University at 3MT, Brisbane**

## State News continued

**Di Barton** has established a branch of NT Fisheries in Wagga for the next 3 years. She has spent this year finishing up her fish stock discrimination projects, with her work on the black croaker and the grass emperor recently published. The descriptions of the many new species of parasites found in these fish are slowly making their way too. She has also begun a project on the stock discrimination of hammerhead sharks with NT Fisheries and JCU. If all goes well, her interests will expand to freshwater fish of the Murray Darling Basin as well as working on a project on the parasites of snakes from around Wagga and in Tasmania over the next couple of years.

**Shokoofeh Shamsi** attended the first AGM and symposium of the Japan Society for Promotion of Science in Canberra where she talked about "shared love, shared risk: Australian and Japanese perspectives on research into parasites in seafood".

#### ASP Undergraduate Prizewinners

Prize winners for 2017 are **Scott Day** and **Louise Sproule**, congratulations!

## Victoria

### La Trobe University

**Teresa Carvalho** and colleagues were recently awarded a \$1M grant from the Centre for Invasive Species Solutions (CISS) to investigate the presence of virus and parasites in wild deer in Australia. This 4 year project, entitled "The role of wild deer in the transmission of diseases of livestock" is a joint collaboration between La Trobe University and the Arthur Rylah Institute, during which Teresa, Dr Karla Helbig (La Trobe) and Dr Carlo Pacioni (ARI) will co-supervise a PhD student.

## Monash University

Dr **Anubhav Srivastava**, a research fellow in Dr Darren Creek's group at the Monash Institute of Pharmaceutical Sciences, won the CASS (Contributing to Australian Scholarship and Science) Foundation's travel award to attend the (28th) Annual Molecular Parasitology at Woods Hole, MA, USA in September 2017. Anubhav gave an oral presentation and presented a poster on using metabolomics to find mode of action of novel anti-malarial compounds. He also won the best poster prize at the conference for showcasing the work done in antimicrobial metabolomics at the Creek laboratory at MIPS and the Open Source Malaria Project.

Dr **Darren Creek** from the Monash Institute of Pharmaceutical Sciences was successful in obtaining a NHMRC Career Development Fellowship (level 2) to continue his research applying metabolomics to drug discovery for malaria and trypanosomiasis. He was also awarded the Future Research Leader Award from the Monash Faculty of Pharmacy and Pharmaceutical Sciences.

## University of Melbourne

#### Tilley Lab

The Tilley lab has welcomed several overseas visitors recently. We have been hosting undergraduate student Theana Johnson, from Imperial College London, who is here on a 'Research Abroad' year to experience life as a research scientist. Theana will be working with Natalie Spillman, investigating the mechanism of action of new antimalarial drugs. She is already hard at work growing malaria parasites. The lab has also welcomed Tahmina Ahmed. Tahmina is with us for three months, from the International Center for Diarrheal Disease Research, Bangladesh (ICDDRDB). She is here on a sabbatical collaboration project funded by the World Intellectual Property Organization (WIPO) in partnership with BIO

Ventures for Global Health (BVGH) and several leading pharmaceutical companies. She will also be working with Natalie on antimalarial drug targets.

\*

#### Recent publications by Victorian researchers

Lopaticki S, Yang ASP, John A, Scott NE, Lingford JP, O'Neill MT, Erickson SM, McKenzie NC, Jennison C, Whitehead LW, Douglas DN, Kneteman NM, Goddard-Borger ED, Boddey JA. Protein O-fucosylation in *Plasmodium falciparum* ensures efficient infection of mosquito and vertebrate hosts. *Nat Commun*. 2017 Sep 15;8(1):561.

Yang ASP, Lopaticki S, O'Neill MT, Erickson SM, Douglas DN, Kneteman NM, Boddey JA. AMA1 and MAEBL are important for *Plasmodium falciparum* sporozoite infection of the liver. *Cell Microbiol*. 2017 Sep;19(9).

França CT, White MT, He WQ, Hostetler JB, Brewster J, Frato G, Malhotra I, Gruszczyk J, Huon C, Lin E, Kiniboro B, Yadava A, Siba P, Galinski MR, Healer J, Chitnis C, Cowman AF, Takashima E, Tsuboi T, Tham WH, Fairhurst RM, Rayner JC, King CL, Mueller I. Identification of highly-protective combinations of *Plasmodium vivax* recombinant proteins for vaccine development. *Elife*. 2017 Sep 26;6. pii: e28673.

Parkyn Schneider M, Liu B, Glock P, Suttie A, McHugh E, Andrew D, Batinovic S, Williamson N, Hanssen E, McMillan P, Hliscs M, Tilley L, Dixon MWA. Disrupting assembly of the inner membrane complex blocks *Plasmodium falciparum* sexual stage development. *PLoS Pathog*. 2017 Oct 6;13(10):e1006659.

Huang HM, Bauer DC, Lelliott PM, Dixon MWA, Tilley L, McMorran BJ, Foote SJ, Burgio G. Ankyrin-1 Gene Exhibits Allelic Heterogeneity in Conferring Protection Against Malaria. *G3 (Bethesda)*. 2017 Sep 7;7(9):3133-3144.

State News continued

## Queensland Griffith University

### Griffith Institute for Drug Discovery (GRIDD)

Tropical parasitology Laboratory  
Professor **Kathy Andrews** was awarded a prestigious Women in Technology (WiT) Life Sciences Research Leader Award for 2017. Congratulations Kathy!

Welcome to Dr **Shafiul Alam**. Dr Alam is a visiting fellow from the International Centre for Diarrhoeal Disease Research, Bangladesh in the Emerging Infections and Parasitology Laboratory, Infectious Diseases division Bangladesh. Dr Shafiul will spend 6 months at GRIDD to gain insights in the area of natural product drug discovery for malaria.

Honours student **Emily Cooper** was awarded First Class Honours for her thesis "Investigating New Treatment Drug Leads for Malaria". Well done Emily!

### Discovery Biology Laboratory



### Key Publications:

**Bilal Zulfiqar, Todd B. Shelper and Vicky M. Avery.** Leishmaniasis drug discovery: recent progress and challenges in assay development. *Drug Discovery Today*. [Review] 2017 Oct;22(10):1516-1531 PMID: 28647378. IF: 6.369.

This review provides an overview of the disease, current treatment options and compares the various classical and modern in vitro assays used in the last 20 years for anti-leishmanial drug discovery. Among the assays available to identify drug candidate's triage, the High Content Screening (HCS) represent a potential alternative, as the technique correlates the high throughput efficiency with biologically relevant models. HCS of the intracellular amastigote is thus likely to remain the gold standard for Leishmania drug discovery in the coming decade.

Thomas Weidner, **Leonardo Lucantoni**, Abed Nasereddin, Lutz Preu, Peter G. Jones, Ron Dzirkowski, **Vicky M. Avery** and Conrad Kunick. Antiplasmodial dihetarylthioethers target the coenzyme A synthesis pathway in Plasmodium falciparum erythrocytes stages. *Malaria Journal*. 2017 May 15; 16(1): 192. IF: 3.40.

In this research article we show that a new class of diarylthioether compounds interfere with plasmodial coenzyme A synthesis, a mechanism of action not yet exploited in current antimalarial drugs and clinical candidates. In particular, the oxazole KuWei173 displayed double-digit nanomolar antiplasmodial activity and lacked cytotoxicity against HEK-293 cells, and thus represents a promising chemical starting point for further drug development.

**Leonardo Lucantoni, Sasdekumar Loganathan and Vicky M. Avery.** The need to compare: assessing the level of agreement of three high-throughput assays against Plasmodium falciparum mature gametocytes. *NATURE Scientific Reports*. 2017 Apr 5; 7: 45992. IF: 5.525.

### Ala Tabor and her Christmas tick

A number of high-throughput screening assays for Plasmodium falciparum gametocytes have been published in recent years. In an attempt to unravel the discrepancies observed in their outcomes and explain the existing attrition in the prediction of transmission-blocking activity in the mosquito, we conducted a comparison of three distinct mature stage gametocytocidal assays (using high-content imaging and luciferase approaches), by testing 39 appropriately selected gametocytocidal compounds under strictly controlled parasitological, chemical, temporal and analytical conditions. We found that combining two assay approaches (sufficiently divergent from each other by biology covered, strain and/or technology used) and long incubation times greatly improves the agreement between in vitro assays and transmission-blocking activity in the mosquito, thus providing enhance predictivity for the identification of biologically relevant malaria transmission blocking compounds.

## ACT

## Australian National University

### Martin Lab

**Sashika Richards** (PhD Student) was awarded a 2017 Infection and Immunity Prize for a Student Poster and 3-min Talk (\$250; sponsored by the Biochemical Journal). Congratulations Sashika!

The Martin lab has welcomed **Simone Babij** as a new PhD student and farewellled Dr **Robert Summers**. Rob has joined Prof Dyann Wirth's lab at the Harvard T.H. School of Public Health where he will undertake the first 2 years of his NHMRC CJ Martin Fellowship before returning to the Martin lab for the second leg of his fellowship.

State News continued

## Western Australia

### Murdoch University

#### PhD completions

A number of PhD students completed their doctorates recently. Congratulations to Dr. **Catherine Perez** from the Murdoch Parasitology group for completing her PhD titled "The investigation of two *Trypanosoma cruzi* isolates for their ability to complicate disease progression in the host" supervised by **Andy Thompson** and **Alan Lymbery**. Congratulations to Dr. **Narelle Dybing** for completing her PhD titled "Invasive animals and the Island Syndrome: Parasites of feral cats and black rats from Western Australia and its offshore islands", supervised by **Peter Adams, Peter Irwin, Caroline Jacobson, and Dave Algar**.

**Crystal Cooper** from The University of Western Australia (in conjunction with Murdoch Parasitology) completed her PhD titled "Characterisation of the biology, evolutionary relationships, and host-parasite interactions of Australian *Trypanosoma* spp." supervised by **Peta Clode, Andy Thompson, and Christopher Peacock**.

#### Media

An article on parasites and electron microscopy was published (picture below) in the West Australian featuring some of the work conducted at Murdoch Parasitology and the Centre for Microscopy, Characterisation, and Analysis at UWA.



## Fellows of the Society: names to the faces

Here are the names of the five ASP Fellows shown on page 14



**Russell Hobbs**  
FASP 2007



**Emanuela Handman**  
FASP 2006



**Nick Sangster**  
FASP 2006



**Roger Prichard**  
FASP 2007



**Nick Smith**  
FASP 2008

To read a brief biography of each Fellow, visit  
[parasite.org.au/the-society/fellows-of-the-society/](http://parasite.org.au/the-society/fellows-of-the-society/)

# Employment and research opportunities



## Research Officer, Boddey Laboratory, WEHI

**Application closing date:**  
**Sun, 31/12/2017 - 5:00pm**

An opportunity exists for a Research Officer to join the Infection and Immunity Division to study the molecular basis of malaria parasite development in liver cells. The laboratory is focused on understanding how the malaria parasite transmitted from mosquitoes infects liver cells and changes its intracellular environment. This is essential for subsequent blood stage infections that cause malaria.

The successful candidate will hold a

recent PhD and have a strong background in molecular biology, cell culture, flow cytometry and ethical research with mice. Proficiency in microscopy and RNA sequencing is highly desirable. The successful applicant will work with malaria parasites and mosquitoes in the Institute's insectary to study parasite-host interactions. A background in malaria or microbiology is not essential.

The Institute is very supportive of female scientists and offers financial support for childcare through a Craven and Shearer Award and an onsite Early Childhood Education Centre childcare facility is due to open in 2018. Financial support for technical assistance is available through a Page Betheras Award during and after Maternity leave.

The position is available for 12 months in the first instance with funding available for up to 3 years. Salary is dependent upon qualifications and experience. Up to

17% superannuation and attractive salary packaging options are available.

General enquiries should be directed to A/ Prof. Justin Boddey (boddey@wehi.edu.au)

A position description is available.

Written applications including cover letter, CV and the names of 3 professional referees should be emailed in PDF format to jobapplications@wehi.edu.au, quoting reference WEHI/CAJB in the subject line.

At the Walter and Eliza Hall Institute, we strive to ensure our staff and students enjoy a great working environment. We value diversity and gender equity in our workforce and promote flexible working arrangements for staff to balance working requirements and personal needs.

**The original job advertisement can be found at:** <https://www.wehi.edu.au/research-officer-boddey-laboratory>



## Research Scholar - Cattle Parasites

**Application closing date:**  
**Fri, 12/01/2018 - 11:55pm**

**Job no:** 501664

**Area:** Qld Alliance for Agriculture and Food Innovation

**Salary (FTE):** Research Scholar BAND

**Work type:** Full Time - Fixed Term, Full Time - Scholarship

**Location:** St Lucia, Brisbane

**The role:** Your PhD research will investigate the molecular and immune interactions at tick bite and buffalo fly feeding sites in cattle with high fly numbers and fly lesions to identify markers

associated with:

- Cattle tick resistance
- Buffalo fly resistance
- Resistance to development of buffalo fly lesions

Samples will be collected initially from pilot herds within south east Queensland to establish protocols and to obtain preliminary data as indications of resistance or susceptibility. The methods to be used will include next generation sequencing and proteomics, immune response and analysis of skin and blood samples for immune markers. Following initial identification of markers, wider herd studies will be undertaken to select robust biomarkers for assay development.

**The candidate:** Applicants should possess qualifications in relevant disciplines of animal science, immunology and molecular

biology, and have an interest developing computational skills from other scientists in the team. You should also have a strong desire to develop your personal research skills, while contributing to this team effort. You should have a current drivers licence. You will need to meet the PhD entry requirements of the UQ Graduate School (<http://www.uq.edu.au/grad-school/our-research-degrees>). The applicant should be holder of an Australian Postgraduate Award (APA) or equivalent.

**Enquiries:** To discuss this opportunity, please contact Prof Ala Tabor (a.lewtabor@uq.edu.au). For general information on the research higher degree program, see <http://www.uq.edu.au/grad-school/future-students>

**The full job advertisement can be found at:** <http://jobs.uq.edu.au/caw/en/job/501664/research-scholar-cattle-parasites>

*Employment and research opportunities continued*

### **Postdoctoral Fellows and experienced lab coordinator, Striepen Lab, University of Pennsylvania**

**Location: Philadelphia**

#### **Work on Cryptosporidium in a new Bill and Melinda Gates Foundation-funded project**

Join us at the University of Pennsylvania in Philadelphia to work on *Cryptosporidium* genetics, metabolism, and drug development.

*Cryptosporidium* is a leading cause of severe diarrhea in young children and an important contributor to early childhood

mortality. Fully effective drugs to treat crypto infection are lacking. We develop and apply molecular genetic strategies to enable parasite drug development as part of a large interdisciplinary team.

In this new project funded by the Bill & Melinda Gates Foundation we will use CRISPR-based genome modification to discover and/or validate the mode of action of newly identified crypto drug candidates. In a genome-wide effort we will map parasite metabolism, test essentiality and unravel interaction between host cell and parasite metabolism.

We are looking for recent PhD graduates with strong training in experimental molecular biology or biochemistry, a keen interest in science and global health and the drive to solve challenging problems. Bioinformatics skills are a plus. We will also consider experienced molecular biologists with a BS or MS for the position of lab coordinator.

The University of Pennsylvania is a leading US center of biomedical research and a marvelous place to do a postdoc with a stimulating intellectual environment and access to the latest technology.

Philadelphia is an exciting city to live in.

#### **Applications**

Contact Boris Striepen by e-mail with a CV a statement of interests, and the names of three references.

Boris Striepen  
Professor of Microbiology & Immunology  
Department of Pathobiology  
University of Pennsylvania  
380 South University Avenue  
Philadelphia, PA 19104-4539

[striepen@upenn.edu](mailto:striepen@upenn.edu)

<http://www.striepenlab.org>



### **Research Scientist (ParaBoss) at the University of New England**

**3 year fixed-term position, with the possibility of extension.**

**Salary: \$114,074 to \$131,360 per annum (Level C).**

**Location: Armidale, NSW, Australia**

**Applications close 10 am, Monday, 22nd January 2018**

ParaBoss is a national authority for ruminant livestock parasite management and is funded by Meat & Livestock, Australia, Australian Wool Innovation Ltd and UNE, and is currently seeking an experienced Parasite Research Scientist to join the ParaBoss team based at UNE.

This Research Scientist role will contribute to the ParaBoss team and also develop a portfolio of ruminant livestock parasitology research. Both activities will contribute to improved parasite management of sheep, goats and/or cattle. The position will join an academic and technical team covering a range of disciplines with access to UNE SMART Farms, Cooperative Research Centres and Animal Genetics and Breeding Unit.

To discuss this role please contact Dr Deborah Maxwell:

Phone 02 6779 4262, 0437 524 163

or email [deb@paraboss.com.au](mailto:deb@paraboss.com.au)

#### **Job advertisement**

[https://hr.une.edu.au/v15/WK8127\\$APP.draw\\_attachments?P\\_VACANCY\\_REF\\_NO=217242&P\\_CALLER\\_URL=WK8127ZZDOLLARZZAPP.QueryListZZQMARKZZZ\\_ORDER\\_BY=1](https://hr.une.edu.au/v15/WK8127$APP.draw_attachments?P_VACANCY_REF_NO=217242&P_CALLER_URL=WK8127ZZDOLLARZZAPP.QueryListZZQMARKZZZ_ORDER_BY=1)

# Upcoming events

## National Scientific Conference on Infectious Diseases, HIV/AIDS and the 8th ASEAN Congress of Tropical Medicine and Parasitology (ACTMP) 2018

**Nha Trang, Vietnam**  
**26 to 29 July 2018**

Dear Professors, Colleagues, Members and Friends,

On behalf of the Organizing Committee, we warmly invite you to join us in July 2018 at what will be the first ACTMP Congress to be held in Vietnam.

With the theme "A better health for ASEAN Community", the Congress will be excellent opportunities to bring together Vietnamese, ASEAN and international infectious diseases and parasitology community to share and exchange knowledge, experience and learn from each other as well as promote new international collaborations. The program will include clinical and scientific topics from zoonotic to vector-borne diseases, emerging and re-emerging diseases, parasitic diseases,

veterinary health, travel medicine and innovation in diagnosis and treatment of infectious and parasitic diseases.

In addition, you will have the opportunity to visit Nha Trang, a coastal city and capital of Khanh Hoa Province located on the South Central Coast of Vietnam. Nha Trang has the most beautiful beach and islands in Vietnam and has developed into a popular destination for international tourists with a large numbers of tourist attractions. Nha Trang has beautiful white sand beaches and crystal clear waters, where the waves are perfect for surfing and where the diving lovers have a lot to discover. Nha Trang Bay is considered one of the most beautiful of all South-East Asia and one of the most beautiful in the world 29 bays.

The Vietnam Annual National Scientific Conference on Infectious Diseases, HIV/AIDS & 8th ASEAN Congress of Tropical Medicine and Parasitology (ACTMP) are jointly hosted by the National Hospital for Infectious Diseases (NHTD), Vietnam Society of Infectious Diseases (VSID), Vietnam Clinical of HIV/AIDS Society (VCHAS), Vietnam Society of Parasitology (VSP), Oxford Clinical Research Unit Vietnam (OUCRU), ASEAN Society of Tropical

Medicine and Parasitology (ASTMP).

We therefore take great pleasure in inviting you and your organisation to participate in the Congress as our valued attendance, sponsor, to showcase the cutting edge technologies and products.

We are excited about this congress as well as the opportunities for scientific and social interactions with colleagues from the Vietnam, ASEAN and around the world. Join us in 2018 in Nha Trang for an enlightening, informative and enriching experience as well as enjoying Nha Trang, one of the most beautiful bay in the world.

For more information, please visit the website <http://www.actmp2018.com>

We look forward to welcoming you in Nha Trang 2018.

Yours sincerely,

Associate Professor. Nguyen Van Kinh

Chair of the 8th ACTMP Organizing Committee

## British Society for Parasitology Spring Meeting 2018



**University of Aberystwyth, Wales**  
**8th to 11th April 2018**

The BSP Spring Meeting will Include a BES stream, BAVP stream and Trypanosomiasis & Leishmaniasis Symposia

Organiser Contact Details:

Justin Pachbat  
T: 01234 211015  
[jip@aber.ac.uk](mailto:jip@aber.ac.uk)

# Council of the Australian Society for Parasitology Inc.

## Executive



### President

**Una Ryan**

Murdoch University

E: [president@parasite.org.au](mailto:president@parasite.org.au)



### Vice President

**David Emery**

The University of Sydney

T: (02) 9351 3102

E: [david.emery@sydney.edu.au](mailto:david.emery@sydney.edu.au)



### Treasurer

**Amanda Ash**

Murdoch University

E: [treasurer@parasite.org.au](mailto:treasurer@parasite.org.au)



### Executive Secretary

**Charlotte Oskam**

Murdoch University

E: [secretary@parasite.org.au](mailto:secretary@parasite.org.au)

ASP Council continued

## State Councillors



### ACT

#### Chrstina Spry

Research School of Biology,  
Australian National University,  
Canberra, ACT 0200  
E: christina.spry@anu.edu.au



### NSW

#### Shokoofeh Shamsi

Charles Sturt University  
Wagga Wagga, NSW 2678  
T: +61 2 6933 4887  
E: sshamsi@csu.edu.au



### NT

#### Michelle Boyle

Menzies School of Health Research  
Global and Tropical Health Division  
PO Box 41096  
Casuarina, NT 0811  
E: mboyle@burnet.edu.au



### QLD

#### Gillian Fisher

Eskitis Institute for Drug Discovery,  
Griffith University,  
T: +61 7 3735 4415  
E: g.fisher@griffith.edu.au



### SA

#### Danny Wilson

University of Adelaide.  
T: +61 8 8313 8259  
E: danny.wilson@adelaide.edu.au



### TAS

#### Barbara Nowak

University of Tasmania  
AMC, NCMCRS  
Locked Bag 1370  
Launceston, Tasmania 7250  
E: B.Nowak@utas.edu.au



### VIC

#### Matthew Dixon

University of Melbourne  
E: matthew.dixon@unimelb.edu.au



### WA

#### Crystal Cooper

University of Western Australia,  
crystal.ccooper@research.uwa.edu.au

ASP Council continued

## Other Members of Council



### IJP Editor

**Brian Cooke**

Monash University,  
E: editor@IJP.org.au  
T: +61 3 9902 9146



### IJP:DDR Editor

**Kevin Saliba**

Australian National University  
kevin.saliba@anu.edu.au  
(02) 61257549



### IJP:DDR Editor

**Andrew Kotze**

CSIRO Animal, Food and Health  
Sciences  
andrew.kotze@csiro.au



### IJP:PAW Editor

**Andrew Thompson**

Murdoch University  
Murdoch WA  
T: (08) 9360 2466  
E: a.thompson@murdoch.edu.au



### Bancroft-Mackerras Medal Convenor

**Malcolm Jones**

University of Queensland  
E: m.jones@uq.edu.au



### Incorporation Secretary

**Tina Skinner-Adams**

Eskitis Institute for Drug Discovery,  
Griffith University,  
E: t.skinner-adams@griffith.edu.au



### ASP Network Convenor

**Nick Smith**

E: nick.smith@parasite.org.au



### ASP Executive Officer

**Lisa Jones**

ASP Network for Parasitology,  
James Cook University,  
Cairns Campus QLD 4878  
T: (07) 4232 1311  
E: lisa.jones1@jcu.edu.au



### Archivist

**Haylee Weaver**

Australian Biological Resources  
Study  
T: (02) 2 6250 9434  
E: Haylee.Weaver@environment.gov.au