Australian Physiological Society

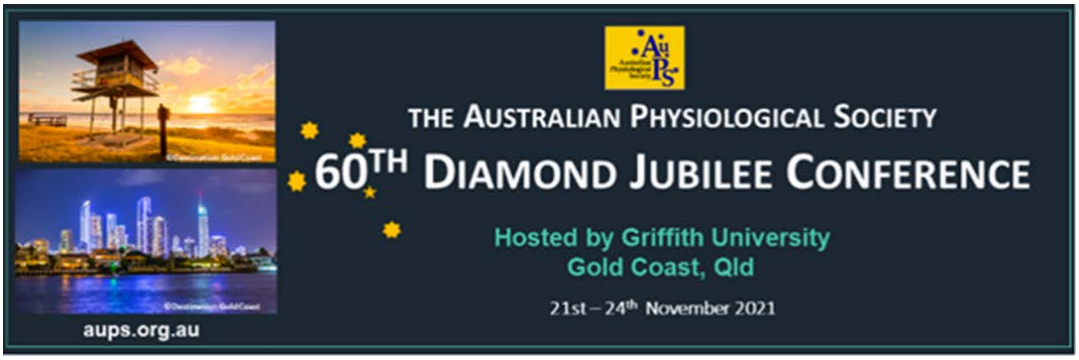
THE PROFESSIONAL ASSOCIATION FOR AUSTRALIAN PHYSIOLOGISTS

AuPS News – September 2021

Upcoming Australian Physiological Society 60th Diamond Jubilee Conference and Award Information

Notwithstanding everything that is currently going on across the country - we are excited to announce that our AuPS 60th Diamond Jubilee Conference will be held Face to Face on the Gold Coast, 21st-24th November and registrations are now open. If you haven't yet seen the website, it is populated with a lot of information about the meeting. For those who cannot travel due to COVID-19, the *registrations* page also provides options to access the Meeting (limited program) from a Hub in your capital city.

NOTE: If you are logging into our new database for the first time you will need to reset your password. To do this simply click on *forgot password* and follow the directions. Any problems please contact out IT Manager Danielle Hiam.



The AK McIntyre Award

Sponsored by AuPS

The A K McIntyre Prize is named in honour of the Society's first President. The Prize shall be awarded periodically to members of the Society who are judged to have made significant contributions to Australian physiological science over their pre-doctoral and early post-doctoral years.

Application & Eligibility:

To be considered for this award, nominees must:

- be proposed by two financial members of the Society, who should provide a statement of not more than 500 words summarising the nominee's achievements.
- provide a curriculum vitae and a list of published works, including conference proceedings.
- normally have graduated from their PhD or equivalent doctoral degree by 1st November not more than 7 years before the year of application.
- be current financial Ordinary Members of the Society (note: provisional members are not eligible to apply).

- In considering nominations, the judges will take into account the nominee's contributions to scientific meetings of the Society. No individual may be awarded the prize more than once.

When awarded, the winner will be announced during the conference dinner at the following AuPS meeting, and in the December Newsletter.

Email applications to the AuPS National Secretary Prof Glenn Wadley: glenn.wadley@deakin.edu.au

Closing date: Applications close 5pm (AEST), 8th October 2021.

Eligibility and selection criteria can be found here: http://aups.org.au/Prizes/

Former AK McIntyre winners at the AuPS conference dinner in 2017. Pictures from left to right; Gordon Lynch (1995), Brad Launikonis (2005), Paul Gregorevic (2006), James Ryall (2008), Robyn Murphy (2010), Kate Murphy (2011), James Bell (2012), Natalie Trevaskis (2015), Kim Mellor (2016) and James Cuffe (2017).

A full list of previous winners can be found on the AuPS website.

The Michael Roberts Excellence in Physiology Education Award

The Michael Roberts Excellence in Physiology Education Award is an award bestowed periodically by the Australian Physiological Society in memory of Michael Roberts, who was a lifelong passionate and dedicated advocate of physiology teaching and education.

The award is intended to recognise AuPS members who have demonstrated a sustained performance of excellence in the delivery of physiology education at the tertiary level, and make a contribution to the teaching activities of AuPS.

The recipient of this award will be presented with a medal and a cash award, at the conference dinner in the year of the award, and will be invited to deliver a keynote lecture at the Educational Symposium in the following year's AuPS conference.

Email applications to the AuPS National Secretary - Prof Glenn Wadley: glenn.wadley@deakin.edu.au

Closing date: Applications close 5pm (AEST), 8th October 2021. See the AuPS website for further details.

The AuPS Postdoctoral and Student Publication Prizes

These are annual awards for the best original paper published by an AuPS member during their first 4 postdoctoral years and during the course of their PhD studies.

The prize for each award is $500 and is to be used to present work at a conference. (Note: winners will be reimbursed after providing a copy of an invoice of conference expenses). Winners will be announced during the conference dinner of the following AuPS meeting and in the December AuPS newsletter.

Email applications to the AuPS National Secretary - Prof Glenn Wadley: glenn.wadley@deakin.edu.au

Closing date: Applications close 5pm(AEST), 8th October 2021. See the AuPS website for further details.

Congratulations to the AuPS PhD Student Small Grant Scheme 2021 Winners

Yuqin Wu – Monash University, Exploring the mechanisms of glucagon resistance.

Emily Attril - University of Tasmania, Do pericytes regulate skeletal muscle capillary blood flow in response to insulin?

Nykola Kent - The University of Queensland, Thyroid autoimmunity in pregnancy.

Vale IAN RICHARD NEERING

PhD, MSc, BSc

born 27th July 1946; died 18/03/2020

Ian Neering was an engaging and determined physiologist and pharmacologist. Sadly, he died of respiratory complications at Calvary Hospital in Canberra at the onset of the Covid 19 pandemic. He made important contributions to pharmacology and physiology during his career.

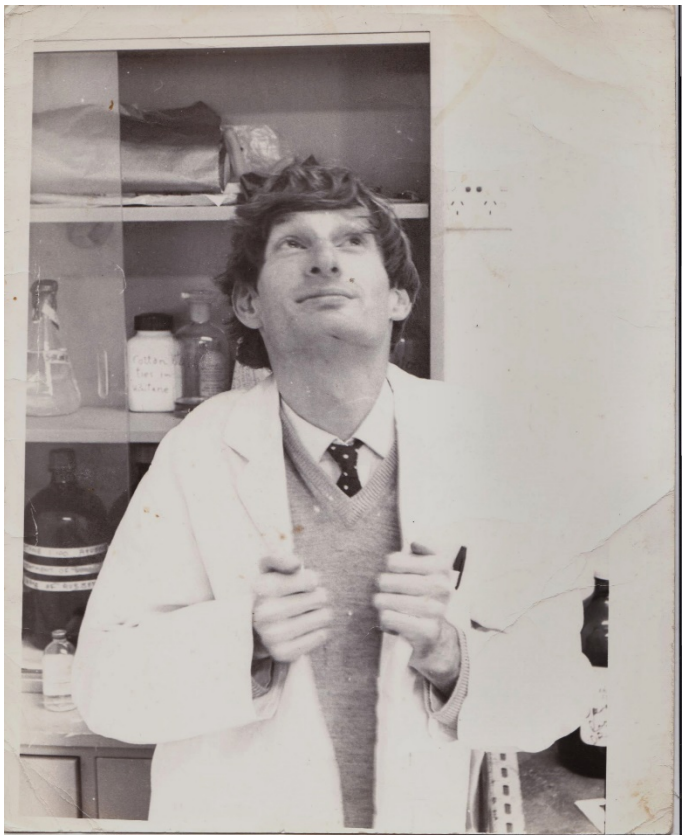
After graduating from UNSW in 1967, Ian subsequently did his MSc at the University of Sydney. Here he teamed up with Dr Dennis Halmagyi at the Gordon Craig Research Laboratory in the Department of Surgery where he worked on pharmacological ways to produce complete autonomic blockade. He was trying to devise better

methods to treat circulatory shock. He did his PhD in halcyon days in the School of Physiology and Pharmacology at UNSW when W E Glover (his formal supervisor) was Head of School and later Dean of Medicine.

Finishing his PhD was quite a feat not because of the content of which he was a master, but because of his extensive hobbies which always seemed to get precedence. One was his love of nature which he managed to escape to in many camping trips made in his bone rattling short wheelbase Toyota four-wheel-drive. Another was his love for sailing having been the proud owner of various small sailing boats, the last being a small yacht which he raced with a loyal crew in Sydney harbour. He generously made his middle harbour mooring available to others. He was also very handy – he made a beautifully crafted canoe that his son, Cole, still proudly keeps.

Subsequently from 1976 to 1980 Ian spent periods in the Department of Biochemistry, University of Georgia, (USA) and the Department of Pharmacology, Mayo Clinic, Rochester, Minnesota. During his time in Rochester with Kathleen Morgan he undertook ground-breaking work published in *Nature* on the role of calcium in excitation-contraction coupling in smooth muscle. This was done using the bioluminescent protein aequorin obtained from a jellyfish and the work was part of a growing realisation that such proteins provided a vital tool to understand intracellular processes.

He then returned to a lectureship in the School of Physiology and Pharmacology at UNSW where he remained until his premature retirement as Associate Professor in 1995. He received a number of career awards, of particular note were a research fellowship from the National Science Foundation (USA), travelling fellowships from the Nuffield Foundation and the British Council. He also conducted research in Antarctic waters as part of a marine biology expedition sponsored by the Australian Antarctic Division. He supervised three highly successful PhD students.



Following his retirement from teaching and research at UNSW, hastened in part by his respiratory limitation, he was far from idle. He continued a link with UNSW as the co-ordinator of the master's degree program in Biopharmaceutics by distance education. Several other projects kept him busy. As examples, from 2005 much time was spent as a director and chief financial officer of Mount Sylvia Diatomite. The company processed and marketed high-quality diatomite and basalt products derived from its mines in Queensland for multiple agricultural uses. A transition from academic life to running a serious business. In addition, he ran a company providing consultant services to the legal and pharmaceutical industries on matters of drug usage, licensing and patenting. Notwithstanding some practical difficulties he accompanied his wife Louise as driver on a lengthy trip to the western Arnhem Land border. Louise worked with people across Arnhem Land as an expert on material culture with an emphasis on fibre arts. They also made

another trip right from Sydney to Perth looking at rock art along the way. Ian was also a consummate cook, and when at home in Canberra, Louise and Ian hosted many memorable dinner parties, for which his friends are seriously grateful.

Ian will be remembered by his all his colleagues and friends for his zest for life and for knowledge. He set a remarkable example to all who knew him. He is survived by his wife Louise Hamby and their son Cole.

Some personal recollections from four of his colleagues follow.

David Adams (now Executive Director, Illawarra Health and Medical Research Institute)
I was doing my PhD with Professor Peter Gage (in the School of Physiology and Pharmacology, UNSW) when I first met Ian. Later, when I was a postdoc at the University of Washington (1978-80), Ian was working at the Mayo Clinic in Rochester. He would visit the Friday Harbour Laboratories, Puget Sound with colleagues from the Mayo Clinic to collect jellyfish and extract aequorin, the calcium-activated photoprotein. For his two first-author Nature papers (1980 and 1984) Ian used aequorin that he had extracted to measure intracellular calcium transients in smooth muscle and neurones. On many occasions, I would meet Ian at Friday Harbour and spend the weekend with him. I also visited Ian in Rochester during winter and caught him shovelling snow to free his car! Subsequently with another Peter Gage PhD student Owen Hamill, we attended his wedding to Louise Hamby in Greensboro, NC.

Peter Carroll (now Honorary Professor Discipline of Pharmacology and School of Pharmacy, University of Sydney):
Ian was truly one of the good guys who lived life to the full, despite the physical handicap he suffered as a result of a childhood polio infection. He had an unbelievable zest for life, and he never let anything slow him down. For many years Ian and I were close colleagues in the School of Physiology and Pharmacology at the University of NSW. Ian was a very competent researcher, an excellent teacher who really cared for his students and their welfare, and a very close personal friend with whom I shared many enjoyable and unforgettable times. In recent years, while I did speak with Ian on the phone, I did not see him in person as much as I would have liked. I had great respect for Ian and held him in very high esteem.

Simon Gandevia (now Deputy Director, Neuroscience Research Australia):
My first meetings with Ian occurred during my BSc Med research in 1975. His lab and desk were often close to mine until I returned to Medicine in 1979. He introduced me to his quest for the finest neenish tarts and tastiest hamburgers at the local Randwick shops. More importantly I grew to respect his fascination with physiological processes and the breadth of techniques available to study them. Later our work converged directly when at Prince Henry Hospital with my first PhD student, David McKenzie. We began to tackle a topical problem in respiratory medicine: the fatiguability of human inspiratory muscles. Ian joined us and we confirmed, unsurprisingly to physiologists but not to physicians at the time, the high fatigue resistance of the diaphragm in human volunteers and isolated animal preparations. Later, Ian and Professor John Colebatch (respiratory physician at Prince Henry Hospital), both extraordinary survivors of severe polio infections, insisted that I start work on the muscle performance in people with prior polio. This led to establishment of a clinic for prior polio patients and work on the strength, endurance and voluntary drive to muscles in polio. Ian was part of that work which helped establish important aspects of the long-term response to prior polio infection. I remained a loyal friend and medical advisor especially when Ian became unwell as a result of his respiratory and musculoskeletal conditions.

Guy Lewington (Now Director Rockmin Solutions and Rockmin Composts)

I first met Ian in November 1982. We shared a love of the outdoors and as a geologist I could wax lyrical on my fieldwork experiences. In 2005 I invited Ian to join Martin I'Ons (a geochemist and close friend), and me as a Director of Mt Sylvia Diatomite P/L. He was most enthusiastic. He was CFO and Administration Manager. He was a most personable individual and delighted in talking with customers. His natural aptitude for research came to the fore with his added role in research and development as the business developed. He drove improvement in quality control and used his connections to find the researchers who would confirm the qualities as a natural insecticide. Dr Stephen Doggett from the Department of Entomology (ICPMR) Westmead Hospital led a team that confirmed the benefits of diatomaceous earth in eradicating bed bugs. Prof. Dusan Losic, Director of ARC Graphene Research at the University of Adelaide worked on Nano material properties of diatoms as did researchers including Prof Ian Mackinnon and his group at QUT. As the company grew we established a basalt quarry. We recognised that basalt had unique qualities as it had been partially palagonised. This understanding led Ian once again to find scientists who could evaluate the benefits of our discovery. Studies were undertaken in the use of palagonite in the reduction of odours in commercial chicken houses and studies at Southern Cross University quantified its impressive water-holding capacity. Ultimately a number of companies became interested to buy the company and this occurred at the end of 2019. It was always Ian's hope that we would have a successful sale as he knew his days were numbered and he wanted to make sure his financial house was in order. We had achieved a 16-fold increase in the value of the company and it is a great sadness that he did not live long enough to enjoy it. We became the closest of friends over the 15 years working together and not a day went by without a phone call or an email.

Prepared by Simon Gandevia (Neuroscience Research Australia) with input from a number of his colleagues, family and friends
21st March 2021

PhD Student Small Grant Winner Profiles - 2020

Aldo Meizoso Huesca

University of Queensland

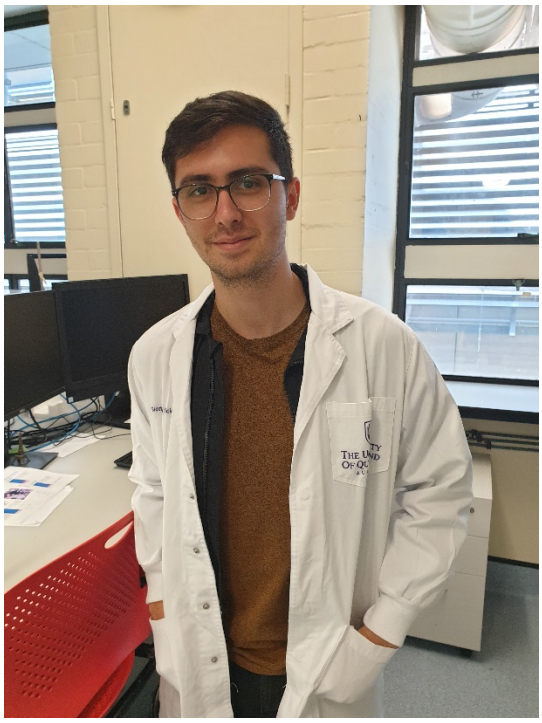
Congratulations on being awarded the grant. What is the background of your project?

Thank you, I want to use this opportunity to acknowledge the role that the Australian Physiological Society plays in the academic and professional development of students organizing initiatives such as this one (PhD small grant scheme). Putting a grant proposal together was already quite an enriching experience before being awarded with the grant. I hope that activities like this one continue in the future.

My project is focused on understanding how the skeletal muscle employs proteins involved in contraction to produce heat when this tissue is at rest, with a particular interest on the contribution of small fluxes of calcium across intracellular membranes on resting heat generation.

What were your findings? Did restrictions relating to COVID-19 alter your project timeline or outcomes?

We have been able to establish a novel approach to define the contribution of the sarcoplasmic reticulum (SR) calcium release channel (RyR) to heat generation in resting skeletal muscle fibres. With this approach, we estimate that ~50% of the basal heat coming from ATP hydrolysis at the sarcoplasmic reticulum is directly linked to calcium ions being constitutively leaked out of the SR through the RyR; an observation with important implications in



different fields such as metabolism or ageing, where these processes become altered.

Developing this project during COVID-19 times has been a challenge in a sense that the uncertainties related to potential outbreaks and lockdowns made it difficult to follow a fixed schedule. Several times my experiments were interrupted due to lockdowns.

What are your future plans?

In my near future I will continue working on this project as well as some others within the laboratory. Simultaneously, I will put together a manuscript with our findings to be submitted for publication. I also have to submit my PhD thesis early next year, so I am working on that. After this, the idea is to look for a postdoctoral position where I can continue developing my scientific career.

Do you have any advice for students trying to adapt to research in the time of COVID-19?

In my personal experience here in Queensland, one thing that helped me to continue progressing with my research in the COVID-19 context was to create a list of things to do and categorize them based on their priority, including wet lab work like preparation of solutions or executing experiments and computer work like data analysis or writing, and to try to keep up to date that list. This way, if a lockdown occurred, I had something already identified to work on at home. In contrast, if it was possible for me to work on campus, I would know beforehand exactly what I had to do to be as efficient as possible during my time in the lab.

However, I am aware that my work has only been mildly impaired compared to others within Australia and overseas. I think it is important to keep in mind that several aspects of this situation are out of our control and that we as students should not feel disappointed at ourselves due to research impairments during this pandemic. In contrast, we should recognise our own work and performance during this period and be proud for keeping up despite the difficulties that COVID-19 brought to our research plans.

Dr Daniel Singh

University of Queensland

Congratulations on being awarded the grant. What is the background of your project?

Thanks to AuPS for this student grant award - awesome initiatives like this really make a difference for students and ECRs! We set out to design and validate a novel malignant hyperthermia (MH) diagnostic assay. MH is a myopathy that arises from a mutation on the skeletal muscle RyR Ca^{2+} channel. Exposure to a triggering agent (e.g. most volatile anaesthetics) in combination with an underlying RyR mutation acts as a trigger for excessive release of Ca^{2+}, causing uncontrolled muscle contractions. This leads to excessive heat production and potential fatality if left without immediate treatment. From an anaesthetist's perspective, a MH event during surgery

is considered their 'worst nightmare'. Current diagnostics are problematic, non-specific, expensive, and invasive. The gold standard diagnostic assay, known as an *in vitro* contracture test (IVCT), examines the contracture force of a 5 cm skeletal muscle sample in the presence of Ca^{2+} channel agonists. We aimed to downsize this assay by using single muscle fibres sourced from needle biopsies (rather than the current 5 cm strip of muscle) and track Ca^{2+} movements with fluorescent confocal microscopy.

What were your findings? Did restrictions relating to COVID-19 alter your project timeline or outcomes?

We were able to assess a large population of individuals with our novel diagnostic assay. The assay was effectively able to distinguish individuals with malignant hyperthermia. The key advantages of this technique (small muscle sample required, cost effective, specificity) make it a favourable candidate to replace current diagnostics. To validate the technique, we collaborated with the MH diagnostic units at Westmead Children's Hospital and The Royal Melbourne Hospital. For validation, a small piece of muscle was sectioned from routine IVCT muscle biopsies and priority transported to our Lab for simultaneous testing. This allowed us to compare our results with the actual diagnosis and establish the reliability of our technique. Unfortunately, only a small number of these simultaneous biopsies have been assayed due to COVID-19 related disruptions in elective surgery and logistics (minimal freight options). The project is currently on hold and should restart again soon.

What are your future plans?

Currently I'm employed as a postdoc in the Launikonis skeletal muscle group at UQ. Hopefully I can continue a successful career in skeletal muscle research as it is an area that I've always had a keen interest in. However, I have noticed that its slowly becoming a dying art - in particular skeletal muscle cell physiology! AuPS symposia/talks have traditionally comprised a large portion of skeletal muscle research, hopefully the glory days return in the near future! I also enjoy teaching which I put a lot of effort towards during my PhD, so I wouldn't mind staying involved in physiology education as well.

Do you have any advice for students trying to adapt to research in the time of COVID-19?

Keep on grinding! A PhD will always have its obstacles, and this is just another 'mild' inconvenience. I had to completely change the direction/interpretation of one of my thesis chapters due to COVID-19 but this was a positive learning curve in itself. I'm sure many are itching to get back into the lab or spend more time in the lab but don't forget to make the most of your computer time. Also, try to attend conferences even if they are virtual or small local meetings. It gives you an opportunity to take a step back and listen to others in your field or others at your career level. By the end of the conference and receiving advice from others, you may realise that those final experiments that you've desperately been trying to complete while in lockdown aren't actually 'that critical'.

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The next issue of AuPS News will be distributed to members in December 2021.
All contributions for AuPS News should be sent to: associateeditor@aups.org.au before the end of November; please feel free to email any articles or article ideas.

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