Australian Physiological Society

THE PROFESSIONAL ASSOCIATION FOR AUSTRALIAN PHYSIOLOGISTS

AuPS News – March 2018

A letter from the President: Prof Gordon Lynch, University of Melbourne

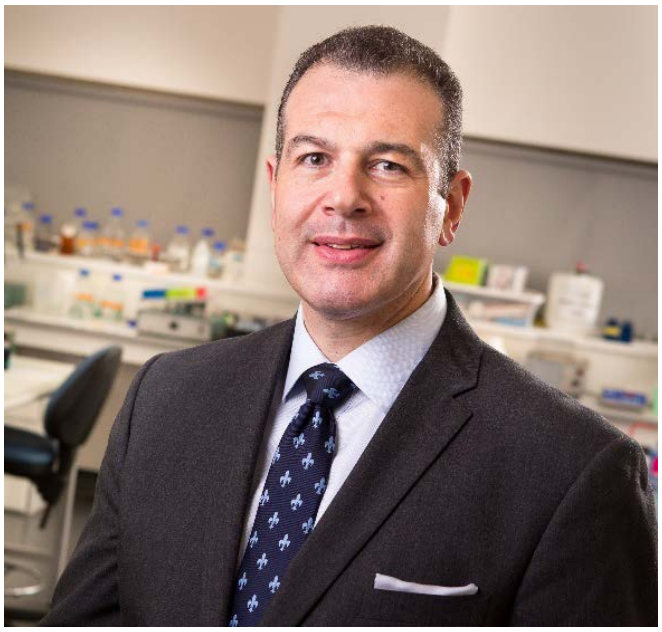
It is my great honour and privilege to serve as President of the *Australian Physiological Society*.

On behalf of the *Society* membership, may I take this opportunity to sincerely thank Professor Graham Lamb for his outstanding contributions to the *AuPS* over many years, but especially for guiding it so well as President in its most recent history. On a personal level, I am very grateful to Graham for sharing his insights about the role and acquainting me with the behind-the-scenes handling of various matters of concern to our membership. Thank you, Graham.

The *AuPS* has played and continues to play a major role in shaping my career – starting as a (very) naïve graduate student, developing as an early career researcher and then as a University-based academic researcher.

A brief history

I did my undergraduate degree at La Trobe University, majoring in computer science (yes, you read that correctly!) and zoology (animal physiology). I was not a good computer programmer then and I'm certainly not a good programmer now! However, one subject of the degree, 'software engineering', involved us working together in teams on a specific industry-based project. Being part of and leading motivated teams just clicked with me and I've never forgotten the principles it taught me. I was privileged to do my Honours year with Dr. George Stephenson (as he was then, later of course, 'Professor Stephenson') and with Dr. David Williams (yes, later 'Professor Williams'), who had just returned from the United States on a NHMRC C.J. Martin Fellowship. Despite realising they had a somewhat headstrong but naive charge on their hands, they remained patient and caring and provided me the opportunity and freedom to pursue research on muscle and exercise. Both had an enormous influence on my personal and career development.



During my Honours year in 1987, George Stephenson was the Local Secretary of the September scientific meeting of the *Society*, and because we students had assisted in the setting up of the conference, he allowed us to attend. It was a fascinating eye-opener on how scientists communicate research and it sparked my desire to pursue science as a career.

My greatest opportunity came when David Williams was appointed to a Lectureship in Physiology at The University of Melbourne and he gave me the chance to go with him to undertake a Ph.D., negotiating that as part of his job offer. So, you can well appreciate the role that David Williams has played in my life both personally and professionally. Had it not been for him providing me with that opportunity, I would not have achieved what I was eventually able to accomplish. He took a chance on me

when he didn't have to, and I made sure that I didn't let him down.

In those days, the *Society* held two scientific meetings every year and so I made the most of this by attending and presenting talks and posters at every opportunity. Can I assure our younger members that the *Society*, in the so-called 'old' days, were a much tougher crowd than they are today and some delighted in tearing strips off the presenting students! Regardless, the *Society* was a wonderful training ground for me and I learned over time to relish in giving presentations and communicating publicly. This continues today through my privileged position in the broadcast media, where each week for the last 16 years I've presented the science of health and fitness on *ABC Radio* across our country and internationally. If you don't wake up early on a Saturday morning to exercise, don't worry, you can always listen to the podcasts via Twitter (@GordonSLynch).

I worked hard during my Ph.D. under the watchful eyes of David Williams and George Stephenson and published extensively on topics related to muscle cell function, exercise and muscle plasticity. I was fortunate to secure a C.J. Martin Fellowship for postdoctoral training at the Institute of Gerontology and Department of Physiology at The University of Michigan, with mentor Professor John A. Faulkner, delving deeply into muscle contractility, injury and repair, ageing (sarcopenia) and muscular dystrophy. John Faulkner's influential mentorship and my training at Michigan, changed my life and forged my character as a scientist. It was a highly competitive environment and it brought out my best and, at times, my worst! Regardless, my training overseas defined me, both personally and professionally. When I was awarded the A.K. McIntyre Medal in 1995, while still overseas, it was naturally a pretty big deal and John Faulkner threw a huge party at his house in my honour to celebrate. It is something I'll never forget.

I returned to the Department of Physiology at The University of Melbourne in 1997 and was fortunate to be awarded fellowships from the Australian Research Council and the NHMRC. My faculty career began in 1999 when I secured a lectureship in the Department that I love very dearly. I worked very hard and my career progressed well, supported by the efforts of so many amazingly talented, dedicated and loyal students and postdoctoral fellows, many of whom remain very close to me as friends and collaborators. Being a dedicated and inspirational mentor requires selfless commitment and the reward for those efforts comes from seeing trainees achieve and become more successful than you. It is an amazing feeling and I am always grateful and never take for granted the privileged position I enjoy as a physiologist at one of the world's best universities.

This year, in 2018, I celebrate my 10th anniversary since becoming a full Professor at The University of Melbourne. In that time, I have served as Head of the Department of Physiology (2011-2016) and most recently was tasked with establishing and leading the *Centre for Muscle Research*, a unique hub to facilitate 'big picture' collaborative research on muscle. The *Centre* brings together muscle-related researchers from across the university and its affiliated hospitals and institutes and these collaborations extend to working with (and not competing against!) other muscle researchers across Australia and internationally. Most importantly, the *Centre* will be an exemplar for mentoring and training researchers at all levels and facilitate career opportunities for emerging research leaders. It's an exciting time to be involved in muscle biology and I'm very lucky to be a part of it. The *AuPS* will continue to be the place where our best research is showcased and I will continue to look to the *Society* as a place to recruit highly motivated and talented researchers at all levels.

The future of physiology

Physiology is a remarkably resilient discipline having undergone remarkable changes over the last 30 years or so. It remains the foundation discipline and point of reference for molecular, cellular and systems biology and provides the framework of relevance for related disciplines such as neuroscience, immunology and biochemistry. But how do we keep physiology relevant in the face of continual change? How do we adapt our research and our people to remain competitive for revamped national funding schemes?

The days of single investigators or single labs researching away comfortably, doing one or two techniques and generating incremental advances in their field, are long gone. Big teams are needed to tackle more fundamental research questions and for translating research into medical application or industrial-scale relevance. This sort of collaboration is not merely encouraged, it is essential

for our survival. How do physiologists position themselves and their expertise to be part of these research teams? How can we utilise skills in integrative physiology to make sense of big data and so be in competitive positions to lead such teams? How do we best train and mentor our early- and mid-career researchers such that they have the security and trajectory that allows them to develop into leaders who will steer our discipline through its next challenges? How will the *AuPS* maintain and expand its links with other physiology societies to ensure we're at the forefront of physiology education? These are just some of the issues facing the discipline and the *AuPS* Council and the *Society* membership need to be mindful when devising schemes and strategies to address them.

Through my observations as a long-serving member of a review panel for our major funding agencies, I would suggest one way that we physiologists could compete more favourably for national grants and improve the rates of success, would be to act more kindly to one another when reviewing grants! In the current highly competitive environment where one or two negative comments can derail a deserving grant, it makes it extremely difficult for that grant to be championed 'across the line' when 'experts' (often fellow physiologists) have unnecessarily criticised non-critical aspects of the proposal. That attitude needs to change. Researchers in other disciplines, I will give physiotherapy as an example, support each other's grants very strongly and this helps advocate for their success. Of course, not every grant can be supported, especially if there are obvious flaws, but if you have the pleasure of reading quality physiology grants or fellowships then support them and leave the agency in no doubt as to why that project or person deserves to be funded! We can have some influence on the future of the discipline by promoting good grants and fellowships of other physiologists.

The *AuPS* caters for all physiologists and I urge our membership to encourage colleagues to become new members or for lapsed members to renew. I also encourage graduate students and early career researchers to join the *Society* and help shape its future. There's a saying 'Decisions are made by those who show up'. So, if you want your specialty to thrive, then please get involved in the *Society* and help steer its direction, especially with respect to its scientific conference and special symposia. Council is keen to hear the views of our membership, so please keep us informed and the *Society* will try its best to serve your needs.

Wishing the *Society* and all its members the very best for a successful 2018.

Sincerely,

Gordon

Professor Gordon S. Lynch, Ph.D., FACSM, CSCS

Student Member Profile: Greg Quaife-Ryan,

University of Queensland

Greg was awarded the AuPS prize for best student publication at the 2017 Scientific Meeting in Melbourne.

The prize was proudly sponsored by SDR scientific.

What is your current position/role?

I am currently a 4th-year PhD student and a 2nd-year MD student at University of Queensland, under the supervision of A/Prof Enzo Porrello, Dr James Hudson and Prof Walter Thomas.

I was thrilled to win the AuPS PhD student publication prize. It went straight to the Pool Room. I believe my

mother has put it next to my last prize; the coveted "Most-Improved Player" for the under-13s Yeppoon Cricket Club. I am currently trying to finish my PhD in a timely manner.

Can you tell us about your award winning publication?

In contrast to the adult mammalian heart, the neonatal mouse heart retains a remarkable capacity for cardiac regeneration. The mechanisms that mediate cardiac regeneration in the neonatal period and that govern loss of regenerative capacity during postnatal development are largely unknown and currently under intensive investigation. To understand the physiological processes governing the shutdown of cardiac regenerative potential after birth, we assembled and analysed the transcriptomes of cardiomyocytes, fibroblasts, leukocytes and endothelial cells before and after myocardial infarction in the neonatal (regenerative) and adult (non-regenerative) heart. Importantly, several novel biological insights were gained from this data set, which provided a new understanding of the physiological processes governing mammalian heart regeneration.

A key finding was that all cardiac cell population undergo major transcriptional changes as they mature from neonatal to adult stages. However, in contrast to fibroblasts and leukocytes, cardiomyocytes and endothelial cells are unable to re-activate the neonatal gene program following cardiac injury. This finding challenges the current dogma that cardiomyocytes activate a foetal gene program following injury or disease. Moreover, our study presents a new framework for the loss of cardiac regenerative potential after birth whereby epigenetic condensation of cell-cycle genes during cardiomyocyte development, prevents re-activation of the regenerative gene program in the adult mammalian heart following infarction.

How did you begin your career in Physiology?

I completed honours in Prof Walter Thomas' lab looking at the role of a taste receptors in cardiovascular biology. Honours was tough but seeing Prof Thomas' enthusiasm for science inspired me to do research. After Honours, Prof Thomas was kind enough to employ me as a research assistant. I was oft heard to remark "do you want me to autoclave that?" – autoclaving is still one of my great skills. It was around this time that I met A/Prof Enzo Porrello and Dr James Hudson and began my PhD in their labs. My time here has been some of the best years of my life. I have been incredibly lucky to work in labs that not only produce world-class research but are filled with great people.

What research are you currently involved with?

I am looking at the role of a cell-cell adherence signalling molecule called beta-catenin in controlling cardiomyocyte proliferation. Many people in the lab has devoted several years of work in this project and we hope to publish it shortly.

What is the career direction you would like to take in the next 3-5 years?

I will finish medicine and then decide whether I become a medical doctor or a cool doctor (science). At the moment, I am interested in doing a Post-Doc looking at how chromatin architecture is remodelled and how this process impacts cardiac development and regeneration.

What do you like to do when you are not in the lab or studying?

I am currently trying to get fit and I swim a lot. My housemate recently got a Maltese puppy, which I refer to as my dog. I have devoted the majority of my time to sending innumerable videos of the puppy to friends, family and even brief acquaintances.

Greg's was awarded the PhD publication prize for:

Quaife-Ryan GA, et al. Multicellular Transcriptional Analysis of Mammalian Heart Regeneration. Circulation. 2017, 136:1123-1139.

Science Meets Parliament 2018

AuPS representatives Richard Mills and Renee Dwyer

Dr Renee Dwyer and Dr Richard Mills recently represented AuPS at the Science meets Parliament (SmP) meeting in Canberra. SmP is an annual event that aims to build understanding between federal parliamentarians and those working in the science, technology, engineering and mathematics (STEM) fields. This year the meeting was attended by more than 200 STEM professionals to discuss the future direction of science and recognise the importance of science to Australia economically, socially and environmentally.

On Day one delegates heard from the leaders in Australian science, including Australia's Chief Scientist, Dr Alan Finkel and CSIRO Chief Executive, Dr Larry Marshall, who shared their insights into policy, media, science and technology, politics and lobbying. The day concluded with a Gala Dinner in the great hall of Parliament, where the opposition leader, Bill Shorten, and the Minister for Jobs and Innovation, Michaelia Cash, gave their vision for the STEM sectors.

AuPS representative Richard Mills (far right) with MP Susan Lamb (second from left).

On Day two, delegates met face-to-face with parliamentarians to share their enthusiasm for science and discuss pressing issues in STEM. AuPS delegates discussed the necessity for a long term science vision (10 yrs plus), gender equality in STEM, the significance of early maths education for STEM disciplines and the importance of funding basic, non-applied research. The National Press Club Address by Science and Technology Australia president Professor Emma Johnston was also a highlight.

Overall, SmP was an interesting, valuable and insightful opportunity, that we wholeheartedly thank AuPS for supporting.

Dr Richard Mills – University of Queensland

Dr Renee Dwyer – University of Tasmania

Student Member Profile:

Paris Papagianis,

Monash University and the University of Western Australia

Paris was runner up for the AuPS prize for best oral presentation at the 2017 Scientific Meeting in Melbourne.

The prize was proudly sponsored by SDR scientific.

Can you tell us how you got into research?

I completed a bachelor of science with Honours at Monash University, where I majored in Anatomy and Physiology. I developed a passion for physiology research during an undergraduate unit at Monash called Fetal and Neonatal Development (BME3082). Students in this unit were able to participate in research being conducted by scientists at The Ritchie Centre. Many researchers within the Ritchie Centre use large animal models to carry out experiments and I found this particularly attractive and I then decided to do my Honours at The Ritchie Centre, Hudson Institute of Medical Research. My honours project investigated the use of nasally delivered bubble continuous positive airway pressure as a first line of respiratory support in preterm lambs.

Can you tell us about your current role?

I am currently a 3rd year joint PhD candidate at Monash University and the University of Western Australia. I am within the Perinatal Inflammation Research Group, headed by A/Prof Tim Moss. Broadly, this research group investigates how infection and inflammation before birth affects/alters fetal development and susceptibility to disease. The Perinatal Inflammation Research Group also investigates treatments to prevent infection and inflammation in fetal and newborn life.

My PhD is a collaboration with The University of Western Australia. I am the first domestic PhD student to be enrolled in a joint PhD program between Monash University and The University of WA. The University of WA is home to the only preclinical intensive care research unit (PICRU) in the southern hemisphere for the long-term care of preterm lambs. The PICRU was established by Prof. Jane Pillow (BMedSci MBBS, PhD, FRACP) and allows the study of long-term systemic outcomes associated with controversial or promising neonatal therapies. At PICRU lambs are managed for a number of weeks or months in a way that mimics neonatal care.

My PhD studies utilise the PICRU to investigate the application of human amnion epithelial cells (hAEC) as an anti-inflammatory therapy in preterm babies likely to develop the chronic lung disease, bronchopulmonary dysplasia (BPD), due to prolonged respiratory support and intensive care.

What did the work presented at AuPS in 2017 involve?

My award at the 2017 AuPS meeting followed the presentation of my work using hAECs as a therapy for BPD-like lung pathology in preterm lambs. My work demonstrated the pro-reparative effects of hAECs in preterm lambs exposed prenatally to inflammation and maintained for 7 days postnatally. Prenatal inflammation is the most common cause of preterm birth. Postnatally, lambs were managed as per clinical practice for preterm infants in intensive care. Preterm infants in intensive care are often kept alive using respiratory support, which although lifesaving, can cause chronic lung inflammation and BPD.

Preterm lambs that received hAECs on the first day of life had improved lung architecture and some indication of lung maturation in comparison to preterm lambs that did not receive cells. However, despite improvements in lung structure, preterm lambs receiving hAECs spent an increased amount of time intubated on mechanical ventilation over the first week of life. The immune

response of animals receiving hAECs was enhanced, potentially indicating modulation of the immune response to inflammation with hAECs. The data from this work is expected to help the design of a phase II dose-escalation clinical trial using hAECs in preterm infants at risk of developing BPD. A phase I safety trial using hAECs in preterm infants with established BPD has already been conducted (ACTRN: 12614000174684).

What are your current career plans?

I am due to submit my thesis by August 2018. I then aim to pursue a career in research and hope to obtain a postdoctoral position following my PhD. I am particularly interested in research targeting the health of women and children.

Paris' award winning presentation was titled:

'Human amnion epithelial cells alter lung development and inflammation in 7-day-old preterm lambs exposed to inflammation before birth.'

Upcoming Events:

A preliminary list of invited speakers and symposia is now available.

Online Conference Registration will be available in August 2018

Local Contact: Bill Phillips william.phillips@sydney.edu.au

Conference Website: http://aups.org.au/Meetings/201811/

AuPS PhD Grant Scheme

AuPS council has developed a competitive grants scheme for AuPS student PhD members. These funds will support the purchase of equipment, consumables or training to further the development of students' PhD research programmes. The scheme will develop the students' CVs and provide experience in preparing grant applications.

Two x $1,000 AUD grants will be available, awarded to the two best applications from PhD student members of the AuPS.

Students must be currently enrolled in a physiology-related PhD programme at an Australian University/Research Institute.

The application should include:

- Research proposal (Background, rationale and aims (300 words).
- Justification and budget (200 words):
- What the applicants will spend their funds on.
- Costing of equipment/consumables, training etc.
- Significance of the research and expected outcomes of funding (200 words).
- References (maximum of 10)
- Letter of support from primary supervisor.
- CV (2 page limit)

Instructions to applicants:
Applications should be written in Times New Roman 12 point, justified formatting, 1.5 line spacing.

- Word limits must be adhered to.
- Vancouver reference style.

The application will be assessed on scientific merit, clarity of research aims, feasibility, and added benefit to their PhD. Early PhD candidates should be encouraged to apply as the grants are based largely on the project and not their CV.

Applications close Monday April 16th at 5pm by emailing the secretary d.skelly@griffith.edu.au.

Funds cannot be spent on travel or conference attendance.

Successful applicants must provide a half -page report of how funds were spent, and the benefits they provided (to be presented to council at the end-year meeting and published in the AuPS Newsletter).

Dr Deanne Skelly

National Secretary
Australian Physiological Society

Griffith University
email d.skelly@griffith.edu.au

Details can also be found on the AuPS Facebook page for students and early career investigators.

The Gage Conference on Muscle

Canberra Boys Grammar School, ACT, April 17th to 19th 2018

This is a biennial meeting continuing the original series of Curtin Conferences organized by Peter Gage. It encompasses all aspect of the biology of striated muscle, including excitation-contraction coupling; ryanodine receptor physiology and biophysics; Ca^{2+} regulation; performance and fatigue; metabolism and aging; cardiac muscle growth and dysfunction; myopathies.

REGISTRATIONS AND ABSTRACT SUBMISSION
Close 4th April, 5.00 pm

Further information: http://gageconf.org.au/muscle2018/
email: nicole.beard@canberra.edu.au

Organising Committee

Angela Dulhunty, Gordon Lynch, Bradley Launikonis, Lea Delbridge, Miranda Grounds, Nicole Beard, Robyn Murphy, Sandra Cooper, Marco Casarotto

The EMCR Forum's fifth national meeting, *Science Pathways 2018: Diversify your Thinking*, will be held in Brisbane at the Mercure Hotel on 23-24 April 2018. The event will bring together early- and mid-career researchers (EMCRs) and scientific leaders from academia, industry and government.

Diversify Your Thinking presents a highly interactive program with a strong professional development focus for EMCRs.

During the two day conference delegates will explore a range of topics including:

- how to achieve equity in STEM
- how to access funding from non-traditional sources
- the key considerations for interdisciplinary research.

Delegates will take part in a workshop using cognitive behavioural coaching techniques on "Maximising Research Productivity (and still having a life)" by ThinkWell.

This is Australia's premier conference for career development of EMCRs from academia, industry and government and offers unique opportunities to network with leading scientific professionals from some of Australia's top organisations in public and private enterprise.

Most importantly, this meeting aims to engage you—Australia's early- and mid-career researchers, across all disciplines and from around the country—in active discussion. The Forum wants to learn more about the specific challenges you face and, with you, devise some possible solutions—both aspirational and practical. We want you to have your say

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MONASH BIOMEDICINE DISCOVERY INSTITUTE

Breakthrough Discoveries in Metabolism, Diabetes and Obesity is pleased to announce registrations and abstract submissions are now open!

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This issue of AuPS News was compiled by Chris Shaw with many thanks to the generous contributors.

The next issue of AuPS News will be distributed to members in July 2018.
All contributions for AuPS News should be sent to: newsletter@aups.org.au before the end of June.