Member Profile:
Dr Charles Sevigny
University of Melbourne

Winner of the Michael Roberts Excellence in Physiology Education Award

Congratulations on winning the award. Can you tell us about your career in Physiology Research and Education to date?

I began my doctorate in functional neuroanatomy with Prof Andrew Allen at the University of Melbourne in 2005, when I first moved to Australia from the U.S.- and yes, it was actually one of those 'with only the clothes on my back' stories but I'll spare you that one today. During that time, I had the opportunity to run a practical subject, Research-Based Physiology as a maternity leave replacement and immediately knew I loved teaching. I began doing casual lecturing for second-year Physiology students and found it incredibly rewarding. A few years later, a continuing lectureship position opened in the Department for a teaching specialist. Knowing I needed to complete my PhD before I would be eligible, I wrote my thesis in 3 months and submitted it the day before the interview. I was fortunate enough to be the successful candidate and nine years later here I am. Now I'm a senior lecturer in the Department of Anatomy and Physiology, and the Director of Digital Learning for the School of Biomedical Sciences, still at the University of Melbourne.

Can you describe your achievements and teaching innovations for which you received the award?

I've always taught large classes- 300-700 students, and one of the main challenges I always faced was bringing personalised learning to so many students. How do you make learning personalised at scale, and make students feel like they are involved in that learning process? Believe it or not I began with the lecture itself- there is no reason a lecture can't be interactive and inclusive. This meant establishing a dialogue with the room, using live polling, and encouraging inquiry-based learning among the cohort. But not everyone comes to lectures, so I needed another way to make learning and feedback personal.

We began building adaptive learning modules for students to interact with online. These modules complement lecture content with animations (built in-house) and text-based information which provides a more interactive alternative to the textbook. This blended-learning approach also utilizes 'question trees' which provide instant feedback, and redirect students to more fundamental questions should they choose an incorrect response.

It was when our animator, Jairus Bowne, was building a fantastically accurate animated model of the human heart that we both realised what we really wanted to do was reach out and grab it, explore it, pull it apart. I had just received some funding at the time from the University's David White Award for teaching Excellence, and we put that towards purchasing two Virtual Reality (VR) headsets. In VR, we could immerse ourselves into this exploration in ways we never could on a flat screen.

From there we launched the Virtual Reality Learning Studio in the Department of Physiology and hosted thousands of students all exploring the heart in this novel way, and they absolutely loved it. Two years later we grew into the Digital Learning Hub (DLH) for the School of Biomedical Sciences, not only continuing with VR activities, but developing our own programs, and getting students to develop content as well.

Then came 2020. We were teaching online now, and the challenge grew to keep students engaged. Student wellbeing has been an increased concern during the pandemic, and wholly online teaching threatened to exacerbate this detachment and lack of motivation if deployed in a depersonalized manner. Challenging, but not impossible with the right approach.

My approach ranged from running live interactive lectures and workshops through Zoom, with a very active student chat element and synchronous polling,

through to the development of an entirely novel platform for content delivery together with my colleagues Keenan Hellyer (software development genius) Jairus Bowne (animator extraordinaire) and Jo Tay (award winning learning designer and user experience/user interface guru). The platform, named _Roslin_ deploys a range of question types which provide personalized feedback, branching adaptive learning elements enabling self-guided learning paths, rich media including interactive 3D elements, a high resolution slide viewer with collaborative annotation, and 360° media which can recreate explorable environments such as hospitals or laboratory settings. We continue to develop this platform in anticipation of blended learning elements which will persist past the return to on-campus learning. In the first two months since it's first creation, Roslin is deployed across seven subjects, with an average monthly viewership of 1,800 unique visitors and 6,000 pageviews. I am especially proud of the coronary vasculature module which was developed by my Honours student, Zois Stavrakis this year, who was able to persist with his project despite the unanticipated change in landscape.

What does the society and award mean to you?

We oftentimes become siloed in our teaching practice, and the AuPS education forums have always been a lucrative source of ideas from a collection of outstanding educators. I've made great friends and learned so much from these talented Australian academics and it is a great honour to be selected for this award from such an inspirational group. I think I can speak for all of us when I say our reward for teaching is seeing the students learn and grow- seeing that lightbulb go off when they understand a challenging topic or being there to help shepherd them through a tough time and watching them succeed through hardship. I'm delighted to be recognised by the AuPS, but it honestly feels strange to receive an award for something you would do for free (don't tell my supervisor I said that).

What do you see as the current and future challenges in physiology education?

The pandemic catapulted us ten years into the future. Technologies we were previously hesitant to try suddenly became essential and we began to see their value. The tree was shaken, and we needed to move out of old habits and reinvent the way we teach. I believe we will come out of this with more creative blended approaches to assessment, feedback, and the way we deliver content. The challenge for the future will be determining the right blend of these technologies with our traditional components. We still want students to be social- sitting at the café discussing something interesting they just learned in lecture or how their experiment went horribly wrong in prac class. (Maybe I'm an idealist).

The trap I hope we avoid is not realising that online delivery can be time and cost effective in the long run and letting that trump the pedagogy and pastoral care which should be our driving principles.
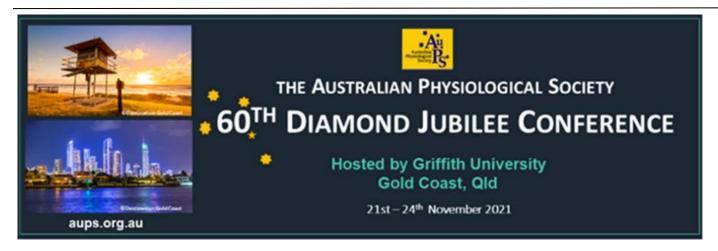
Digital Learning Hub: https://biomedicalsciences.unimelb.edu.au/study/dlh

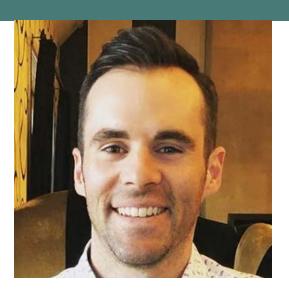Charles Sevigny and Jairus Bowne

Keenan Hellyer

Member Profile:
Dr Angus Lindsay
Deakin University

Angus was the winner of the best oral presentation at the student and ECR forum in 2020.

Presentation Title: **Stress: a novel regulator of Duchenne muscular dystrophy pathogenesis?**

What sparked your interest in physiology, and what is your current position/role?

From a young age, I have competed in several sports that require a physiological component, such as track cycling and powerlifting. Understanding what differentiated competitors and experimenting with interventions that accelerate recovery of muscle function following exercise triggered my interest in physiology. I completed my PhD at the University of Canterbury, New Zealand, under the supervision of Associate Professor Steven Gieseg and Professor Nick Draper. I investigated the effects of training sessions, competitive games and post-exercise cooling interventions on rates of recovery using biomarkers of psychophysiological stress in amateur and professional athletes. In 2016, I completed my first post-doc at the University of Minnesota with Professors James Ervasti and Dawn Lowe. My field of research changed somewhat and I began elucidating the molecular mechanisms regulating eccentric contraction-induced force loss in dystrophin-deficient muscle. It was during this tenure that I listened to Professor Aaron Russell present at a conference in Florida, and the next thing I knew, I was starting my next post-doc in the Institute for Physical Activity and Nutrition (IPAN) at Deakin University in 2019 under his leadership. In 2021, I was fortunate enough to receive the Philip Wrightson Fellowship from the Neurological Foundation to explore the role of stress on Duchenne muscular dystrophy pathogenesis.

Tell us more about the research you presented in the AuPS student and ECR forum.

During my three-year tenure at the University of Minnesota, I was part of a multi-disciplinary team (physiology, stress biology and neurobehaviour) that determined severe forms of behavioural stress can be lethal to a mouse model of Duchenne muscular dystrophy (*mdx*). Although other international teams have similarly explored the hyper-sensitivity of the *mdx* mouse to stress, this research (EBioMedicine. 55: 102700) was the first to show that stress drives physical inactivity and death through dysregulation of arterial blood pressure. Further investigations also led us to determine that the *mdx* mouse does not habituate to stress, and that stress is capable of exacerbating some dystrophinopathy phenotypes. Using this excellent foundation laid by Professor James Ervasti and Associate Professor Alessandro Bartolomucci, I began exploring what drove the differential sensitives of *mdx* mice to behavioural stress at Deakin University. This research demonstrated that *mdx* mice with superior resistance to a batch of behavioural stressors had a higher skeletal muscle oxidative capacity and a less severe striated muscle histopathology compared to *mdx* mice that were hyper-sensitive. These findings suggest that stress could be a novel regulator of Duchenne muscular dystrophy pathogenesis. Understanding the mechanisms that distinguish the behavioural stress response of *mdx* mice could lead to the identification of novel therapeutics that jointly target muscle

degeneration and neurological dysfunction in patients with Duchenne muscular dystrophy.

Where do you see yourself in the future?
I am currently in my 6th year post-PhD, a time for an ECR that is extremely challenging because I'm not a principal investigator nor a PhD student. However, I am in a position where IPAN offers an extraordinary mentoring program for ECRs (run by Professor Kylie Ball) that will undoubtedly support my goals of securing a permanent position at an Australasian Institute. I would love to be running my own research program within the next few years that primarily focuses on revealing the factors that drive striated muscle degeneration and neurological dysfunction in the muscular dystrophies.

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Member Profile: Crystal Seng

Crystal was the winner of the best poster presentation at the student and ECR forum in 2020.

Poster title: **Characterising Mitochondrial Ca^{2+} across a spectrum of SR-RyR1 Ca^{2+} leak**

What sparked your interest in physiology, and what is your current role?
My interest in physiology was sparked by a second year physiology course that I took during my undergraduate degree at the University of Queensland (UQ). My current supervisor (Associate Professor Bradley Launikonis) continues to be surprised by this, but it was his muscle physiology lectures that got me excited about muscle physiology and the discipline in general. I really enjoy the process of breaking things down at a muscle fibre level and looking at how millimolar changes in Ca^{2+} from one organelle can have an impact on the homeostasis of the entire cell and ultimately affect gross muscle function.

I am currently an MPhil student in Bradley Launikonis's Skeletal Muscle Research Lab in the School of Biomedical Sciences at UQ. I work on my degree part-time whilst studying a full-time MD degree. It is hard not being in the lab all the time, and I miss the collegiate atmosphere of research when I'm

University of Queensland

not surrounded by my colleagues. However, Brad is very understanding and I am exceedingly grateful for the support from my lab over the past few years.

Tell us more about the research you presented in the AuPS student and ECR forum.

It was a great opportunity to be able to present at the AuPS online student forum in 2020, despite the pandemic. The research I presented was a snapshot of a project I have been working on in collaboration with several lab members (Dr Cedric Lamboley and Luke Pearce). This research is centred around Ca2+ redistribution within skeletal muscle cell in disease states. Our main focus is on a mouse model of malignant hyperthermia, which is a condition where exposure to drugs such as volatile anaesthetics results in an excessive leak of Ca^{2+} from the SR through the ryanodine receptor and into the cytosol. So far we have found that Ca^{2+} accumulates in the cytosol and the mitochondria in these diseased mice in a gene-dosage manner and that there appears to be differential effect in slow twitch fibres in comparison to fast twitch. This is likely to have various ramifications for the wider cell, including a raised metabolic demand on the mitochondria.

Where do you see yourself in the future?
I am planning to finish my MPhil at the end of this year and also graduate from the MD program. Next year I will be a medical intern in Queensland and plan to get involved in clinical research when the opportunity presents itself. My career goal is to be a clinician researching and improving patient outcomes. Studying a dual MD-MPhil at UQ and being able to attend annual conferences such as the AuPS National Conference has been an invaluable experience of which I am appreciative.

Introducing Future Physiology – the Professional Development Focused Conference for Early Career Researchers

Future Physiology is the professional development focused conference for early career researchers! This year's conference will take place across 4 days, **19-22 April 2021** and will be hosted online, so that early career researchers can join from anywhere in the world.

The focus of Future Physiology 2021 is 'Future Physiology: 2021 and Beyond'.
https://www.physoc.org/events/future-physiology-2021/

The invited speaker talks and panel discussions will explore what we have learnt from challenges brought by the pandemic, and how we can apply this to better our lifestyles in the future.
The focus will be on the secondary impacts of the pandemic including an increase in sedentary activity, and the extreme change in teaching practices. The conference, now in its fifth year, is coordinated by our newly appointed Early Career Theme Leads, each representing one of The Society's seven Themes (detailed below.)

This conference is a platform for early career physiologists to showcase their research, engage with the physiological community, and benefit from valuable career development opportunities.

Attendees will have the chance to:
- Foster new collaborations with peers and role models across all seven of our Scientific Themes.
- Gain confidence in a supportive environment.
- Develop skills with the bespoke professional development workshops.
- Enhance their CVs by presenting their research and collecting CPD points.
- Enter their oral or poster communication into a competition to win a prize.

The programme offers something for everyone, regardless of their research focus.
Across four days, there will be a series of exciting talks, panel discussions, workshops and ePoster sessions, all of which can be accessed from anywhere in the world.

Our organising committee of Early Career Theme Leads

- Laura Rich, University of Nottingham, UK – Neuroscience.
- Dr Jennifer Pearson-Farr, University of Southampton, UK – Epithelia and Membrane Transport.
- Greg Sutton, The University of Edinburgh, UK - Cardiac and Vascular Physiology.
- Dr Ruth Norman, University of Leeds, UK – Education and Teaching.
- Dr Paul Ansdell, Northumbria University, Newcastle, UK – Human, Environmental and Exercise Physiology.
- Dr Kelly Bowden Davies, Manchester Metropolitan University, UK - Metabolic Physiology.
- Dr Shelley Harris, University of Southampton, UK – Endocrinology.

The Physiological Society

The Physiological Society brings together over 4,000 scientists from over 60 countries.
The Society promotes physiology with the public and parliament alike. It supports physiologists by organising world-class conferences and offering grants for research.
The Society also publishes the latest developments in the field in its three leading scientific journals, *The Journal of Physiology*, *Experimental Physiology and Physiological Reports*. www.physoc.org

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All contributions for AuPS News should be sent to: AssistantEditor_@aups.org.au before the end of May

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