

Canterbury Branch of the Royal Society of New Zealand Te Apārangi November 2023 Newsletter

Dear Member,

We hope you are keeping well, warm, and safe.

Since our last newsletter we have established two new working groups, one to look at how the Branch can provide support to students who enter or wish to enter a science fair/competition and how we can support further schools and their teachers in science, technology, and humanities.

The other group is to look at our student travel/research grants to see if the processes can be improved and to consider the applications and make recommendations to the Branch Council. They will also provide a draft Memorandum of Understanding to clarify some of the issues arising from recent changes to legislation and the operating procedures of the Trust.

If you have any suggestions for either of these groups, please contact us so we can have a chat with you about your suggestions.

We will soon be asking for your input to the development of a strategic plan for the Branch. Three questions you can give some thoughts too are:

1. What are our values?
2. What is our unique identity?
3. What is our target population?
4. How can we motivate the younger generations to join?

Finally, we have awarded more student travel grants to several students and received a report from a student who attended a conference in Japan with our help.

Student travel awards

We have given several awards in the past few months. The recipients are:

Kenny Ardouin, Ph.D., School of Psychology Speech & Hearing, University of Canterbury, Oral, Designing, delivering and evaluating a camp for people with cleft lip and/or palate in New Zealand and Understanding clinician perspectives of transitioning patients from childhood to adulthood in New Zealand, Appearance Matters 10 (AM10), Bristol, United Kingdom, 11 June 2024 – 13 June 2024.

Rebecca Attwell, Ph.D., Sports Science, University of Canterbury, Oral, Influence of the Menstrual Cycle and Body Image on Female Athlete Experiences, Sport & Exercise Science NZ (SESNZ) and Asia-Pacific Society for Physical Activity (ASPA) conference, Victoria University, Wellington, 27-29th November 2023.

Nicky Slater, Ph.D., School of Psychology, Speech and Hearing, University of Canterbury, Oral, Structural integrity of cholinergic pathways associated with executive function networks in Parkinson's disease., Annual Meeting of the Australasian Cognitive Neuroscience Society (ACNS), University of Sydney, Australia, 27 – 30 November 2023.

Below are reports from four of our award recipients...

Report from Recipient: Trudy Caljé-van der Klei

International Federation of Automatic Control World Congress 2023 (IFAC WC)

Dates: 9th July-14th July 2023

Recipient: Trudy Caljé-van der Klei (PhD student at University of Canterbury)

A group of us from the University of Canterbury began the journey over to Yokohama, Japan on the 6th July. This consisted of myself and six other participants both PhD students and post-doc researches working within biomedical Engineering. We spent the first few days gaining our bearings and preparing for the conference which commenced on the 9th July. That first day was reserved for registrations and the opening ceremony, sessions and discussions began on the Monday 10th July and continued through to the Friday 14th July.

The conference was held at the Pacifico conference centre in Yokohama, Japan and had over 1500 people attend globally. All three submissions that I either co-authored or was primary author on, were listed under the Biology and Medicine Society sessions. UC alone had over 20 open invited papers in this category. I thoroughly enjoyed attending these sessions where my colleagues were presenting their work. The conference was also a great opportunity to attend other sessions within my field as well as similar sessions. I feel I have a more comprehensive understanding of the research being conducted within the lung mechanics/ventilation/virtual patient field. Attending these sessions also gave great opportunities to have discussions with researchers (particularly from Belgium and Germany) around my research and their ideas around additional avenues or potential optimisation methods, as well as vice versa We also discussed the possibility of doing some joint research with the researchers in Germany and Belgium in the next couple years.

On Monday 10th July, I completed my first oral presentation of two. This was a portion of a large journal article I've been working on for the past year as a part of my thesis. The paper was titled: *Pulmonary Response Prediction Through Three Personalized Basis Functions in a Virtual Patient Model*.

Figure 1 (overleaf) shows Josie, Jaimey, and myself (also recipients of the travel award) on the first day registering for the conference. It is incredibly hot and humid in Japan during the summer so if we look flustered, that's why!



Figure 1: Left to right: Josie, myself and Jaimey at the IFAC WC

On Thursday 13th July, I completed my second oral presentation of the two. This was based on the work completed primarily by Alex Edmonds whom I supervised last year for her final year project (FYP). This paper grew on research I had conducted in 2021 for my FYP and over the summer 2021-2022 when I was employed at the university as researcher. The paper submitted was titled *Endotracheal Tube Cuffs for Neonates: Novel Cuff Design to Minimise Tracheal Damage*. Figure 2 (overleaf) shows picture captured during my presentation.

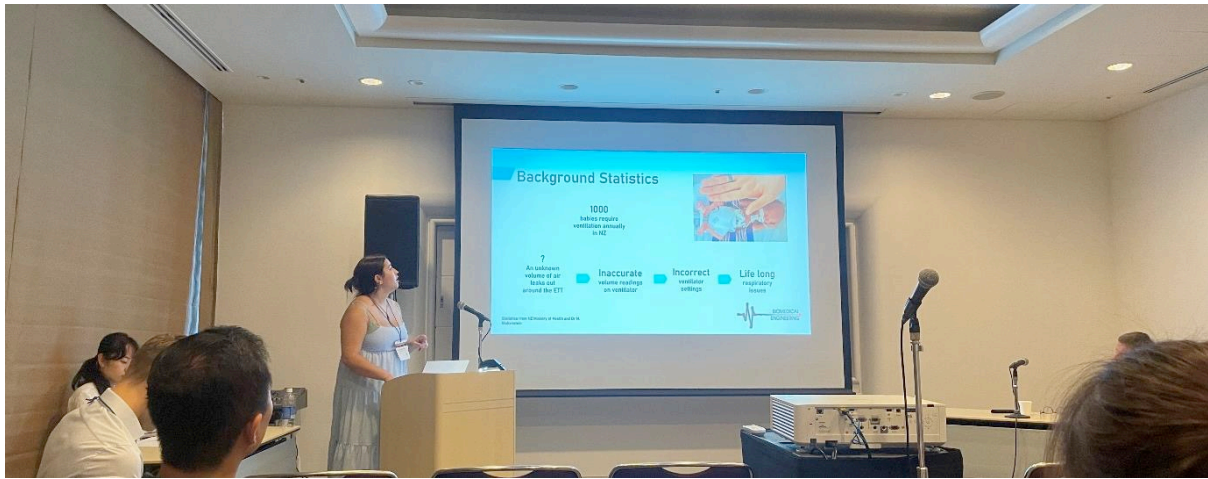


Figure 2: Mid presentation of paper 'Endotracheal Tube Cuffs for Neonates: A Novel Cuff Design to Minimise Tracheal Damage

Report – Rebecca M. Lee

Australasian Winter Conference for Brain Research (AWCBR) in Queenstown, New Zealand (26-30 August 2023)

Thanks in part to the generous funding and support from the Canterbury Branch, Royal Society of New Zealand, I recently attended the Australasian Winter Conference for Brain Research (AWCBR) in Queenstown, New Zealand (26-30 August 2023). The AWCBR is New Zealand’s premier annual interdisciplinary neuroscience conference with students, researchers, and clinicians attending from all over New Zealand and beyond. This year’s attendees included presenters from Germany, Canada, Taiwan, Brazil, and Australia.



I am a final year PhD student at the University of Otago Christchurch, and I presented a talk titled “Long term impacts of cannabis on resting state functional networks: are there any?”. Cannabis is the most widely used illicit substance used in New Zealand and worldwide. It is associated with varying effects on learning, attention, temporary hallucinations, paranoia, and short-term memory loss. I worked in collaboration with and recruited from the

Christchurch Health and Development Study (CHDS) – a longitudinal study of people born in Christchurch in 1977 and followed from birth. The sixty-nine participants in my study all underwent MRI scanning, and I analysed these scans to look for any brain differences between the past cannabis-using participants and the non-using control cohort. My research specifically looks at the long-term effects of past cannabis use and its effect on grey matter in brain volume, blood flow, white matter integrity, and brain network connectivity.

As an early career researcher, the AWCBR conference was of huge value to me as I was able to be peer reviewed and receive comments and feedback on improvements and future steps for my research and career pathway. I was able to use this chance to organize an MRI networking breakfast to meet with many like-minded senior researchers in the field to help expand my network, and hopefully make meaningful collaborations in the future.

Report from Chris Cameron

Travel details

Location: Boston, USA

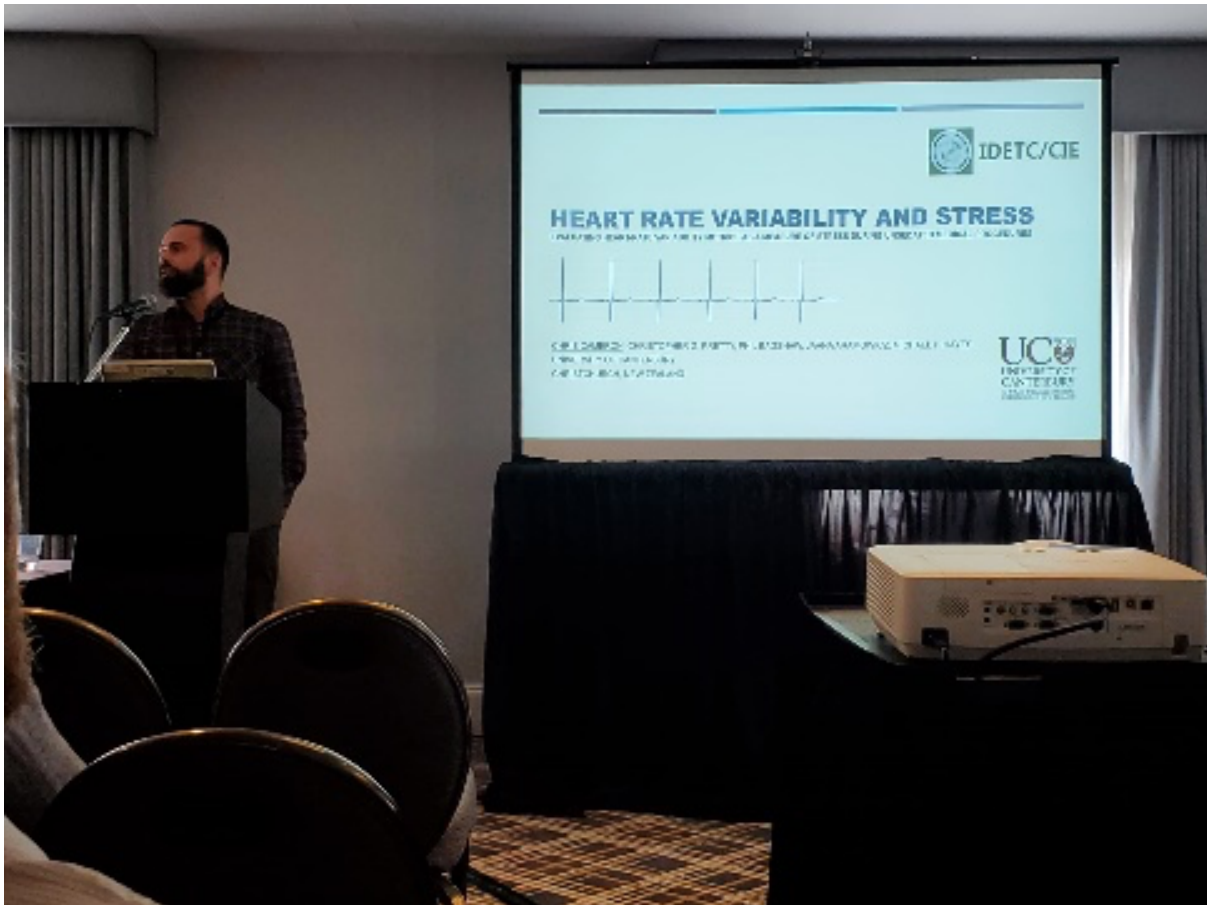
Conference: ASME IDETC-CIE 2023 MESA

Conference dates: August 20-23, 2023

Re: RSNZ Canterbury Travel Grant

Thank you for your generous assistance with travel costs for my recent trip to the United States to attend the American Society of Mechanical Engineers International Design Engineering Technical Conferences and Computers and Information in Engineering Conference from August 20-23, 2023. Due to your help, I was able to attend and present a talk in the Mechatronics and Embedded Systems Applications (MESA) stream on my paper: “Evaluating Heart-Rate Variability Metrics as a Measure of Stress During Unsedated Medical Procedures”. That’s all the wordy titles out of the way.

I’m in the final year of a PhD in Bioengineering at the University of Canterbury, and my research has increasingly revolved around heart-rate variability (HRV). HRV measures how much a person’s heart rate changes beat-to-beat: a healthy human heart isn’t a metronome, but instead is constantly adjusted by a complex arrangement of parallel inputs. The main inputs to this system are the two branches of the autonomic nervous system, the sympathetic (“fight-or-flight”) and parasympathetic (“rest-and-digest”) systems. The goal of heart-rate variability metrics is to extract some information from the heart rate about what these underlying systems are doing: in this context, we’re trying to assess how stressed a patient is by comparing the relative intensity of these two inputs. There’s a preponderance of scientific and pseudo-scientific information available on the matter, however many existing validations rely on contrived experimental circumstances or assumptions that may not hold true in the settings in which HRV is commonly used. The paper presented at this conference describes a comparison of methods of deriving a “score” for HRV during a flexible sigmoidoscopy.



Chris Cameron, PhD Candidate (final year), Bioengineering, University of Canterbury

In a flexible sigmoidoscopy, a 13mm diameter probe is inserted into the colon through the anus. This is, for many patients, stressful. Coupled with the sterile experimental conditions – a patient is lying at rest on their side and doing very little *except* being probed – this affords a great opportunity to measure the effects of stress on heart-rate variability without many of the confounding variables present in previous validations. This research was conducted by the team at the Canterbury Charity Hospital, who offer flexible sigmoidoscopies for free for people who have rectal bleeding but don't otherwise meet the criteria for a screening colonoscopy. The wider study examines the effects of an inhalational sedative (Entonox) on reducing stress, for which we needed a reliable way to quantify it.

This work fit the MESA stream as the HRV quantification side of the research is primarily a signal processing exercise on signals recorded with our own embedded hardware. A key focus of this stream was the advances in healthcare equity afforded by advances in low-cost computing and embedded systems. Presenting my work in this environment exposed me to many different approaches and applications which will likely led to promising research avenues in future and allowed me to make plentiful contacts for future collaborations. I've come back better equipped to continue my research, and with only a moderate case of Covid-19, which really rounded out the American experience.

Report from Katie Pitt – 13th European Vertebrate Pest Management Conference, September 2023

Earlier this year I was fortunate enough to be invited to give a talk at the 13th European Vertebrate Pest Management Conference (EVPMC) which would be occurring August 28th – September 2nd 2023. The EVPMC focuses on the newest and most exciting topics covering a wide range of disciplines and taxa including symposia on conservation, ecology, fertility control, genetics, and new tools and methods in the management of pests mammals – the category my research fell under.

The research I presented at the EVPMC was titled ‘Potential Solutions for Reducing Environmental Impact of Pest Mammal Monitoring in New Zealand’, this work is part of my PhD, which I am in my second year of. My research aims to find solutions for the high amount of plastic the conservation sector uses to manage our large number of introduced pest mammals. I offer potential solutions in the form of eco-friendly, biodegradable alternatives to the most commonly used plastic equipment in pest mammal management, chew cards and tracking tunnels.

My research and presentation was met with a lot of positive feedback. By attending the conference I was able to start a conversation about the use of plastic in some of our most vulnerable ecosystems – a conversation and topic that is rarely discussed, but is of extreme importance. From a large number of presentations and posters, my research was the sole topic that discussed sustainability in pest mammal control and management, a point that was bought up and discussed at length. While my research is fully New Zealand based, the encouraging feedback gained from the EVPMC showed that sustainability, plastic pollution and innovative, alternative approaches to plastic use which is the bases of my research, are an international interest.



Canterbury/Westland Secondary School Science Fair

The branch provided prizes to the Canterbury/Westland Secondary School Science Fair recently. The judging committee of Alice Cruickshank, Rob Cruickshank, Krishna Dev Bhatta, Fiona McGregor, and Amit Sarkar awarded prizes to the following students...

Year 7 (two joint winners)

Sammy Burrows, Cathedral Grammar School, The Nor-West wind gives you wings (if you're a big bud mite) (\$100)

William Murahidy, Cathedral Grammar School, Comparing heavy vs. light foundations on liquefiable sandy soils during earthquakes (\$100)

Year 8

Evangeline Casey, Selwyn House School, The calf raise cracker, put to the test (\$200)

Year 9/10

Jesse Tveden, Hillview Christian School, Chicken egg collector (\$200)

Branch visit to the Teece Museum and Townsend Observatory Christchurch Event

Eleven members enjoyed a recent trip to the rebuilt Observatory Tower (1896) at The Arts Centre Te Matatiki Toi Ora. We were lucky to enjoy a clear sky with Saturn the [Jewel Box star cluster](#) some of the objects seen. Many thanks to Heather and Quin, both 4th year students who where our guides.

Earlier in the evening we visited the Teece Museum of Classical Antiquities, part of the University of Canterbury Classics Department, where we were given a short talk by Museum Curator Terri Elder, who explained the stories told by some of the pottery. Members were shown items from the collection, including the oldest book held in the collection, *The Phaenomena* by Aratus of Soli, Printed by Aldus Manutius in Venice in 1499. Many thanks to Terri for guiding us through the Greek and Roman past.



Teece Museum of Classical Antiquities



Townsend Telescope Observatory

For a future field trip, we are planning to visit [The Cotter Medical History Museum](#), which the Branch has supported with funding in past. More on this in the next newsletter.

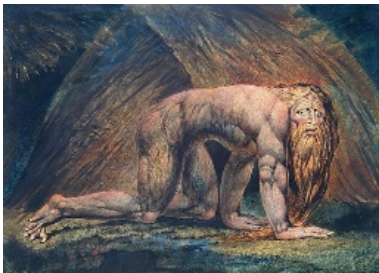
To keep these trips and begin a series of public talks next year, it would be fantastic if we could form a small sub-committee to help organise these. If you are interested to help out please contact us.

Links to articles of interest



Martine Maron, University of Queensland, Megan C Evans, UNSW Sydney & Sophus zu Ermgassen, University of Oxford
Nature positive is the new rallying cry to reverse environmental decline. But it could easily become greenwash – if we're not careful.

[‘Nature positive’ isn’t just planting a few trees – it’s actually stopping the damage we do](#)



Sidney Bloch & Nick Haslam, University of Melbourne
Humans have attempted to understand and treat mental illness for centuries – from ancient Greek medicine, Middle Ages exorcisms and the rise of asylums, to modern medical breakthroughs.

[Friday essay: ‘black bile’, malaria therapy and insulin comas – a brief history of mental illness](#)



Agata Mrva-Montoya, University of Sydney

The legal ruling against the Internet Archive has come down in favour of the rights of authors.

[Internet Archive’s digital library has been found in breach of copyright. The decision has some important implications](#)



Richard Heller, University of Newcastle

Making study materials free could potentially allow students to take multiple units from different universities. It would also make higher education much more accessible.

[DIY degree? Why universities should make online educational materials free for all](#)



Erin McEwan, University of Canterbury

Earthquakes can cause rivers to unexpectedly change course. New research reveals we may be able to predict the resulting flooding – and plan better for future disasters.

[Earthquakes can change the course of rivers – with devastating results. We may now be able to predict these threats](#)

...and finally, some cause for hope..

Jeffrey Corbin, Meghan Duffy, Jacquelyn Gill & Carly Ziter

Reframing climate change education around a message of “hopeful alarm” not only will underscore the threats we face but will also show students how they can act to shape the future.

[Climate Education That Builds Hope and Agency, Not Fear](#)

You can keep updated by on the branch’s Facebook page Canterbury RSNZ Branch or twitter @CanterburyRSNZ.If have any suggestions for speakers, field trips ideas, or even contribute something in the newsletter please contact us and I am always willing to discuss anything regarding the branch with you.

Roger Fagg, Branch President

C: 0272497325

E: r.fagg@xtra.co.nz