# AUSTRALIAN & NEW ZEALAND SOCIETY OF BIOMECHANICS

*Newsletter*

May 2024
Volume 15
Issue 1


## PRESIDENT'S REPORT

*By Karen Mickle*

Hello members, I can't believe we are well into 2024 already! We are a little delayed in getting our first newsletter out for the year as a lot has happened since my end-of-year message. Planning for ABC14 in December is well underway and we are pleased to announce that this year's meeting will be held jointly with the Australian and New Zealand Orthopaedic Research Society (ANZORS). There are a lot of common areas of research between our two societies and this offers an opportunity for our members to widen their potential collaborative networks. More details and key dates are outlined later in the newsletter. As such, we are expecting this to be our largest ABC to date!

Keep an eye out for travel grants to attend ABC14 to be announced soon. We'll also have our call for the annual publication of the year award. With a conference this year it also means that we are looking for our next conference host of ABC15 (to be held in 2026). Please reach out to Tim (tim.doyle@mq.edu.au) our president-elect or Patricio (p.pincheiramiranda@uq.edu.au), our conference liaison, if you have any questions and would like to submit an EOI.

In the next newsletter, we will be putting out a call for new members of the executive committee including the president-elect, secretary/treasurer, communication officer, and student and ECR representatives. Please consider if you would like to contribute to the society in one of the roles. Again, reach out to any of the current executives if you'd like to know more about any of the roles. I really look forward to serving as President of ANZSB for the year ahead, please always feel free to reach out if I can be of any assistance. Wishing you all the best for a safe, healthy and successful 2024.

Until next time,
Karen

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### SOCIAL MEDIA

Don't forget to engage with us via social media
Facebook - facebook.com/ANZSB
Twitter - @ANZSB

# ABC 14

We are excited to announce the upcoming Australasian Biomechanics Conference (ABC14), will be a conjoined conference with the Australia New Zealand Orthopaedic Research Society (ANZORS).

We invite you to mark your calendars for this exciting event!
🗓️ Sunday December 1st to Wednesday 4th, 2024
📍Swinburne University, Melbourne, Australia

The conference will bring together professionals and researchers in the field of biomechanics and orthopaedics. This event provides a platform for knowledge sharing, collaboration, and discussion of the latest advancements in biomechanical research. Conference biomechanical themes include orthopaedics, sports, clinical, imaging, modelling & simulation, new and emerging technologies and more.

🗓️ **Important dates**
Abstract submissions will open mid June
Abstract submission closes July 20th

For further details and updates check out our website and social media channels
website https://abc14.com.au/

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## ANZSB COMMITTEE

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University of Newcstle, NSW, Australia

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University of Queensland, QLD, Australia

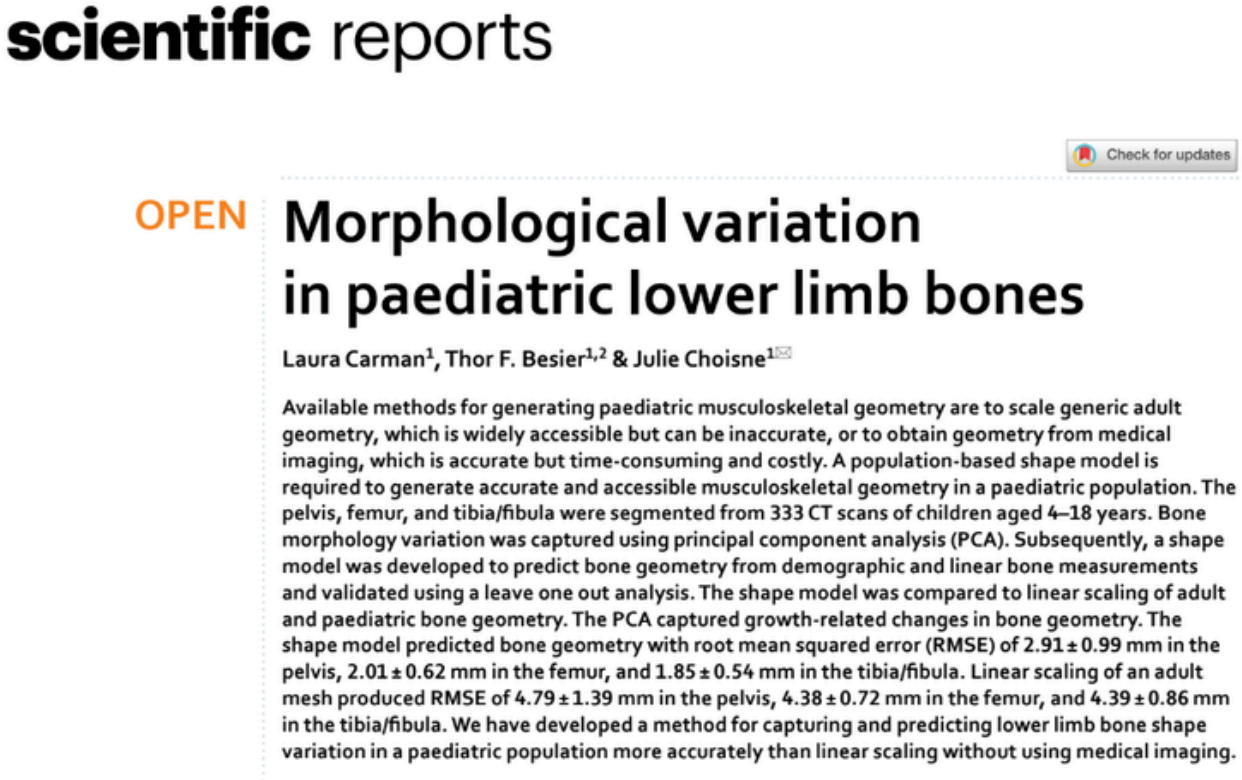
## ANZSB Membership

If you know of someone who you think might be interested in receiving this newsletter but is not a member, then please encourage them to sign up as a ANZSB member! Signing up to membership is easy and can be done by going to: http://www.anzsb.asn.au/membership

# PUBLICATION OF THE YEAR

Congratulations to Laura Carman, Thor Besier and Julie Choisne for there publication "Morphological variation in paediatric lower limb bones" which was awarded the 2022 Publication of the year award.

Applications for the 2023 publication of the year will open shortly, check out the website or follow us on social media for updates



scientific reports

Check for updates

OPEN

## Morphological variation in paediatric lower limb bones

Laura Carman[1], Thor F. Besier[1,2] & Julie Choisne[1]✉

Available methods for generating paediatric musculoskeletal geometry are to scale generic adult geometry, which is widely accessible but can be inaccurate, or to obtain geometry from medical imaging, which is accurate but time-consuming and costly. A population-based shape model is required to generate accurate and accessible musculoskeletal geometry in a paediatric population. The pelvis, femur, and tibia/fibula were segmented from 333 CT scans of children aged 4–18 years. Bone morphology variation was captured using principal component analysis (PCA). Subsequently, a shape model was developed to predict bone geometry from demographic and linear bone measurements and validated using a leave one out analysis. The shape model was compared to linear scaling of adult and paediatric bone geometry. The PCA captured growth-related changes in bone geometry. The shape model predicted bone geometry with root mean squared error (RMSE) of 2.91 ± 0.99 mm in the pelvis, 2.01 ± 0.62 mm in the femur, and 1.85 ± 0.54 mm in the tibia/fibula. Linear scaling of an adult mesh produced RMSE of 4.79 ± 1.39 mm in the pelvis, 4.38 ± 0.72 mm in the femur, and 4.39 ± 0.86 mm in the tibia/fibula. We have developed a method for capturing and predicting lower limb bone shape variation in a paediatric population more accurately than linear scaling without using medical imaging.

# SOCIÉTÉ DE BIOMÉCANIQUE

The Société de Biomécanique (SB) is an affiliated society with the ANZSB. A benefit of this memorandum of understanding is access to SB newsletters and announcements as well as reduced registration rates to attend the annual SB Congress.

Earlier this month in the most recent SB newsletter came out, check it out here,
SB newsletters can always be found through the members section of our website (https://www.anzsb.asn.au/sb).
To access these newsletters, members are required to create a log-in and register for website members access.

# REGIONAL ABCS

At the end of 2023, three centres hosted regional ABCs. A big shout out to David Saxby (Griffith University), Ceridwen Radcliffe (University of Canberra) and Jodie Wills (Macquarie University) who coordinated the symposium activities.

## Griffith University

Hosted at the legendary Logemas "Church", nestled in the industrial heartland of Albion, the ANZSB Regional Symposium Queensland was held Monday, November 27th , 2023. The event featured an excellent and diverse area of research presentations from HDR and M/ECR. Our day kicked off with a keynote delivered by Dr Antony McNamee, a blood rheologist, DECRA-winner, and research leader from Griffith University providing an overview of transformative cardiac and vascular devices, where the field is heading, and exciting developments in his lab. This was followed by 5 short-form presentations broadly in the Orthopaedics domain by HDR from across Queensland.
Our next keynote was Dr Naomi Paxton from Queensland University of Technology, an Advance Queensland Fellow and QLD Women in Technology Life Science Young Achiever winner. She discussed innovations in biofabrication technology and numerous applications both in health sciences, but also tangentially to built environment.

Our second HDR session focused on neuromusculoskeletal modelling, showing a diverse range of applications and technologies from muscle deformation to AI-acceleration of computational modelling. Our last keynote was Dr Thang Vo-Doan of University of Queensland, who impressed with his survey of current research activities focused on insect-machine hybrid robots.

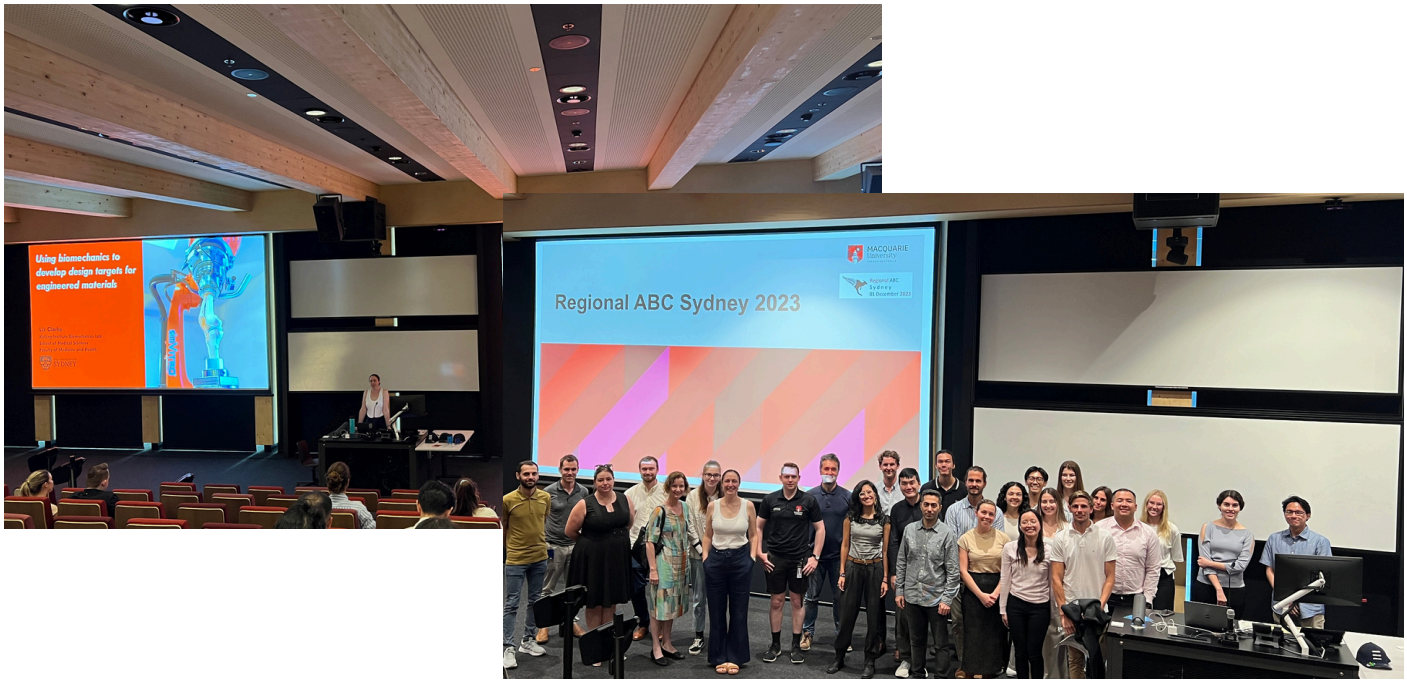

Award winners
Orthopaedics:Ms Ayda Dastgerdi of Griffith University
Neuromusculoskeletal modelling : Ms Nikki Kelp of University of Queensland
Applied/Comparative biomech: Mr Joshua Gaschk of University of Sunshine Coast.

Sponsors
A major thank you goes out to our sponsors for their generous support of Biomechanics Research in Queensland, Materialise, Logemas, Joint Biomechanics ITTC and ANZSB.

# REGIONAL ABCS

**Macquarie University**
The ANZSB Regional ABC Sydney event was held at Macquarie on Friday December 1st, 2023. A diverse range of fantastic research presentations were given by HDR students from across the NSW region who travelled to join us on campus. The day kicked off with a welcome and brief opening talk provided by Dr. Jodie Wills, before commencing the first of two human movement sessions; research presentations centred around modelling and analytical methodologies, and sensor driven biomechanics, respectively. During the morning break, a mini-student event was held where student members joined our current ANZSB student rep for a coffee walk to chat all things research.

In the afternoon, our last presentation session was held, which covered aspects of mechanobiology with a focus on spinal-based research. The symposium was closed out by a fascinating keynote provided by Associate Professor Elizabeth Clarke from the University of Sydney, who presented on future directions of how biomechanics can help us develop design targets for engineered materials.  To wrap the day, a networking event was hosted to celebrate the day, which was kindly sponsored by Logemas. A huge thank you to all presenters, attendees, session chairs, award judges, and sponsors for making the ANZSB Regional ABC Sydney 2023 symposium such a great event!




<u>Award winners</u>
ANZSB Best Student Presentation Award: Ayden McCarthy for his presentation “An evaluation of multiple machine learning models to predict performance in a military lift-to-place task”.

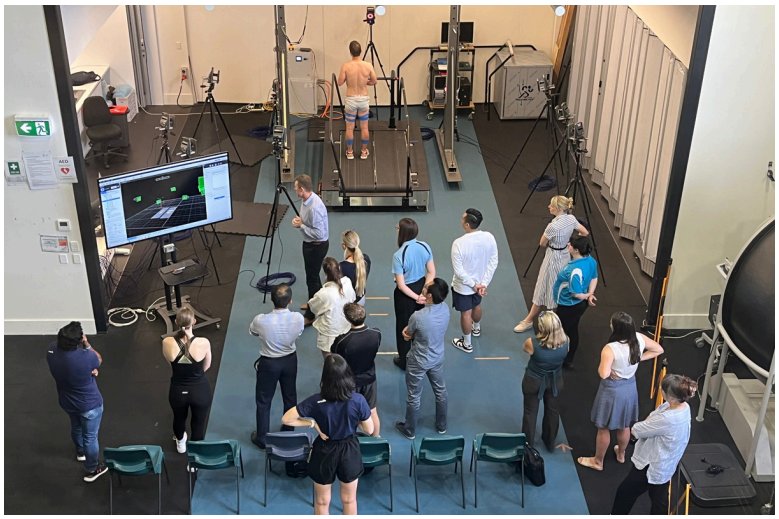
<u>Sponsors</u>
A major thank you goes out to Logemas for sponsoring the event and ANZSB.

# REGIONAL ABCS

## University of Canberra

The ANZSB Regional Symposium Canberra was hosted by the University of Canberra's (UC) Applied Biomechanics research group on Thursday 7th December 2023. The day began with a Gait Lab demonstration in the UC biomechanics lab, where Dr Wayne Spratford described the capabilities of the lab. Following a coffee catch-up, delegates attended UC Applied Biomechanics' academic member, Prof Nick Ball's professorial lecture. Prof Ball presented his journey to Professor, including his work as a Sports Biomechanist. Four student, and two staff presentations followed. These presentations covered topics related to sports, clinical and occupational biomechanics.

The final session included research showcases from four biomechanics groups across the ACT, including Dr Celeste Coltman (UC Applied Biomechanics), Dr Dan Cottam and Dr Adam Hunter (AIS), Prof Jennie Scarvell (Trauma and Orthopaedic Research Unit, ACT Health), and Dr John Warmenhoven (UTS/AIS). These presentations showcased each groups' applied/research focus and highlighted areas for collaboration within the Canberra biomechanics network. The event was attended by 29 delegates, including 14 students, 7 ECR/MCR/SCR, 6 clinicians and, 2 industry delegates.



<u>Award winners</u>
Best Student Presentation: Cody Lindsay (HDR student at UC)
People's Choice: Dr Phil Newman (Assoc/Prof at UC).

<u>Sponsors</u>
Thank you to our sponsors, ANZSB and University of Canberra Research Institute for Sport and Exercise