

The 2nd Musculoskeletal Combined Workshop

Hosted by ARCTCIBE and SydMSK Alliance

10 November 2020

1:00 – 5:00 pm



THE UNIVERSITY OF
SYDNEY

<https://arctcibe.org/2nd-musculoskeletal>

Overview

The 2nd Musculoskeletal **ARCTCIBE** and **SydMSK** Combined Online Workshop is hosted by [ARC Training Centre for Innovative Bioengineering](#) in coordination with [Sydney Musculoskeletal Bone and Joint Health Alliance](#).

It will bring together clinicians from the Musculoskeletal discipline with biomedical engineers and MSK experts from the University of Sydney. ARC TRAINING CENTRE FOR INNOVATIVE BIOENGINEERING builds links between Engineering, Science, Medicine and Industry.

This half-day meeting will provide an opportunity to the Musculoskeletal clinicians to present clinical issues they would like to solve using technologies to be developed by the Biomedical engineers. There would be an opportunity for one on one interaction and breakout sessions to discuss problems and their solutions. The Centre has strong links to industry (orthopaedic companies) who would be potential partners for any discoveries we may have.

The schedule and format of the workshop will be shared closer to the date with all registrants.

Facilitators: [Dr Ashnil Kumar](#), [Dr Jiao Jiao Li](#) **Organisers:** [Ms Swatee Mishra](#), [Mrs Ros Wu](#)

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Guest Speakers

Session 1: Grand Challenges



Professor David Hunter is a rheumatology clinician-researcher whose main research focus has been clinical and translational research in osteoarthritis (OA). He is the Florance and Cope Chair of Rheumatology and Professor of Medicine at the University of Sydney and the Royal North Shore Hospital. He is ranked as the world's leading expert in osteoarthritis on Expertscape.com since 2014. He is on the editorial board for *Arthritis and Rheumatology*, *Osteoarthritis and Cartilage*, *Arthritis Care and Research* and part of the review committee for OA for the American College of Rheumatology, EULAR and OARSI scientific meetings. Dr Hunter has over 450 peer-reviewed publications in international journals, numerous book chapters, is the section editor for UpToDate Osteoarthritis and has co-authored several books, including books on self-management strategies for the lay public.



Professor Zsolt Balogh is the Discipline Head of Traumatology and Surgery and leads the Traumatology Research Group at the University of Newcastle. He is also the Director of Trauma Surgery at the John Hunter Hospital and Hunter New England Local Health District. Apart from a teacher and researcher, he is an active trauma and orthopaedic surgeon with a major interest in complex polytrauma patients and pelvic and acetabulum fracture patients. As the Discipline Head of Traumatology, Professor Balogh is responsible for the Trauma curriculum at the University of Newcastle, which has formal components in years 1,3,4 and 5 in the Medical School. His research covers many areas of trauma care such as orthopaedic trauma, torso trauma and postinjury critical care. He collaborates with academic trauma centres and Universities in Europe, the United States and Australia.



Professor Lyn March is the Liggins Professor of Rheumatology and Musculoskeletal Epidemiology at Sydney Faculty of Medicine and Health and Head of the Department of Rheumatology at Royal North Shore. She is on the Executive committees of SydMSK, GMUSC and OMERACT. She was the inaugural Co-Chair of the NSW ACI MSK Network that launched the MSK Models of Care. In her Keynote: Evidence into Practice she will take you on the Osteoporosis Re-fracture Prevention Journey.



Dr Craig Willers is the National Director of the Australian Arthritis and Autoimmune Biobank Collaborative (A3BC), University of Sydney. Since completing his PhD in orthopaedic tissue engineering, he has worked in health and medical research (mainly musculoskeletal) within university, healthcare, industry, charity and government (NSW Health). His core expertise and interest are large-scale, integrated data/informatics and biobanking projects that facilitate collaboration and develop more holistic data models for innovative discovery and efficient evidence-based advances in both patient and population health.



Professor Vasi Naganathan is an academic at the Faculty of Medicine and Health at the University of Sydney and a Consultant Geriatrician at Concord Hospital in Sydney. He is co-director of the Centre of Education and Research on Ageing (CERA). His research interests are wide including the health of older men, oral health, falls, fractures and osteoporosis, pharmacology in older people and the application of evidence-based medicine to older people. Vasi collaborates with and exchanges ideas with some of Australia's leading researchers and thinkers in Geriatric medicine and Ageing Research. He is the president-elect of the Australian New Zealand Society of Geriatric Medicine.



A/Prof Roderick Clifton-Bligh is Head of the Department of Endocrinology at Royal North Shore Hospital and conjoint - associate professor in Medicine at the University of Sydney. He completed a PhD in the genetics of thyroid disorders at the University of Cambridge. He now supervises dual research groups, one of which focuses on the genetics of endocrine neoplasms, and the other on metabolic bone disease.

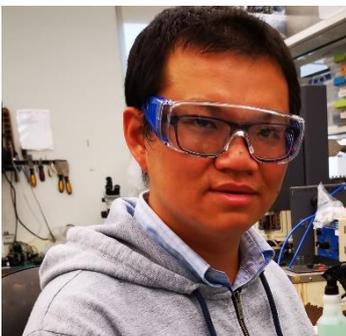


Associate Professor David Parker is a nationally and internationally recognised specialist in disorders and surgery of the knee joint. He has particular interests in computer-assisted and robotic knee replacement surgery, sports injuries and ligament reconstruction surgery, as well as surgery to realign and restore the knee joint. His elective surgical practice focuses exclusively on the knee joint, and he also has a strong interest in the nonsurgical management of knee arthritis and has recently established a multidisciplinary clinic for this in Crows Nest.

Having established the Sydney Orthopaedic Research Institute in 2002, Associate Professor Parker has subsequently become known internationally for his research into the surgery of the knee joint. Associate Professor Parker is actively involved in several international orthopaedic and sports medicine organisations, including being the current 2nd vice-president of the International Society for Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine (ISAKOS), Past President of the Asia Pacific Knee, Arthroscopy and Sports Medicine Society (APKASS), and a board member of the International Anterior Cruciate Ligament Study Group. He is also a Clinical Associate Professor at the University of Sydney.



Dr Kayla Cornett PhD is an NIH funded postdoctoral research fellow at the University of Sydney and Children's Hospital at Westmead. She is an expert in clinical outcome measurement for pediatric neuromuscular diseases. As an early career researcher, Dr Cornett has over 20 publications including a seminal report published in the *Annals of Neurology* focusing on the natural history of Charcot-Marie-Tooth disease during childhood. She collaborates with leading researchers in Charcot-Marie-Tooth disease and Spinal Muscular Atrophy internationally with her research focussing on reliable and sensitive assessment of function in children with neuromuscular diseases.



Vi Khanh Truong is an RMIT Vice Chancellor's Postdoctoral Research Fellow and Fulbright Scholar. Dr. Truong obtained his Ph.D. in Nanobiotechnology in 2012 from Swinburne University of Technology, Australia. He held industrial research positions with the CRC for Polymers and the ARC Steel Research Hub. In these positions, he has designed innovative antimicrobial coatings. In his current research, he further investigates the interactions between microbial cellular structures and nanomaterials to understand "antimicrobial resistance" and develop "next-generation antimicrobial strategies".

Session 2: Technology Solutions



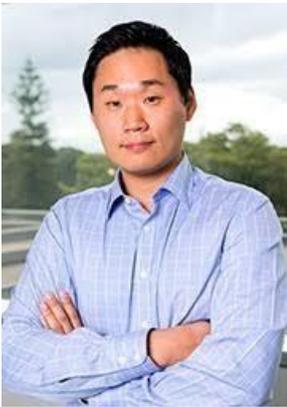
Professor Hala Zreiqat AM is Professor of Biomedical Engineering, a 2016-2017 Radcliffe Fellow at Harvard University, a National Health and Medical Research Council Senior Research Fellow, Director of the ARC Training Centre for Innovative BioEngineering and is Head of the Biomaterials and Tissue Engineering Research Unit in the Faculty of Engineering at the University of Sydney. She is also an Honorary Professor at Shanghai JiaoTong University (2013-2019). Her group consists of a multidisciplinary team of researchers including engineers, cell and molecular biologists and clinicians. Her lab works on the development of novel engineered materials and 3D printed platforms for regenerative medicine, particularly in the fields of orthopaedics, dental and maxillofacial applications. Also, her group is interested in the development of novel nanospheres for growth factors, drug and cell delivery as well as novel injectable materials. She has over 100 peer-reviewed publications. Her pioneering development of innovative biomaterials for tissue regeneration has led to one awarded (US) and 6 provisional patents, 5 as a lead investor, and several collaborations with inter/national industry partners. She is regularly invited to give a keynote and plenary presentations at major international and national conferences. She has organized/chaired several major international conferences/symposia/workshops. She is the immediate past president of the Australian and New Zealand Orthopaedic Research Society (2010-2012). She is the founder and chair of the Alliance for Design and Application in Tissue Engineering and the IDEAL Society network. Amongst her awards are: Eureka Prize for Innovative Use of Technology (2019); Payne-Scott Professional Distinction (2019); Member of the Order of Australia 2019; One of the 10 of Australia's most influential women in engineering, Create magazine (2019); The King Abdullah II Order of Distinction of the Second Class – the highest civilian honour bestowed by the King of Jordan (2018); Leopold Dintenfass Memorial Award, for Excellence in Research (2012) and the University of Sydney Engineering Deans Research Award (2009).



Professor Alistair McEwan received his PhD from the University of Oxford in 2005. He is currently Ainsworth Chair of Technology and Innovation within the School of Electrical and Information Engineering researching bioelectronics, the electrical and optical properties of tissue and disabilities such as cerebral palsy. He works closely with clinicians from several hospitals in Sydney, including the Royal Prince Alfred Hospital, Westmead Hospital, Royal North Shore and Nepean Hospital. His research focuses on using signal processing, electronics and modelling to understand the effects of the impedance of tissue as a biomarker in neurology, cardiology, musculoskeletal tissue and the effect on neuromodulation.



Professor Qing Li obtained his PhD degree from the University of Sydney in 2000. He received postdoc training from Cornell University, NY, USA 2000 – 2001. He was a recipient of an Australian Research Council (ARC) Australian Postdoctoral (APD) Research Fellowship in 2001 (55 awarded nationwide). Dr Qing Li was a senior lecturer in School of Engineering, James Cook University, Townsville, Australia from 2004 to 2006. He returned to Sydney by taking up a Sesqui senior lectureship in 2006, where he was promoted to Associate Professor in 2010 and Professor in 2014. Before his academic appointment in Sydney, Dr Qing Li was a recipient of an Australian Academy of Science (AAS) international award to visit the University of Michigan, Ann Arbor, the USA in 2006. Professor Qing Li is now an ARC Future Fellow (2013-2017) in the School of Aerospace, Mechanical and Mechatronic Engineering, at the University of Sydney.



Jinman Kim is an Associate Professor of computer science at the The University of Sydney. He is the Academic Director, Healthcare Engineering Westmead, where he leads the translation of engineering research into clinical implementations. He is also the Imaging Theme Leader of the ARC Training Centre in Innovative Biomedical Engineering on musculoskeletal technologies. He is also the Director of the Telehealth and Technology Center, Nepean hospital. His research is in the integration of machine learning for biomedical image analysis and visualization, with a focus on multi-modal biomedical data processing.

Program

The 2 nd Musculoskeletal ARCTCIBE and SydMSK Combined Online Workshop	
Tuesday, 10 November 1:00 pm to 5:00 pm	
1:00 to 1:10 pm	Opening Address Professor Hala Zreiqat and Professor David Hunter Zoom link <i>Chair: TBC</i>
1.10- 2:40pm	Session 1: Grand Challenges Zoom link <i>(8 Minutes per talk)</i> <i>Chair: Ashnil Kumar and Jiao Jiao Li</i>
1:10 pm	Critical size bone defects in polytrauma patients Professor Zsolt Balogh
1:20 pm	Title TBC A/Professor Rory Clifton Bligh
1:30 pm	Things to think about when developing technology for older people Professor Vasi Naganathan
1:40 pm	Achieving greater precision in knee reconstruction surgery A/Professor David Parker
1:50 pm	Targeting focal structural abnormalities in osteoarthritis Professor David Hunter
2:00 pm	Measuring real-world gait and function in paediatric neuromuscular diseases Dr Kayla Cornett
2:10 pm	Nanoengineering materials for tackling antimicrobial resistance Vi Khanh Truong
2:20 pm	Integrating research and clinical practice – can we make IT systems and Analytics work? Professor Lyn March and Dr Craig Willers
2:30-2:40	<i>Extra Time for Q&A and Time management between sessions</i>
2:40 – 2:50	Break
2.50- 4:00 pm	Session 2: Technology Solutions Zoom link <i>(15 minutes per talk with Q&A)</i> <i>Chair: Ashnil Kumar and Jiao Jiao Li</i>
2:50 pm	Title TBC Professor Hala Zreiqat
3:05 pm	Electroceutical sensors and stimulation in MSK Professor Alistair McEwan

3:20 pm	Title TBC Professor Qing Li	
3:35 pm	Deep Learning for Musculoskeletal Image Analysis and Visualisation A/Professor Jimman Kim	
3:50-4:00pm	<i>Extra Time for Q&A and Time management between sessions</i>	
4.00- 4:50 pm	Session 3: Breakout Zoom link <i>Chair: Ashnil Kumar and Jiao Jiao Li</i>	
4:00 pm	Briefing Professor Hala Zreiqat and Professor David Hunter	
4:00 – 4:40 pm	3x Breakout Rooms	
Medical Imaging * <i>Chairs: Jinman & Lei</i>	Biomaterials ** <i>Chairs: Colin & Zufu</i>	Biodevices *** <i>Chairs: Alistair & Nhan</i>
4:40 – 4:50 pm	Debriefing	
4:40 pm	Medical Imaging	
4:45 pm	Biomaterials	
4:50 pm	Biodevices	
4:55-5:00 pm	Closing Remarks Professor Hala Zreiqat and Professor David Hunter	

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1)THEME #1: MEDICAL IMAGING

- Clinical data
- Novel segmentation, visualisation and modelling algorithms
- Supporting diagnosis and surgical planning - Improved diagnosis and postsurgical outcomes

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2)THEME #2: BIOMATERIALS

- Development of novel ceramic materials for MSK applications
- Novel fabrication technologies including 3D printing ceramics
- Antimicrobial ceramic materials
- Development of plasma spraying surface modification technologies for orthopaedic applications
- Novel quick-release orthopaedics

3) THEME #3: BIODEVICES

- Develop the implantable sensor and stimulation system
- Monitor rehabilitation and implant failure
- Indicate factors that influence the healing process such as osteoporosis, implant fatigue, wear, and mechanical stimulation - Optimise patient health and surgical outcomes

Zoom Etiquette

To all Attendees,

- Please join live session via Zoom on a computer or laptop. Kindly avoid using your phone to Zoom unless necessary as it will hinder your ability to fully participate.
- Please ensure that you are on mute when a presenter is speaking.
- Please do not use the Chat function while the speaker is talking to avoid any distractions.
- Please type in your question in chat box during Q&A.
- All sessions are being recorded and will be made available later.

Breakout Room:

- You will be prompted to join a breakout room online for 40 minutes
- This will be the room where a few participants from the group will join in
- The host will pick group participants based on pre-suggested list, if any provided, otherwise randomly
- If you are facing any challenge you can request the host to join your room by clicking, ask help box
- The host will prompt at 10 and 5 minutes to remind the closing of discussion
- The host will close the session and a timer will start to slowly make you join the main session room.

For More Information
Contact Us at ros.wu@sydney.edu.au
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