

# ABC 11 - Program – DAY 1

3rd Dec 2018

8.00am to 9.00am	Registration and Opening Ceremony
9 am to 9.30 am	<p><b>Invited Speaker – Prof Peter Hunter</b> University of Auckland - ABI</p> <p>On: MAPPING THE AUTONOMIC NERVOUS SYSTEM</p>
9.30 am to 10.30am	<p><b>CLINICAL BIOMECHANICS I – <i>Scientific Presentations</i></b></p> <ul style="list-style-type: none"> <li>• Hip muscle activation in femoroacetabular impingement syndrome – Laura Diamond (Griffith University)</li> <li>• Validation of automated clinical gait assessment using a smart knee brace – Andrew McDaid (University of Auckland)</li> <li>• How pelvic tilt influences modes of spinal motion segment failure under direct compression - Nurul Haiza (Zaza) Sapiee (University of Auckland)</li> <li>• The effects of heel lifts on lower limb biomechanics – Chantel Rabusin (La Trobe University)</li> <li>• Combined EMG-informed neuromusculoskeletal and surrogates of finite element models estimate localised Achilles tendon strain in real-time – Claudio Pizzolato (Griffith University)</li> </ul>
10.30 am – 11.00 am	<b>MORNING TEA</b>
11.00 am to 11.30 pm	<p><b>Invited Speaker - A/Prof Sam Veres</b> Saint Mary's University</p> <p>On: MEETING THE IN VIVO LOADING REQUIRMENTS OF COLLAGENOUS TISSUES THROUGH STRUCTURAL SPECIALIZATION OVER MULTIPLE LENGTH SCALES: INSIGHTS FROM THE STUDY OF FUNCTIONALLY DISTINCT TENDONS</p>
11.30 am to 12.30 pm	<p><b>CLINICAL BIOMECHANICS II - <i>Scientific Presentations</i></b></p> <ul style="list-style-type: none"> <li>• Can 3-dimensional motion analysis and fuzzy entropy detect movement differences in general movement assessment categories in the normative infant population? – Michelle McGrath (Queensland Health)</li> <li>• Effect of ankle push-off haptic biofeedback on lower-limb kinetics and gait symmetry – Duncan Bakke (University of Auckland)</li> <li>• Why are certain discs vulnerable to herniation? – Kelly Wade (Ulm University)</li> </ul>

	<ul style="list-style-type: none"> <li>• The influence of feedback and engagement on pedaling performance in stroke patients – Mukesh Soni (University of Melbourne)</li> <li>• The use of feedback and video engagement on exercise performance during pedaling - Mukesh Soni (University of Melbourne)</li> </ul>
12.30 pm to 1.30 pm	<p><b>LUNCH</b>  <i>With:</i></p> <ul style="list-style-type: none"> <li>- Poster Viewing</li> <li>- Student Round Table</li> </ul>
1.30 pm to 2.00 pm	<p><b>Invited Speaker - Professor Patria Hume</b>  Auckland University of Technology  On: HOW SPORTS BIOMECHANICS HELPS IMPROVE PERFORMANCE AND REDUCE RISK</p>
2.00 pm to 3.00 pm	<p><b>SPORTS BIOMECHANICS - Scientific Presentations</b></p> <ul style="list-style-type: none"> <li>• Characterizing stress patterns in the brains after traumatic brain injury– Vickie Shim (University of Auckland)</li> <li>• Inter- and intra-day reliability of common injury screening measures in rugby league is variable – Tim Doyle (Macquarie University)</li> <li>• Foot pronation is associated with increased knee joint loading rate and adduction after long distance running – Justin Fernandez (University of Auckland)</li> <li>• Lower limb impact accelerations vary with sensor placement – Daniel Glassbrook (Macquarie University)</li> <li>• Stride length, thorax and pelvic positioning during lawn bowls deliveries – Samantha Birse (La Trobe University)</li> </ul>

3.00 pm to 3.30 pm	<b>AFTERNOON TEA</b>
3.30 pm to 4.00 pm	<b>Invited Speaker - Dr Marcos Domingos</b> University of Manchester On: 3D BIOPRINTING: CURRENT AND FUTURE TRENDS IN SKELETAL TISSUE REGENERATION
4.00 pm to 5.00 pm	<b>ORTHOPAEDIC BIOMECHANICS - <i>Scientific Presentations</i></b> <ul style="list-style-type: none"> <li>• Understanding the scaphoid kinematics after sectioning of scapholunate ligament - Ita Suzana Mat Jais (Singapore General Hospital)</li> <li>• Exploring lesser known mechanisms of structural failure in mechanically-induced disc herniations - Vonne van Heeswijk (University of Auckland)</li> <li>• Effects of lower limb anthropometry on gait stability - Sandro Miharadi (Institut Teknologi Bandung)</li> <li>• Bone microarchitecture damage due to press-fit femoral knee implantation quantified using HR-pQCT and digital volume correlation- Egon Perelli (Flinders University)</li> <li>• Comparing Cartilage thickness and subchondral bone microarchitecture in varus- and valgus-aligned osteoarthritic tibiae with controls – Sophie Rapagna (Flinders University)</li> </ul>
5.00 pm to 6.30 pm	<b>Special Session of the CLINICAL MOTION ANALYSIS GROUP (CMAG): TRANSLATING TECHNOLOGY INTO THE CLINICAL GAIT LABORATORY</b> <ul style="list-style-type: none"> <li>• <b>Invited Speaker:</b> The use of patient specific neuromusculoskeletal modelling in clinical motion analysis - Dr Chris Carty</li> <li>• Gait model results are sensitive to impaired muscle size profiles in cerebral palsy – Geoffrey Hansfield (University of Auckland)</li> <li>• <b>Invited Speaker:</b> Assumptions in foot modelling: what are we ignoring - Dr Luke Kelly</li> <li>• Personalised 3d printing ankle-foot orthoses for children with charcot-marie-tooth disease – Elizabeth Wojciechowski (University of Sydney)</li> <li>• PANEL DISCUSSION on: “How well are we translating technology into the clinical gait laboratory?”</li> </ul>
6.30 pm till late	<b>OFFICIAL WELCOME EVENT</b> Student group Event – Details TBA ECR group Event – Details TBA

**END DAY 1 of 3**

# ABC 11 - Program – DAY 2

4<sup>th</sup> Dec 2018

9 am to 9.30 am	<p><b>Invited Speaker - Dr Elizabeth Clarke</b>          University of Sydney/ Kolling Institute          On: IN VIVO AND IN VITRO EXPERIMENTAL MODELS OF INJURY</p>
9.30 am to 10.30am	<p><b>AWARDS SESSION I</b>  <b>Scientific Presentations</b></p> <ul style="list-style-type: none"> <li>• Wearable Sensors: Towards Evaluating Knee Joint Replacement Recovery – Shasha Yeung (University of Auckland)</li> <li>• Effect of neuromuscular exercise on joint contact forces in people following partial meniscectomy: secondary analysis of a randomised controlled trial – Scott Starkey (University of Melbourne)</li> <li>• Development of a virtual reality acetabulum reaming simulator and the need for biomechanical data - Mario Lorenz (Chemnitz University Of Technology)</li> <li>• The mechanical significance of the articular cartilage surface layer on tissue swelling. – Emma Brown (University of Auckland)</li> <li>• Imaging of structural and molecular transport compartmentalisation in an in vivo osteoarthritis model – Lucy Ngo (University of New South Wales)</li> </ul>
10.30 am – 11.00 am	MORNING TEA
11.00 am to 11.30 pm	<p><b>Invited Speaker - Professor Neil Broom – University of Auckland</b>          On: EXPLORING SOFT-HARD JUNCTIONS IN THE MUSCULOSKELETAL SYSTEM: AN EXPERIMENTAL APPROACH</p>
11.30 am to 12.45 pm	<p><b>AWARDS SESSION II</b>  <b>Scientific Presentations</b></p> <ul style="list-style-type: none"> <li>• Structural Integration Across the Endplate Cement Line - Nurul Haiza (Zaza) Sapiee (University of Auckland)</li> <li>• Muscle architecture in the medial gastrocnemius of stroke patients: a diffusion tensor imaging investigation – Arkiev D'Souza (Neuroscience Research Australia)</li> </ul>

	<ul style="list-style-type: none"> <li>• Sub-critical knee injury: a risk factor for critical injury and osteoarthritis in mice - Carina Blaker (University of Sydney)</li> <li>• Speed-adaptive myoelectric ankle exoskeleton to improve post-stroke walking performance – Taylor Dick (University of Queensland)</li> <li>• Assessment of thorax and rib cage joint rigidity on spinal loading - Hossein Mokhtarzadeh (Harvard Medical School)</li> <li>• Pericellular matrix thickness distribution around chondrocytes is orientation-dependent - Eng Kuan Moo (University of Calgary)</li> </ul>
12.45 pm to 1.30 pm	<b>LUNCH and POSTER VIEWING</b>
1.30 pm to 2.00 pm	<p><b>COMPUTATIONAL MODELING I</b></p> <p><b>Invited Speaker</b></p> <p>Professor Tim David – University of Canterbury</p> <p>On: PARALLEL INTEGRATED MODELS OF NEUROVASCULAR COUPLING AND BOLD SIGNALS</p>
2.00 pm to 3.00 pm	<p><b>Scientific Presentations</b></p> <ul style="list-style-type: none"> <li>• Effects of pth treatment in osteoporosis – insights from a mechanistic pk-pd model - Maxence Lavaill (Queensland University of Technology)</li> <li>• Can humeral fractures occur spontaneously in infant while rolling? A finite element study - Zainab Altai (University of Sheffield)</li> <li>• Time-course changes of lower limb kinematics during military load-carriage - Jodie Wills (Macquarie University)</li> <li>• Development of a deep neural network for automated electromyographic pattern classification – Riad Akhundov (Griffith University and University of Newcastle)</li> <li>• Hip arthokinematics determined using subject-specific mri and mesh contact theory – David Saxby (Griffith University)</li> </ul>
3.00 pm to 3.30 pm	<b>AFTERNOON TEA</b>
3.30 pm to 4.00 pm	<p><b>COMPUTATIONAL MODELING II</b></p> <p><b>Invited Speaker</b></p> <p>Dr Alys Clarke – University of Auckland/ Auckland Bioengineering Institute</p> <p>On: BIOMECHANICS OF PREGNANCY: FROM CONCEPTION TO DELIVERY</p>

4.00 pm to 5.15 pm	<p><b>Scientific Presentations</b></p> <ul style="list-style-type: none"> <li>• Biomechanical role of anterolateral ligament in ACL-deficient knee: a 3D finite element study - Duraisamy Shriram (Singapore University of Technology and Design)</li> <li>• Image-driven Modelling and Simulation of Micro-scale Articular Cartilage Mechanics - Scott Sibole (University of Calgary)</li> <li>• Identifying the unloaded shape and stiffness of the breast - Thiranjya Prasad Babarenda Gamage (University of Auckland)</li> <li>• How to estimate the friction coefficient of articular cartilages using in-vivo imaging of the joints? - Saeed Miramini (University of Melbourne)</li> <li>• Rapid prediction of personalized achilles tendon tissue strains with a machine learning technique – Vickie Shim (University of Auckland)</li> <li>• Influence of the reference state on estimators of cardiac contractility – Mario Habenbacher (Graz University of Technology)</li> </ul>
5.15 pm to 6.00 pm	<b>Poster Viewing with Reception</b>
6.00 pm onwards	<p>Join Larry Sherman in his TEDx-style talk: From Music to the Matrix: How Music Influences the Developing and Aging Brain</p> <p><i>(This is a Matrix Biology Society of Australia and New Zealand event and is open to all ABC11 registrants.)</i></p>

**END DAY 2 of 3**

# ABC 11 - Program – DAY 3

5<sup>th</sup> Dec 2018

8.30 am – 9.00 am **Welcome ceremony: 10<sup>th</sup> Annual Mechanobiology Symposium**

## MECHANOBIOLOGY – ABC11 and MBSANZ

09.00 am to 11.15am	<p><b>Invited Speaker</b>          Professor Toshiro Ohashi – Hokkaido University          On: INVESTIGATION OF ENDOTHELIAL MECHANOTRANSDUCTION MECHANISM: MECHANICAL PROPERTIES OF PRIMARY CILIA</p> <p><b>Invited Speaker</b>          Professor Peter Torzilli – Cornell University and Hospital for Special Surgery, NY.          On: SOFT TISSUE BIOMECHANICS AND MECHANOBIOLOGY OF ARTICULAR CARTILAGE</p> <p><b>Scientific Presentations</b></p> <ul style="list-style-type: none"> <li>• A model of bone mechanostat directed by osteocytes mechanosensation – Madge Martin (Queensland University of Technology)</li> <li>• Ultrastructural characterisation of the osteocyte lacunar-canalicular network during aging – mechanobiological implications – Peter Pivonka (Queensland University of Technology)</li> <li>• Towards cellular epidemiology of degenerative diseases using geographic information systems, multisem and machine learning approaches – Anton Nathanson (University of New South Wales)</li> <li>• The impact of joint injury on the development of meniscal pathology and its association with OA in ACL deficient knees – Carina Blaker (University of Sydney)</li> <li>• The extracellular matrix facilitates mechanical activation of epithelial Na<sup>+</sup> channel in response to shear force to regulate blood pressure – Martin Fronius (University of Otago)</li> <li>• Tenocyte shape, and the expression of cytoskeleton and matrix remodelling genes, are altered when cells are cultured on degenerated ECM – David Musson (University of Auckland)</li> </ul>
11.15 am – 11.45 am	<b>MORNING TEA</b>

	<p><b>10<sup>th</sup> University of Auckland Mechanobiology Symposium Celebration</b></p>
11.45 am to 01.30 pm	<p><b>MECHANOBIOLOGY TOOLBOX</b></p> <p><b>Invited Speakers</b></p> <p>Associate Professor Tim Woodfield – University of Otago, Christchurch, New Zealand  <b>3D BIOPRINTING AND BIOASSEMBLY FOR REGENERATIVE MEDICINE OF MUSCULOSKELETAL TISSUES</b></p> <p>Associate Professor Kris Kilian – University of New South Wales, Sydney, Australia  <b>HYDROGEL MICROENGINEERING TO DECIPHER ‘MATRIX STRUCTURE-CELL FUNCTION’ RELATIONSHIPS</b></p> <p><b>Scientific Presentations</b></p> <ul style="list-style-type: none"> <li>• Quantifying birefringence in the bovine model of early osteoarthritis using polarisation-sensitive optical coherence tomography and mechanical indentation – Matthew Goodwin (University of Auckland)</li> <li>• Stiffness gradient GelMa hydrogel for 2D and 3D stem cell mechanobiology – Yu Suk Choi (University of Western Australia)</li> <li>• Improving chondrogenesis of equine umbilical cord blood-mesenchymal stem cell in three-dimensional hydrogel by synergistic control of chemical and mechanical cues – Xiaolin Cui (University of Otago)</li> <li>• Renal fibrosis in human kidney organoids – Veronika Sander (University of Auckland)</li> </ul>
1.30pm to 2.30pm	<p><b>LUNCH and ANZSB General Meeting</b></p>
2.30pm to 4.15 pm	<p><b>Invited Speaker</b></p> <p>Professor Rami Korhonen – University of Eastern Finland.  <b>On: BIOMECHANICAL RESPONSES OF CHONDROCYTES IN HEALTHY AND MENISCECTOMIZED RABBIT KNEE JOINTS</b></p> <p><b>CELL and TISSUE MECHANICS</b></p> <p><b>Scientific Presentations</b></p> <ul style="list-style-type: none"> <li>• A XRD study of biomimetically re-calcified bovine bone tissue - Lei Zhao (Hokkaido University)</li> <li>• How much force is required to perforate a colon during colonoscopy? - Niels Hammer (University of Otago)</li> </ul>



	<ul style="list-style-type: none"> <li>• Mildly degenerative structural changes in the fibrillar matrix of cartilage influences the extent of chondrocyte death following impact loading - Joshua Workman (University of Auckland)</li> <li>• Application of 3d printing technology to facilitate and standardize the testing soft tissues - Niels Hammer (University of Otago)</li> <li>• Shock-absorbing ability of damaged vs undamaged equine cartilage-bone - Fatemeh Malekipour (University of Melbourne)</li> <li>• Three-dimensional bulging of the human medial gastrocnemius muscle during isometric contractions in vivo - Rob Herbert (Neuroscience Research Australia)</li> </ul>
4.15 pm to 4.40 pm	<b>AFTERNOON TEA</b>
4.40 pm to 6.40 pm	<p><b>IMAGING AND MODELLING</b></p> <p><b>Invited Speaker</b> Professor Simo Saaraakala On: IMAGING OF JOINT TISSUES: IMPLICATION FOR BETTER UNDERSTANDING, DIAGNOSTICS AND PREDICTION OF OSTEOARTHRITIS</p> <p>Professor Martyn Nash – University of Auckland, Auckland, New Zealand REMODELLING OF HEART MUSCLE STRUCTURE AND FUNCTION DUE TO HYPERTENSION</p> <p><b>Scientific Presentations</b></p> <ul style="list-style-type: none"> <li>• Geometric shape fitting of the tibia and femur in the development of a coordinate system for the knee – Stuart Millar (University of South Australia)</li> <li>• Raman imaging of calcified cartilage and subchondral bone for osteoarthritis research – Shuvashis Das Gupta (University of Oulu)</li> <li>• Parametrisation of diffusion weighted magnetic resonance images of the heart to extract fibre and sheet orientations – Bianca Freytag (University of Auckland)</li> <li>• Investigation of spectral CT for use in bone mineral density assessment and association with histopathological grade – Kenzie Baer (Christchurch Regenerative Medicine and Tissue Engineering Group)</li> <li>• An in-silico model of the extracellular matrix of the lung – Kelly Burrowes (University of Auckland)</li> </ul>

7.00 pm till late	ABC 11 Conference Dinner and Awards Presentation <i>followed by</i> Closing Ceremony
-------------------	---

**END DAY 3 of 3**

## POSTERS

1. Fascia stress patterns are highly dependent on tissue structure. – Vickie Shim (University of Auckland)
2. Design and manufacturing of a low-cost robotic ankle for Indonesian trans-tibial amputees. – Ferryanto Ferryanto (Institut Teknologi Bandung)
3. Reliability and sensitivity of radiographic outcome measures for hip dysplasia in paediatric Charcot-Marie-Tooth disease. – Leanne Purcell (Sydney Musculoskeletal, Bone & Joint Health Alliance)
4. Right-to-left shape differences in the ulna – Desney Greybe (University of Auckland)
5. Clustering healthy runner based on 3-d kinematics patterns of pelvic during running using hierarchical method – Davood Khezri (University Of Mazandaran)
6. Kinematic study of clean and jerk lift in the 69-kg category weightlifting – Ferryanto Ferryanto (Institut Teknologi Bandung)
7. The effect of strengthening the muscles of the foot on common ligament injury mechanism in females participating in court sports. – Carla Van Der Merwe (Massey University)
8. Rapid quadrupedal locomotion – Hasti Hayati (University Of Technology Sydney)
9. Non-invasive estimate of left ventricular pressure using ultrasound – Amila Perera (University of Auckland)
10. Safe Lifting Ergonomics Program for Truck-Loaders: A Multi-site Case Study with Qualitative and Econometric Analyses - Hezekiah Oluwole Adeyemi (Olabisi Onanbanjo University)
11. Sensor validation of a smart knee brace – Andrew McDaid (University of Auckland)
12. Impact of walking speed on joint angular velocity Benjamin Mentiplay (La Trobe University)
13. A network model for lung parenchyma for describing the interplay between the crucial components of the extracellular matrix – Amin Iravani (University of Auckland)
14. Multivariate splines to estimate muscle-tendon length and moment arms in the upper limb - Thorben Pauli (University of Auckland)
15. Probing the Mechanisms of Muscle Degeneration in Cerebral Palsy using Agent-Based Modelling - Stephanie Khoo (University of Auckland)
16. Validation of three workflows to obtain bone and cartilage meshes for computational human knee modelling – Nynke Rooks (University of Auckland)
17. The effect of splint type on the stress distribution of bruxism patient's teeth – Satrio Wicaksono (Institut Teknologi Bandung)
18. MAP-OpenSim model hip muscles' pathways determined using optimized wrapping surfaces – Simao Brito Da Luz (Griffith University)
19. OpenSim-compatible library for kinematic reconstruction using inertial measurement units – Ted Yeung (University of Auckland)
20. A comparison of four factorization methods for muscle synergy extraction – Mohammad Rabbi (Griffith University)
21. Magnetic resonance imaging and freehand 3d ultrasound methods provide similar estimates of free achilles tendon geometry - Daniel Devaprakash (Griffith University)