



MBSANZ18 Programme

Scientific Meeting of the Matrix Biology Society
of Australia and New Zealand

December 4-7, 2018

Auckland, New Zealand



Tuesday December 4th

AMRF Auditorium 505-011, Grafton Campus

3.00pm	Registration opens – Atrium of Building 505
6.00pm	Professor Larry Sherman FROM MATRIX TO MUSIC: HOW MUSIC INFLUENCES THE DEVELOPING AND AGING BRAIN. <i>A TED-X talk exploring your inner musician.</i> Followed by welcome drinks and nibbles in the Atrium, kindly sponsored by Aroa Biosurgery

Wednesday December 5th

Lecture theatre 505-007, Grafton Campus

MBSANZ18 & ABC11 Shared Day on Mechanobiology

8.30-9.00am	Powhiri - a traditional Maori welcome MBSANZ18 and 10th Annual Mechanobiology Symposium Opening
9.00-10.45am	MECHANOBIOLOGY AND THE MATRIX
	<p>Invited Speaker</p> <p>Professor Toshiro Ohashi – Hokkaido University, Hokkaido, Japan INVESTIGATION OF ENDOTHELIAL MECHANOTRANSDUCTION MECHANISM: MECHANICAL PROPERTIES OF PRIMARY CILIA</p> <p>Oral presentations</p> <ul style="list-style-type: none"> • A model of bone mechanostat directed by osteocytes mechanosensation – Madge Martin (Queensland University of Technology) • Ultrastructural characterisation of the osteocyte lacunar-canalicular network during aging – mechanobiological implications – Peter Pivonka (Queensland University of Technology) • 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) • The extracellular matrix facilitates mechanical activation of epithelial Na⁺ channel in response to shear force to regulate blood pressure – Martin Fronius (University of Otago) • 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)
10.45-11.15am	MORNING TEA 10 th University of Auckland Mechanobiology Symposium Celebration

11.15-1.00pm	MECHANOBIOLOGY TOOLBOX
	<p>Invited Speakers</p> <p>Associate Professor Tim Woodfield – University of Otago, Christchurch, New Zealand 3D BIOPRINTING AND BIOASSEMBLY FOR REGENERATIVE MEDICINE OF MUSCULOSKELETAL TISSUES</p> <p>Associate Professor Kris Kilian – University of New South Wales, Sydney, Australia HYDROGEL MICROENGINEERING TO DECIPHER ‘MATRIX STRUCTURE-CELL FUNCTION’ RELATIONSHIPS</p> <p>Oral presentations</p> <ul style="list-style-type: none"> • Quantifying birefringence in the bovine model of early osteoarthritis using polarisation-sensitive optical coherence tomography and mechanical indentation – Matthew Goodwin (University of Auckland) • Stiffness gradient GelMa hydrogel for 2D and 3D stem cell mechanobiology – Yu Suk Choi (University of Western Australia) • 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) • Renal fibrosis in human kidney organoids – Veronika Sander (University of Auckland)
1.00-2.00pm	LUNCH
2.00-3.45pm	CELL AND TISSUE MECHANICS
	<p>Invited Speaker</p> <p>Professor Peter Torzilli – Cornell University and Hospital for Special Surgery, New York, USA. SOFT TISSUE BIOMECHANICS AND MECHANOBIOLOGY OF ARTICULAR CARTILAGE</p> <p>Oral Presentations</p> <ul style="list-style-type: none"> • A XRD study of biomimetically recalcified bovine bone tissue – Lei Zhao (Hokkaido University) • How much force is required to perforate a colon during colonoscopy? – Niels Hammer (University of Otago) • Mildly degenerative structural changes in the fibrillar matrix of cartilage influences the extent of chondrocyte death following impact loading – Joshua Workman (University of Auckland) • Application of 3D printing technology to facilitate and standardize the testing soft tissues – Niels Hammer (University of Otago) • Shock-absorbing ability of damaged vs undamaged equine cartilage-bone – Fatemeh Malekipour (University of Melbourne) • Three-dimensional bulging of the human medial gastrocnemius muscle during isometric contractions <i>in vivo</i> – Bart Bolsterlee (Neuroscience Research Australia)
3.45-4.00pm	AFTERNOON TEA

4.00-6.00pm	IMAGING AND MECHANOBIOLOGY
	<p>Invited Speakers</p> <p>Professor Simo Saaraakala - Oulu University, Oulu, Finland 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>Oral presentations</p> <ul style="list-style-type: none"> • Geometric shape fitting of the tibia and femur in the development of a coordinate system for the knee – Stuart Millar (University of South Australia) • Raman imaging of calcified cartilage and subchondral bone for osteoarthritis research – Shuvashis Das Gupta (University of Oulu) • Parameterisation of diffusion weighted magnetic resonance images of the heart to extract fibre and sheet orientations – Bianca Freytag (University of Auckland) • 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) • An <i>in-silico</i> model of the extracellular matrix of the lung – Kelly Burrowes (University of Auckland)
6.00pm	ABC11 Closing Ceremony
6.15-8.00pm	MBSANZ18 Beer and Pizza (Atrium of Building 505)
<p>Thursday December 6th</p> <p>Goldie Estate, Waiheke Island</p>	
Travel to Waiheke	<i>Departure from Grafton to Waiheke will be confirmed.</i> <i>All transport from Grafton to Waiheke return is covered by conference registration</i>
9.00-10.45pm	MATRIX AND DISEASE I
	<p>Plenary Speaker</p> <p>Dr Matthew Hoffman – National Institute of Dental and Craniofacial Research, NIH, Maryland, USA BUILDING A GENETIC TOOL-KIT TO INVESTIGATE 3-O-SULFATION OF HEPARAN SULFATE DURING ORGAN DEVELOPMENT</p> <p>Oral presentations</p> <ul style="list-style-type: none"> • Human mast cells produce the mammalian chondroitinase, hyaluronidase 4, and generate unique chondroitin sulphate structures – Brooke Farrugia (University of New South Wales) • Exercise attenuates hepatic steato-fibrosis in rats fed a high-fat diet – Farqad Abdulqader (University of Auckland) • Kallistatin-Sirtuin 1 pathway is crucial in matrix protection and limiting abdominal aortic aneurysm progression – Smriti Krishna (James Cook University) • Developing <i>in vitro</i> human iPSC cell lines using CRISPR/Cas9 to investigate the role of perlecan in fibrosis – John Whitelock (University of New South Wales)

	<ul style="list-style-type: none"> Reduction of ARNT-induced matrix metalloproteinases pathway is a novel regulator of cardiac endothelial barrier integrity in diabetes – Rosie (Rongxue) Wu (University of Chicago)
10.45-11.15am	MORNING TEA
11.15-1.00pm	THERAPEUTICS
	<p>Invited speakers</p> <p>Dr Carl Flannery – Bioventus Global LLC, North Carolina, USA TBC</p> <p>Professor Jerry Turnbull – University of Liverpool, Liverpool, UK NEXT GENERATION HEPARINS: TARGETING PROTEOGLYCAN FUNCTIONS FOR THERAPEUTIC BENEFIT</p> <p>Oral presentations</p> <ul style="list-style-type: none"> Placenta derived exosomes: a potential new therapy to improve intrauterine growth restriction – Gaayathri Ariyakumar (University of Sydney) Targeting the lysyl oxidases in pancreatic cancer – Jessica Chitty (Garvan Institute of Medical Research) Chemokine expression as biological marker for bone regeneration occurring during the Masquelet-Therapy – Patrick Haubruck (Heidelberg University Hospital) Proteomic profiling of human prostate cancer-associated fibroblasts identifies LOXL2 as a key regulator of pro-tumorigenic extracellular matrix – Natalie Lister (Monash University) The potential chondro-protective effects of 26S proteasome inhibitors in an in vitro cartilage explant model – Cindy Shu (University of Sydney) Defining the predictive utility of the mouse DMM model of osteoarthritis for testing/developing therapeutic agents – Sanaa Zaki (University of Sydney) Novel 3-dimensional glycomimetic clusters as heparanase inhibitors for anticancer therapy – Olga Zubkova (Victoria University of Wellington)
1.00-1.45pm	LUNCH
11.15-1.00pm	MATRIX AND DISEASE II
	<p>Invited Speakers</p> <p>Dr Raewyn Poulsen – University of Auckland, Auckland, New Zealand CIRCADIAN CONTROL OF MATRIX SYNTHESIS AND BREAKDOWN</p> <p>Dr Tom Cox – Garvan Institute of Medical Research, Sydney, Australia DELVING DEEPER INTO THE MATRIX: ECM REMODELLING IN SOLID TUMOUR PROGRESSION AND METASTASIS</p> <p>Oral presentations</p> <ul style="list-style-type: none"> Neogenin1 knockdown in human colorectal cancer cells causes increased deposition of fibronectin and MMP1 exhibiting ECM-remodelling and partial EMT response – Vishal Chaturvedi (University of Melbourne) Influence of matrix stiffness on cancer cell metastatic potential – Elyse Filipe (Garvan Institute of Medical Research) Role of stem cells in degenerative joint disease: implications for a new regenerative therapy – Jiao Li (University of Sydney)

	<ul style="list-style-type: none"> • Human cartilage influences the crystallization of monosodium urate: a potential link between osteoarthritis and gout – Ashika Chhana (University of Auckland) • ARC (Apoptosis Repressor with Caspase recruitment domain) deficient mice develop severe post-traumatic knee osteoarthritis but have reduced pain – Cindy Shu (University of Sydney) • Malignant progression in recessive dystrophic epidermolysis bullosa – Albert Mellick (University of New South Wales)
4.00-5.30pm	Wine tasting tour
4.45-5.30pm	MBSANZ Annual General Meeting
5.30-6.15pm	Barry Preston Award followed by MBSANZ18 Conference Dinner
Friday December 7th AMRF Auditorium 505-011, Grafton Campus	
9.00-10.45am	MATRIX AND NEUROSCIENCE
	<p>Plenary Speaker Professor Larry Sherman – Ohio Health State University, Ohio, USA DYNAMIC CHANGES IN HYALURONAN REGULATE NEURAL PROGENITOR CELL DIFFERENTIATION: IMPLICATIONS FOR NEURODEGENERATION AND REGENERATION</p> <p>Oral presentations</p> <ul style="list-style-type: none"> • Loss of interneurons and disruption of perineuronal nets in the cerebral cortex following hypoxia-ischaemia in near-term fetal sheep – Justin Dean (University of Auckland) • Heparan sulfate proteoglycans as mediators of human neurogenesis – Larisa Haupt (Queensland University of Technology) • A developmental role for the extracellular matrix sugar hyaluronan in regulating the growth of neuronal processes in vitro – Rashi Karunasinghe (University of Auckland) • Functional consequences of KS sulfation in electrosensory tissues and in neuroregulation – James Melrose (University of Sydney) • Expression and function of the extracellular matrix sugar hyaluronan in developing neurons – Justin Dean (University of Auckland) • Development Novel tissue targeted Nerve Growth Factor: Fibronectin chimeric fusion proteins as a potential therapeutic for peripheral nerve regeneration – Mangapathiraju Tippana (Queensland University of Technology) • ADAMTS4 AAV-gene therapy breakdown of chondroitin sulphate proteoglycans combined with rehabilitation is therapeutic after spinal cord injury – Simon O'Carroll (University of Auckland)
11.00-11.20am	MORNING TEA
11.20-1.00pm	IMAGING THE MATRIX
	<p>Invited Speakers Professor Nicola Dalbeth –University of Auckland, Auckland, New Zealand DUAL ENERGY CT IMAGING IN GOUT</p> <p>Dr Kathryn Stok – University of Melbourne, Melbourne, Australia MULTI-SCALE MECHANOBIOLOGICAL IMAGING</p>

	<p>Oral presentations</p> <ul style="list-style-type: none"> • The corneal epithelium: how it maintains its shape – Guy Lyons (Centenary Institute) • Analysis of the primary cilium in human and bovine intervertebral disc cells – Sharon Owen (University of Keele) • Does the matrix play a role in intracellular remodelling in human heart failure? – David Crossman (University of Auckland)
	<p>PhD Student E-Poster Session – Denis Lowther Award</p>
	<ul style="list-style-type: none"> • The role of hyaluronan in the morphological development of hippocampal neurons – Molly Abraham (University of Auckland) • How does joint injury lead to osteoarthritis? The progression of osteochondral damage in the ACL deficient knee – Carina Blaker (University of Sydney) • Self-assembling block copolymer for signalling molecules delivery by collagen layer degradation – Isabela Monteiro (University of Auckland) • Heparan sulfate proteoglycans as biomarkers of mesenchymal stem cell neural development – Jade (Chieh) Yu (Queensland University of Technology) • Engineering freestanding hierarchical vascular structures using tropoelastin – Richard Wang (University of Sydney) • Enzymatic digestion of auricular cartilage with guanidine hydrochloride acts similarly on fresh and lyophilised samples – Manula Rathnayake (University of Melbourne) • The histological features of hip abductor tendon tears: quantifying degeneration of the tendon and enthesis – Mark Zhu (University of Auckland)
1.00-1.45pm	LUNCH
1.45-3.30pm	BIOMATERIALS AND BIOFABRICATION – sponsored by IOP Publishing
	<p>Invited Speakers</p> <p>Professor Joanne Tipper - University of Technology Sydney, Sydney, Australia BIOLOGICAL IMPACT OF WEAR PARTICLES FROM TOTAL JOINT REPLACEMENTS</p> <p>Professor Cameron Brown – Queensland University of Technology, Brisbane, Australia LEARNING FROM BIOLOGICAL MATERIALS</p> <p>Oral presentations</p> <ul style="list-style-type: none"> • Functional insights from the proteomic inventory of ovine forestomach matrix – Sandi Dempsey (Aroa Biosurgery Ltd) • Silk biomaterials functionalised with recombinant domain V of human perlecan promote angiogenesis and tissue vascularisation – Jelena Rnjak-Kovacina (University of New South Wales) • Development of novel visible light photo-initiators for 3D bioprinting – Khoon Lim (University of Otago) • Incorporation of hydroxyproline into recombinant bacterial collagen produced in E.coli – John Ramshaw (University of Melbourne) • Design of chondro-instructive hydrogels for high-throughput 3D-biofabrication of cartilage tissue modules – Gabriella Lindberg (University of Otago)
	BOB FRASER NEW INVESTIGATOR & DENIS LOWTHER BEST POSTER AWARD PRESENTATION
3.30pm	Conference closing

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MBSANZ18 Highlights

Plenary Speakers



Larry Sherman
Professor of Neuroscience, OHSU, USA
Dynamic changes in hyaluronan regulate neural progenitor cell differentiation: Implications for neurodegeneration and regeneration



Matt Hoffman
Scientific Director, NIH NIDCR, USA
Building a genetic tool-kit to investigate 3-O-sulfation of heparan sulfate during organ development

Social Activities



At the Grafton Campus:

Tuesday evening – Fun TED-X talk on music and the brain followed by drinks mixer with the Biomechanics Society guys and gals.

Wednesday evening – Super relaxed beers and pizza evening as the sun goes down on the city.

Thursday @ Goldie Estate, Waiheke Island



The absolute highlight of the meeting! A whole day at the University's winery. We will start with science and finish with wine! Grab the chance to network while enjoying a range of premium wines, as Goldie staff guide you through their wine selection. Enjoy a glass of wine and some nibbles or a leisurely stroll to the top of the hill to soak in the magnificent views before our conference dinner.

Visit: www.mbsanz18.nz for more info