



MBSANZ18 Programme

Scientific Meeting of the Matrix Biology Society
of Australia and New Zealand
December 4-7, 2018
Auckland, New Zealand



Tuesday December 4th

Lecture theatre 505-011, Grafton Campus

3.00pm	Registration opens – Atrium of Building 505
5.15-6.00pm	ABC11 Poster viewing – all MBSANZ delegates welcome
6.00-7.00pm	Professor Larry Sherman FROM MATRIX TO MUSIC: HOW MUSIC INFLUENCES THE DEVELOPING AND AGING BRAIN. Followed by welcome drinks and nibbles in the Atrium from 7pm. This evening has kindly been sponsored by Aroa Biosurgery .

Wednesday December 5th

AMRF Auditorium 505-011, Grafton Campus

MBSANZ18 & ABC11 Shared Day on Mechanobiology

8.00am	Registration opens – Atrium of Building 505
8.30-9.00am	Mihi - a traditional Maori welcome MBSANZ18 and 10th Annual Mechanobiology Symposium Opening
9.00-11.05am	MECHANOBIOLOGY AND THE MATRIX
	<p>Invited Speakers</p> <p>Professor Toshiro Ohashi – Hokkaido University, Hokkaido, Japan INVESTIGATION OF ENDOTHELIAL MECHANOTRANSDUCTION MECHANISM: MECHANICAL PROPERTIES OF PRIMARY CILIA</p> <p>Professor Peter Torzilli – Cornell University & Hospital for Special Surgery, NY, USA SOFT TISSUE BIOMECHANICS AND MECHANOBIOLOGY OF ARTICULAR CARTILAGE</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) • Towards cellular epidemiology of degenerative diseases using geographic information systems, multitem and machine learning approaches – Anton Nathanson (University of New South Wales) • 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)

	<ul style="list-style-type: none"> 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)
11.05-11.35am	MORNING TEA 10 th University of Auckland Mechanobiology Symposium Celebration
11.35-1.15pm	MECHANOBIOLOGY TOOLBOX
	Invited Speakers Associate Professor Tim Woodfield – University of Otago, Christchurch, New Zealand 3D BIOPRINTING AND BIOASSEMBLY FOR REGENERATIVE MEDICINE OF MUSCULOSKELETAL TISSUES Associate Professor Kris Kilian – University of New South Wales, Sydney, Australia HYDROGEL MICROENGINEERING TO DECIPHER ‘MATRIX STRUCTURE-CELL FUNCTION’ RELATIONSHIPS Oral presentations <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 (Stephen) Cui (University of Otago) Renal fibrosis in human kidney organoids – Veronika Sander (University of Auckland)
1.15-2.15pm	LUNCH
2.15-3.55pm	CELL AND TISSUE MECHANICS
	Invited Speaker Professor Rami Korhonen – University of Eastern Finland, Finland BIOMECHANICAL RESPONSES OF CHONDROCYTES IN HEALTHY AND MENISCECTOMIZED RABBIT KNEE JOINTS Oral Presentations <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> – Robert Herbert (Neuroscience Research Australia)

3.55-4.20pm	AFTERNOON TEA
4.20-6.15pm	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)
6.20-8.00pm	MBSANZ18 Beer and Pizza (Atrium of Building 505)
<p>Thursday December 6th</p> <p>Goldie Estate, Waiheke Island</p>	
8.15am (Ferry departs)	<i>Departure from Auckland Ferry Terminal (Quay Street, Downtown Auckland).</i> <i>Ferry transport to and from Waiheke Island, and travel to and from Goldie Estate is covered by conference registration. Delegates must arrive at the ferry terminal by 7.45am to collect tickets.</i>
9.30-11.05am	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)
11.05-11.30am	MORNING TEA
11.30am-1.30pm	THERAPEUTICS
	<p>Invited speakers</p> <p>Dr Carl Flannery – Bioventus Global LLC, North Carolina, USA MEDICATING THE MATRIX: FOCUS ON ORTHOBIOLOGICS</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) The potential chondro-protective effects of 26S proteasome inhibitors in an <i>in vitro</i> cartilage explant model – Cindy Shu (University of Sydney) An osteocyte-rich <i>ex vivo</i> model for studying bone health – Young Eun Park (University of Auckland) Defining the predictive utility of the mouse DMM model of osteoarthritis for testing/developing therapeutic agents – Chris Little (University of Sydney) Novel 3-dimensional glycomimetic clusters as heparanase inhibitors for anticancer therapy – Olga Zubkova (Victoria University of Wellington)
1.30-2.15pm	LUNCH
2.15-4:05pm	MATRIX AND DISEASE II
	<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>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 – Elysse Filipe (Garvan Institute of Medical Research) Role of stem cells in degenerative joint disease: implications for a new regenerative therapy – Jiao Jiao Li (University of Sydney) Human cartilage influences the crystallization of monosodium urate: a potential link between osteoarthritis and gout – Ashika Chhana (University of Auckland)

	<ul style="list-style-type: none"> • ARC (Apoptosis Repressor with Caspase recruitment domain) deficient mice develop severe post-traumatic knee osteoarthritis but have reduced pain – Shihani Stoner (University of Sydney) • Malignant progression in recessive dystrophic epidermolysis bullosa – Albert Mellick (University of New South Wales)
4.05-5.30pm	Networking with wine tasting and afternoon tea
4.45-5.30pm	MBSANZ Annual General Meeting
5.30-6.15pm	Barry Preston Award followed by MBSANZ18 Conference Dinner
9:30pm	Return ferry to Downtown Auckland Ferry Terminal. The bus will depart Goldie Estate at 9pm.
Friday December 7th AMRF Auditorium 505-011, Grafton Campus	
8.00am	Registration opens – Atrium of Building 505
8.45-10.40am	MATRIX AND NEUROSCIENCE - sponsored by Brain Research New Zealand and the Centre for Brain Research
	<p>Plenary Speaker Professor Larry Sherman – Oregon National Primate Research Center, Oregon, 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 <i>in vitro</i> – 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)
10.40-11.00am	MORNING TEA
11.00am-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	<p>LUNCH</p>
1.45-3.25pm	<p>BIOMATERIALS AND BIOFABRICATION – sponsored by IOP Publishing</p>
	<p>Invited Speakers</p> <p>Dr Raewyn Poulsen – University of Auckland, Auckland, New Zealand CIRCADIAN CONTROL OF MATRIX SYNTHESIS AND BREAKDOWN</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) • Incorporation of hydroxyproline into recombinant bacterial collagen produced in E.coli – Yong Peng (University of Melbourne) • Development of novel visible light photo-initiators for 3D bioprinting – Khoon Lim (University of Otago) • Design of chondro-instructive hydrogels for high-throughput 3D-biofabrication of cartilage tissue modules – Khoon Lim (University of Otago)
	<p>BOB FRASER NEW INVESTIGATOR & DENIS LOWTHER BEST POSTER AWARD PRESENTATION</p>
3.30pm	<p>Conference closing</p>

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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