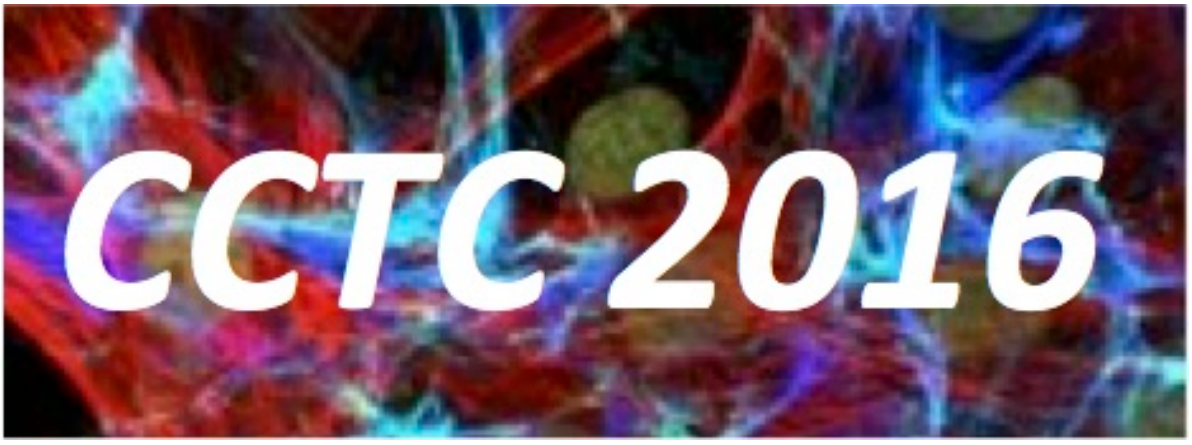
McMaster University

M. G. DeGroote Centre for Learning and Discovery
Rm. 1110

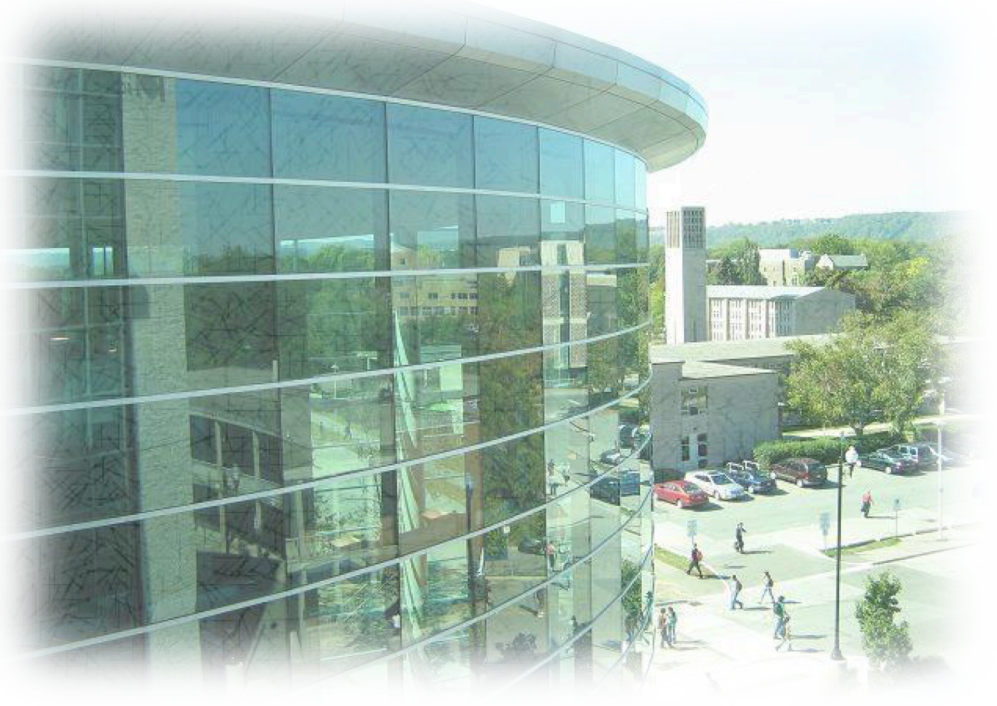


22nd Annual

Canadian Connective Tissue Conference

June 1-3, 2016

Hamilton, Ontario, Canada



Welcome … to the **22nd Canadian Connective Tissue Conference -2016**. The Scientific Committee and local organizing committee are pleased to host this conference at McMaster University in Hamilton, Ontario for the first time since the existence of the CCTC.

The CCTC is supported by the work of the Canadian Connective Tissue Society, a not-for profit corporation, with its mission to strengthen contacts among researchers in connective tissue research and musculoskeletal health. The CCTC is also focused on the development of young Canadian trainees and scientists and as such provides trainees with opportunities to present their work and participate in the scientific sessions.

This year's program includes international researchers Ben Alman (Durham, USA) as keynote speaker, Drew Rowan (UK) , Eric White (U of Michigan, USA) , Canadian researchers Dr. Boris Hinz (Toronto), Lisbet Haglund (Montreal), Cheryl Seguin (London) and Rick Adachi (Hamilton).

The program also includes 24 oral presentations selected from submitted abstracts, as well as two poster sessions. Awards will be provided for best trainee oral and poster presentations.

Included in the registration fees is the cost of one year's membership in the Canadian Connective Tissue Society (CCTS). The CCTS will hold its general assembly on the Friday of the conference. CCTS website (http://connective-tissue-canada.com)

Registration for CCTC-2016 includes: entry to the opening reception on the evening of June 1st that includes a light dinner and live jazz music; deluxe continental breakfast, lunch and coffee breaks on June 2nd and 3rd; and, for those who pre-purchased tickets at the time of registration, a formal dinner on the evening of June 2nd.

McMaster's main campus, located in the Westdale neighbourhood of Hamilton, Ontario, is comprised of 300 acres of scenic property at the western end of Lake Ontario, between Toronto and Niagara Falls. Its 30-acre central core is designated for pedestrians and bicyclists. Nearby attractions include Cootes Paradise, the Bruce Trail, the Waterfront Trail, the Royal Botanical Gardens, and the Niagara Escarpment, a UNESCO World Biosphere Reserve.

The CCTC-2016 Scientific Committee and the local organizing committee members are looking forward to June 1!

CCTC-2016

Scientific Organizing Committee

Dr. Kjetil Ask
Dr. Marin Kolb
Dr. Rick Adachi
Dr. Maggie Larche
Dr. Fernando Botelho
Dr. Greg Wohl
Dr. Carl Richards (Conference Chair)

Local Organizing Committee

Anisha Dubey
Ehab Ayaub
Sally Esmail (U of T)
Jewel Imani
Dr. Judy West-Mays
Dr. Fernando Botelho
Dr. Chiko Shimbori
Norma Stewart

CCTC-2016 Sponsors

The CCTC-2016 is grateful for the financial support by corporate, CIHR and local University sponsors. This sponsorship is critically important in enabling the conference proceedings, speaker travel, trainee travel and presentation awards and the continued support of the networking and scientific development of new researchers in connective tissue research and musculoskeletal health. We are particularly thankful for our platinum sponsor support from:

Boehringer-Ingelheim Canada
ProMetic Life Sciences Inc
CIHR–IMHA

also provided generous sponsorship

Faculty of Health Science
Department of Pathology and Molecular Medicine
Department of Medicine
McMaster Immunology Research Centre (MIRC)

Faculty of Engineering

McMaster University Campus Logistics

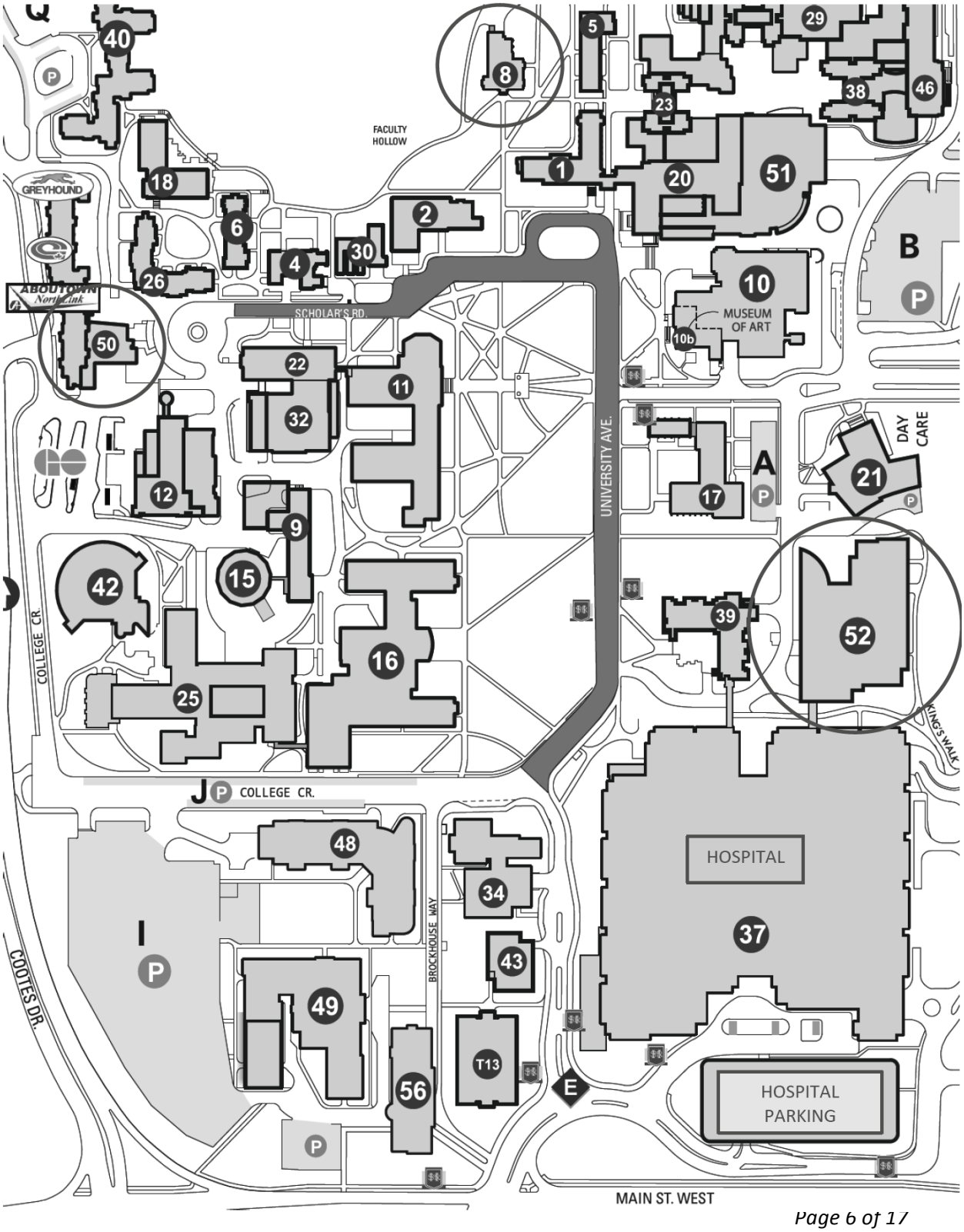
McMaster University – Mary Keyes Residences
Building 50 on campus map (page 8)

Registration and Cocktail Receptions
University Club of McMaster
Alumni Memorial Hall
Building 8 on partial campus map (page 8)

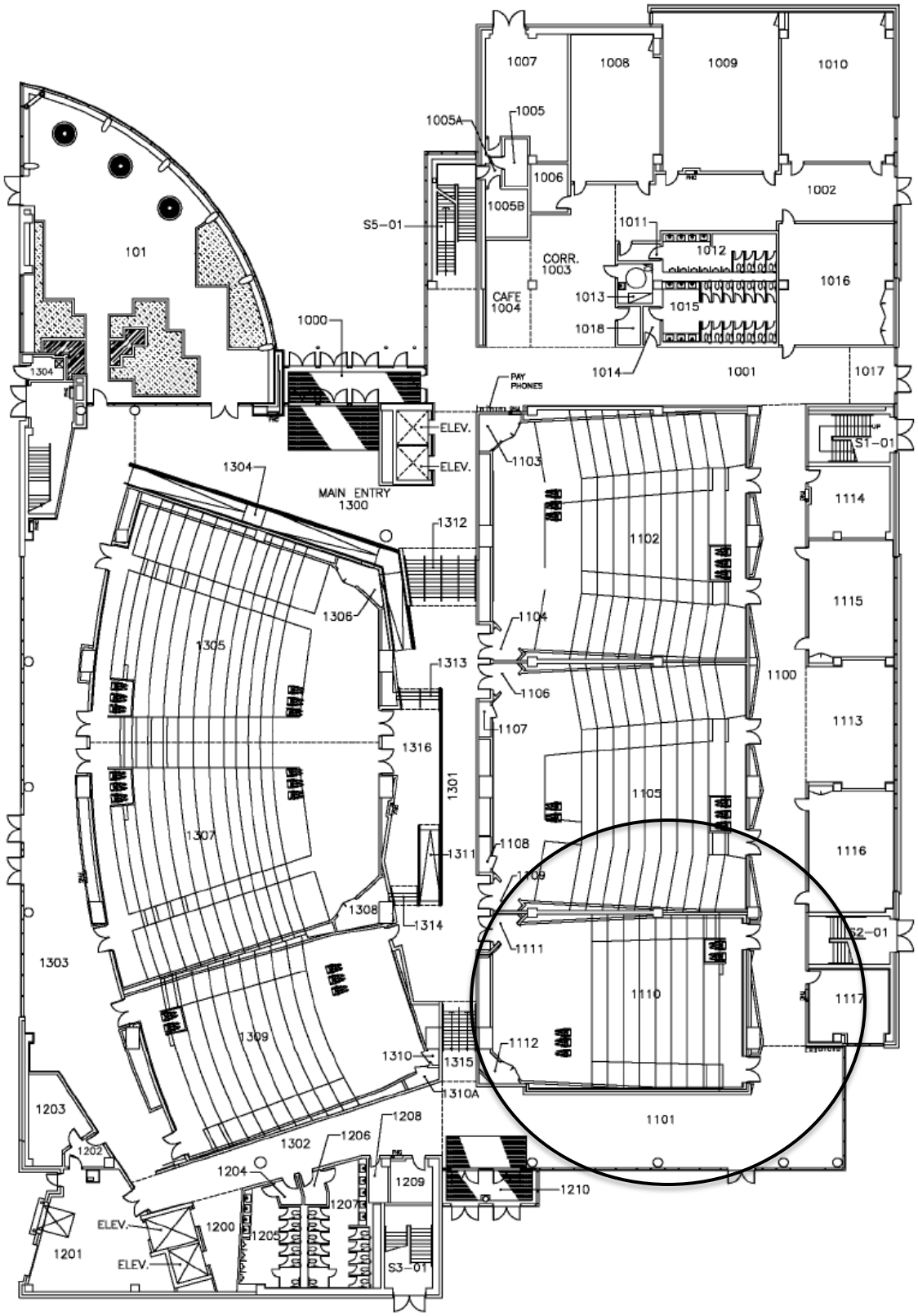
Scientific Sessions
Michael G DeGroote Centre for Learning and Discovery/School of Medicine (MDCL)
Building 52 on partial campus map (page 8)
Oral Presentations – Room 1110 (see MDCL map on page 9)
Poster Presentations – Foyer (see MDCL map on page 9)

Gala Dinner *(for those who pre-purchased tickets only)*
University Club of McMaster
Alumni Hall
Building 8 on partial campus map (page 8)

Partial Map of McMaster University Campus with pertinent buildings circled



Michael G DeGroote Centre for Learning and Discovery/School of Medicine (MDCL)



Speaker Biographies

Keynote Speaker:
Benjamin Alman, MD

Chair of the Department of Orthopaedic Surgery
Duke School of Medicine, Durham, NC, USA

Since his appointment in 2013 at Duke School of Medicine, Dr. Alman has led a respected team of more than 60 clinical and research faculty and 55 residents and fellows committed to advancing scientific discovery and enhancing patient care. Dr. Alman previously served as the A.J. Latner Professor and Chair of Orthopaedics at the Universtiy of Toronto in the Research Institute's Developmental and Stem Cell Biology Program at The Hospital for Sick Children. He was also vice chair of research in the Department of Surgery and interim director of the Toronto Musculoskeletal Centre at the University of Toronto.

Dr. Alman's clinical practice focuses on the care of children with syndromes, spinal deformity, neuromuscular disorders, and tumors involving the bones, joints and soft tissues. He is also runs a world class basic science research program, studying the role of developmental signaling pathways in musculoskeletal tumors and reparative processes. That research has brought Dr. Alman numerous awards, including the J. Edouard Sampson Award for outstanding research, the Arthur H. Heune Award for outstanding contributions in pediatric orthopaedics, and most recently the Lodwick Award for the best publication in the musculoskeletal field and the Charles Tator Surgeon-Scientist Mentoring Award. The CCTC-2016 is pleased that Dr. Alman is our keynote speaker this year.

Invited Speaker:
Drew Rowan, PhD

Professor of Molecular Rheumatology
Head, Musculoskeletal Research Group
Newcastle University, UK

Drew obtained his PhD in 1989 at the world-renowned Strangeway's Research Laboratory in Cambridge UK with Alan Barrett which started his interest in proteinases. This became linked to arthritis following a post-doc position at the Shriner's Hospital in Montreal with John Mort and Robin Poole. After returning to Cambridge to work with Tim Cawston, Drew moved with Tim to Newcastle in 1996 to take up a lectureship. He has been Professor of Molecular Rheumatology since 2007 and Head of the Musculoskeletal Research Group from 2013. Drew's group focuses on identifying which proteinases are critical for mediating tissue breakdown, especially in osteoarthritis, and how they are regulated by external stimuli such as inflammation. He is particularly interested in mechanisms whereby proteolysis triggers cell signaling and understanding how this impacts upon matrix homeostasis. The group is also beginning to translate some of their findings via the development of novel proteinase inhibitors that could prevent further tissue destruction in osteoarthritis patients.

Invited Speaker:
Dr. Lisbet Haglund, PhD

Scientist, RI-MUHC, Montreal General Hospital
Associate Professor, Department of Surgery, Division of Orthopaedics,
Faculty of Medicine, McGill University, Montreal, Canada

Dr Haglunds' research focuses on characterization of molecular mechanisms leading to intervertebral disc degeneration and progression. Research goals include the development of molecular markers to follow disease state, progression or effect of treatment, and most importantly novel therapeutic interventions for degenerative and painful intervertebral disc degeneration. Dr. Haglund also serves on the board of the CCTS as vice-president.

Invited Speaker:
Jonathan (Rick) Adachi. MD, FRCPC

Professor, Department of Medicine, Division of Rheumatology
McMaster University, Hamilton, ON, Canada
Alliance for Better Bone Health Chair in Rheumatology

Dr. Rick Adachi is an internationally acclaimed clinician for his work on osteoporosis clinical trials and therapy, with current interests in the relationship between bone, muscle and joints, and effects on fracture risk. His work uses both peripheral quantitative computed tomography and magnetic resonance imaging to determine bone and muscle parameters to look at prospectively gathered fracture data. This is examined in light of other established risk factors for fracture, and frailty indices have been developed to examine the influence of muscle and falls on fractures. Work is also being conducted in osteoarthritis and the influence of muscle on arthritis. Dr. Adachi serves as head of Rheumatology at McMaster, and currently holds the Alliance for Better Bone Health Chair.

Invited Speaker:
Dr. Boris Hinz, PhD

Professor, Faculty of Dentistry
University of Toronto

Dr. Hinz leads the Laboratory of Tissue Repair and Regeneration (LTR_2) which is situated at the interface of cell and molecular biology, biophysics, bioengineering and clinical research. The LTR_2 aims to understand the molecular mechanisms that lead to myofibroblast formation and that control its fibrotic activity. This includes the functional analysis of the cell's contractile apparatus (actin stress fibers), of force transmission at sites of cell-extracellular matrix contacts (focal adhesions) and of the mechanical cross-talk between contractile stress fibers of contacting fibroblasts at sites of cell-cell adherens junctions. The LTR_2 further aims to develop novel strategies counteracting myofibroblast malfunction by targeting these instrumental structures of the contractile phenotype. Dr Hinz 's research programs are internationally recognized, and he also serves on the board of the CCTS.

Invited Speaker:
Dr. Eric White, MD

Associate Professor, Department of Internal Medicine
University of Michigan, Ann Arbour, Michigan USA
Director, Sarcoidosis Program

Dr. Eric White is a specialist in the fields of pulmonary and critical care medicine. In 1995, he graduated magna cum laude from the State University of New York Health Science Center, in Brooklyn, and completed an internal medicine residency and pulmonary and critical care medicine fellowship at the University of Michigan.
The White Lab focuses on understanding the biologic underpinnings of lung fibrosis and repair with an emphasis on the role of the extracellular matrix in these processes. Roles of fibronectin, osteopontin, PTEN and myofibroblast function are of particular interest. By employing a translational approach using human tissues, Dr White is exploring the ways in which the matrix contributes to lung fibrosis and might be exploited either therapeutically or as biomarkers to predict disease progression. In addition, he also has an investigative focus in lung regeneration. Dr. White's clinical interests include diffuse parenchymal lung diseases, primarily idiopathic pulmonary fibrosis and sarcoidosis, and pulmonary vasculitis syndromes. Dr. White also runs a dedicated multidisciplinary sarcoidosis clinic.

Invited Speaker:
Dr. Cheryle Séguin, PhD

Assistant Professor, Department of Physiology and Pharmacology
Western University, London, ON, Canada

Dr Séguin obtained her BSc (1999) and MSc (2001, Dept of Anatomy and Cell Biology) from The University of Western Ontario and her PhD in the area of cell biology and tissue engineering from the University of Toronto. Following this, she became a postdoctoral fellow with Dr. Janet Rossant at the SickKids Hospital, working in the field of early mammalian development and stem cell biology. While at SickKids, she assumed the role of Interim Manager and helped establish the Ontario Human Induced Pluripotent Stem Cell (iPSC) Facility, an endeavour funded by the Ontario Ministry of Innovation. In 2009, she was recruited to the Department of Physiology and Pharmacology at Western. She has been recognized by the Canadian Arthritis Network Scholar Award (2009-2013) and the CIHR New Investigator Award (2014-2019). Her research program is focused on understanding the pathways that regulate the fate and function of cells, with particular emphasis on the intervertebral disc and spine pathologies. The program includes a number of interrelated projects that use novel genetic mouse strains, and in vivo and ex vivo model systems.

PROGRAM

WEDNESDAY JUNE 1, 2016

6:00-9:00 Registration, Reception and Light Dinner
University Club of McMaster, Alumni Memorial Hall

THURSDAY JUNE 2, 2016

Michael G DeGroote Centre for Learning and Discovery (MDCL) Room 1110

7:45-8:30 Deluxe Continental Breakfast

7:45-3:00 Registration desk open (MDCL foyer, outside 1110)

8:30-8:45 Welcome Remarks
Carl Richards, McMaster University, Hamilton, Ontario, Canada

BONE, CARTILAGE AND DISEASE: FUNDAMENTAL ASPECTS

8:45-9:25 Keynote Speaker: **Ben Alman,** Duke University, Durham, North Carolina, USA
"Rejuvenation of fracture repair: it's all in the blood"

9:25-10:30 ***Bone Cell Biology and signaling* – Selected Abstracts (A) *presenters:***

Esmail, Sally: Mapping functional domains of v-atpase a subunit: potential therapeutic target for osteoporosis and cancer metastasis

Alotaibi, Mohammed: Evaluation of bone healing in xylt-2 knockout mouse model

Zhang, Lucia: Effects of osteoblast-specific gα_s over-expression on skeletal development using a transgenic mouse model

Kim, Brandon H: Extracellular atp potentiates calcium signaling by parathyroid hormone through two distinct mechanisms

Chu, Anh: Elucidating the role of lipid binding domains in v-atpases *a* subunits

10:30-10:45 Break

10:45 ***Matrix proteins/MMPs structure/function***

10:45- 11:25 Invited speaker: **Drew Rowan**, University of Newcastle, UK
"Chondrocyte Biology in OA"

11:25-12: 15 ***ECM Protein-protein interactions*** – **Selected Abstracts (B)** ***presenters:***

Hubmacher, Dirk: Adamts17, an extracellular protease with unusual biochemical properties, binds to fibrillin microfibrils

O'Hagan-Wong, Kelsey: The role of gingipains in the degradation of dentogingival attachment proteins

Alabdulkarim, YA: Serum levels of amino terminal propeptide of type 1 procollagen (p1np) as a biomarker to assess bone regeneration

Kumra, Heena: Interplay between cellular and plasma fibronectin in maintaining vessel wall integrity and function

12:15-2:00 **LUNCH** (MDCL foyer southeast)
Poster viewing (MDCL foyer west)

12:15-2:00 CCTS Board Meeting (MDCL-4023)

2:00 ***Matrix mediators and regulation of stromal cells***

2:00-2:25 Invited speaker: **Lisbet Haglund**, McGill University, Montreal, Quebec, Canada

"Soluble factors implicated in painful IVD degeneration"

2:25-3:15 **Selected Abstracts (C)** ***presenters:***
Mukherjee, Subhendu: Role of adenylate cyclase pathway in prevention of pulmonary fibrosis
Dubey, Anisha: Il-33 and associated extracellular matrix induction by oncostatin m in murine lung is independent of il-6
Krock, Emerson: Toll-like receptor 2 activation induces degeneration of human intervertebral discs
Gawri, Rahul: Simple, silica column-based method to isolate and quantify inorganic polyphosphates from mammalian tissues

3:15-3:30 Break

BONE, CARTILAGE AND DISEASE: TRANSLATIONAL AND CLINICAL ASPECTS

3:30-4:10 Invited speaker: **Rick Adachi,** McMaster University, Hamilton, Ontario, Canada

"Current Treatment and Diagnostics in Osteoporosis"

4:10- 5:40 Poster Presentations and Viewing

6:00-9:00 Cocktail Reception and Formal Dinner (ticket purchase required)
University Club at McMaster Alumni Hall

FRIDAY JUNE 3, 2016 (Michael G DeGroote Centre for Learning and Discovery Room 1110)

7:45-8:45 Deluxe Continental Breakfast

8:30-10:30 Registration desk open (MDCL-foyer)

HEALING AND TISSUE FIBROSIS:
MOLECULAR/CELLULAR AND CLINICAL ASPECTS OF TISSUE REPAIR AND FIBROSIS

9:00-9:45 Invited speaker: **Boris Hinz,** University of Toronto, Toronto, Ontario, Canada

"Basic mechanisms in tissue fibrosis"

9:45-10:50 **Selected Abstracts (D)** ***presenters:***
Mohammadi, Hamid: Inelastic remodeling of collagen matrices enables remote intercellular communication: insights from experimental and computational studies
Shafieyan, Yousef: Live cell contraction studies on suft substrates: a paradigm to characterize diseased and healthy cells
Lama, Polly: Focal uncoupling of cell-matrix interactions and swelling acclerate processes leading to pain in disc degeneration
Rosenzweig, Derek H: High mechanical strain inhibits pc12 cell neurite sprouting through reduced mapk signaling and decreased neurofilament expression
Coelho, Nuno M: Discoidin domain receptor 1 enables the force-mediated collagen contraction

10:50-11:10 Break

11:10-11:55 Invited speaker: **Eric White,** University of Michigan, USA
"Extracellular matrix in the diagnosis and management of lung fibrosis"

12:00-1:00 LUNCH (MDCL foyer southeast)

12:50-1:50 Final Poster Viewing (MDCL foyer west)

1:50- 2:30 **Selected Abstracts (E)** ***presenters:***
Ayaub, Ehab: Il-6 mediated hyperpolarization of pro-fibrotic macrophages is dependent on spliced xbp1
Auler, Markus: Posttranscriptional regulation of myofibroblast homeostasis
Bellaye, P-S: Pathogenesis of pulmonary fibrosis - the role of extracellular heat shock protein-90 (hsp90) in myofibroblast differentiation and persistence

STEM CELLS, TISSUE ENGINEERING AND REGENERATION

2:30-3:10 Invited speaker: **Cheryle Seguin,** Western University, London, Ontario, Canada

"From development to disease: the role of progenitor cells in the intervertebral disc"

3:10-3:30 Break

3:30-4:10 **Selected Abstracts (F)** ***presenters:***

Crasto, Gazelle J: An ultrasound temporally activated nano-system delivery implant that releases bmp-2 for on-demand bone regeneration

Clafshenkel, William P: Using human adipose stromal/stem cell-derived reconstructed osseous tissues as a platform for studying the impact of melatonin on osteogenesis

Chatoor, Kenny: Exploring the potential use of passaged nucleus pulposus cells for nucleus pulposus tissue generation in vitro

4:10-4:30 Poster Breakdown

4:30-5:30 **CCTS Business Meeting/General Assembly**

Conference wrap up:
Announcement of winning trainee presentations
Concluding remarks

Poster Titles (MDCL foyer west)- **presenting author *italicized***

1) Pena-Diaz, Ana M: Characterization of alternatively spliced *wt1* transcripts in Dupuytren's disease

2) Bian, Qian: Serum 25-hydroxyvitamin d insufficiency and deficiency in children with duchenne muscular dystrophy

3) McKee, Turney: Regulation of osteoclast precursor motility and migration by receptor activator of nuclear factor κb

4) Zhang, Rongmo: Cellular microrna regulation by fibrillin-1 and fibronectin mediated by integrins

5) Muthu Lakshmi: Role of fibrillin-1 in bone remodeling

6) Nelea, Valentin: Fibulin-4 is a chaperon for the structure and function of latent transforming growth factor beta binding protein 4 (ltbp-4)

7) Bellaye, P-S: Macitentan prevents pulmonary fibrosis progression and secondary pulmonary hypertension induced by tgf-β1 overexpression in rats

8) Armstrong, James Jacob: Dupuytren's disease: toward an *in vitro* model of fibrosis

9) Imani, Jewel: Donor derived complement protein c5 is necessary for development of pulmonary manifestations in a murine model of chronic graft vs host disease

10) Landman, Erin: Establishing new cell models to investigate interactions between macrophages and myofibroblasts

11) Shimbori, Chiko: Mecanical stress-induced mast cell degranulation activates tgf-β-1 signalling pathway in pulmonary fibrosis

12) Pakshir, Pardis: Myofibroblast contraction generates mechanical cues in the extracellular matrix that attract macrophages

13) Karvonen, Heena: A new mechanism of latent tgf-β1 presentation in lung fibrosis

14) Lodyga, Monika: Effects of myofibroblasts on macrophage polarization

15) Robinson, Lily: Early inflammatory cytokine-induced modulation of gene expression in primary human rotator cuff tendon cells

16) Hong, Angeline: Cytokine-induced gene expression in frozen shoulder syndrome

17) Stellar, Boo: About the stress of measuring active tgf-β1 – facts, myths, and mysteries

18) Fournier, Roxanne: 3d-cultured osteocytes under static and mechanical loading environments

19) Koehler, Anne: Inhibition of αv integrins reduces fibrosis around implanted biomaterials

20) De France, Kevin J: Oriented *in situ* gelling nanocomposite hydrogels for directional cell growth applications

21) Veras, Matthew A: Characterization of changes in annulus fibrosus cell phenotype resulting from loss of ent1

22) Upagupta, Chandak: Extracellular matrix driven mesenchymal cell differentiation

23) Knee, Erica Jane: Micro rna mir-21 preserves fibrotic mechanical memory of mesenchymal stem cells

24) Fairag, Rayan: Application of mesenchymal stem cells in intervertebral disc tissue regeneration

25) Kim, Min Kyu M: Characterization of the cellular response of annulus fibrosus cells to cyclic tensile strain

26) Wong, Andy: The association between achilles tendon properties and bone-muscle health

27) Kerr, Geoffrey J: C57bl/6 mice are resistant to whole-body vibration-induced joint degeneration

28) Curie, Brooke: Preliminary analyses of factors secreted by mouse intervertebral discs when challenged with tlr agonists

29) Bisson, Daniel: Upregulated tlr2 in abnormally loaded scoliotic facet joints accelerates degeneration

30) Tremblay Gravel, Julien: T1-ρ mri to evaluate proteoglycan content pre and post treatment in bovine and human intervertebral disc explants

31) Ovidiu Ciobanu. Human Tooth Enamel surface characterization timeline after peroxide treatment.