

# 31st Canadian Materials Science Conference 2019

## Monday June 10

FF 103	15:00 – 18:00	Registration
Grad Student Centre	18:00 - 22:00	Evening Student Mixer

## Tuesday June 11

FSC Lobby	8:00- 9:00	Registration / Breakfast
FSC1005	9:00-10:00	<b>The Development of Corrosion-resistant Copper-coated Steel Containers for the Permanent Disposal of High Level Nuclear Waste</b> David Shoosmith, Materials Chemistry Lecture
FF 217, 317 and 303	10:00-10:20	Coffee Break
FF303	10:20-12:00	<b>Embury Symposium I</b>
FF317	10:20-12:00	<b>Advanced Characterization of Materials I</b>
FF217	10:20-12:00	<b>Applied Electrochemistry and Degradation of Materials I</b>
FSC Lobby	12:00-13:00	Lunch
FF303	13:00-14:20	<b>Embury Symposium II</b>
FF317	13:00-14:20	<b>Advanced Characterization of Materials II</b>
FF217	13:00-14:20	<b>Applied Electrochemistry and Degradation of Materials II</b>
FF 217, 317 and 303	14:20-14:40	Coffee Break
FF303	14:40-17:00	<b>Embury Symposium III</b>
FF317	14:40-17:00	<b>Advanced Characterization of Materials III</b>
FF217	14:40-17:00	<b>Additive Manufacturing</b>
FSC Lobby	17:15-19:00	<b>Poster Session</b>

## Wednesday June 12

FSC Lobby	8:00- 9:00	Breakfast
FSC1005	9:00-10:00	<b>Deformation and Fatigue of Magnesium Alloys: Twinning and Detwinning</b> Daolun Chen, Materials Physics Lecture
FF 217, 317 and 303	10:00-10:20	Coffee Break
FF303	10:20-12:00	<b>Embury Symposium IV</b>
FF317	10:20-12:00	<b>Computational Materials Science I</b>
FF217	10:20-12:00	<b>Emerging Materials and Processes I</b>
FSC Lobby	12:00-13:00	Lunch
FF303	13:00-14:20	<b>Embury Symposium V</b>
FF317	13:00-14:20	<b>Computational Materials Science II</b>
FF217	13:00-14:20	<b>Emerging Materials and Processes II</b>
FF 217, 317 and 303	14:20-14:40	Coffee Break
FF303	14:40-16:00	<b>Embury Symposium VI</b>
FF317	14:40-16:00	<b>Computational Materials Science III</b>
FF217	14:40-16:00	<b>Emerging Materials and Processes III</b>
Angus 098	16:15-17:15	<b>Dynamic Processes in Colloidal Crystals and Glasses</b> Frans Spaepen, MacDonald Lecture
Sage	18:00	Conference Banquet

Thursday June 13

FSC Lobby	8:00- 9:00	Breakfast
FF303	9:00-12:30	Embury Symposium VII
FF303	10:00-10:20	Coffee Break

**Nametags:** Behind your name tag will be tickets for the student mixer, drink for the poster session and banquet if ordered

**Internet Access:** Select **ubcvisitor** and accept **terms** (or Eduroam if you have access)

**Help onsite:** Volunteers will have green UBC hats and green name tags (or email [debbie.burgess@ubc.ca](mailto:debbie.burgess@ubc.ca))

**Taxi Service:**  
Black Top Cabs 604-731-1111  
Yellow Cabs 604-681-1111  
McClures 604-831-1111

**Interactive map:** <http://www.maps.ubc.ca/PROD/index.php>

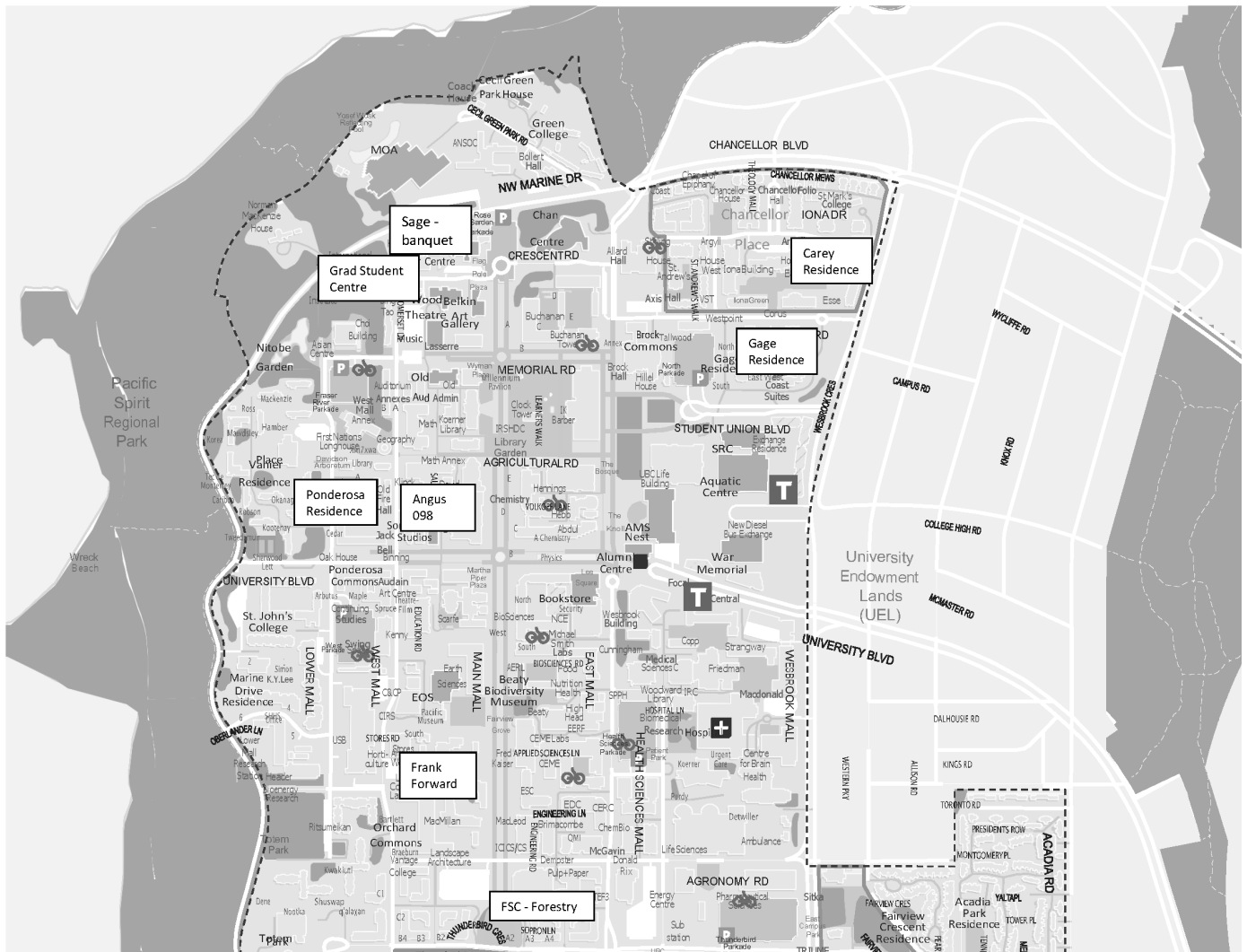
**FSC - Forest Sciences Centre** 2424 Main Mall (Breakfast, Lunch and Plenary)

**FF - Frank Forward Building** 6350 Stores Rd (Coffee and Breakout sessions)

**Angus - Henry Angus Building** 2053 Main Mall (McDonald Lecture)

**Sage – PWIAS** 6331 Crescent Rd. (Conference Banquet)

**Grad Student Centre – Thea Koerner House** 6371 Crescent Rd. (Student Mixer)



## Monday, June 10

15:00 – 18:00 Registration (FF 103)

18:00 – 22:00 Student Mixer (Grad Student Centre)

## Tuesday, June 11

8:00 – 9:00 Registration & Breakfast (FSC Lobby)

9:00 – 10:00 Materials Chemistry Lecture (FSC 1005)

**The Development of Corrosion-resistant Copper-coated Steel Containers for the Permanent Disposal of High Level Nuclear Waste**

David Shoesmith

10:00-10:20 Coffee Break (FF Rooms 217, 317 and 303)

10:20-12:00 Embury Symposium I FF303, Session Chair: W.J. Poole

10:20 – 10:40

**Structural and chemical phase transitions at grain boundaries** Chad Sinclair

10:40 – 11:00 (Invited)

**Phase transitions, stresses, and the physical properties of solids** Gary Purdy

11:00 – 11:20 (Invited)

**Precipitation in aluminium alloys** Christopher Hutchinson

11:20 – 11:40 (Invited)

**Opportunities for the development of compositionally-graded steels** Hatem Zurob

11:40 – 12:00 Discussion

10:20-12:00 Advanced Characterization of Materials I FF317, Session Chair: G. Miyamoto

10:20 – 10:40 (Invited)

**Understanding materials with advanced electron microscopy** Gianluigi Botton

10:40 – 11:00

**Material characterization on VESPERS beamline at CLS** Renfei Feng

11:00 – 11:20

**Materials research using synchrotron: From good to better, impossible to possible** Feizhou He

11:20 – 11:40

**Study of the formation of adiabatic shear bands in AZ31 magnesium alloy during impact** Francis Tetteh

11:40 – 12:00

**Advanced characterization techniques for understanding the effect of non-framework cation field strength on the structure of (Na-Mg) aluminosilicate glasses** Harisankar Nellattukuzhi Sreenivasan

10:20-12:00 Applied Electrochemistry and Degradation of Materials I FF217, Session Chair: E. Asselin

10:20 – 10:40 (Invited)

**Multi-layered steel as an alternative to ferritic stainless steel for automotive exhaust systems** Joey Kish

10:40 – 11:00

**Effects of stress intensity factor and loading spectra on intergranular SCC crack growth** Hamid Niazi

11:00 – 11:20

**Evaluation of FBE and HPPC coatings using a modified cathodic disbondment test** Min Xu

11:20 – 11:40

**Corrosion behavior of hot-dip galvanized steel in simulated soil solution: a statistical analysis** Davood Nakhaie

12:00 – 13:00 Lunch (FSC Lobby)

**13:00-14:20 Embury Symposium II** FF303, Session Chair: C.W. Sinclair, D. Wilkinson

13:00 – 13:20 (Invited)

**Understanding the fracture behaviour of advanced high strength steels through the application of in situ methodologies** David Wilkinson

13:20 – 13:40 (Invited)

**Temperature induced softening effects during high rate ( $10^3 \text{ s}^{-1}$ ) fracture of ultra high strength steel sheets** Michael Worswick

13:40 – 14:00 (Invited)

**Constitutive modeling of void nucleation, growth and coalescence in structural metals** Kevin Boyle

14:00 – 14:20 Discussion

**13:00-14:20 Advanced Characterization of Materials II** FF317, Session Chair: G. Botton

13:00 – 13:20 (Invited)

**Solute clustering and its hardening effect in ferrous alloys** Goro Miyamoto

13:20 – 13:40

**Comparative studies of the effect of warm and high rolling temperatures on the microstructure and texture of API X70 pipeline steel** Joseph Omale

13:40 – 14:00

**In situ electron microscopy study of the structural evolution of nanostructured palladium during electrodeposition**

Jie Yang

14:00 – 14:20

**Analyzing the fracture behaviour of tool steels in various stress triaxialities** Alexandra Rose

**13:00-14:20 Applied Electrochemistry and Degradation of Materials II** FF217, Session Chair: E. Asselin

13:00 – 13:20 (Invited)

**Using in – situ surface enhanced Raman spectroscopy to study the effect of triazine-based  $\text{H}_2\text{S}$  scavenger on the film composition and cracking of carbon steel** Brendy Rincon Troconis

13:20 – 13:40

**Evaluation of material susceptibility to hydrogen embrittlement (HE) based on experimental and finite element (FE) analyses** Tuhin Das

13:40 – 14:00

**Electrochemical behavior of metallic bipolar plates under fluctuating potential conditions** Yuanyuan Hong

14:00 – 14:20

**Effect of deposit particle size on the corrosion behavior of API-X100 pipeline steel** Hongxing Liang

14:20 -14:40 **Coffee Break** (FF Rooms 217, 317 and 303)

**14:40-17:00 Embury Symposium III** FF303, Session Chair: D. Wilkinson

14:40 – 15:00 (Invited)

**Measurement of back stress evolution during deformation of Dual-Phase steels** Doug Boyd

15:00 – 15:20 (Invited)

**Crystal plasticity modelling of large strain behaviour of metals** Peidong Wu

15:20 – 15:40 (Invited)

**In-situ high resolution TEM on deformation twinning process in BCC crystals** Scott X Mao

15:40 – 16:00 (Invited) **The role of simple shear in material processing** Tayfur Ozturk

16:00 – 16:20 Discussion

16:20 – 16:40 (Invited)

**On the ‘assemblage mechanics’ associated with materials optimization** Glenn Hibbard

16:40 – 17:00 (Invited)

**Materials science and materials systems** Marc Fry

**15:00-16:40 Advanced Characterization of Materials III** FF317, Session Chair: G. Botton

**15:00 – 15:20**

**Plasmonic behavior of wrinkled-gold surfaces** S. Shayan Mousavi Masouleh

**15:20 – 15:40**

**Atomic and electronic structures of nanoscale constituents within solids** Guozhen Zhu

**15:40 – 16:00**

**The effects of microstructure and microtexture generated during solidification on deformation micromechanism in IN713C Nickel-based superalloy** Gang Liu

**16:00 – 16:20**

**Effect of nitrogen ion implantation on the fatigue life of AISI 1018 and AISI 1045 carbon steels** Emmanuel Awoyele

**16:20 – 16:40**

**Boiling heat transfer during run-out table jet impingement cooling of a stationary steel plate** Debanga Kashyap

**14:40-17:00 Additive Manufacturing** FF217, Session Chair: H. Lebbad

**14:40 – 15:00**

**Fatigue behaviour of shot-peened additive manufactured Ti-TiB** Liza-Anastasia DiCecco

**15:00 – 15:20**

**Effect of printing parameters on porosity and micro-hardness of AISI 316L fabricated by DMLS** Ali Eliasu

**15:20 – 15:40**

**Effect of heat treatment on the microstructural evolution of 3D-printed WC-Co cemented carbides**

Joseph Agyapong

**15:40 – 16:00**

**Characterization of mechanical behavior of 3D printed composite parts** Madhukar Somireddy

**16:00 – 16:20**

**Using additive manufacturing to tailor the design of heterogeneous/graded architected cellular metamaterials**

Bosco Yu

**16:20 – 16:40**

**Tantalum coatings by high-pressure cold spray for wear and high-temperature corrosion protection applications**

Jagannadh Sripada

**16:40 – 17:00**

**The influence of post-deposition heat treatments on the microstructure and mechanical properties of wire-arc additive manufactured (WAAM) ATI 718Plus superalloy** Oluwasanmi Oguntuase

**17:15 – 19:00 Poster Session (FSC Lobby)**

## Wednesday, June 12

**8:00 – 9:00 Breakfast** (FSC Lobby)

### **9:00 – 10:00 Materials Physics Lecture** (FSC 1005)

**Deformation and Fatigue of Magnesium Alloys: Twinning and Detwinning**

Daolun Chen

**10:00 – 10:20 Coffee Break** (FF Rooms 217, 317 and 303)

### **10:20-12:00 Embury Symposium IV** FF303, Session Chair: C. Hutchinson

**10:20 – 10:40** (Invited)

**Nanoscaled structure and properties of ultrafine grained aluminum stabilized by Ca grain boundary segregations and intermetallic particles** Xavier Sauvage

**10:40 – 11:00** (Invited)

**Precipitation hardening associated with high temperature forming of heat treatable Al alloys** Shahrzad Esmaeili

**11:00 – 11:20** (Invited)

**TEM studies of the essential microstructural features of second phase particles in aluminum alloys** Xiang Wang

**11:20 – 11:40** (Invited)

**A tribute to David Embury** Muriel Veron

**11:40 – 12:00 Discussion**

### **10:20-12:00 Computational Materials Science I** FF317, Session Chair: V. Razumovskiy

**10:20 – 10:40** (Invited)

**Molecular dynamics simulation of structure evolution of hydrotalcite and CO<sub>2</sub> adsorption behavior in hydrotalcite and its derived oxides** Hao Zhang

**10:40 – 11:00** (Invited)

**Impact of chemical composition on core structure and glide behavior of dislocations in bcc metals** Lorenz Romaner

**11:00 – 11:20**

**Large scale ab-initio simulations of dislocations in Mg** Mauricio Ponga

**11:20 – 11:40**

**The effect of grain boundaries on mechanisms of small scale plasticity** Mahdi Bagheripoor

**11:40 – 12:00**

**Generation of gradient nano-grained heterostructures from high velocity impacts** David Funes

### **10:20-12:00 Emerging Materials and Processes I** FF217, Session Chair: J. Kish

**10:20 – 10:40**

**Formability and windability of aluminum and copper magnet wire** Lucas Chauvin

**10:40 – 11:00**

**Using microwave to sinter leak-free proton conductor electrolyte to be used in solid oxide fuel cells** Taghi Amiri

**11:00 – 11:20**

**Thermophysical property measurements of molten slag systems using Brookfield viscometry and aerodynamic levitation** Lily Ren

**11:20 – 11:40**

**The effect of boronizing on hardness, wear and corrosion properties of steels used in potash processing facilities**

Chao Peng

**11:40 – 12:00**

**Microstructural evolution during heat treatment and mechanism of wear of conventional and 3D printed Ti6Al4V titanium alloys** Niyousha Azgomi

**12:00-13:00 Lunch** (FSC Lobby)

**13:00-14:20 Embury Symposium V** FF303, Session Chair: H. Zurob

**13:00 – 13:20**

**The ductility of Al-Mg-Si-Mn-Fe alloys** Warren J. Poole

**13:20 – 13:40** (Invited)

**PSP modeling for HPDC Mg** Jeff Wood

**13:40 – 14:00** (Invited)

**Flow stress and electrical resistivity in pure Al at 4K** Marek Niewczas

**14:00 – 14:20 Discussion**

**13:00-14:20 Computational Materials Science II** FF317, Session Chair: H. Zhang

**13:00 – 13:20** (Invited)

**Fracture ab initio: A force-based scaling law for atomistically informed continuum models** Rebecca Janisch

**13:20 – 13:40** (Invited)

**Ab-initio driven multiscale modeling of austenitic FeCrMn and Marval X12 steels** Vsevolod Razumovskiy

**13:40 – 14:00** (Invited)

**Computing and modelling solute-grain boundary interaction** Liam Huber

**14:00 – 14:20 Multi-scale modeling of hot tearing in DC casting aluminum alloys** Niloufar Khodaei

**13:00-14:20 Emerging Materials and Processes II** FF217, Session Chair: G. Miyamoto

**13:00 – 13:20**

**High-performance, room temperature hydrogen sensing with a Cu-BTC/Polyaniline nanocomposite film on a quartz crystal microbalance** Osama Abuzalat

**13:20 – 13:40**

**Effect of graphene and carbon nanotubes on wear behaviour of alumina-zirconia hybrid nanocomposites** Solomon Duntu

**13:40 – 14:00**

**KWN modeling of precipitation in a friction stir welding process** Olga Gopkalo

**14:20-14:40 Coffee Break** (FF Rooms 217, 317 and 303)

**14:40-16:00 Embury Symposium VI** FF303, Session Chair: H. Zurob

**14:40 – 15:00** (Invited)

**Taxonomy, design and performance of periodic lattice materials** Frank W. Zok

**15:00 – 15:20** (Invited)

**Advantages of disorder in cellular solids** Ben Hatton

**15:20 – 16:00 Discussion**

**14:40-16:00 Computational Materials Science III** FF317, Session Chair: L. Romaner

**14:40 – 15:00** (Invited)

**Modeling non-equilibrium microstructure kinetics using structural phase field crystal theories** Nik Provatas

**15:00 – 15:20**

**Phase-field modeling of Widmanstätten growth** Hocine Lebbad

**15:20 – 15:40**

**Introducing density shifts to binary alloy phase field crystal models** Matthew Frick

**15:40 – 16:00**

**Modeling of multi-pass rolling during thermo-mechanical processing using a physically-based model** Shenglong Liang

**14:40-16:00 Emerging Materials and Processes III** FF217, Session Chair: M. Xu

**14:40 – 15:00**

**Synthesis and characterization of pH sensitive copolymer for targeted oral drug delivery** Harish Chakrapani

**15:00 – 15:20**

**Cellulose nanofibers for active food packaging of fresh produce** Karthik Ramachandran Shivakumar

**15:20 – 15:40**

**Sulfated  $\beta$ -cyclodextrin layer-by-layer films in heavy metals detection** Jessica de Almeida

**15:40 – 16:00**

**Photocatalytic degradation of Natural Organic Matters (NOM) by plasmonic photocatalysis using UV-LED controlled periodic illumination** Azar Fattahi

**16:15 – 17:15 Mac Donald Lecture (Angus 098)**

**Dynamic Processes in Colloidal Crystals and Glasses**

Frans Spaepen

**18:00 – 22:00 Conference Banquet (Sage)**

**Thursday, June 13**

**8:00 – 9:00 Breakfast (FSC Lobby)**

**9:00 – 12:10 Embury Symposium VII** FF303, Session Chair: C.W. Sinclair

**9:00 – 9:30 (Invited)**

**Canadian Steel – Accelerating into the future** David Overby

**9:30 – 9:50 (Invited)**

**Perspectives and prospectives in vehicle lightweighting: many faces of advanced steels** Mohammad M. Gouné

**9:50 -10:10 (Invited)**

**Towards a better understanding of the damage properties of Dual Phase steels** Colin Scott

**10:10 -10:30 (Invited)**

**Phase transformations, clustering and strengthening in modern line pipe steels** Fateh Fazeli

**10:30 – 10:50 Coffee Break**

**10:50 – 11:10 (Invited)**

**Role of intermetallic compound in fracture of Al-steel resistance spot welds** Jidong Kang

**11:10 – 11:30 (Invited)**

**Microstructure-property development during CGL-compatible thermal processing of medium-manganese third generation advanced high strength steels** Joseph R. McDermid

**11:30 – 11:50**

**Multi-scale modelling of phase transformations in steels** Matthias Militzer

**11:50 – 12:10**

**Concluding Remarks** David Embury