Composites at Lake Louise 2019

Lake Louise, Canada
10 - 14 November 2019

Editors:

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Sunday, November 10, 2019

16:30 – 18:30	Conference Check-in (Alpine Gallery)
18:45 – 19:00	Conference Welcome Conference Chairs and ECI Technical Liaison
19:00 – 20:45	**Nicholson Memorial Session** Session Chair: Meisha L. Shofner, Georgia Institute of Technology, USA
19:00 – 19:30	**Enabling circular engineering by redesigning a driver's side front door using ultralightweight thermoplastics composites via systems level design and simulation strategy...1** Srikanth Pilla, Clemson University, USA
19:30 – 20:00	**Geologic entropy with economic constraints predicts mineral prices...2** Alan J. Hurd, Los Alamos National Laboratory, USA
20:00 – 20:45	**Geopolymers: Versatile ceramics made at ambient temperatures...3** Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA
20:45	Reception (Heritage Hall)

Room locations and notes

- General Sessions will be held in Mount Temple B. Parallel sessions will be held in Mount Temple A and B.
- Poster Sessions will be in Heritage Hall.
- Breakfasts will be in Lago Restaurant and lunches will be in Mount Temple C. The conference banquet location will be in Mount Temple A.
- The ECI office is the Parker Room.
- Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.
- Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).
- Speakers – Please leave discussion time as previously directed by your session chair.
- Please do not smoke at any conference functions.
- Turn your mobile telephones to vibrate or off during technical sessions.
- Please write your name on your program so that it can be returned to you if lost or misplaced.
- After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.
- Emergency Contact Information: Because of privacy concerns, ECI does not collect or maintain emergency contact information for conference participants. If you would like to have this information available in case of emergency, please use the reverse side of your name badge.

Monday, November 11, 2019

07:00 – 08:00	Breakfast
08:00 – 10:00	**Composites for Energy Storage and Conversion I (*Parallel Session*)** Session Chair: Erik Spoerke, Sandia National Laboratories, USA
08:00 – 08:30	**Composite polymer electrolytes for all-solid-state lithium batteries with nanostructured garnet ceramic fillers...4** Candace K. Chan, Arizona State University, USA
08:30 – 09:00	**Hybrid organic-inorganic nano-composites for solid-state battery electrolytes...5** John Kieffer, University of Michigan, USA
09:00 – 09:30	**Understanding the evolution of the silicon electrode SEI through model lithium silicate thin film layers...6** Christopher A. Apblett, Sandia National Laboratories, USA
09:30 – 10:00	**Dense ceramic cathodes for lithium and sodium batteries...7** Paul Braun, University of Illinois at Urbana-Champaign, USA
08:00 – 10:00	**Sustainable Synthesis, Processing, and Materials Design I (*Parallel Session*)** Session Chair: Brett G. Compton, University of Tennessee, USA
08:00 – 08:30	**Self-healing copolymers via van der Waals interactions...8** Marek Urban, Clemson University, USA
08:30 – 09:00	**Vapor phase infiltration for transforming polymers into organic-inorganic hybrid materials: Processing science, structural complexity, and emerging applications...9** Mark D. Losego, Georgia Institute of Technology, USA
09:00 – 09:30	**New furan-based thermosetting polymer systems...10** Giuseppe R. Palmese, Drexel University, USA
09:30 – 10:00	**A new paradigm in functionally graded adhesives...11** Daniel Schmidt, UML Plastics Engineering, USA
10:00 – 10:30	Coffee Break
10:30 – 12:30	**Composites for Energy Storage and Conversion II (*Parallel Session*)** Session Chair: Paul Braun, University of Illinois at Urbana-Champaign, USA
10:30 – 11:00	**Novel calcium ion conducting solid electrolyte with NASICON-type structure...12** Nobuhito Imanaka, Osaka University, Japan
11:00 – 11:30	**The ion seeps tonight: Assessing ionic transport in multilayered nanocomposites...13** Erik Spoerke, Sandia National Laboratories, USA
11:30 – 12:00	**Electrochemical artificial muscle yarns and textiles that harvest and store environmentally available energies...14** Ray Baughman, The University of Texas at Dallas, USA

Monday, November 11, 2019 (continued)

12:00 – 12:30	**Multi-component colloidal nanorod heterostructures and their optoelectronic/photovoltaic applications...15** Moonsub Shim, University Of Illinois, USA
10:30 – 12:30	**Sustainable Synthesis, Processing, and Materials Design II (*Parallel Session*)** Session Chair: Mark D. Losego, Georgia Institute of Technology, USA
10:30 – 11:00	**Direct-write additive manufacturing of polymer and ceramic composites...16** Brett Compton, University of Tennessee, USA
11:00 – 11:30	**Hyperbaric laser chemical vapor deposition of high-strength aluminum-silicon-carbide nanocomposite fibers for aerospace and transportation applications...17** James L. Maxwell, La Trobe University, Australia
11:30 – 12:00	**Cold sintered ceramic composites for microwave applications...18** Ian Reaney, University of Sheffield, United Kingdom
12:00 – 12:30	**Design of ceramic-polymer optical composites for building energy efficiency: Infrared property control and transparent bulk thermal insulators...19** Paul Clem, Sandia National Laboratories, USA
12:30 – 13:30	Lunch
13:30 – 14:15	**Poster Session I**
14:15 – 19:00	Ad hoc discussions / Networking / Free time
19:00 – 21:00	**Mechanics of Complex Systems I** Session Chair: Erik Spoerke, Sandia National Laboratories, USA
19:00 – 19:30	**Engineered Molding Compound (EMC): Optimizing the design, performance, and economics of carbon fiber composites for industrial applications...20** Jason Reese, Dow Chemical, USA
19:30 – 20:00	**Bioinspired design of structural and thermal interface materials...21** Nima Rahbar, Massachusetts Institute of Technology, USA
20:00 – 20:30	**Soft matter structure measurement by polarized resonant soft X-ray scattering...22** Dean DeLongchamp, NIST, USA
20:30 – 21:00	**Profiles in local glass transition temperature near and across polymer interfaces in nanostructured blends...23** Connie B. Roth, Emory University, USA

Tuesday, November 12, 2019

07:00 – 08:00	Breakfast
08:00 – 10:00	**Materials Design for Biomedical Applications I (*Parallel Session*)** Session Chair: John A. Nychka, University of Alberta, Canada
08:00 – 08:30	**Hierarchical hybrid materials for robust and reusable functional devices...24** Sharmila Mukhopadhyay, Wright State University, USA
08:30 – 09:00	**Organic-inorganic hybrid polymer coatings with controlled biofunctionality...25** Svetlana A. Sukhishvili, Texas A&M University, USA
09:00 – 09:30	**Protein-based drug delivery and thermal protection via Mof encapsulation...26** Jeremiah Gassensmith, University of Texas at Dallas, USA
09:30 – 10:00	**Additive manufacturing of monomer-free ORMOCER®-based composites for dental and audiological application...27** Herbert Wolter, Fraunhofer Institute for Silicate Research ISC, Germany
08:00 – 10:00	**Mechanics of Complex Systems II (*Parallel Session*)** Session Chair: Connie B. Roth, Emory University, USA
08:00 – 08:30	**High rate deformation behavior and extraordinary energy absorption of carbon nanotube mats and glassy polymer thin films...28** Edwin Thomas, Rice University, USA
08:30 – 09:00	**Defect coupling: The last frontier in predicting the strength, life, and durability of fiber reinforced composite laminates...29** Kenneth Reifsnider, University Texas Arlington, USA
09:00 – 09:30	**Tricomponent composites with cellulose nanocrystals and chitin nanofibers - Exploring potential synergy through component interactions...30** Meisha Shofner, Georgia Institute of Technology, USA
09:30 – 10:00	**Precise 3D structuring of polymer nanocomposites using triaxial magnetic fields...31** Namiko Yamamoto, The Pennsylvania State University, USA
10:00 – 10:30	Coffee Break
10:30 – 12:00	**Materials Design for Biomedical Applications II (P*arallel Session*)** Session Chair: Svetlana A. Sukhishvili, Texas A&M University, USA
10:30 – 11:00	**Ceramic composite bone tissue scaffolds...32** John A. Nychka, University of Alberta, Canada
11:00 – 11:30	**Improved mechanical performance of a next-generation hybrid bone adhesive...33** Alina Kirillova, Duke University, USA
11:30 – 12:00	**Natural functionally-graded composites in hard-to-soft tissue (bone-tendon) junctions...34** Linn W. Hobbs, Massachusetts Institute of Technology, USA

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12:00 – 12:30	**How big should your nanoindentation be? The implications of indentation size in assessing the properties of complex structure...35** David F. Bahr, Purdue University, USA
10:30 – 12:30	**Mechanics of Complex Systems III (*Parallel Session*)** Session Chair: Namiko Yamamoto, The Pennsylvania State University, USA
10:30 – 11:00	**Directions of zero thermal expansion in anisotropic oxides...36** Scott J. McCormack, University of Illinois at Urbana Champaign, USA
11:00 – 11:30	**Activating extrinsic and intrinsic toughening mechanisms in polycrystalline ceramics and their composites via microstructural engineering...37** Jessica A. Krogstad, University of Illinois, Urbana Champaign, USA
11:30 – 12:00	**A new paradigm to evaluate the cleavage energy of brittle materials...38** Dov Sherman, Tel-Aviv University, Israel
12:00 – 12:30	**Strategies to strengthen ceramics for windows and domes...39** Ivar Reimanis, Colorado School of Mines, USA
12:30 – 13:30	Lunch
13:30 – 14:15	**Poster Session II**
14:15 – 20:15	Ad hoc discussions / Free Time / Networking
20:15 – 20:45	**Conference Banquet Talk** Session Chair: John Kieffer, University of Michigan, USA
	Cosmic composites: Rocks from space and their astonishing influence on earth and humanity...40 Gregory A. Brennecka, University of Münster, Germany

Wednesday, November 13, 2019

07:00 – 08:00	Breakfast
08:00 – 10:00	**Sustainable Synthesis, Processing, and Materials Design III (*Parallel Session*)** Session Chair: Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA
08:00 – 08:30	**Processing and structure of Bopp film with nanoparticle-based additives...41** Krishnamurthy Jayaraman, Michigan State University, USA
08:30 – 09:00	**Imparting machine intelligence into direct ink write manufacturing...42** J. Daniel Berrigan, Air Force Research Laboratory, USA
09:00 – 09:30	**Bioinspired nanocomposites: Ordered 2D materials within a 3D lattice...43** Iryna Polishchuk, Technion-Israel Institute of Technology, Israel
09:30 – 10:00	**Scaling up graphene PET nano-composites for industry applications...44** Jay C. Hanan, Oklahoma State University, USA
08:30 – 10:00	**Functional Materials I (*Parallel Session*)** Session Chair: Geoff L. Brennecka, Colorado School of Mines, USA
08:30 – 09:00	**3D printing functional composites & devices...45** Michael McAlpine, University of Minnesota, USA
09:00 – 09:30	**Additive manufacturing of inorganic-organic hybrid materials for transdermal biosensor applications...46** Roger Narayan, North Carolina State University, USA
08:00 – 10:00	**Bio-Nanopatterning: Inkjet printed nanopatterned aptamer-based sensors for improved optical detection of foodborne pathogens...47** Lia Stanciu, Purdue University, USA
10:00 – 10:30	Coffee Break
10:30 – 12:00	**Functional Materials II (*Parallel Session*)** Session Chair: Lia Stanciu, Purdue University, USA
10:30 – 11:00	**Perovskite nitrides: A new playground for functional materials...48** Geoff L. Brennecka, Colorado School of Mines, USA
11:00 – 11:30	**Ag nanowire-based nanocomposites for interconnects of flexible/wearable electronics...49** Byungil Hwang, Chung-Ang University, South Korea
11:30 – 12:00	**Self-strengthening polymer composites by vibration...50** Aaron Esser-Kahn, University of Chicago, USA

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10:30 – 12:30	**Sustainable Synthesis, Processing, and Materials Design IV (Parallel Session)** Session Chair: J. Daniel Berrigan, Air Force Research Laboratory, USA
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11:00 – 11:30	**Carbon oxidation over silver/perovskite-type oxide composite catalysts...52** Hidenori Yahiro, Ehime University, Japan
11:30 – 12:00	**Beyond nanosilica: Geopolymeric nanoaluminosilicates for functional nanocomposites...53** Dong-Kyun Seo, Arizona State University, USA
12:00 – 12:30	**In situ synchrotron studies of oxide ceramics to 3,000°C...54** Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA
12:30 – 13:30	Lunch
13:30 – 14:15	**Poster Session III**
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19:00 – 21:00	**Mechanics of Complex Systems IV** Session Chair: Meisha L. Shofner, Georgia Institute of Technology, USA
19:00 – 19:30	**Coherent nanoprecipitates within a biogenic single crystal: From spinodal decomposition to a prestressing strategy...55** Boaz Pokroy, Technion, Israel
19:30 – 20:00	**Role of nanoscale coherent precipitates on the thermo-mechanical response of martensitic materials...56** Alejandro Strachan, Purdue University, USA
20:00 – 20:30	**Design, printing, and characterization of aerospace morphing structures...57** Jeffery Baur, Air Force Research Laboratory, USA

Thursday, November 14, 2019

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08:30 – 11:30	**Poster Session IV**
10:00 – 10:30	Coffee Break
10:30 – 12:00	**Impromptu II: Things we believe will work with the right collaborator(s)** Session Chairs: John Kieffer, University of Michigan, USA Meisha L. Shofner, Georgia Institute of Technology, USA Erik Spoerke, Sandia National Laboratories, USA
12:00 – 12:15	Closing Remarks and Future Directions
12:15	Lunch and Departures

Poster Presentations

1. **Self-healable copolymers via van der Waals interactions...58**
   Siyang Wang, Clemson University, USA

2. **Reconstitution of elastic properties – New insights into the functional behavior of polymer matrix composites...59**
   John Kieffer, University of Michigan, USA

3. **Fracture of 3D printed brittle open-cell structures under compression...60**
   Dov Sherman, Tel-Aviv University, Israel

4. **Reprintable self-healing polymer networks...61**
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   Seyyedarash Haddadi, University of British Columbia, Canada

6. **Deeper understanding of cobalt-doped SiC nanowires as excellent electromagnetic wave absorbers...63**
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7. **A novel and cost-effective double-capsule nanocomposite coating based on carbon hollow spheres with self-healing performance for corrosion protection...64**
   Seyyedarash Haddadi, University of British Columbia, Canada

8. **Investigating the mechanical properties of nonfunctionalized mwcnt reinforced polymer (pmma) nanocomposites...N/A**
   Anand Joshi, G H Patel College of Engineering and Technology, India

9. **Sintering of hierarchically-structured boron carbide for toughening and multi-functionality...65**
   Namiko Yamamoto, The Pennsylvania State University, USA