

Program

2013 Composites at Lake Louise

November 3 - 7, 2013

The Fairmont Chateau Lake Louise
Alberta, Canada

Conference Co-Chairs

Van Thompson

(Kings College London, United Kingdom)

Jennifer Lewis

(Harvard University, USA)



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Sunday, November 3, 2013

- 16:30 – 19:00 Conference check-in and coffee
- 19:00 – 19:45 **Plenary Lectures**
Room: Victoria Ballroom
Chair: Van Thompson, King's College London Dental Institute, United Kingdom
- Plenary Speaker**
Takashi Kato, Tokyo University, Japan
Development of hybrid materials inspired by biomineralization: morphology control with macromolecular templates
- 19:45 – 20:30 **Nicholson Memorial Lecture**
Trudy Kriven, University of Illinois, USA
Geopolymers composites - low energy, ecofriendly and sustainable ceramics – a potential solution to global warming
- 20:30 **Evening Reception**

NOTES

- Please do not smoke at any conference functions.
- Turn your mobile telephones to vibrate or off during technical sessions.
- The Plenary and Biocomposite sessions will be in the Victoria Ballroom. The Functional Composites sessions will be in the Agnes Room and the Structural Composites sessions will be in the Louise Room.
- Breakfasts will be in the Poppy Brasserie and lunches in the Fairview Dining Room.
- The conference banquet on Tuesday will be in the Victoria Ballroom
- Be sure to check your contact information on the Participant List in this program and make any corrections to your name/contact information online. A corrected copy will be sent to all participants after the conference.

Monday, November 4, 2013

- 07:30 – 08:30 Breakfast (Poppy Room)
- 08:30 **Room: Victoria Ballroom**
Chair: Van Thompson, King's College London Dental Institute, United Kingdom
Jennifer Lewis, Harvard University, USA
- 8:30 – 09:15 **Plenary Speaker**
Lawrence Drzal, Michigan State University, USA
Graphene nanoplatelets: A nanomaterial additive for multifunctional composites
- 09:30 – 12:30 **Biocomposites Session 1: Bone**
Room: Victoria Ballroom
Chairs: Amy Wagoner Johnson, University of Illinois, USA
Masanori Kikuchi, National Institute for Materials Science, Japan
- 09:30 – 10:00 **Linn Hobbs**, MIT, USA and Alexandra Porter, Imperial College London Engineering
nature's exquisite composite: The cellular origins of bone and bone-tendon enthesis mineralization
- 10:00 – 10:25 **Hirota Maeda**, Nagoya Institute of Technology, Japan
Incorporation of calcium phosphate cluster into calcium silicate hydrate for bone regeneration
- 10:25 – 10:50 Coffee Break
- 10:50 – 11:15 **Masakazu Kawashita**, Tohoku University, Japan
Poly(methylmethacrylate) bone cement containing magnetite nanoparticles
- 11:15 – 11:40 **Amy Wagoner Johnson**, University of Illinois, USA
Promoting multi-scale osteointegration in CaP using capillary forces
- 11:40 – 12:05 **Yuki Shirosaki**, Kyushu Institute of Technology, Japan
Preparation of inorganic-organic porous hybrids and in vitro apatite formation
- 12:05 – 12:30 **Masanori Kikuchi**, National Institute for Materials Science, Japan
Injectable hydroxyapatite/collagen bone-like nanocomposite
- 09:30 – 12:30 **Functional Composites Session 1: Energy**
Room: Agnes
Chairs: Paul Braun, University of Illinois, USA
Nobuhito Imanaka, Osaka University, Japan
- 09:30 – 10:00 **Haleh Ardebili**, University of Houston, USA
Novel polymer nanocomposite electrolytes for flexible lithium ion batteries
- 10:00 – 10:25 **Paul Braun**, University of Illinois, USA
3D deterministic composite battery electrodes for high power and energy
- 10:25 – 10:50 **Ranji Vaidyanathan**, Oklahoma State University, USA
Use of natural polymers as a means to obtain effective nanoparticle dispersion prior to introduction into polymer composites
- 10:50 – 11:15 **Matt Aldissi**, Fractal Systems Inc., USA
Nanocomposite organic and hybrid solar cells

Monday, November 4, 2013 (continued)

- 11:15 – 11:40 **Aaron Esser-Khan**, University California Irvine, USA
MicroVaSCular materials for mass and energy transport: Mimicking the avian lung
- 11:40 – 12:05 **Koji Amazawa**, Tohoku University, Japan
In situ analysis of materials for solid oxide fuel cells by X-ray absorption spectroscopy
- 12:05 – 12:30 **Nobuhito Imanaka**, Osaka University, Japan
Environmental catalysts based on C-type cubic rare earth oxides
- 09:30 – 12:30 **Structural Composites Session 1: Carbon Forms +
Room: Louise
Chairs: David Bahr**, Purdue University, USA
 Toshiki Miyazaki, Kyushu Institute of Technology, Japan
- 09:30 – 10:00 **David Bahr**, Purdue University, USA
Pseudoelastic and superplastic behavior in open cell, multilayer metallic-carbon
nanotube turf composites
- 10:00 – 10:25 **Robert Young**, University of Manchester, United Kingdom
Reinforcement of composites with graphene
- 10:25 – 10:50 Coffee break
- 10:50 – 11:15 **Meisha Shofner**, Georgia Institute of Technology, USA
Copolymer-mediated synthesis of nanoparticles for use in polymer matrix composites
- 11:15 – 11:40 **Toshiki Miyazaki**, Kyushu Institute of Technology, Japan
Organic-inorganic interaction in magnetite-polymer composites
- 11:40 – 12:05 **Roger Narayan**, University of North Carolina, USA
Two photon polymerization of inorganic-organic materials for medical applications
- 12:05 – 12:30 **Rick Uvic**, Boise State University, USA
Modeling the effect of aliovalent doping on the pseudocubic lattice constant of
perovskites
- 12:30 – 13:30 Lunch (Fairview dining room)
- 13:30 – 19:00 Free time
- 19:00 – 21:15 **Evening Speakers:
Room: Victoria Ballroom
Chairs: Jennifer Lewis**, Harvard University, USA
 Linn Hobbs, MIT, USA
- 19:00 – 19:45 **Erik David Spoeke**, Sandia National Laboratory, USA
Optoelectronic "Tinker Toys": Supramolecular nanocomposite frameworks for next
generation photovoltaics
- 19:45 – 20:30 **Hitoshi Takamura**, Tohoku University, Japan
All-solid-state lithium battery using a hydride-based solid electrolyte
- 20:30 – 21:15 **Michael McAlpine**, Princeton University, USA
Bionic Nanomaterials

Tuesday, November 5, 2013

- 07:30 – 08:30 Breakfast (Poppy Room)
- 08:30 **Room: Victoria Ballroom**
Chairs: Jennifer Lewis, Harvard University, USA
Van Thompson, King's College London Dental Institute, United Kingdom
- 8:30 – 09:15 **Plenary Speaker:**
Alfred Crosby, University of Massachusetts Amherst, USA
Draping materials: Enabling advanced multifunctional technologies
- 09:30 – 12:30 **Biocomposites Session 2: Nanocomposites**
Room: Victoria Ballroom
Chairs: Rudiger Kniep, Max-Planck Institute, Germany
Julian R. Jones, Imperial College London, United Kingdom
- 09:30 – 10:00 **Melissa Grunlan**, Texas A&M University, USA
Nanocomposite self-cleaning membranes for implanted glucose biosensors
- 10:00 – 10:25 **Rudiger Kniep**, Max-Planck Institute, Germany
Morphogenesis and nano-composite structure of calcite-protein statoliths (otoconia):
An approach towards deeper understanding of a bio-sensor and its function
- 10:25 – 10:50 Coffee Break
- 10:50 – 11:15 **Darrell Irvine**, Massachusetts Institute of Technology, USA
Polymer microneedle macro- and nano-structured composites for delivering medicine
through the skin
- 11:15 – 11:40 **Jeffrey Karp**, Brigham and Women's Hospital Harvard Medical, USA
Bio-inspired polymeric tissue adhesive technologies
- 11:40 – 12:05 **Julian R. Jones**, Imperial College London, United Kingdom
Hybrids with interpenetrating networks and tailored properties for tissue regeneration
- 12:05 – 12:30 **Van Thompson**, King's College London Dental Institute, United Kingdom
Dental enamel: Lessons from a hierarchical composite
- 09:30 – 12:30 **Functional Composites Session 2: Fibers +**
Room: Agnes
Chairs: Lia Stanciu, Purdue University, USA
John Nychka, University of Alberta, Canada
- 09:30 – 10:00 **Lia Stanciu**, Purdue University, USA
Reusable photocatalytic titanium dioxide-cellulose nanofiber films
- 10:00 – 10:25 **John Nychka**, University of Alberta, Canada
Mechanical response to moisture in natural fiber-based biocomposites
- 10:25 – 10:50 Coffee Break
- 10:50 – 11:15 **Richard Trask**, University of Bristol, United Kingdom
Additive layer manufacturing of biologically inspired short fibre reinforced composites

Tuesday, November 5, 2013 (continued)

- 11:15 – 11:40 **Boaz Pokroy**, Technion, Israel
Superhydrophobic and superoleophobic surfaces based on various wax crystals inspired by plant leaves
- 11:40 – 12:05 **Philseok Kim**, Harvard University, USA
Omni-repellent solid-liquid composite interface
- 12:05 – 12:30 **Robert Shepherd**, Cornell University, USA
Composite materials in soft actuators
- 09:30 – 12:30 **Structural Composites Session 2: Fabrication**
Room: Louise
Chairs: Alexander J. Liddle, National Institute of Standards and Technology, USA
Jim Smay, Oklahoma State University, USA
- 09:30 – 10:00 **Jay Hanan**, Oklahoma State University, USA
Scaling up polymer nano-composites for industry application
- 10:00 – 10:25 **Alexander J. Liddle**, National Institute of Standards and Technology, USA
High-throughput measurements for carbon nanocomposite manufacturing
- 10:25 – 10:50 **Jim Smay**, Oklahoma State University, USA
3D printing of composites using a mixing nozzle
- 10:50 – 11:15 **Jennifer Lewis**, Harvard University, USA
Printing functional materials
- 11:15 – 11:40 **Katsuhiko Ariga**, National Institute for Materials Science, Japan
Best of both worlds for creation of novel composites: mesoporous from materials world and layer-by-layer from fabrication world
- 11:40 – 12:05 **Svetlana Sukhishvili**, Stevens Institute of Technology, USA
Responsive-polymer nanocomposite assemblies
- 12:05 – 12:30 **Ian M. Reaney**, Sheffield University, United Kingdom
Prototype multilayer devices
- 12:30 – 13:30 Lunch (Fairview dining room)
- 19:00 **Banquet**
Room: Victoria Ballroom
Chair: Van Thompson, King's College London Dental Institute, United Kingdom
- Banquet Speaker: James Weaver**, Wyss Institute, Harvard University, USA
New electron microscopy imaging techniques for the large-scale high-throughput characterization of hierarchical biological materials and synthetic constructs

Wednesday, November 6, 2013

- 07:30 – 08:30 Breakfast (Poppy Room)
- 08:30 **Room: Victoria Ballroom**
Chairs: Van Thompson, King's College London Dental Institute, United Kingdom
Jennifer Lewis, Harvard University, USA
- 08:30 – 09:15 **Plenary Speaker: Jaime Grunlan**, Texas A&M University, USA
Stopping fire and controlling gas flow with nanobrick wall composite thin films
- 09:30 – 12:30 **Biocomposites Session 3: Characterization**
Room: Victoria Ballroom
Chairs: Krystyn Van Vliet, Massachusetts Institute of Technology, USA
Kristi Lynn Kiick, University of Delaware, USA
- 09:30 – 10:00 **Krystyn Van Vliet**, Massachusetts Institute of Technology, USA
Hybrid biopolymeric materials in regenerative & preventative medicine
- 10:00 – 10:25 **Kristi Lynn Kiick**, University of Delaware, USA
Hybrid biopolymeric materials in regenerative medicine
- 10:25 – 10:50 Coffee Break
- 10:50 – 11:15 **Hui Lu**, Caulk Division Dentsply, USA
Polymerization shrinkage stress in modern dental composite: Origin, characterization, & control
- 11:15 – 11:40 **Richard Rusin**, 3M ESPE, USA
Resin nanoceramic material for dental restorations
- 11:40 – 12:05 **Liang Chen**, Bisco, USA
Flexible monomer-modified dental resin composite
- 12:05 – 12:30 **Yu Zhang**, University New York, USA
Graded ceramic composite surfaces for enhanced performance
- 09:30 – 12:30 **Functional Composites – Session 3: Thin layers +**
Room: Agnes
Chairs: Rick D. Davis, National Institute of Standards and Technology (NIST), USA
Jessica Krogstad, Johns Hopkins University, USA
- 09:30 – 10:00 **Rick D. Davis**, National Institute of Standards and Technology (NIST), USA
Engineered fire resistance using nanoparticle-based thin coatings
- 10:00 – 10:25 **Tetsuya Oyamada**, Iwate University, Japan
Study on effect of deicing chemicals on the freezing thawing resistance of concrete
- 10:25 – 10:50 **Somaia Talaat**, Egyptian Space Program, Egypt
Experimental and numerical investigation of the capabilities of periodic plates for vibration attenuation
- 10:50 – 11:15 **Jessica Krogstad**, Johns Hopkins University, USA
Influence of multi-phase microstructures on the performance of zirconia-based thermal barrier coating

Wednesday, November 6, 2013 (continued)

- 11:15 – 11:40 **Hidenori Yahiro**, Ehime University, Japan
New preparation method of perovskite-type oxide from cyano metal complex and their catalytic activity for gas- and liquid-phase reactions
- 11:40 – 12:05 **James Maxell**, Dynetics Company, USA
Hyperbaric laser chemical vapor deposition of metallic and ceramic fibers
- 12:05 – 12:30 **Boaz Pokroy**, Technion, Israel
Bio-inspired band gap engineering of zinc oxide by intracrystalline incorporation of amino acid
- 09:30 – 12:30 **Structural Composites – Session 3: Improved Characteristics**
Room: Louise
Chairs: Gerhard Dehm, Max-Planck Institute, Germany
 Anna C. Balazs, University of Pittsburgh, USA
- 09:30 – 10:00 **Daniel Schmidt**, University of Massachusetts, USA
Enhancing the sustainability of composite materials
- 10:00 – 10:25 **Anna C. Balazs**, University of Pittsburgh, USA
Strain recovery and self-healing in dual cross-linked nanoparticle networks
- 10:25 – 10:50 Coffee Break
- 10:50 – 11:15 **Arnand Jagota**, Lehigh University, USA
Structure and thermodynamics of hybrids between DNA and carbon nanotubes
- 11:15 – 11:40 **Gerhard Dehm**, Max-Planck Institute, Germany
Superhard, flexible, fatigue resistant: mechanical demands for thin films
- 11:40 – 12:05 **Shen Dillon**, University of Illinois, USA
Application of in-situ TEM to systems evolving in complex environments
- 12:05 – 12:30 **Quentin Demassieux**, ESPCI, Paris, France
Strain induced nanocavitation in crystallizable elastomeric nanocomposites probed by real time small angle x-ray scattering
- 12:30 – 13:30 Lunch (Fairview dining room)
- 19:00 **Evening Speakers**
Room: Victoria Ballroom
Chairs: Van Thompson, King's College London Dental Institute, United Kingdom
 Jennifer Lewis, Harvard University, USA
- 19:00 – 19:45 **Michael Dickey**, North Carolina State University, USA
3D Printing of liquid metals for stretchable and self healing conductors
- 19:45 – 20:30 **Ian Bond**, University of Bristol, United Kingdom
Managing damage and effecting recovery in advanced fibre reinforced polymer composites
- 20:30 – 21:15 **Jeffrey Stansbury**, University of Colorado-Denver, USA
Interphase design to control stress development in polymer/polymer and polymer/silica composites

Thursday, November 7, 2013

- 07:30 – 08:30 Breakfast (Poppy Room)
- 08:30 **Room: Victoria Ballroom**
Chairs: Van Thompson, King's College London Dental Institute, United Kingdom
Jennifer Lewis, Harvard University, USA
- 08:30 – 09:15 **Plenary Speaker: Andre Studart**, ETH Zurich, Switzerland
Bioinspired composites: Unprecedented properties via microstructural design
- 09:30 – 12:30 **Biocomposites – Session 4: Biomineralization/Biomimetics**
Room: Victoria Ballroom
Chair: Valeria T. Milam, Georgia Institute of Technology, USA
Johnna Temenoff, Georgia Institute of Technology, USA
- 09:30 – 10:00 **Sylvain Deville**, Saint-Gobain, France
Nacre-like strong and tough ceramic composites
- 10:00 – 10:25 **Valeria T. Milam**, Georgia Institute of Technology, USA
Modified oligonucleotides in reversible assembly schemes for materials
- 10:25 – 10:50 **Candan Tamerler-Behar**, University Kansas, USA
Bio-enabled hybrid materials through biomimetic molecular design
- 10:50 – 11:15 **David Kisailus**, University of California, USA
Recent developments in biological and biomimetic composites
- 11:15 – 11:40 **Nima Rahbar**, Worcester Polytechnic Institute, USA
Bioinspired design of multilayered materials
- 11:40 – 12:05 **Johnna Temenoff**, Georgia Institute of Technology, USA
Engineering biomaterials to promote cell response to soluble cues
- 09:30 – 12:30 **Functional Composites – Session 4: Nano-interphases**
Room: Agnes
Chairs: Marilyn Minus, Northeastern University, USA
John Kieffer, University of Michigan, USA
- 09:30 – 10:00 **Katti Kalpana**, North Dakota State University, USA
Nanoclays influence both mechanics and biological behavior in composites for biomedical applications
- 10:00 – 10:25 **Marilyn Minus**, Northeastern University, USA
Polymer interphases in nano-carbon composite fibers
- 10:25 – 10:50 **Oren Regev**, Ben-Gurion University of the Negev, Israel
Fracture behaviour of nanotube polymer composites
- 10:50 – 11:15 **Neil Wilson**, Warwick University, United Kingdom
Evolution in structure and properties from graphene to graphene oxide
- 11:15 – 11:40 **John Kieffer**, University of Michigan, USA
Interfaces and interphases in PMC: Insights from inelastic light scattering and molecular simulations

Thursday, November 7, 2013 (continued)

- 11:40 – 12:05 **Erik Spoerke**, Sandia National Laboratory, USA
Hunting an electrochemical sasquatch: The search for phase pure NaSICON ceramic electrolytes
- 09:30 – 12:30 **Structural Composites – Session 4: Orientation Processing**
Room: Louise
Chairs: Tetsuo Uchikoshi, National Institute for Materials Science, Japan
Junichi Tatami, Yokohama National University, Japan
- 09:30 – 10:00 **Tetsuo Uchikoshi**, National Institute for Materials Science, Japan
Fabrication of textured lanthanum silicate bulk ceramics by magnetic field-assisted colloidal processing
- 10:00 – 10:25 **Tohru Suzuki**, National Institute for Materials Science, Japan
Controlling orientation in each layer of ceramics by using electric and magnetic fields
- 10:25 – 10:50 **Wegst, Ulrike**, Dartmouth College, USA
Novel nano- and micro-composites by freeze casting
- 10:50 – 11:15 **Junichi Tatami**, Yokohama National University, Japan
Improvement of strength and electrical conductivity of CNT/alumina composites by control of dispersing and networking of CNTs
- 11:15 – 12:05 **Gale Holmes**, NIST, USA
Rheology of a fumed silica shear thickening fluid (STF) composite
- 12:10 – 13:00 Lunch (Fairview dining room) & Departures