

March 17, 2016

IGCMAT 2016: 1st International Conference on Grand Challenges in Construction Materials

UCLA Carnesale Commons, Palisades Ballroom, 251 Charles E Young Drive West, Los Angeles, CA 90095

7:30am - 9:00am

Continental Breakfast, *Salons A&B, Foyer*

7:30am - 5:00pm

Registration, *Foyer*

8:30am - 8:45am

Welcome & Opening Remarks: *Salons A&B*

Gaurav Sant, Associate Professor, Civil and Environmental Engineering, UCLA Henry Samueli School of Engineering and Applied Science, *J.R. DeShazo*, Director, UCLA Luskin Center for Innovation.

Moderator: *Maria Juenger (University of Texas, Austin)*

8:45am - 9:15am

Keynote: Intermolecular and surface forces over large size, length, rate, and time scales in hard and soft material systems, *Jacob Israelachvili*, Professor, Department of Chemical Engineering, University of California Santa Barbara (UCSB), U.S.A, *Salons A&B*

9:15am - 9:45am

Keynote: Carbon Footprint of Cementing Materials, *Fredrik P. Glasser*, Professor and Chair in Chemistry, Department of Chemistry, University of Aberdeen, Scotland, *Salons A&B*

9:45am - 10:15am

The Future of Construction, *Paul Seiler*, Technology Manager, BASF Admixtures-Construction Chemicals, U.S.A, *Salons A&B*

10:15am - 10:30am

Break

10:30am – 11:00am

Grand Challenges in Admixtures, *Josephine Cheung*, Director of Research, GCP Applied Technologies, U.S.A, *Salons A&B*

11:00am – 11:30 pm

Fly Ash Sustainability: “Fly Ash is Still in Your Future,” *Rafic Minkara*, Vice-President for Research and Development, Headwaters Incorporated, U.S.A, *Salons A&B*

11:30am - 12:15pm

Panel Discussion (Salons A&B): An industrial perspective on “grand challenges” and “grand opportunities”: Is there a role for fundamental “yet actionable” research? *Paul Seiler* (BASF Construction Chemicals), *Josephine Cheung* (GCP Applied Technologies), *Rafic Minkara* (Headwaters Resources Inc.), *Tom Tietz* (California Nevada Cement Association), *Wolfram Franke* (Yara International)
Moderator: *Nemkumar Banthia (University of British Columbia)*

12:15pm - 1:30pm

Networking Luncheon, *Salons C&F*

1:30pm - 3:00pm

Breakout Sessions – Focus 1 – Sustainability and Specifications (Salons A&B)

Moderator: *Narayanan Neithalath (Arizona State University)*

- Consider Functional Equivalence: A (Faster) Path to Upscaling Sustainable Infrastructure Materials Compositions, *Kimberly Kurtis*, Professor, School of Civil & Environmental Engineering, Georgia institute of Technology
- Developing Specifications To Enable Sustainable Binder Technologies in Robust and Durable Concretes, *R. Douglas Hooton*, Professor, Civil and Mineral Engineering, University of Toronto
- Using CO₂ to reduce the carbon footprint of concrete, *Sean Monkman*, Vice President of Technology Development, CarbonCure Technologies
- Lowering energy usage in cement production, *Theodore Hanein*, Ph.D. Candidate, University of Aberdeen, School of Engineering
- Structure, Composition and Thermochemical Properties of C-(N)-S-H and N-A-S-H Gels, *Lauren Gómez Zamorano*, Associate Professor of Materials Engineering, University of Nuevo Leon, Mexico
- The future of concrete may be in its past: the natural pozzolan renaissance, *Maria Juenger*, Professor, Department of Civil, Architectural, and Environmental Engineering, The University of Texas at Austin

Breakout Sessions – Focus 2 – Chemistry and Microstructure (Salons D&E)

Moderator: *Jeffrey Bullard (National Institute of Standards and Technology)*

- Characterizing the enhanced dissolution and condensation of aluminosilicates in alkaline environments, *Howard Dobbs*, Ph.D. Candidate, Department of Chemical Engineering, University of California Santa Barbara
- Fly-ash based inorganic polymers: understanding the precursor-to-product composition relationships, *Trevor Williamson*, Ph. D. Candidate, Department of Civil, Architectural, and Environmental Engineering, The University of Texas at Austin
- Topological Controls on Silicate Dissolution Kinetics, *Mathieu Bauchy*, Assistant Professor,

- Department of Civil and Environmental Engineering, University of California, Los Angeles
- Controlling the Molecular Architecture of Admixtures with Radical Polymerization, *Newell Washburn*, Associate Professor, Department of Chemistry, Carnegie Mellon University
- Using Nano X-ray Imaging to Create Time-dependent Three Dimensional Constitutive Maps of the Evolution of Cementitious Microstructure, *Tyler Ley*, Williams Foundation Professor at Oklahoma State University
- Direct Carbonation of $\text{Ca}(\text{OH})_2$ using Liquid and Supercritical CO_2 : A Potential Route Towards CO_2 -Neutral Cementation, *Gabriel Falzone*, Ph. D. Candidate, Department of Civil and Environmental Engineering, University of California, Los Angeles

3:00pm - 3:15pm

Break

Moderator: *John Mauro (Corning Inc.)*

3:15pm – 3:45pm

The Computational Materials Science of Concrete: 2036 AD, *Edward Garboczi*, Fellow, Applied Chemicals and Materials Division, National Institute of Standards and Technology, U.S.A, *Salons A&B*

3:45pm – 4:15pm

A Grand Challenge for Cementitious Materials: Is it possible to obtain images and XANES with 4 nm-spatial resolution? *Paulo Monteiro*, Professor and Roy W. Carlson Endowed Chair, Department of Civil and Environmental Engineering, University of California, Berkeley, U.S.A, *Salons A&B*

4:15pm - 5:00pm

Panel Discussion (Salons A&B): Decaying infrastructure: Is this a “materials” failure? *Nemkumar Banthia* (University of British Columbia), *Burkan Isgor* (Oregon State University), *Narayanan Neithalath* (Arizona State University), *Jack Youtcheff* (Federal Highway Administration), *Yann Le Pape* (Oak Ridge National Laboratory)

Moderator: *Paulo Monteiro (University of California, Berkeley)*

5:00pm – 7:00pm

Poster Session & Reception, Foyer

March 18, 2016

IGCMAT 2016: 1st International Conference on Grand Challenges in Construction Materials

UCLA Carnesale Commons, Palisades Ballroom, 251 Charles E Young Drive West, Los Angeles, CA 90095

7:30am - 9:00am

Continental Breakfast, *Salons A&B, Foyer*

7:30am - 5:00pm

Registration, *Foyer*

Moderator: *Zachary Grasley* (Texas A&M University)

8:30am - 9:00am

Digitization of Infrastructure with Smart Materials and Sensorial Networks, *Nemkumar Banthia*, Professor and Research Chair in Infrastructure Rehabilitation and Sustainability, Department of Civil Engineering, University of British Columbia, Canada, *Salons A&B*

9:00am - 9:30am

Grand Challenges in Glass Science, *John Mauro*, Senior Research Manager, Glass Research, Corning Incorporated, U.S.A., *Salons A&B*

9:30am - 10:00am

Measurement and Modeling Needs for Next-Generation Construction Materials, *Jeffrey W. Bullard*, Materials Research Engineer, Materials and Structural Systems Division, Inorganic Materials Group, National Institute of Standards and Technology, U.S.A, *Salons A&B*

10:00am - 10:15am

Break

10:15am - 10:45am

Innovative Sustainable Structural and Architectural Materials, *Grace Hsuan*, Program Officer, Division of Civil, Mechanical and Manufacturing Innovation, National Science Foundation, U.S.A, *Salons A&B*

10:45am - 11:15am

Perspectives on irradiation effects on long-term operation of nuclear power plants, *Yann Le Pape*, Senior Scientist, Oak Ridge National Laboratory, U.S.A, *Salons A&B*

11:15am - 12:00pm

Panel Discussion (Salons A&B): Two centuries later: Does “ordinary portland cement” remain the binder of the 21st century? If not, what’s next? *Fredrik P. Glasser* (University of Aberdeen), *Paulo Monteiro* (University of California, Berkeley), *Jeffrey W. Bullard* (National Institute of Standards and Technology), *Maria Juenger* (University of Texas, Austin), *Henri Van Damme* (IFFSTAR)

Moderator: *Kimberly Kurtis* (Georgia Institute of Technology)

12:00pm - 1:15pm

Networking Luncheon, *Salons C&F*

1:15pm - 2:30pm

Breakout Sessions – Focus 3 – Corrosion and Transport (Salons A&B)

Moderator: *Newell Washburn* (Carnegie Mellon University)

- Reactive-transport Modeling of the Pore Solution Chemistry along the Steel and Concrete Interface, *O. Burkan Isgor*, Associate Professor, Civil Engineering, Civil and Construction Engineering, Oregon State University
- A Refined, Self-Consistent Poisson-Nernst-Planck (PNP) Model for Electrically Induced Transport of Multiple Ionic Species through Concrete, *Narayanan Neithalath*, Associate Professor, School of Sustainable Engineering and the Built Environment, Arizona State University
- Methodology of taking local climate data into concrete carbonation depth prediction. Proposition of a model predicting carbonation depth spatial variation on cooling towers, *Nhu Cuong Tran*, Research Engineer, R&D center, EDF Lab
- Study on Calcium Nitrate impact on Carbonation of Concrete, *Wolfram Franke*, Application Development Manager, Yara International
- Probabilistic Design of Sustainable Concrete Infrastructure Using Multi-Physics Service Life Models, *Michael Lepech*, Associate Professor, Stanford University

Breakout Sessions – Focus 4 – Mechanical Behavior (Salons D&E)

Moderator: *Mathieu Bauchy* (University of California, Los Angeles)

- Material properties prediction for long term operation of nuclear power plants civil engineering structures: challenges at EDF, *Julien Sanahuja*, Researcher, Électricité de France (EDF)
- The role of dissolution on irreversible deformation of cement paste, *Zachary Grasley*, Associate Professor, Texas A&M University
- The Effect of Aluminum Substitution in C-S-H on Viscoelastic Properties: Stress Relaxation Nanoindentation, *William Hunnicutt*, Ph.D. student, University of Illinois at Urbana-Champaign
- Polymeric microcapsules for self-healing cement based materials, *Chrysoula Litina*, Ph. D. Student, Geotechnical and Environmental Research Group, Cambridge University
- The Nano- and Micro-Chemo-Mechanical Signature of Seeded Cementitious Materials, *Christian Hoover*, Post Doctoral Associate, Michigan Institute of Technology

- **Microstructure-Guided Constitutive Modeling for Random Heterogeneous Materials: Application to Novel Sustainable Materials**, Narayanan Neithalath, Associate Professor, School of Sustainable Engineering and the Built Environment, Arizona State University

2:30pm - 2:45pm

Break

Moderator: *Bu Wang (University of California, Los Angeles)*

2:45pm – 3:15pm

Multiscale structure of cement paste: 2D and 3D imageries, evolving morphology and confined transport of water, *Pierre Levitz*, Director of Research at Centre National de la Recherche Scientifique (CNRS), Ecole Polytechnique, France, *Salons A&B*

3:15pm – 3:45pm

Reaching experimental time scales with atomistic simulations: the kinetic activation-relaxation technique, *Normand Mousseau*, Professor and Canada Research Chair in Computational Physics of Complex Materials, Université de Montréal, Canada, *Salons A&B*

3:45pm – 4:15pm

Additive manufacturing with cement-based materials: Conditions and prospects, *Henri Van Damme*, Scientific Director, The French Institute of Science and Technology for Transport, Development and Networks (IFSTTAR), France, *Salons A&B*

4:15pm-4:45pm

Poster Session Awards *Salons A&B*

4:45pm - 5:00pm

Closing Remarks: *Salons A&B*

Gaurav Sant, Associate Professor, Civil and Environmental Engineering, UCLA Henry Samueli School of Engineering and Applied Science, *J.R. DeShazo*, Director, UCLA Luskin Center for Innovation.