

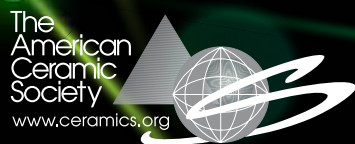
**PROGRAM**

# 12<sup>TH</sup> ADVANCES IN CEMENT-BASED MATERIALS

**July 11–13, 2022**

University of California, Irvine, USA

Organized by:  
The Cements Division of



Sponsored by:



**WILEY**

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HEIDELBERGCEMENT Group

<https://ceramics.org/cements2022>

# 12<sup>TH</sup> ADVANCES IN CEMENT-BASED MATERIALS

## DELLA ROY LECTURE

**Tuesday, July 12 | 4 – 5 pm**

**Lecture location ISEB 1010**

**Barbara Lothenbach**, University Berne, Switzerland, and NTNU, Norway

Title: *Uptake of ions by C-S-H*



### **Barbara Lothenbach**

is group leader of the Cement Chemistry and Thermodynamics Group of the Concrete & Asphalt Laboratory at Empa, the Swiss Federal Institute for

Materials Science & Technology. She has graduated from ETH Zürich and now is associate professor at University Berne, Switzerland, and adjunct professor at NTNU, Norway. She plays an active role in the promotion of the use of thermodynamic modelling to predict and understand the composition of hydrated cement, fundamental to develop durable and low CO<sub>2</sub>-cements.

## POSTER SESSION

**Tuesday, July 12, 2022**

**5 – 7 pm**

**ISEB Open Area & Lobby**

For complete poster listings see pg 13

## PROGRAM CHAIRS

**Denise A. Silva**, Oak Ridge National Laboratory

**Shiho Kawashima**, Columbia University

**Mo Li**, University of California, Irvine

**Mohammad Javad Abdolhosseini Qomi**, University of California, Irvine

### ISEB BUILDING:

**UNIVERSITY OF CALIFORNIA IRVINE**  
**419 Physical Sciences Quad, Irvine, CA 92697**

## SCHEDULE OF EVENTS

### SUNDAY, JULY 10

Student event at Eureka! (4143 Campus Drive)  
 (appetizers and drink tickets will be provided)

6 – 8 pm

### MONDAY, JULY 11

Registration & Coffee

8 – 8:30 am

Opening Remarks

8:30 – 8:45 am

Keynote #1 – Sabbie Miller, University of California, Davis,  
*Addressing concrete performance in carbon emissions mitigation*

8:45 – 9:30 am

Breakout Session 1a and 1b (1h20m)

9:45 – 11:05 am

Bio-inspired cementitious materials

Durability and Service-life modeling

Lunch

11:05 am – 1 pm

Breakout Session 2a and 2b (2h)

1 – 3 pm

*Supplementary and Alternative Cementitious Materials Part 1 of 3*  
*Advances in Rheology*

Breakout Session 3a and 3b (1h40m)

3:15 – 4:55 pm

*Cement Chemistry Part 1 of 2*

*Nanotechnology in Cementitious Materials Part 1 of 2*

### TUESDAY, JULY 12

Registration & Coffee

8 – 8:30 am

Keynote #2 – Tiziana Vanorio, Stanford University

8:30 – 9:15 am

Breakout Session 4a and 4b (2h)

9:30 – 11:30 am

*Supplementary and Alternative Cementitious Materials Part 2 of 3*  
*Additive Manufacturing using Cementitious Materials*

Lunch

11:30 am – 1:30 pm

Breakout Session 5a and 5b (2h)

1:30 – 3:30 pm

*Materials Characterization Techniques*

*CO<sub>2</sub> Emissions Reduction in the Cement Industry*

Business Meeting

3:45 – 4 pm

Della Roy Lecture - Barbara Lothenbach, University Berne, Switzerland, and NTNU, Norway, *Update of ions by C-S-H*

4 – 5 pm

Poster session / Della Roy Reception

5 – 7 pm

### WEDNESDAY, JULY 13

Registration & Coffee

8 – 8:30 am

Keynote #3 – Eric Giannini - Portland Cement Association

8:30 – 9 am

*Portland-Limestone Cements in North American: Current Status and Research Initiatives*

Breakout Session 6a and 6b (1h20m)

9:15 – 10:35 am

*Supplementary and Alternative Cementitious Materials Part 3 of 3*  
*Smart Materials and Sensors*

Breakout Session 7a and 7b (1h20m)

10:50 am – 12:10 pm

*Cement Chemistry Part 2 of 2*

*Nanotechnology in Cementitious Materials Part 2 of 2*

Poster award ceremony

12:25 – 12:40 pm

Closing remarks

12:40 – 12:45 pm

## CONFERENCE SCHEDULE

### DAY 1 – JULY 11 (Monday)

**8-8:30 am**

Registration & Coffee  
(ISEB Lobby)

**8:30-8:45am**

Opening Remarks

**8:45-9:30 am**

Moderator: Denise Silva

**Keynote speaker #1**

**SABBIE MILLER**

University of California, Davis

*Addressing concrete  
performance in  
carbon emissions mitigation*

(ISEB 1010)

## COVID-19 STATEMENT

The Advances in Cement-Based Materials, are complying with guidance from the Centers for Disease Control and relevant state and local authorities in an effort to provide a safe and healthy environment for attendees during the ongoing COVID-19 pandemic. However, COVID-19 is an extremely contagious disease and it is not possible to eliminate the risk of spreading or contracting COVID-19.

### BREAKOUT SESSION 1A | 9:45 – 11:05 AM | ISEB 1010

#### BIO-INSPIRED CEMENTITIOUS MATERIALS

Moderator: Wil Srubar III

Time	Description
9:45 – 10:05 am	<i>Screening siliceous biominerals extracted from microalgae using a small-scale, modified R3 method</i> <b>Sarah L. Williams*</b> ; Danielle N. Beatty <sup>1</sup> and Wil V. Srubar III, University of Colorado Boulder, Boulder, CO
10:05 – 10:25 am	<i>Bioinspired self-healing in cement-based materials</i> <b>Ali Ghahremaninezhad*</b> and Elvis Baffoe, University of Miami, Coral Gables, FL
10:25 – 10:45 am	<i>Bio-inspired silica coating for steel fibers</i> <b>Jialai Wang*</b> , The University of Alabama, Tuscaloosa, AL
10:45 am – 11:05 pm	<i>Biogenic CaCO<sub>3</sub> as a CO<sub>2</sub>-storing filler in portland limestone cement</i> <b>Danielle N. Beatty*</b> , Halie Brimelow, Shane D. Frazier and Wil V. Srubar III; University of Colorado Boulder, Boulder, CO

### BREAKOUT SESSION 1B | 9:45 – 11:05 AM | ISEB 1200

#### DURABILITY AND SERVICE-LIFE MODELING

Moderator: Matt D'Ambrosia

Time	Description
9:45 – 10:05 am	<i>Effect of strain history and mixture proportions on early-age cement paste and mortar stress relaxation</i> <b>Cesario Tavares*</b> , and Zachary Grasley; Texas A&M University, TX
10:05 – 10:25 am	<i>Deterioration in concrete exposed to sodium chloride: Mitigations strategies</i> <b>Fadi Althoeey*</b> , Najran University, Saudi Arabia
10:25 – 10:45 am	<i>Application of nonlinear kinetics model to ettringite expansion data</i> <b>Richard A. Livingston*</b> , Nour Alkhalouf, and Amde M. Amde; University of Maryland, MD
10:45 am – 11:05 pm	<i>Coupled moisture-carbonation-chloride reactive transport model for service life prediction of alkali-activated concrete</i> <b>Tamara Janey Chidiac*</b> <sup>1</sup> , John Provis <sup>1</sup> , Neven Ukrainczyk <sup>2</sup> , Dale Prentice <sup>3</sup> , Daniel Geddes <sup>1</sup> , Oday Hussein <sup>1</sup> and Brant Walkley <sup>1</sup> ; (1) University of Sheffield, UK, (2) Technische Universität Darmstadt, Germany, (3) University of California, USA



## MEETING REGULATIONS



No photography/recording  
Cell phones silent

During oral sessions conducted during Society meetings, unauthorized photography, videotaping, and audio recording is strictly prohibited for two reasons: (1) conference presentations are the intellectual property of the presenting authors as such are protected, and (2) engaging in photography, videotaping, or audio recording is disruptive to the presenter and the audience. Failure to comply may result in the removal of the offender from the session or from the remainder of the meeting.

Note: The Society may engage photographers to photograph sessions for marketing and promotional purposes.

### BREAKOUT SESSION 2A | 1:00 – 3:00 PM | ISEB 1010

#### SUPPLEMENTARY AND ALTERNATIVE CEMENTITIOUS MATERIALS PART 1 OF 3

Moderator: Prannoy Suraneni

Time	Description
1:00 – 1:20 pm	<i>Relating LC<sup>3</sup> microstructure, surface resistivity and compressive strength development</i> <b>Ogulcan Canbek</b> <sup>*1</sup> , Newell R Washburn <sup>2</sup> , and Kimberly E. Kurtis <sup>1</sup> ; (1) Georgia Institute of Technology, Atlanta, GA (2) Carnegie Mellon University, Pittsburgh, PA
1:20 – 1:40 pm	<i>Strength and durability performance of emerging fly ashes</i> Jetsun Thinley <sup>1</sup> , Lisa E Burris <sup>2</sup> , Doug Hooton <sup>3</sup> , Prannoy Suraneni <sup>4</sup> , and <b>Christopher Shearer</b> <sup>*1</sup> ; (1) South Dakota School of Mines and Technology, SD; (2) Ohio State University; (3) University of Toronto, Ontario, Canada; (4) University of Miami, FL
1:40 – 2:00 pm	<i>Physico-chemical evolution and corrosion performance of LC<sup>3</sup>-based composites under carbonation</i> <b>Rotana Hay</b> <sup>*</sup> , and Kemal Celik; New York University, Abu Dhabi, United Arab Emirates
2:00 – 2:20 pm	<i>Recent advances in belitic calcium sulfoaluminate cements</i> <b>Omkar M Deo</b> <sup>*1</sup> , Danny Chung <sup>1</sup> , Neel Bhuskute <sup>1</sup> , Robbie M Damiani <sup>1</sup> and Eric P Bescher <sup>2</sup> ; (1) R&D, CTS Cement Manufacturing Corp., Garden Grove, CA, (2) UCLA, Los Angeles, CA
2:20 – 2:40 pm	<i>Recycling of waste concrete powder as a solidifying agent for radioactive waste immobilization</i> Ji-Hyun Kim <sup>1</sup> , <b>Chul-Woo Chung</b> <sup>*2</sup> , Eun-A Seo <sup>1</sup> and Do-Gyeum Kim <sup>2</sup> ; (1) Pukyong National University, Busan, Korea, Republic of (South), (2) Goyang-si, Korea, Republic of (South)
2:40 – 3:00 pm	<i>Early-age characterization of near-neutral salt activated metakaolin and slag materials supplemented with lime mineral admixtures</i> Elise Westhoff and <b>Juan Pablo Gevaudan</b> <sup>*</sup> ; Pennsylvania State University, PA

# DAY 1 – JULY 11 (Monday)

## BREAKOUT SESSION 2B | 1:00 – 3:00 PM | ISEB 1200

### ADVANCES IN RHEOLOGY

Moderator: Dimitri Feys

Time	Description
1:00 – 1:20 pm	<i>Modeling the time-dependent rheological behavior of cement paste</i> <b>Babajide Y Onanuga*</b> and Joseph Biernacki; Tennessee Technological University, Cookeville, TN
1:20 – 1:40 pm	<i>Role of shear stress at rest on the viscoelastic response of fresh cement pastes</i> Siwei Ma and <b>Shiho Kawashima*</b> ; Columbia University, New York, NY
1:40 – 2:00 pm	<i>Using the water thickness model to analyze paste rheology</i> <b>Jedariah F Burroughs*</b> , U.S. Army, Vicksburg, MS
2:00 – 2:20 pm	<i>Testing procedures for rheological properties of rapid setting cement-based materials</i> <b>Paige Toeppen*</b> , Fareh Abudawaba, Jordan Stoddard, Mohamed ElGawady and Dimitri Feys; Missouri University of Science and Technology, Rolla, MO
2:20 – 2:40 pm	<i>AI-based interpretation of the influencing factors for concrete pumpability</i> <b>Yu Song*</b> and Gaurav Sant; University of California, Los Angeles, CA
2:40 – 3:00 pm	<i>A rheological approach to development of slurries for subsurface applications</i> <b>Sriramya D Nair*</b> , Moneeb Genedy, and Lyn Zemberekci, Cornell University, Ithaca, NY

BREAKOUT SESSION 3A | 3:15 – 4:55 PM | ISEB 1010

CEMENT CHEMISTRY PART 1 OF 2

Moderator: Nishant Garg

Time	Description
3:15 – 3:35 pm	<i>Atomistic thermodynamics and kinetics of dicalcium silicate dissolution</i> <b>MJ Abdolhosseini*</b> , Yong Tao, and Siavash Zare, University of California Irvine, CA
3:35 – 3:55 pm	<i>Are organic leachates from recycled aggregates poisoning cement hydration?</i> Amir Behravan, Michael D. Lowry, Mehdi Ashraf-Khorassani and <b>Alexander S. Brand*</b> ; Virginia Tech, Blacksburg, VA
3:55 – 4:15 pm	<i>Multifunctional cementitious materials for sustainable concrete</i> <b>Damian Stefaniuk</b> , Marcin Hajduczek, Nicolaus Chanut, Franz-Josef Ulm, Admir Masic*, Massachusetts Institute of Technology, Cambridge, MA
4:15 – 4:35 pm	<i>Effect of binder chemistry on superabsorbent polymer internal curing of cementitious systems</i> <b>Caitlin J. Adams*</b> <sup>1</sup> , Baishakhi Bose <sup>1,2</sup> , Michael Nelson <sup>3</sup> , Tommy E. Nantung <sup>3</sup> , Jan Olek Dr. <sup>1</sup> and Kendra A. Erk <sup>1</sup> ; (1) Purdue University, West Lafayette, IN, (2) Lawrence Berkeley National Lab, Berkeley, CA, (3) Indiana Department of Transportation, Indianapolis, IN
4:35 – 4:55 pm	<i>The effectiveness of sucrose on the hydration of calcium sulfoaluminate cement pastes and mixtures</i> <b>Jonathan Lapeyre*</b> and Jeffrey Bullard; Texas A&M University

BREAKOUT SESSION 3B | 3:15 – 4:55 PM | ISEB 1200

NANOTECHNOLOGY IN CEMENTITIOUS MATERIALS PART 1 OF 2

Moderator: Kim Kurtis

Time	Description
3:15 – 3:35 pm	<i>The intrinsic mechanical properties of calcium silicate hydrate in the presence of polycarboxylate ether and graphene oxide: The first evidence</i> <b>Jiaqi Li*</b> , Lawrence Livermore National Laboratory, Livermore, CA
3:35 – 3:55 pm	<i>Nanoscale layer thinning in metakaolin upon dissolution</i> <b>Nishant Garg*</b> , University of Illinois at Urbana-Champaign, Urbana, IL
3:55 – 4:15 pm	<i>Performance of portland cement composites incorporating graphene oxide coated waste mask PP microfibers</i> <b>Zhipeng Li*</b> and Xianming Shi; Washington State University, WA
4:15 – 4:35 pm	<i>Effect of organic-inorganic C-S-H nanolaminates on the cement hydration kinetics and microtexture of cementitious matrices</i> Amir Moshiri, Santiago El Awad, Debra Kendall, Damian Stefaniuk Dr., Sarah Hlailhel and <b>Konrad J Krakowiak*</b> ; University of Houston, Houston, TX
4:35 – 4:55 pm	<i>The H<sub>2</sub>O-CO<sub>2</sub> Mixture Phase behavior in C-S-H</i> <b>Siavash Zare*</b> <sup>1</sup> , MJ Abdolhosseini <sup>1</sup> , Andreas Funk <sup>2</sup> , K. M. Salah Uddin <sup>2</sup> and Quin Miller <sup>3</sup> ; (1) University of California Irvine, (2) University of Kassel, Germany, (3) Pacific Northwestern National Laboratories

## CONFERENCE SCHEDULE

### DAY 2 – JULY 12 (Tuesday)

**8:30 – 9:15 am**

Moderator: Mohammad Javad  
Abdolhosseini Qomi

**Keynote speaker #2**

**TIZIANA VANORIO**

Stanford University

*From Natural Cementation to a  
Geo-Inspired Cement: A Geosci-  
ence and Engineering Approach*

ISEB 1010

**3:45 – 4:00 pm**

**Business Meeting**

**4:00 – 5:00 pm**

Moderator: Jeff Thomas

**Della Roy Lecture, Q&A**

**BARBARA LOTHENBACH**

University Berne, Switzerland,  
and NTNU, Norway

*Uptake of ions by C-S-H*

ISEB 1010

**5:00 – 7:00 pm**

**Poster Session**

ISEB Open Area & Lobby

#### BREAKOUT SESSION 4A | 9:30 – 11:30 AM | ISEB 1010

##### SUPPLEMENTARY AND ALTERNATIVE CEMENTITIOUS MATERIALS PART 2 OF 3

Moderator: Sabbie Miller

Time	Description
9:30 – 9:50 am	<i>Incineration fly ash in cementitious system: Hydration, mechanical and leaching performance</i> <b>Aniruddha Baral*</b> , Vikram Kumar, Jeffery Roesler and Nishant Garg; University of Illinois at Urbana-Champaign, Urbana, IL
9:50 – 10:10 am	<i>Understanding the influence of mix design on the formation of sodium aluminosilicate hydrate gel in alkali-activated systems</i> <b>Luiz Miranda de Lima*</b> <sup>1</sup> , John Provis <sup>2</sup> and Guang Ye <sup>1</sup> , (1)TU Delft, Netherlands, (2) University of Sheffield, UK
10:10 – 10:30 am	<i>New insights into chemical sulfate resistance of alternative and port-land cementitious material systems</i> <b>Prasanth Alapati*</b> , and Kimberly E. Kurtis; Georgia Institute of Technology, Atlanta, GA
10:30 – 10:50 am	<i>Biomolecule-microstructure-property relationships in alkali-activated slag systems</i> Elvis Baffoe, <b>Ali Ghahremaninezhad*</b> , and Sadegh Tale Masoule; University of Miami, Coral Gables, FL
10:50 – 11:10 am	<i>Aging of geopolymer lunar concrete under the space environment</i> <b>Aleksandra Radlinska*</b> <sup>1</sup> , Peter J Collins <sup>1</sup> , and Louise Strutzenberg <sup>2</sup> ; (1) Pennsylvania State University, State College, PA, (2) NASA
11:10 – 11:30 am	<i>Geopolymer-based concrete for high-temperature thermal energy storage (TES) application</i> Mohammad Rahjoo <sup>1</sup> , Juan José Gaitero <sup>2</sup> , Pavel Martauz <sup>3</sup> , Esther Rojas <sup>4</sup> and <b>Jorge S Dolado*</b> <sup>1</sup> ; (1) Centro de Física de Materiales (CFM) CSIC-UPV/EHU, Spain, (2) TECNALIA R&D, Spain, (3) POVAZSKA CEMENTAREM, Slovakia, (4) Plataforma Solar de Almería PSA-CIEMAT, Spain

BREAKOUT SESSION 4B | 9:30 – 11:30 AM | ISEB 1200

ADDITIVE MANUFACTURING USING CEMENTITIOUS MATERIALS

Moderator: Mo Li

Time	Description
9:30 – 9:50 am	<i>Digital fabrication and sustainability: What does 3D printing concrete really bring to the table, and how can we improve it?</i> Robert J. Flatt and <b>Timothy Wangler*</b> ; ETH Zurich, Zurich, Switzerland
9:50 – 10:10 am	<i>Compliant and tough architected mortar materials inspired by bouligand and double-bouligand designs</i> <b>Hadi Shagerdi Esmaeeli*</b> , Shashank Gupta, Arjun Prihar and Reza Moini; Princeton University, Princeton, NJ
10:10 – 10:30 am	<i>Fracture behavior of additively manufactured cementitious materials</i> Yun-Chen Wu, <b>Xinbo Wang*</b> , and Mo Li; University of California, Irvine, CA
10:30 – 10:50 am	<i>Concrete 3D printing: How to make it work(able)?</i> <b>Karthik Pattaje S.*</b> , and David Lange; University of Illinois at Urbana Champaign, Urbana, IL
10:50 – 11:10 am	<i>2-d stationary computational printing of cement-based pastes with time-dependent rheology</i> <b>Abdul Salam Mohammad*</b> , Babajide Y Onanuga, and Joseph Biernacki, Tennessee Technological University, Cookeville, TN
11:10 – 11:30 am	<i>Investigating flexural performance and bonding properties of additively manufactured polymeric elements with bioinspired architecture as potential reinforcements for cementitious materials</i> <b>Parsa Namakiaraghi*</b> <sup>1</sup> , Liam McNally <sup>1</sup> , Robert Spragg, <sup>2</sup> and Yaghoob Farnam <sup>1</sup> ; (1) Drexel University, Philadelphia, PA, (2) Federal Highway Administration, McLean, VA



BREAKOUT SESSION 5A | 1:30 – 3:30 PM | ISEB 1010

**MATERIALS CHARACTERIZATION TECHNIQUES**

Moderator: Alex Brand

Time	Description
1:30 – 1:50 pm	<p><i>On the development and adaptation of micro-bending for multi-scale characterization of cement-based materials and ceramics</i></p> <p><b>Santiago El Awad*</b>, Damian Stefaniuk Dr. and Konrad J Krakowiak Dr.; University of Houston, Houston, TX</p>
1:50 – 2:10 pm	<p><i>What is the intrinsic healing capacity of a cementitious crack?</i></p> <p>Shuai Fan and <b>Mo Li*</b>, University of California, Irvine, CA</p>
2:10 – 2:30 pm	<p><i>Nondestructive estimate of concrete petrography based on prompt gamma neutron activation analysis</i></p> <p><b>Richard A. Livingston*</b><sup>1</sup>, H. Heather Chen-Mayer<sup>2</sup>, and Neal S. Berke<sup>3</sup>; (1) University of Maryland, MD, (2) National institute of Standards and Technology, Gaithersburg, MD, (3)Tourney Consulting Group, Kalamazoo, MI</p>
2:30 – 2:50 pm	<p><i>Mapping mineralogy of mswi ashes via raman imaging</i></p> <p><b>Hamza Samouh*</b>, Vikram Kumar and Nishant Garg; University of Illinois at Urbana-Champaign, Urbana, IL</p>
2:50 – 3:10 pm	<p><i>Development of an apparatus capable of applying multiaxial tensile stress states to cementitious composites</i></p> <p><b>Trevor Jay Looney*</b>, U.S. Army Engineer Research and Development Center, Vicksburg, MS</p>
3:10 – 3:30 pm	<p><i>Semicircular bending fracture test for cementitious materials</i></p> <p><b>Xijun Shi*</b><sup>1</sup> and Zachary Grasley<sup>2</sup>; (1) Texas State University, San Marcos, TX, (2) Texas A&amp;M University</p>

BREAKOUT SESSION 5B | 1:30 – 3:30 PM | ISEB 1200

CO<sub>2</sub> EMISSIONS REDUCTION IN THE CEMENT INDUSTRY

Moderator: Kendra Erk

Time	Description
1:30 – 1:50 pm	<p><i>Lower Embodied Carbon of Concrete via Carbon Sequestration and Recycling</i></p> <p><b>Aron Newman*</b>, Edward J Garboczi and Kelsea Schumacher; National Institute of Standards and Technology, Boulder, CO</p>
1:50 – 2:10 pm	<p><i>Environmental impacts of alkali-activated materials determined by adapting an open-source tool</i></p> <p><b>Alyson Kim*</b>, Patrick R Cunningham and Sabbie A Miller; University of California, Davis, CA</p>
2:10 – 2:30 pm	<p><i>Carbon sequestration capacity of Biochar-Cementitious Materials</i></p> <p><b>Geetika Mishra*</b>, Surendra Shah, Panagiotis Danoglidis, and Maria S. Konsta-Gdoutos; The University of Texas at Arlington, Arlington, TX</p>
2:30 – 2:50 pm	<p><i>Characteristics of calcium phosphate modified cement paste exposed to supercritical CO<sub>2</sub></i></p> <p>Ji-Hyun Kim, and <b>Chul-Woo Chung*</b>; Pukyong National University, Busan, Korea, Republic of (South)</p>
2:50 – 3:10 pm	<p><i>Fast pyrolysis biochar as a carbon-sequestering cement additive and the potential for carbon neutral concrete</i></p> <p><b>Julia Rae Hylton*</b>, Lori Tunstall, and Brennan Pecha, Colorado School of Mines, Golden, CO</p>
3:10 – 3:30 pm	<p><i>Microencapsulation of biobased phase change materials with silica coated inorganic shell for thermal energy storage</i></p> <p><b>Abdulmalik Bamidele Ismail*</b>, and Jialai Wang, The University of Alabama, Tuscaloosa, AL</p>

## CONFERENCE SCHEDULE

### DAY 3 – JULY 13 (Wednesday)

**8:30 – 9:00 am**

Moderator: Shiho Kawashima

**Keynote speaker #3**

**ERIC GIANNINI**

Portland Cement Association

*Portland-Limestone Cements in North America: Current Status and Research Initiatives*

(ISEB 1010)

#### BREAKOUT SESSION 6A | 9:15 – 10:35 AM | ISEB 1010

##### SUPPLEMENTARY AND ALTERNATIVE CEMENTITIOUS MATERIALS PART 3 OF 3

Moderator: Sriramy Nair

Time	Description
9:15 – 9:35 am	<i>Estimation of supplementary cementitious materials alkali-silica reaction mitigation potential based on reactivity and bulk resistivity.</i> <b>Ying Wang*</b> <sup>1</sup> , Sivakumar Ramanathan <sup>2</sup> , Krishna S.T. Chopperla <sup>2</sup> , Jason H Ideker <sup>2</sup> and Prannoy Suraneni <sup>1</sup> ; (1)University of Miami, Coral Gables, FL, (2)Oregon State University
9:35 – 9:55 am	<i>Dissolution-precipitation mechanism of crystalline calcium silicate hydrates in carbonated environments</i> <b>Coleman Everett Tolliver*</b> , Rachel Anne McNamara, Suzanne Nguyen, Elizabeth Opila and Andres Clarens; University of Virginia, Charlottesville, VA
9:55 am – 10:15 pm	<i>In-situ TEM imaging of hydrated magnesium carbonate polymorphs during hydration and carbonation of magnesium oxide</i> <b>Nouran Elmesalami*</b> <sup>1</sup> , MJ Abdolhosseini <sup>2</sup> and Kemal Celik <sup>1</sup> ; (1)New York University, New York, NY, (2)University of California Irvine
10:15 – 10:35 pm	<i>The cementing action of calcium carbonate</i> <b>Craig W Hargis*</b> , Product Development, Fortera, San Jose, CA

#### BREAKOUT SESSION 6B | 9:15 – 10:35 AM | ISEB 1200

##### SMART MATERIALS AND SENSORS

Moderator: Kemal Celik

Time	Description
9:15 – 9:35 am	<i>Advanced electromechanical impedance sensitivity and crack detection ability of smart concrete reinforced with carbon based nanostructured materials</i> <b>Michail Margas*</b> , and Maria S. Konsta-Gdoutos; The University of Texas at Arlington, Arlington, TX
9:35 – 9:55 am	<i>Understanding electrical behavior of cementitious materials for self-sensing</i> <b>Jianlei Wen*</b> , Xiaopeng Li, and Mo Li, University of California, Irvine, Irvine, CA
9:55 am – 10:15 pm	<i>Self-heating electrically conductive cement composites with carbon fillers</i> <b>Seongwoo Gwon*</b> , and Myoungsu Shin; Ulsan National Institute of Science and Technology, Ulsan, Korea, Republic of (South)
10:15 – 10:35 pm	<i>Development of self-heating concrete using phase change materials: Multiscale and in-situ real-time evaluation of snow melting and freeze-thaw performance</i> <b>Robin Deb*</b> , Nishant Shrestha, Kham Phan, Mohamed Cissao, Parsa Namakiaraghi, Sharaniya Visvalingam, Yousif Alqenai and Yaghoob Farnam; Drexel University, Philadelphia, PA

# DAY 3 – JULY 13 (Wednesday)

## BREAKOUT SESSION 7A | 10:50 AM – 12:10 PM | ISEB 1010

### CEMENT CHEMISTRY PART 2 OF 2

Moderator: Jiaqi Li

Time	Description
10:50 – 11:10 am	<i>Influences of sucrose on the hydration of calcium sulfoaluminate cement</i> <b>Jonathan L. Lapeyre*</b> and Jeffrey W. Bullard; Texas A&M University, College Station, TX
11:10 – 11:30 am	<i>The use of composite hydrogel particles as internal curing agents to control hydrate assembly in low-water cementitious mixtures</i> <b>Kendra A. Erk*</b> ; Purdue University, West Lafayette, IN
11:30 – 11:50 am	<i>Kinetic studies of magnesium silicate hydrate precipitation at the nanoscale to mesoscale</i> <b>Dylan Singh*</b> <sup>1</sup> , Ian A Shortt <sup>1</sup> , Byeongdu Lee <sup>2</sup> , Sang Soo Lee <sup>2</sup> , Ivan Kuzmenko <sup>2</sup> , Maria S. Konsta-Gdoutos <sup>1</sup> and Erika Callagon La Plante <sup>1</sup> ; (1)University of Texas at Arlington, Arlington, TX, (2)Argonne National Laboratory, Lemont, IL
11:50 am– 12:10 pm	<i>Kinetic Monte Carlo Modeling of Cement Dissolution</i> <b>Pablo Martin*</b> <sup>1,2</sup> , MJ Abdolhosseini <sup>2</sup> , and Hego Manzano <sup>1</sup> ; (1)University of Basque Country UPV/EHU, Bilbao, Spain, (2)University of California Irvine, Irvine, CA

## BREAKOUT SESSION 7B | 10:50 AM – 12:10 PM | ISEB 1200

### NANOTECHNOLOGY IN CEMENTITIOUS MATERIALS PART 2 OF 2

Moderator: Christopher Shearer

Time	Description
10:50 – 11:10 am	<i>Strategically functionalized energy conversion and storage ability of nanoengineered concrete with tunable electrical and thermal conductivity</i> <b>Myrsini Maglogianni*</b> , Panagiotis Danoglidis, and Maria S. Konsta-Gdoutos; The University of Texas at Arlington, Arlington, TX
11:10 – 11:30 am	<i>Effect of carbon nanofibers (CNFs) on the hydration of ultra-high performance concrete (UHPC): Experimental study and model development</i> <b>Linfei Li*</b> , Mohammad Matar, and Mija Hubler; University of Colorado Boulder, Boulder, CO
11:30 – 11:50 am	<i>Comparing the hydration kinetics of cements with nanoclay and nano silica added as a dry-dispersed cement coating versus sonicated solution dispersion</i> <b>AlaEddin Douba*</b> and Shiho Kawashima; Columbia University, New York, NY
11:50 am– 12:10 pm	<i>High-strength engineered cementitious composites (ECC) with nano-silica incorporated</i> <b>Zhigang Zhang*</b> , Zhipeng Li and Xianming Shi; Washington State University, Pullman, WA



JULY 12 (TUESDAY)

## POSTER SESSION

POSTERS 5 – 7 pm

Poster size: 33.1" x 46.8"

***Evaluation of OCcrit method for determination of corrosion initiation and critical chloride threshold of steel reinforcement embedded in portland-slag blended cementitious materials***

David A Orense\*, Penn State University, PA and Juan Pablo Gevaudan, University of Colorado Boulder, CO

***Importance of moisture content of concrete during laser scabbling process using fiber laser.***

Seong-Wook Heo\*, Chul-Woo Chung and Ji-Hyun Kim, Pukyong National University, Busan, Korea, Republic of (South)

***Maintenance and rehabilitation of existing alkali-silica reaction (ASR)-affect structures***

Devin Kumar\*, Georgia Tech, Atlanta, GA

***Cation effect on alkali silica reaction (ASR) gel polymerization***

Juliet F Swinea\*, Kimberly E. Kurtis, and Prasanth Alapati; Georgia Institute of Technology, Atlanta, GA

***Evaluation of drying shrinkage in concrete using diffuse ultrasound***

Eunjong Ahn\*, and Myoungsu Shin; Ulsan National Institute of Science and Technology, Ulsan, Korea, Republic of (South)

***Pore solution characterization and permeability analysis of alkali-activated metakaolin***

Anita Zhang\*, and Claire E. White; Princeton University, Princeton, NJ

***The effects of alkanolamines on hydration and early-age properties of LC3 and csab cements.***

Alexandra Ann Israel\*, Kimberly E. Kurtis, and Angus Wilkinson; Georgia Institute of Technology, Atlanta, GA

***Corrosion resistance of engineered cementitious composite (ECC) using calcined clay limestone cement (LC3)***

Connor Szeto\*, and Kimberly E. Kurtis; Georgia Institute of Technology, Atlanta, GA

***Experimental and computational characterization of silica fume dissolution***

Yoonjung Han\*<sup>1</sup>, Jonathan L. Lapeyre<sup>1</sup>, Umme Zakira<sup>1</sup>, Mine G. Ucak-Astarlioglu<sup>2</sup>, Jedediah F Burroughs<sup>2</sup> and Jeffrey W. Bullard<sup>1,2</sup>; (1) Texas A&M University, TX, (2), U.S. Army Engineer Research and Development Center, Vicksburg, MS

***Quantifying crystalline and amorphous phase assemblage in ternary binders***

Elsa Qoku\*, Georgia Tech, Atlanta, GA, and TU Bergakademie Freiberg, Freiberg, Germany

***Properties of cement paste with SWCNT solution dispersed by sodium deoxycholate***

Ece Burtay Sener, Aidyn Tugelbayev\*, Ji-Hyun Kim, and Chul-Woo Chung; Pukyong National University, Busan, Korea, Republic of (South)

***Mechanical strength of cement paste incorporating MWCNT solutions dispersed by polycarboxylate-ester and sodium naphthalene-sulfonate***

Seong-Hwn Park\*, Chul-Woo Chung, and Ji-Hyun Kim; Pukyong National University, Busan, Korea, Republic of (South)

***Properties of cement paste incorporating functionalized MWCNT after H<sub>2</sub>SO<sub>4</sub>/HNO<sub>3</sub> acid treatment***

Aidyn Tugelbayev\*, Ji-Hyun Kim, and Chul-Woo Chung; Pukyong National University, Busan, Korea, Republic of (South)

***The influence of curing temperature on early-age properties of metakaolin alkali-activated geopolymers***

Abu Naser Rashid Reza<sup>1\*</sup>, Kristen M. Donnell<sup>2</sup>, Jared Sinkey<sup>2</sup>, and Christopher Shearer<sup>1</sup>, (1) South Dakota School of Mines and Technology, Rapid City, SD; (2) Missouri University of Science and Technology, Rolla, MO,

***Modeling upfront CO<sub>2</sub> emissions and sequestration potential of portland cement concrete***

Matt A. Jungclaus\*, Wil V. Srubar III, and Jay H. Arehart; University of Colorado Boulder, Boulder, CO

***Life cycle assessment study for magnesium-based cement produced from reject brine***

Farah Shahbaz\*, New York University Abu Dhabi, Abu Dhabi, United Arab Emirates

***A review on additive manufacturing for construction material production***

Eka Oktavia Kurniati, Johns Hopkins University, Baltimore, MD and Hee-Jeong Kim\*, University of Arizona, Tucson, AZ

***Early age mineralization of synthetic (M,N)-a-(S,P)-h, a promising buffer material for long-term immobilization of high-level nuclear waste***

Juan Pablo Gevaudan, University of Colorado Boulder, Boulder, CO and Titus M Reed\*, Penn State University, PA

***Mechanochemical activation of low-amorphous quarry fines***

Luca Galli\*, and Prannoy Suraneni, University of Miami, Coral Gables, FL

***Limestone replacement in high volume fly ash concrete: Hydration kinetics and phase assemblage***

Aniruddha Baral\* and Jeffery Roesler; University of Illinois at Urbana-Champaign, Urbana, IL

***Influence of Aluminum and Sodium on the Structure of Calcium-Silicate-Hydrate Gel: A Molecular Modeling Approach***

Debra A. Keiser\* and Claire E. White; Princeton University, Princeton, NJ

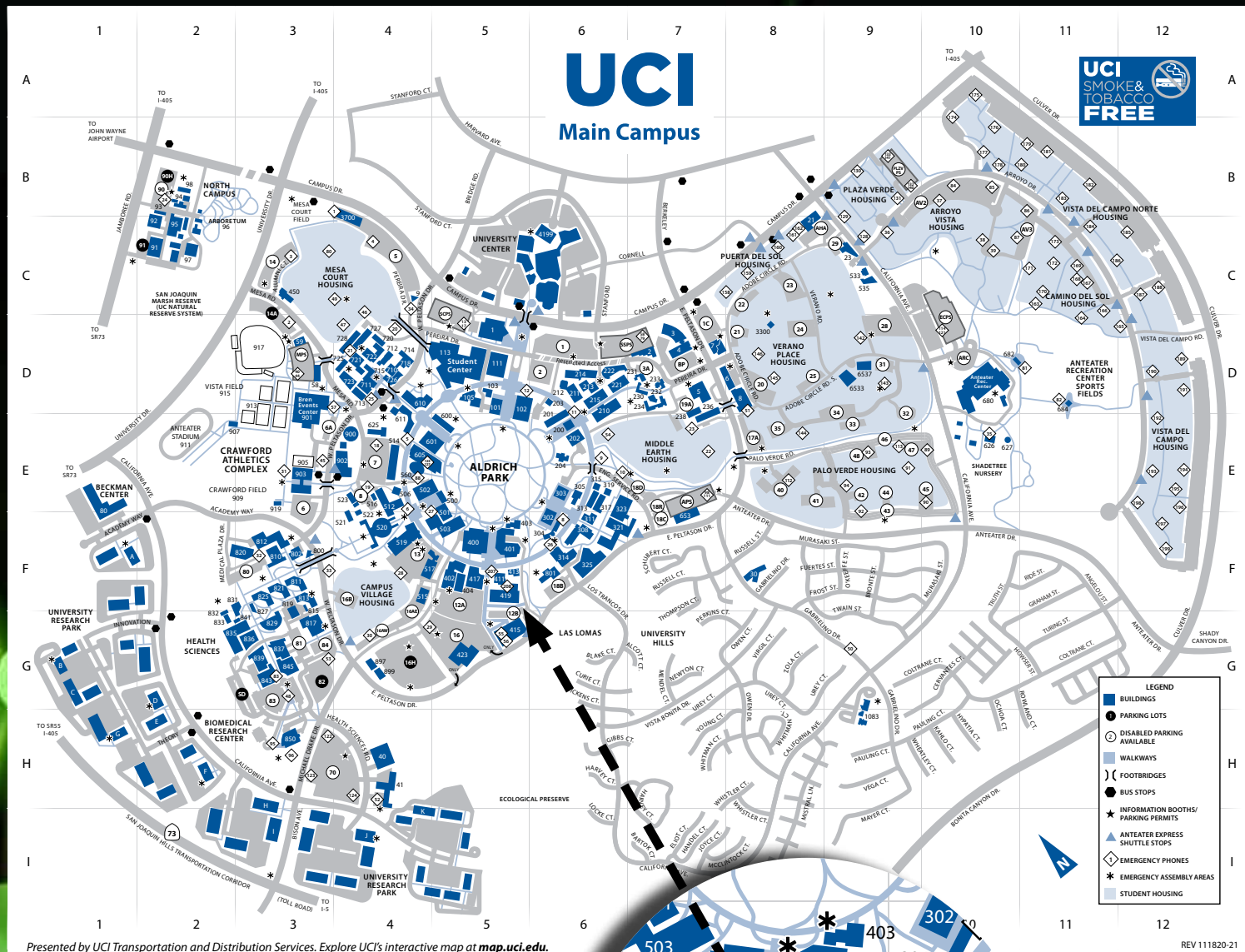
***Stabilization of metastable calcium carbonate polymorphs in Portland cement systems***

Diandian Zhao\*, Jonah Williams, Ah-Hyung Alissa, and Shiho Kawashima; Columbia University, New York, NY

# FLOOR PLAN

## ISEB Building

419 Physical Sciences Quad





# 12<sup>TH</sup> ADVANCES IN CEMENT-BASED MATERIALS



Barbara  
Lothenbach

## Tuesday, July 12 Della Roy Lecture

*Uptake of ions by C-S-H*

4:00 – 5:00 p.m.

ISEB 1010

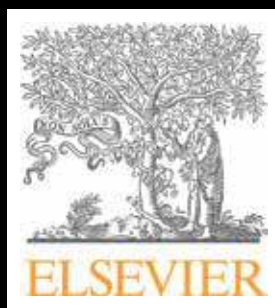
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## Della Roy Reception

5:00 – 7:00 p.m.

ISEB Open Area & Lobby

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