FINAL PROGRAM

9th Advances in Cement-Based Materials (Cements 2018)

ceramics.org/cements2018
SCHEDULE OF EVENTS

**SUNDAY, JUNE 10**

Student reception @ Hub Break Zone  
Hub Robeson Center  
7:00 – 9:00 p.m.

**MONDAY, JUNE 11**

Registration (022BBH)  
7:15 – 8:00 a.m.

Welcome and two keynote speakers (022BBH)  
8:00 – 9:15 a.m.

Breakout sessions (022BBH, 254HHD)  
9:30 – 11:30 a.m.

Lunch on your own  
11:30 a.m. – 1:00 p.m.

Breakout sessions (022BBH, 254HHD)  
1:00 – 2:15 p.m.

Breakout sessions (022BBH, 254HHD)  
2:15 – 3:30 p.m.

Business Meeting (022BBH)  
all attendees invited  
3:45 – 4:00 p.m.

NSF Program Updates (022BBH)  
4:00 – 4:30 p.m.

Della Roy Lecture (022BBH)  
4:30 – 5:30 p.m.

Poster session (ABC Room @ Alumni Center)  
6:00 – 7:30 p.m.

Della Roy Reception  
(Robb Hall @ Alumni Center)  
7:30 – 8:30 p.m

**TUESDAY, JUNE 12**

3D printing workshop (022BBH)  
8:00 – 10:00 a.m.

Breakout sessions (022BBH, 254HHD)  
10:15 a.m. – 12:15 p.m.

Lunch on your own  
12:15 – 1:30 p.m.

Breakout sessions (022BBH, 254HHD)  
1:30 – 3:15 p.m.

Closing session: (022BBH)  
2 keynote speakers + awards  
3:30 – 5:00 p.m.

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**DELLA ROY LECTURE**

**Monday, June 11 | 4:30 – 5:30 pm | 022BBH**

Jan Olek, professor of civil engineering and director of the North Central Superpave Center, Purdue University  
Title: Green concrete—the past, the present and the future

Dr. Jan Olek is Professor of Civil Engineering and Director of the North Central Superpave Center (NCSC) at Purdue University’s Lyles School of Civil Engineering. He received his Ph.D. from Purdue University in 1987 and his M.S.C.E. at the University of Texas at Austin in 1985. Dr. Olek’s research focuses on concrete material and technology, high performance concrete, supplementary cementitious materials, mixture optimization, durability of construction materials and structures, life-cycle modelings, Superpave technology, and tire-pavement noise mitigation.

His awards include being named a Distinguished Alumnus of the Cracow University of Technology, Cracow, Poland and receiving the Bength Frieberg Award for Best Paper by a Young Author (co-advised Narayan Neithalath and Rolando Garcia with Jason Weiss), International Society for Concrete Pavements, August 2005. He has also been honored as an invited speaker to offer two undergraduate and two graduate workshops at the Instituto Tecnológico y de Estudios Superiores de Monterrey (“ITESM”), Mexico, April 2006 and to deliver a Superpave Training Course and Workshop for the Pavement Institute in Nanjing, Peoples Republic of China, April 2005.

**RECEPTION | 7:30 – 8:30 pm**  
Robb Hall @ Hintz Family Alumni Center

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**POSTER SESSION**

**Monday, June 11, 2018**  
6:00 – 7:30 pm  
ABC Conference Room  
Hintz Family Alumni Center

For complete poster listings see pg 8

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**OFF SITE PARKING:** Pugh Street Parking Garage, Fraser St. Parking Garage
## Opening Session:
Welcome and two keynote speakers:

**Maria Juenger** (UT Austin)
The future of energy may be coal-free; what does that mean for concrete?

**Kimberly Kurtis** (Georgia Tech)
ACMs: Evolution or Revolution?

## 9:30 – 11:30 am
**Cement Chemistry, Processing, and Hydration**

<table>
<thead>
<tr>
<th>Session Title</th>
<th>Presenter</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>The dissolution rate of gypsum crystals and powders in continuously stirred reactors</td>
<td>Jeffrey W. Bullard, National Institute of Standards and Technology, Gaithersburg, MD</td>
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<td>Nanoscale dissolution kinetics and behavior at the interface of β-dicalcium silicate and water</td>
<td>Alexander S. Brand, National Institute of Standards and Technology, Gaithersburg, MD</td>
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<td>Direct observation of void evolution during cement hydration</td>
<td>Tyler Ley, Oklahoma State University, Stillwater, OK</td>
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<td>Significance of the dispersion of nano-SiO₂ on the early age hydration of cement pastes</td>
<td>Pan Feng, Southeast University, Nanjing, China</td>
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<td>Hydration of cementitious mortars containing nano-silica</td>
<td>Aly Said, Pennsylvania State University, University Park, PA</td>
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<td>Reducing pre-hydration of cement produced in vertical roller mills - an opportunity to improve cement quality</td>
<td>Jeffrey J Thomas, GCP Applied Technologies, Cambridge, MA</td>
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<td>Influence of biomolecules on the characteristics of calcium-silicate-hydrate</td>
<td>Ali Ghahremaninezhad, University of Miami, Coral Gables, FL</td>
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<td>Magnesium-based Cement Technologies for Achieving Unique Cementitious Properties</td>
<td>Jerry Rademan, Premier Magnesia, Atlanta, GA</td>
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## 9:30 – 11:30 am
**Supplementary Cementitious Materials**

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<thead>
<tr>
<th>Session Title</th>
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<tbody>
<tr>
<td>Effects of the physical and chemical characteristics of ground granulated blast furnace slag on sulfate durability of cementitious systems</td>
<td>Farzaneh Nosouhian, University of South Florida, Tampa, FL</td>
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<td>Evaluating the use of fluidized bed combustion (FBC) fly ash as concrete pozzolan</td>
<td>Mahboubeh Zahedi, Pennsylvania State University, University Park, PA</td>
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<td>Characterization of spherical porous lightweight aggregate made using waste coal combustion bottom ash</td>
<td>Mohammad Balapour, Drexel University, Philadelphia, PA</td>
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<td>Characterization and pozzolanic activity of clays of moderate kaolin content</td>
<td>Brandon Lorentz, University of South Florida, Tampa, FL</td>
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<tr>
<td>Assessment of the chemical, mechanical, and transport properties of sugarcane bagasse ash for use as a supplementary cementitious material</td>
<td>Benjamin Watts, University of Florida, Gainesville, FL</td>
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<td>Durability of OPC-limestone-calcinized clay (LC3) cement</td>
<td>Hamed Maraghechi, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</td>
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<td>Evaluation and beneficiation of fly ash recovered from landfills</td>
<td>Gopakumar Kaladharan, Pennsylvania State University, University Park, PA</td>
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<td>Experimental and Numerical Investigations of the Interfacial Transitional Zone (ITZ) of Concrete Incorporating with Carbon Nanofibers (CNFs)</td>
<td>Yuan Gao, Northwestern University, Evanston, IL</td>
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<tr>
<td>Time</td>
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</table>
| 9:30 – 11:30 am | Cement Chemistry, Processing, and Hydration                    | The effects of immediate and delayed additions of polycarboxylate-type superplasticizers on early hydration of tricalcium silicate  
Rachel Elizabeth Cook, Missouri University of Science and Technology, Rolla, MO  
First step to optimization of polycarboxylate ethers molecular structure mastering fluidity and retardation  
Delphine Marchon, University of California, Berkeley, Berkeley, CA  
Real time 3D nano scale observations of C3S hydration at industrial relevant w/s  
Qinang Hu, Oklahoma State University, Stillwater, OK  
Microstructural investigation of cement solidification (MICS)  
Juliana M. Neves, Pennsylvania State University, University Park, PA  
Influence of pozzolanic additives on hydration mechanisms of tricalcium silicate  
Jonathan L Lapeyre, Missouri University of Science and Technology, Rolla, MO |
| 1:00 – 2:15 pm | Alternative Cementitious Materials                            | Drying-induced atomic structural rearrangements in alkali-activated materials and the mitigating effects of nanoparticles  
Claire E. White, Princeton University, Princeton, NJ  
Geopolymerization of fly ash for solidification/stabilization  
Maria Juenger, University of Texas at Austin, Austin, TX  
Admixture interactions in alternative cementitious material systems  
Prasanth Alapati, Georgia Institute of Technology, Atlanta, GA  
Reactivity of aluminosilicate materials as measured through dissolution in alkaline media.  
Hugo J Uvegi, Massachusetts Institute of Technology, Cambridge, MA  
The characteristics of boron modified active belite (BAB) cement  
Aydin Saglik, State Hydraulic Works, Technical Research & Quality Control Department, Ankara, Turkey |
### MATERIALS CHARACTERIZATION TECHNIQUES

**2:15 – 3:30 pm**

**Pair distribution function computed tomography analysis of the local atomic structure of carbonated alkali-activated slag paste**

Eric R McCaslin, Princeton University, Princeton, NJ

**In situ synchrotron diffraction and tomography studies on the mechanical response of hardened cement-based specimens**

Sriramya D Nair, Cornell University, Ithaca, NY

**In situ quasi-elastic neutron scattering study on the water dynamics during formation of alkali-activated slags**

Kai Gong, Princeton University, Princeton, NJ

**Enhancing macro and micro characterization techniques for use of coal fly ash as a supplementary cementitious material**

Mina Mohebbi, Middle Tennessee State University, Murfreesboro, TN

**Functional nano-silica coated fibers for self-healing of cement composites**

Su-Jin Lee, Columbia University, New York, NY

### OPEN TOPIC

**2:15 – 3:30 pm**

**A multi-scale design philosophy for ultra-high performance concrete using microstructure modeling, rheological characterization and aggregate optimization**

Aashay Arora, Arizona State University, Tempe, AZ

**An investigation on the effects of cellulose nano-fibrils (CNF) on the performance of cement paste and concrete**

Hosain Haddad Kolour, University of Maine, Orono, ME

**Low-cost micro-architecture for high performance/multifunctional concretes**

Jialai Wang, The University of Alabama, Tuscaloosa, AL

**Corrosion related durability of reinforcement in a novel concrete material**

Alberto Sagüés, University of South Florida, Tampa, FL

**The effect of organic acids on the abrasion resistance of cementitious materials**

Sungwoo Park, North Carolina State University, Raleigh, NC
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
<th>Institution</th>
<th>Location</th>
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<tbody>
<tr>
<td>8:00 – 10:00 am</td>
<td>3D printing workshop (022BBH)</td>
<td>Jan Olek</td>
<td>Purdue University</td>
<td>Champaign, IL</td>
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<td>Reza Moini</td>
<td>Purdue University</td>
<td>Champaign, IL</td>
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<td>Joseph Biernacki</td>
<td>Tennessee Technological</td>
<td>Champaign, IL</td>
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<td>Ali Kazemian</td>
<td>University of Southern</td>
<td>Champaign, IL</td>
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<td></td>
<td>10:15 am – 12:15 pm</td>
<td>RHEOLOGY AND ADDITIVE MANUFACTURING</td>
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<td>10:15 am – 12:15 pm</td>
<td>Rheology and additive manufacturing</td>
<td>Peter Stynoski</td>
<td>US Army ERDC-CERL, Champaign, IL</td>
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<td>Printable concrete mixtures for additive construction</td>
<td>Peter Stynoski</td>
<td>US Army ERDC-CERL, Champaign, IL</td>
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<td>Set on demand – controlling structural build-up for digital fabrication with concrete</td>
<td>Lex Reiter</td>
<td>ETH Zürich, Zürich, Switzerland</td>
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<td>Additive manufacturing of cementious materials for NASA’s centennial challenge</td>
<td>Maryam Hojati</td>
<td>Bucknell University, Lewisburg, PA</td>
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<td>Modeling extrusion-based 3D printing of cement-based materials</td>
<td>Sooraj A O Nair</td>
<td>Arizona State University, Tempe, AZ</td>
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<td>X-ray micro-CT investigation of microstructure and mechanical performance of 3D printed cement paste elements with controlled architecture</td>
<td>Mohamadreza Moini</td>
<td>Purdue University, West Lafayette, IN</td>
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<td>Modeling the behavior of 3D printable concrete</td>
<td>Guang Chen</td>
<td>Pennsylvania State University, University Park, PA</td>
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<td>The effect of pressure on the rheological properties of air-entrained cement paste</td>
<td>Daniel Galvez Moreno</td>
<td>Missouri University of Science and Technology, Rolla, MO</td>
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<td></td>
<td>10:15 am – 12:15 pm</td>
<td>DURABILITY AND SERVICE-LIFE MODELING</td>
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<td>Predicting ASR expansion based on temperature, pore solution pH, and aggregate reactivity in a submerged setting</td>
<td>Tiffany Angelica Szeles</td>
<td>Pennsylvania State University, University Park, PA</td>
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<td>The role of alkali cation type in the atomic structure of alkali-silica reaction gel</td>
<td>Mehdi Rashidi</td>
<td>Georgia Tech, Atlanta, GA</td>
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<td>Effect of calcium and lithium on alkali-silica reaction kinetics and phase development</td>
<td>Shuaicheng Guo</td>
<td>Michigan Technological University, Houghton, MI</td>
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<td>Current research in delayed ettringite formation at the university of Maryland</td>
<td>Richard A. Livingston</td>
<td>University of Maryland, College Park, MD</td>
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<td>Is portland-limestone cement sulfate resistant?</td>
<td>Md Manjur A Elahi</td>
<td>South Dakota School of Mines &amp; Technology, Rapid City, SD</td>
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<td>Low Temperature Sulfate Exposure Study of Carbonated Low-Lime Calcium Silicate Pastes</td>
<td>Raikhan Tokpatayeva</td>
<td>Purdue University, West Lafayette, IN</td>
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<td>Shrinkage cracking potential and petrographic analysis of concrete with MgO expansive admixture</td>
<td>Abdulsamed Bazer</td>
<td>Pennsylvania State University, University Park, PA</td>
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<td>Ice crystallization in cement-based materials: Can nature (and biomimicry) help?</td>
<td>Elizabeth A. Delesky</td>
<td>University of Colorado Boulder, Boulder, CO</td>
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### 1:30 – 3:15 pm

**SMART MATERIALS AND COMPUTATIONAL MATERIALS SCIENCE**

- **The fundamental understanding of NOx sequestration of photocatalytic cementitious materials**
  - Qingxu Jin, Georgia Institute of Technology, Atlanta, GA
- **Effects of damage and healing on the electrical properties of cementitious materials**
  - Mo Li, University of California Irvine, Irvine, CA
- **Passive wireless sensors for monitoring behavior of concrete using RFID technology**
  - Ruofei Zou, University of Illinois at Urbana Champaign, IL
- **Modeling the fluid behavior of fresh concrete**
  - Chuan Yue Shen, University of Illinois at Urbana-Champaign, Urbana, IL
- **Nanoscale origins of time-dependent behavior in calcium-silicate-hydrates**
  - MJ Abdolhosseini, University of California Irvine, Irvine, CA
- **Understanding foam concrete failure behavior using a modeling approach**
  - Yu Song, University of Illinois at Urbana-Champaign, Urbana, IL
- **Density functional modeling of the pre-nucleation clusters of calcium-silicate-hydrate and related gels**
  - Kengran Yang, Princeton University, Princeton, NJ
- **Mechanisms of a novel cement strength enhancer**
  - Denise A Silva, GCP Applied Technologies, Cambridge, MA
- **Beyond fly ash, slag, and clays: Synthetic (N-A-S-H) precursors for alkali-activated cements**
  - Jaqueline D. Wallat PhD, University of Colorado Boulder, Boulder, CO
- **Use of CSA based ettringite cement systems for long term energy storage through thermochemical reactions**
  - Aaron J Strand, New Jersey Institute of Technology, Newark, NJ
- **Characterization of heating property for magnetic nanoparticles-modified cement-based materials**
  - Chang Hoon Lee, Western New England University, Springfield, MA
- **Formation of hydrate and carbonate phases within reactive magnesia cement systems**
  - Kemal Celik, New York University, Abu Dhabi, UAE
- **Effect of alkalis on the atomic structure of c-s-h: Insights from x-ray PDF and NMR**
  - Nishant Garg, Princeton University, Princeton, NJ
- **What is the role of water in the geopolymerization of metakaolin?**
  - Sungwoo Park, North Carolina State University, Raleigh, NC

### 3:30 – 5:00 pm

**Closing session titles:**

- **Concrete as Granular Fluid**
  - David Lange (University of Illinois, ACI President)
- **Quantifying the performance of nuclear power plant concrete structures affected by ASR**
  - Steve Feldman (NIST)