

## ***Program***

# ***Alkali Activated Materials and Geopolymers: High-End Technical Applications***

**May 19 - 23, 2025  
Espoo, Finland**

### **Conference Co-Chairs:**

**Cristina Leonelli**

Universita' degli Studi di Modena e Reggio Emilia, Italy

**W.M. Kriven**

University of Illinois at Urbana-Champaign, USA

**John L. Provis**

Paul Scherrer Institut, Switzerland

**Arie van Riessen**

Curtin University, Australia

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**Previous conferences in this series:**

**Geopolymers  
May 24-29, 2015  
Herrnstein, Austria**

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***Alkali Activated Materials and Geopolymers:  
Versatile Materials Offering High Performance and Low Emissions***

**May 27 – June 1, 2018**

**Tomar, Portugal**

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***Alkali Activated Materials and Geopolymers: Sustainable Construction Materials and Ceramics  
Made Under Ambient Conditions***

**May 28 – June 2, 2023**

**Calabria, Italy**

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Cristina Leonelli, University of Modena and Reggio Emilia, Italy  
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Aldo Boccaccini, University of Erlangen-Nuremberg, Germany

## ***Locations and Notes***

- *Technical sessions will be in Kokoustila 1 - 3.*
- *Poster Sessions will be in Kabinetti.*
- *Lunches will be in Pääravintola.*
- *Dinner locations are noted in the program.*
- *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 at least 3 minutes for questions and discussion.*
- *Please do not smoke at any conference functions.*
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- *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, May 19, 2025**

- 12:30 – 14:45           **Conference Check-in (Foyer)**
- Hang Posters**
- 14:45 – 15:00           **Opening Remarks**  
Conference Chairs, ECI Liaison
- 15:00 – 15:30           **Keynote 1**  
**Self-sustaining cementitious processes in ancient Roman architectural and marine concretes**  
Marie D. Jackson, University of Utah, USA
- 15:30 – 16:00           **Keynote 2**  
**Challenges and opportunities in material selection for geopolymers and alkali-activated materials in brazil: A focus on sustainable and cost-effective solutions**  
Ana C. Trindade, University of São Paulo (USP), Brazil
- Session 1: Chemistry**
- 16:00 – 16:15           **Production of low CO<sub>2</sub> slag binder using 2,3-dihydroxynaphthalene as chemical admixture– Hydration and dissolution properties**  
Rajeswari Ramaswamy, University of Oulu, Finland
- 16:15 – 16:30           **Sustainable construction materials: The role of wollastonite in alkali activation and gel network formation**  
Veronica Viola, University of Campania "Luigi Vanvitelli", Italy
- 16:30 – 16:45           **Monitoring reaction kinetics in alternative cementitious systems through electrical conductivity measurements**  
Julson Aymard Tchio, University of Oulu, Finland
- 17:00 – 18:15           **Flash Poster Presentations 1**
- 18:15 – 20:30           **Welcome Reception and Dinner (Club Restaurant)**
- 20:30 – 22:30           **Poster Session I (Posters 1–13)**

## **Tuesday, May 20, 2025**

07:00 – 08:30            **Breakfast**

08:30 – 09:00            **Keynote 3**  
**Methods for determining the reactivity of AAMs precursors**  
Arie van Riessen, Curtin University, Australia

09:00 – 09:30            **Keynote 4**  
**How to achieve specific properties by controlling the chemistry of a geopolymer?**  
Sylvie Rossignol, IRCER UMR CNRS, Limoges University, France

### **Session 2: Mineral wastes as raw materials**

09:30 – 09:45            **Utilizing phlogopite residue in alkali-activated materials**  
Mahtab Akbarzadeh Khoei, University of Oulu, Finland

09:45 – 10:00            **Sustainable recycling of industrial wastes by using geopolymers**  
Antonio D'Angelo, University of Campania "Luigi Vanvitelli", Italy

10:00 – 10:30            **Coffee Break**

10:30 – 10:45            **Granulation of biomass fly ash: Effect of curing and carbonation on the microstructure of highly porous alkali-activated aggregates**  
Anže Tesovnik, Slovenian National Building and Civil Engineering Institute, Slovenia

10:45 – 11:00            **Economic feasibility of construction waste screening residues as a local supplementary material for geopolymer concrete**  
Qaisar Munir, Lappeenranta–Lahti University of Technology, Finland

11:00 – 12:00            **Roundtable 1 – Chemistry of AAMs and geopolymers**  
Moderators: Cristina Leonelli & Arie Van Riessen  
Participants: Marie Jackson, Sylvie Rossignol, Cyril Attwell, Claus Henning Rüscher, Waltraud Kriven

12:00 – 13:30            **Lunch**

13:30 – 14:00            **Keynote 5**  
**Alkali-Activated Materials in precast construction industry: A case study from Consolis Parma**  
Jenni Kiventerä, Consolis Parma, Finland

14:00 – 14:30            **Keynote 6**  
**The practical application of activated legacy ash in road applications in South Africa and USA**  
Cyril Attwell, ARC Innovations, South Africa

### **Session 3: Fresh and hardened properties**

14:30 – 14:45            **Increasing rheological parameters of geopolymer paste using quaternary ammonium compounds**  
Vlastimil Bílek, Brno University of Technology, Czech Republic

**Tuesday, May 20, 2025 (continued)**

- 14:45 – 15:00      **Valorization of unsorted construction and demolition waste through geopolymerization**  
Francesca Servadei, CNR-ISSMC, Italy
- 15:00 – 15:30      **Coffee Break**
- 15:30 – 16:00      **Keynote 7**  
**And after the research is done, what is next? Experiences, suggestions and open questions**  
Yiannis Pontikes, KU Leuven, Belgium
- 16:00 – 17:15      **Roundtable 2 – Industrial scale applications**  
Moderators: Juho Yliniemi & Yiannis Pontikes  
Participants: Cyril Attwell, Jenni Kiventerä, David Brennhagen, Ashish Monite
- 17:15 – 19:00      **Flash Poster Presentations 2**
- 19:00 – 20:30      **Dinner (Pääravintola)**
- 20:30 – 22:30      **Poster Session 2 (Posters 13-26)**

**Wednesday, May 21, 2025**

07:00 – 08:30	<b>Breakfast</b>
08:30 – 09:00	<b><u>Keynote 8</u></b> <b>Alkali-Activated Materials for acid mine drainage remediation: a game changer or a utopian dream?</b> Rui Miguel Novais, University of Aveiro, Portugal
09:00 – 09:30	<b><u>Keynote 9</u></b> <b>Possibilities and limitations of geopolymers in real-world wastewater treatment applications</b> Tero Luukkonen, University of Oulu, Finland
	<b><u>Session 4: Water treatment and liquid wastes</u></b>
09:30 – 09:45	<b>Leaching control of metakaolin-based geopolymers for galvanic sludge encapsulation</b> Isabella Lancellotti, University of Modena and Reggio Emilia, Italy
09:45 – 10:00	<b>Geopolymer-based materials for the removal of phosphates and ammonium from wastewaters</b> Elettra Papa, CNR-ISSMC, Italy
10:00 – 10:30	<b>Coffee Break</b>
10:30 – 10:45	<b>Geopolymer and geopolymer-zeolite adsorbents for environmental remediation</b> Valentina Medri, CNR-ISSMC, Italy
10:45 – 11:00	<b>Sodium sulfate activated slag for solidification and stabilization of Hanford effluent treatment facility liquid secondary waste: An overview</b> Weiliang Gong, Vitreous State Laboratory, USA
11:00 – 11:15	<b>Tailoring of the textural properties of geopolymer and zeolite-geopolymer materials: foaming and cold sintering process</b> Cristina Di Pietro, CNR-ISSMC, Italy
11:15 – 11:30	<b>Alkali activation of sludges rich in silicon</b> Maria Chiara Marchioni, University of Parma, Italy
11:30 – 11:45	<b>Nitrogen adsorption and pore size distribution in metakaolin-based geopolymer composites reinforced with mineral particles and basalt or bamboo fibers</b> Waltraud Kriven, University of Illinois at Urbana-Champaign, USA
11:45 – 12:00	<b>Industrial residues as a part of novel construction materials – a case study with complex pulp mill waste green liquor dregs</b> Juho Rasmus, University of Oulu, Finland
12:00 – 13:30	<b>Lunch</b>

**Wednesday, May 21, 2025** (continued)

13:30	<b>Buses depart Hotel Korpilampi for Hyperion Robotics technical tour</b>
16:00	<b>Buses depart for Helsinki sightseeing canal boat tour</b>
19:00	<b>Return to Hotel Korpilampi</b>
20:00 – 21:30	<b>Dinner (Pääravintola)</b>

**Thursday, May 22, 2025**

07:00 – 08:30            **Breakfast**

08:30 – 09:00            **Keynote 10**  
**Crossover from Portland Cement to alkali-activated materials and geopolymers: Structural relationships of the binders and their affinities to sequestrate CO<sub>2</sub>**  
Claus Henning Rüschler, Leibniz University Hannover, Germany

09:00 – 09:30            **Keynote 11**  
**Geopolymer based materials for the decontamination of nuclear wastewater**  
Alban Gossard, CEA ISEC, France

**Session 5: Nuclear waste**

09:30 – 09:45            **Interplay between geopolymer formulation, microstructure, and strontium sorption properties**  
Alexis Varon, CEA, France

09:45 – 10:00            **Geopolymer composites for enhanced neutron and gamma-ray shielding in nuclear power applications**  
Waltraud Kriven, University of Illinois at Urbana-Champaign, USA

10:00 – 10:30            **Coffee Break**

**Session 6: Thermal Treatments**

10:30 – 10:45            **Use of intumescent geopolymer coatings to safeguard various substrates under temperature**  
Wilfried N. Cho, IRCER, France

10:45 – 11:00            **Norite mine tailing based AAMs exposed to 1000°C**  
David D. E. Brennhagen, Cemonite AS, Norway

11:00 – 11:15            **Use of an assembly based geopolymer to limit heat transfer to 1600°C**  
Sylvie Rossignol, IRCER, France

11:15 – 11:30            **Development of mullite coatings from organic, charge-balanced geopolymer for oxidation resistance**  
Waltraud Kriven, University of Illinois at Urbana-Champaign, USA

11:30 – 11:45            **Performance of thermal resistant geopolymer with alumina as ceramic weld backing applications**  
Duangrudee Chaysuwan, Kasetsart University, Thailand

11:45 – 12:00            **Sustainable waste management in ceramic tile production: Inertization of exhausted lime using alkali activation of incinerator bottom ash**  
Francesco Genua, University of Modena and Reggio Emilia, Italy

12:00 – 13:30            **Lunch**

13:30 – 14:00            **Keynote 12**  
**Additive manufacturing of geopolymers**  
Paolo Colombo, University of Padova, Italy

**Thursday, May 22, 2025 (continued)**

**Session 7: High-end applications**

- 14:00 – 14:15      **Innovative geopolymer mortars from CDWs for 3D printing**  
Miguel Otero, AIMEN Technology Centre, Spain
- 14:15 – 14:30      **A structural approach on the effect of consolidation temperature on geopolymer materials**  
Anass El Khomsi, IRCER, France
- 14:30 – 14:45      **Geopolymer oxygen carrier for improved gasification of biomass**  
Francesco Miccio, CNR-ISSMC, Italy
- 14:45 – 15:00      **Clay-cellulose-lignin composite materials: evaluating a sustainable concrete alternative**  
Oren Regev, Ben-Gurion University of the Negev, Israel
- 15:00 – 15:15      **Valorization of ceramic waste and wood biomass ash in alkali activated materials: assessment of carbon sinking ability**  
Giulia Masi, University of Bologna, Italy
- 15:15 – 15:30      **Geomechanical characterization of a copper mine tailing stabilized with an alkali activated binder**  
Tiago Miranda, University of Minho, Portugal
- 15:30 – 15:45      **Life cycle assessment of an alkali activated binder for copper mine tailings stabilization**  
Eduardo Pereira, University of Minho, Portugal
- 15:45 – 16:15      **Coffee Break**
- 16:15 – 16:45      **Keynote 13**  
**Geopolymers and their potential applications**  
Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA
- 16:45 – 18:00      **Roundtable 3 – High-end applications**  
Moderators: Waltraud Kriven, Cristina Leonelli, Juho Yliniemi  
Participants: Valentina Medri, Alban Gossard, Rui Novais, Tero Luukkonen, Paolo Colombo
- 18:00 – 18:30      **Where we are headed**
- 18:30 – 18:45      **Closing Remarks** (Conference Chairs)
- 19:00 – 22:00      **Gala Dinner and Awards (Club Restaurant)**

**Friday, May 23, 2025**

- 07:00 – 09:00      Breakfast
- Departures

## **Poster Presentations**

### **Poster Session 1 - Monday, May 19**

- 1. Cold sintering of geopolymer powder**  
Lorenzo Lattanzi, ITT Motion Technologies, Italy
- 2. Municipal Solid Waste used as precursor and fine aggregate in thermal insulating lightweight geopolymer concrete**  
Nuno Cristelo, University of Trás-os-Montes e Alto Douro, Portugal
- 3. Using XRD to assess the strength of fly ash and metakaolin-based geopolymers**  
Hendrik Gildenhuys, Curtin University, Australia
- 4. Mechanical performance and practical challenges of potassium silicate activated ground granulated blast furnace slag mortars for textile reinforced concrete**  
Gulsen Nazerian, Vrije Universiteit Brussel, Belgium
- 5. Efficient shaped porous alkali-activated adsorbents for metal recovery**  
Mika Petteri Christophliemk, University of Oulu, Research Unit of Sustainable Chemistry, Finland
- 6. Porous geopolymers for thermal insulation: an environmental assessment by LCA methodology**  
Valentina Medri, CNR-ISSMC, Italy
- 7. Effect of activator type and molarity on rheology and surface chemistry of alkali-activated slag**  
David Markusík, Brno University of Technology, Faculty of Chemistry, Czech Republic
- 8. Mild alkali activation for valorization of WEEE glass and volcanic quarry scraps to obtain building materials**  
Isabella Lancellotti, University of Modena and Reggio Emilia, Italy
- 9. Design of aluminosilicate refractory matrices in the context of climate change: a case study**  
Elie Kamseu, DIF, University of Modena and Reggio Emilia, Italy
- 10. Improving the cellulose/metakaolin geopolymer composite properties through a novel low-water approach**  
Luca Bertolla, Institute of Physics of Materials of the Czech Academy of Sciences, Czech Republic
- 11. Advanced concrete treatment via modified alkaline silicate solutions**  
Lukas Kalina, Brno University of Technology, Czech Republic
- 12. Design of multifunctional foams for water remediation: the Zeoremedia project**  
Claudio Ferone, University Parthenope of Naples, Italy
- 13. A novel reduced graphene oxide-geopolymer composite for Methylene Blue enhanced adsorption**  
Alessio Occhicone, Atena scarl, Italy

## **Poster Session 2 - Thursday, May 12**

- 14. Impact of inherent characteristics of raw laterite and its calcination on properties of geopolymers**  
Claus Rüscher, Leibniz University Hannover, Germany
- 15. Application of the polydisperse spherical model for pore distribution development of metakaolin-based geopolymers**  
Kanao Toda, The University of Tokyo, Japan
- 16. Immobilization of cesium and selenium in fly-ash/slag-based geopolymer matrices**  
Maël Viaud, The University of Tokyo, Japan
- 17. Compositional effects in potassium metakaolin geopolymers containing alumina and glass frit**  
Waltraud Kriven, University of Illinois at Urbana Champaign, USA
- 18. Effect of H<sub>2</sub>-DRI-EAF slag carbonation as co-binder admixture in alkali activated blast furnace slag**  
Srujana Gouda, University of Oulu, Finland
- 19. X-ray absorption spectroscopy study on zinc immobilization in metakaolin-based potassium-geopolymer**  
Pramesti Prihutami, The University of Tokyo, Japan
- 20. Tailored geopolymers for ammonium adsorption from anaerobic digestate**  
Daniela Pinto, University of Bari A. Moro, Italy
- 21. The effect of basalt glass microspheres and microfibers on the wear resistance of metakaolin-based geopolymer composites**  
Yurii Zubko, University of Illinois at Urbana-Champaign, USA
- 22. Transforming sulfidic mine tailings into high-performance geopolymer composites: a sustainable approach to waste valorization**  
Pozhhan Mokhtari, University of Illinois at Urbana-Champaign, USA
- 23. Modification of rheological properties of metakaolin based geopolymer using graphene oxide**  
Seralathan Sivasubramaniam, Hokkaido University, Japan
- 24. Hygrothermal regulation of indoor environment by lightweight/porous alkali-activated materials**  
Joao Labrincha, Universidade de Aveiro, Portugal
- 25. Fabrication of a lightweight geopolymer bonded sandstone building material by ceramic extrusion process**  
David Werner, Fraunhofer Institute for Ceramic Technologies and Systems, Germany
- 26. Utilization of co-combustion fly ash in alkali-activated materials and cement mortar: feasibility and heavy metal leaching analysis**  
Suman Kumar Adhikary, University of Oulu, Finland