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Centre de recherche sur les
infrastructures en béton (CRIB)

PRESENT

**THE 11TH ACI/RILEM INTERNATIONAL CONFERENCE
ON CEMENTITIOUS MATERIALS
AND ALTERNATIVE BINDERS
FOR SUSTAINABLE CONCRETE**



American Concrete Institute
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PROGRAM

ICCM2021
ONLINE

FROM JUNE 07 TO 10, 2021

www.iccm2021.com



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Preface

In July 1983, the Canada Centre for Mineral and Energy Technology (CANMET) of Natural Resources Canada (CANMET), in association with the American Concrete Institute (ACI) and the U.S. Army Corps of Engineers, sponsored a 5-day international conference at Montebello, Quebec, Canada, on the use of fly ash, silica fume, slag and other mineral by-products in concrete. The conference brought together representatives from industry, academia, and government agencies to present the latest information on these materials and to explore new areas of needed research. Since then, eight other such conferences have taken place around the world (Madrid, Trondheim, Istanbul, Milwaukee, Bangkok, Madras, Las Vegas, and Warsaw). The 2007 Warsaw conference was the last in this series.

In 2017, due to renewed interest in alternative and sustainable binders and supplementary cementitious materials, a new series was launched by Université de Sherbrooke (UdeS), ACI and the International Union of Laboratories and Experts in Construction materials, Systems and Structures (RILEM)—in association with a number of other organizations in Canada, the United States, and the Caribbean—sponsored the 10th ACI/RILEM International Conference on Cementitious Materials and Alternative Binders for Sustainable Concrete (ICCM2017). The conference was held in Montréal, Canada from October 2 to 4, 2017. The conference proceedings, containing 50 refereed papers from more than 33 countries, were published as ACI SP-320.

In 2021, the UdeS, ACI and RILEM—in association with Université de Toulouse and a number of other organizations in Canada, the United States, and Europe—sponsored the 11th ACI/RILEM International Conference on Cementitious Materials and Alternative Binders for Sustainable Concrete (ICCM2021). The conference was held online, from June 7 to 10, 2021. The conference proceedings, containing 53 refereed papers from more than 14 countries are published as ACI SP-349.

The purpose of this international conference is to present the latest scientific and technical information in the field of supplementary cementitious materials and novel binders for use in concrete. The conference highlights recent advances in the field of alternative and sustainable binders and supplementary cementitious materials, which are receiving increasing attention from the research community.

To all those whose submissions could not be included in the conference proceedings, the Institute and the Conference Organizing Committee extends its appreciation for their interest and hard work. A large number of other papers were presented in addition to those published in the proceedings. Most of these them were published as supplementary papers, and the authors have been encouraged to publish them in technical journals of their choosing.

Thanks are extended to the members of the International scientific committee to review the papers. Without their dedicated efforts, the proceedings could not have been published for distribution at the conference. The cooperation of the authors in accepting reviewers' suggestions and revising their manuscripts accordingly is greatly appreciated.

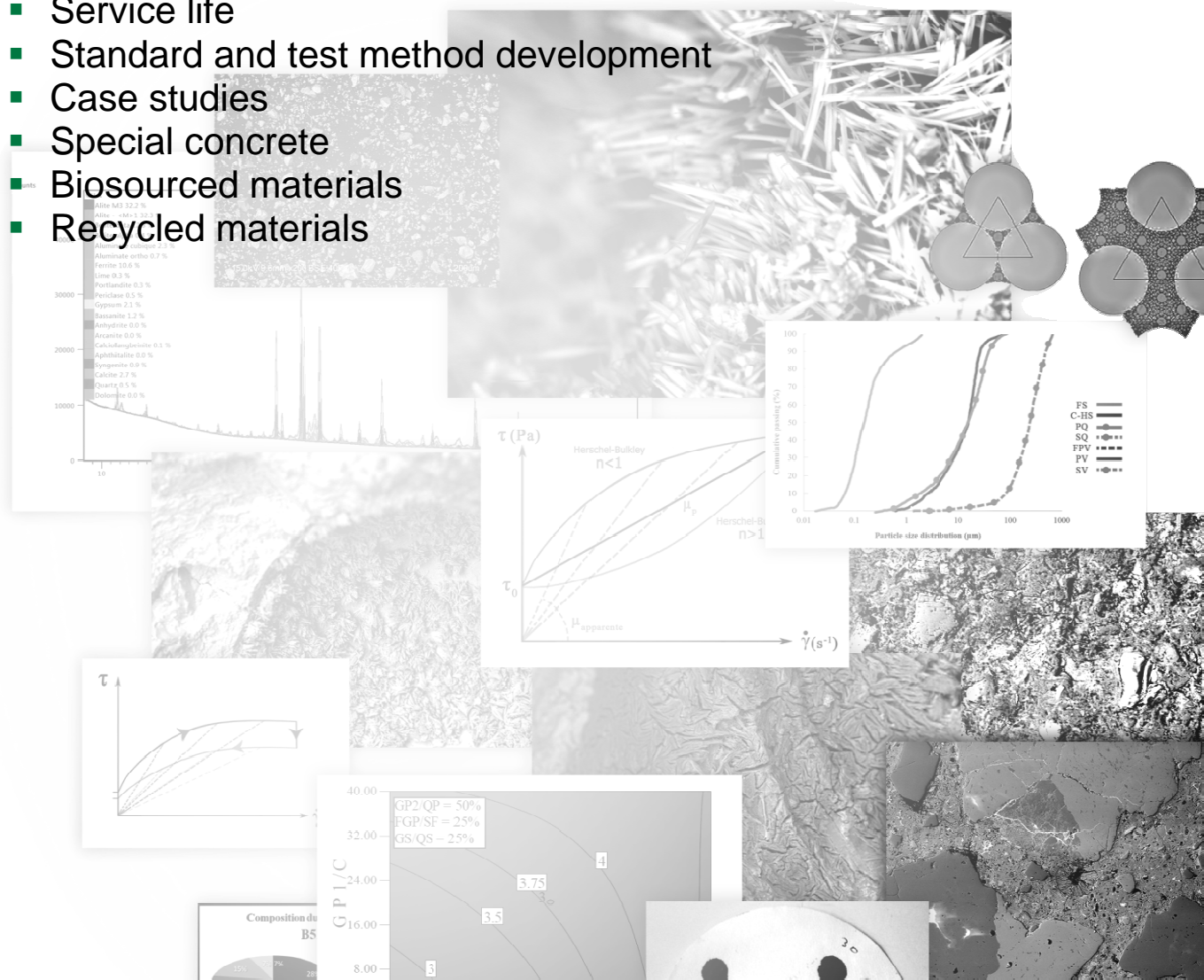
The help and assistance of Ms. Chantal Brien, Secretary of ICCM2021, at the Université de Sherbrooke is greatly acknowledged for the administrative work associated with the conference and for processing the manuscripts, both for the ACI SP and supplementary volume.

Arezki Tagnit-Hamou

Editor, Chairman, 11th ACI/RILEM International Conference on Cementitious Materials and Alternative Binders for Sustainable Concrete (ICCM2021)
Sherbrooke, Canada

Key topics

- Microstructure and hydration
- Activated clays
- Alternative supplementary cementitious materials
- Alkali activated materials
- Alternative binders
- Nanomaterials
- Chemical admixtures
- Concrete mix designs for sustainable development
- Rheology
- Curing techniques
- Mechanical properties and durability
- Modeling of concrete properties
- Multi-component binder systems
- Life cycle assessment
- Service life
- Standard and test method development
- Case studies
- Special concrete
- Biosourced materials
- Recycled materials



Keynotes

Robert J. Flatt Switzerland



He is Professor for Physical Chemistry of Building Materials at ETH Zürich since 2010. Before he was Principal Scientist at Sika Technology AG and postdoctoral researcher at the Princeton University. He owns a master in Chemical Engineering and a PhD from EPFL (Switzerland). Prof. Flatt is currently Deputy Director of the Swiss National Competence Centre on Digital Fabrication in Architecture. His main research topics are the working mechanisms of chemical admixtures, cement hydration, digital fabrication with concrete and the preservation of built cultural heritage. He earned several important awards including the 2016 Swiss Technology Award, two Concrete Innovation Awards (2014, 2017), the RILEM Medal and the Sandmeyer Award from the Swiss Chemical Society for outstanding contribution to industrial and applied chemistry. Robert is also fellow of the American Ceramic Society. Prof. Flatt also co-authored the book *Science and Technology of Concrete Admixtures*.



Maria Juenger U.S.A

She is the L.B. (Preach) Meaders Professor of Engineering in the Department of Civil, Architectural, and Environmental Engineering and Associate Dean of Graduate Education Transformation in the Graduate School at the University of Texas at Austin. Dr. Juenger's teaching and research focus on materials used in civil engineering applications. She primarily examines chemical issues in cement-based materials, including phase formation in cement clinkering, hydration chemistry of cements and supplementary cementitious materials, and chemical deterioration processes in concrete.

Her current research efforts emphasize the interaction of cement-based materials and the environment. This work encompasses the development and characterization of cementitious systems with lower carbon dioxide and energy footprints, as well as the capacity of cementitious materials to produce or remove airborne and waterborne pollutants. Dr. Juenger is a fellow of the American Concrete Institute (ACI) and the American Ceramic Society (ACerS). She currently serves on the Board of Directors of ACI. She has received several awards from ACI for her research, teaching, and service, including the Walter P. Moore, Jr. Faculty Achievement Award, the Young Member Award for Professional Achievement, the Wason Medal for Materials Research, the Delmar L. Bloem Distinguished Service Award, and the Concrete Sustainability Award. She has also received a Faculty Early CAREER Award from the National Science Foundation. She is an associate editor of *Cement and Concrete Composites* and is on the editorial boards of both *Cement and Concrete Research* and *ACI Materials Journal*. Dr. Juenger received her B.S. degree in Chemistry from Duke University and Ph.D. in Materials Science and Engineering from Northwestern University. After completing her Ph.D., she was a postdoctoral researcher in Civil Engineering at the University at California, Berkeley before coming to the University of Texas at Austin.



Kamal Khayat

U.S.A.

He is the Vernon and Maralee Jones Professor of civil engineering at Missouri University of Science and Technology (Missouri S&T), Rolla, Missouri. Between 1990 and 2011, he was professor of Civil Engineering at the Université de Sherbrooke, Sherbrooke, Quebec. He is the director of the Center for Infrastructure Engineering Studies at Missouri S&T and director of the Tier-1 University Transportation Center for Research on Concrete Applications for Sustainable Transportation (RE-CAST). Dr. Khayat is Fellow of ACI and RILEM and recipient of numerous awards, including ACI Concrete Research Council Robert E. Philleo Award in 2020, the ACI Wason Medal for the Most Meritorious paper in 2018, the ACI Foundation Jean-Claude Roumain Innovation in Concrete Award in 2017, and the ACI Arthur R. Anderson Medal in 2015 and the 2020 President's Award for Sustained Career Excellence from the University of Missouri System. He serves on the board of Director and technical Advisory Committee of ACI.

Dr. Khayat has conducted pioneer work in the field of rheology and self-consolidating concrete. Other research interests include high-performance concrete with adapted rheology, underwater concrete, fiber-reinforced concrete, ultra high performance concrete, and grouting. He has authored and co-authored over 450 technical papers and was recently listed by Elsevier among the 150 most cited people in civil engineering in the world.



Chi Sun Poon

Hong Kong

He obtained his PhD from Imperial College, London, spent two years as a Post-doctoral Fellow at Oxford University specialising in cement and concrete research. Currently, he is the Chair Professor of Sustainable Construction Materials and Head at the Civil and Environmental Engineering Department of The Hong Kong Polytechnic University. He has been awarded the title of Changjiang Chair Professor by the Ministry of Education. He specialises in the teaching and research of concrete technology, eco-friendly construction materials and waste management. He has published over 400 papers in international journals and conferences (including over 350 international journal papers, and 8 patents). Prof. Poon is a Fellow of the Hong Kong Institution of Engineers and the Hong Kong Concrete Institute (HKCI).

He was a Chairman of HKIE (Environmental Division) and Discipline Representative of the HKIE Environmental Discipline. He has been the President of the HKCI since 2014 and is now the Immediate Past President. Prof. Poon was also a past President of the American Concrete Institute (China) Chapter. He was awarded the State Technological Innovation Award 2017 (2nd Prize).



Karen Scrivener

Switzerland

She obtained her PhD at Imperial College in 1984. She worked for Lafarge in France for 6 years, before being appointed Professor and Head of the Laboratory of Construction Materials, at EPFL, Switzerland in 2001. In 2003 she founded the research network Nanocem bringing together the leading Industrial companies (Cement and admixtures) with European academic institute to do research on Cementitious Materials. Her research focusses on the understanding the chemistry and microstructure of cement based materials and improving their sustainability. In 2008, she came up with the idea for LC3 cement, this material has the potential to cut CO2 emissions related to cement by more than 400 million tonnes a year. She was made a fellow of the UK Royal Academy of Engineering in 2014.



Arezki Tagnit-Hamou

Canada

Full professor at the Department of Civil and Building Engineering of UdeS and Fellow of the American Concrete Institute (FACI). He is the director of the Research Centre for Concrete Infrastructures at UdeS (CRIB-US). His expertise has been internationally recognized in research areas of ecological concretes and the valorization of by-products. He is the Director of the Cement and Concrete Research Group of UdeS. He is also holding the Industrial Chair for Research in the area of valorization of waste glass in materials which was awarded by the Société des Alcools du Québec (SAQ).

He is member and leader of a number of technical committees of the American Concrete Institute (ACI), the International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM) and the Canadian Standard Association (CSA): ACI C-130: Sustainability in Concrete ACI C130D: Sustainability tools (Directeur) ACI C-555: Concrete with Recycles Materials RILEM TC 224-AAM: Alkali Activated Materials RILEM TC DTA: Durability techniques of alkali-activated materials RILEM TC 217PRE: Progress of recycling in the built environment. CSA A3000: Matériaux Cimentaires CSA A3004: Sous comité ajouts cimentaires alternatifs (co-president in 2011, he received the Jean-Claude Roumain Innovation in Concrete Award for the ACI Strategic Development Council (ACI-SDC) for his research work on the sustainable development in concrete. He is a three-times laureate of an ADRIQ/NSERC award. He was laureate of the "Célébrons le Partenariat (University/Enterprise) in 2011 and 2012 and of the Innovation award in 2013.

Awardee



Pierre-Claude Aïtcin is Professor Emeritus at the Université de Sherbrooke and an Honorary Member of the American Concrete Institute. He was the Scientific Director of Concrete Canada, the Network of Centres of Excellence on High Performance Concrete for 8 years. He also had an Industrial Chair on Concrete technology for nine years in collaboration with 13 industrial partners.

for over five decades of promoting concrete science and technology and developing knowledge leading to the implementation of high-performance and ultra high-performance concrete, silica fume, specialty chemical admixtures, and sustainability in the concrete industry worldwide.

Session in honor of the late Carmel Jolicoeur



Dr. Carmel Jolicoeur (1941 – 2019)

He was a professor in the Department of Chemistry at the Université de Sherbrooke for over 43 years and became Emeritus professor in 2015. His pioneering research in the highly specialized area of chemical admixtures and cement-admixture interaction has paved the way to the development of new chemical admixtures for the construction industry in Canada and beyond.

Program at a glance

(Eastern time, GMT -4 hours, Montreal time)

Monday, June 7, 2021

Time (Eastern time)	Room	
	A	B
7:00 to 7:15	Opening remarks	
7:15 to 9:15	Keynotes presentation	
9:15 to 9:25	10-minute break	
9:25 to 11:05	Session 1A Alternative binders	Session 1B Rheology
11:05 to 11:15	10-minute break	
11:15 to 12:55	Session 2A Alternative binders & Multi-component binder systems	Session 2B Rheology & Chemical admixtures

Tuesday, June 8, 2021

Time (Eastern time)	Room	
	A	B
7:00 to 8:00	Session in honor of the late Carmel Jolicoeur	
8:00 to 8:10	10-minute break	
8:10 to 9:50	Session 3A Microstructure and hydration	Session 3B Activated clays
9:50 to 10:00	10-minute break	
10:00 to 11:40	Session 4A Microstructure and hydration	Session 4B Alternative supplementary cementitious materials
11:40 to 11:50	10-minute break	
11:50 to 13:30	Session 5A Activated clays & Nanomaterials	Session 5B Alternative supplementary cementitious materials

Wednesday, June 9, 2021

Time (Eastern time)	Room	
	A	B
7:00 to 8:40	Session 6A Alkali activated materials	Session 6B Mechanical properties and durability
8:40 to 8:50	10-minute break	
8:50 to 10:30	Session 7A Alkali activated materials	Session 7B Mechanical properties and durability & Life cycle assessment
10:30 to 10:40	10-minute break	
10:40 to 11:55	Session 8A Alkali activated materials	Session 8B Standard and test method development

Thursday, June 10, 2021

Time (Eastern time)	Room	
	A	B
7:00 to 8:40	Session 9A Alkali activated materials	Session 9B Biosourced materials and sustainable concretes
8:40 to 8:50	10-minute break	
8:50 to 10:30	Session 10A Concrete mix designs for sustainable development	Session 10B Recycled materials
10:30 to 10:40	10-minute break	
10:40 to 11:55	Session 11A Concrete mix designs for sustainable development & Modeling of concrete properties	Session 11B Recycled materials
11:55 to 12:05	10-minute break	
12:05 to 12:45	Awardee presentation – Pierre-Claude Aïtcin	
12:45 to 13:00	Closing remarks	

Program

(Eastern time, GMT -4 hours, Montreal time)

SP: Paper published in the Conference proceeding ACI- SP-349.

SU: Supplementary paper presented at the ICCM2021 conference, not included in the formal proceedings.

Monday, June 7, 2021

Plenary session 1

7:00 to 9:15

Activity	Title
Opening remarks	ICCM2021 Chairman, Arezki Tagnit-Hamou
Keynote presentations	Recycling of cement paste powder for value added products by wet carbonation Chi Sun Poon, Hong Kong
	Understanding impact of SCMs on durability Karen Scrivener, Switzerland
	Opportunities for natural pozzolans as supplementary cementitious materials Maria Juenger, United-States
	Use of ground glass pozzolan as supplementary cementitious material for sustainable concrete Arezki Tagnit-Hamou, Canada

9:15 to 9:25 – 10 minute break

Session 1

9:25 to 11:05

Session 1A Alternative binders Chair: Maria Juenger	SP	ID26-On the formulation of reactive binders containing soluble Borate compounds Maurizio Bellotto, Maria Chiara Dalconi, Enrico Garbin, and Gilberto Artioli
	SU	SUPP39-Comparative study of hydration of calcium aluminate anhydrous phases at early age B. C. Budan, J. B. Champenois, C. Cau Dit Coumes, and J. B. d'Espinose de Lacaillerie
	SU	SUPP29-Structural study of a mixture of Portland cement, calcium aluminate cement and calcium sulfate during its early stage hydration Rym Sassi, F. Fayon, M. Chaouche, E. Veron, and V. Montouillout
	SU	SUPP31-Relationship between mix-design, drying and delayed behavior of lime-cement based materials Reda Jaafri, Syed-YasirAlam, Emmanuel Roziere, and Ahmed Loukili
Session 1B Rheology Chair: Charles Nmai	SP	ID37-Effect of morphological characteristics on the viscosity of cementitious materials: Optimization of the rheological behavior of ternary cements Oumayma Ahmadah, Hela Bessaies-Bey, Ammar Yahia, and Nicolas Roussel
	SU	SUPP4-Evolution of viscoelastic parameters during the solidification process of alkali-activated slag Vlastimil Bílek Jr., Lukas Kalina, Miroslav Pazour, Radoslav Novotny, Frantisek Soukal, and Tomas Opravil
	SU	SUPP11-Effect of Graphene Oxide on rheology and hydration kinetics of cement paste Kavya Vallurupalli, Weina Meng, Jianhui Liu, and Kamal Khayat
	SU	SUPP22-Rheological Behaviour of Concrete incorporating recycled concrete aggregate Yathiraj Nagaraju, Mayra Tagliaferri de Grazia, and Leandro F. M. Sanchez

11:05 to 11:15 – 10-minute break

Session 2

11:15 to 12:55

Session 2A Alternative binders & Multi-component binder systems Chair: Claudiane Ouellet-Plamondon	SP	ID1-Effect of mineral additions on the self-healing ability of cementitious materials Carol Namnoun, Benoit Hilloulin, Maxime Robira, Frédéric Grondin and Ahmed Loukili
	SP	ID42-Study of Slag blended cement and the influence of Triethanolamine Rachel Reiver, N. Azéma, G. Le Saoût, L. Ferrari, Marie Jachiet and V. Kocaba
	SP	ID32-Synergetic effect of combined converter steel slag and metakaolin hydration Winnie Franco Santos, Katrin Schollbach, Sieger van der Laan, and H.J.H. Brouwers
	SU	SUPP2-Lime Foams Structure Serves the Thermal and Hygric Performances NourhanMortada, Annabelle Phelipot-Mardelé, and Christophe Lanos

Session 2B Rheology & Chemical admixtures Chair: Kamal Khayat	SP	ID33-Potential correlation between yield stress and bleeding Youssef El Bitouri, and Nathalie Azéma
	SP	ID4-Effect of a lignosulphonate plasticizer on the hydration of a Belite-Ye'elimitite-Ferrite cement paste Angélique Barnoud-Chapelier, Youssef El-Bitouri, Nathalie Azéma, and Gwenn Le Saout
	SP	ID28-Effect of citric acid and polycarboxylate superplasticizers (PCE) on hydration and rheology of sulfoaluminate cement Rachid Belhadi, Alexandre Govin, and Philippe Grosseau
	SU	SUPP13-Admixture effect on the early hydration of coal mining waste blended cements , Sagrario Martinez-Ramirez, Laura Caneda-Martínez, Luis Ignacio Leoz Nunez, Moisés Frias, Raquel Vigil de la Villa, and Rosario Garcia

Tuesday, June 8, 2021

Plenary session 2

7:00 to 8:00

Activity	Title
Session in honor of the late Carmel Jolicoeur	Claude Bédard, chairman
	Effect of Viscosity-Enhancing Admixtures on Performance of UHPC, Kamal Khayat
	Carmel's gentlemen questions and some research it inspired, Robert J. Flatt

8:00 to 8:10 – 10 minute break

Session 3

8:10 to 9:50

Session 3A Microstructure and hydration Chair: Harald Justnes	SP	ID11-On the occurrence of CAH10 in hydrated calcium sulfoaluminate cements Frank Winnefeld and Barbara Lothenbach
	SP	ID2-Hydration of MgO/hydromagnesite blends Alexander German, Frank Winnefeld, and Pietro Lura
	SP	ID36-Impact of OPC-based activation on microstructure of Super Sulphated Slag Cement , Emmanuel Guillon and Catherine Bouillon
	SU	SUPP24-Relating glass structure and reactivity by modifications of GGBS composition Blotvogel Simon, Judit Kaknics, Lola Doussang, Laurent Steger, Abel Danezan, Aurelien Canizares, Patrick Simon, Valerie Montouillout, Cedric Patapy, and Martin Cyr
Session 3B Activated clays Chair: Marta Palacios	SP	ID7-Acceleration of cement blended with calcined clays with CaCl₂, microlimestone and CSH seeds Claudiane Ouellet-Plamondon, Sebastian Scherb, Matthias Köberl, and Karl-Christian Thienel
	SP	ID40-Characterization of calcined clay reactivity for use as additive in a blended cement Victor Poussardin, Michael Paris, Dimitri Deneele, and Arezki Tagnit-Hamou
	SP	ID47-An approach to the rheological behavior of cementitious systems blended with calcined clays and superplasticizers Ricarda Sposito, Marlene Schmid, Johann Plank, and Christian Thienel
	SP	ID29-Influence of calcite on the pozzolanic reaction from kaolinite Isabel Sanchez, Marina Casas Angulo, Mario Ramirez, Raquel Vigil de la Villa, Rosario García-Giménez, Isabel Sonsoles de Soto García, Moises Frias, and Antonio Zapardiel

9:50 to 10:00 – 10- minute break

Session 4

10:00 to 11:40

Session 4A Microstructure and hydration Chair: Frank Winnefeld	SP	ID14-Portland Clinker-Fly Ash cements – Relation between Compressive Strength and Microstructure. Harald Justnes, Klaartje de Weerd, and Tone Anita Ostnor
	SP	ID48-Investigation on microstructure of cement pastes made with by-product from primary aluminumproduction, Hang Thi Tran, Victor Brial, Thomas Sanchez, Luca Sorelli, Claudiane Ouellet-Plamondon, David Conciatori, Houshang Alamdari, Mario Fafard, Laurent Birry, and Martin Beaulieu
	SP	ID43-Synthesis and hydration of ye'elimitite , Yassine El Khessaimi, Youssef El Hafiane, and Agnès Smith
	SU	SUPP27-Influence of accelerators on the reactivity of model cement and synthetic glasses, L. Gonzalez-Panicello and Marta Palacios

<p>Session 4B Alternative supplementary cementitious materials</p> <p>Chair: Martin Cyr</p>	SP	ID21-Industrial Mineral Waste as an Alternative Pozzolan for the Design of Eco-Efficient Binary Cements: Impact on Physical Properties and Chloride Resistance , Laura Caneda-Martínez, Moisés Frias, Isabel Sanchez de Rojas, Javier Sanchez, and César Medina
	SP	ID22-An insight into non-ferrous slags as supplementary cementitious materials Malene Thostrup Pedersen, Barbara Lothenbach, and Frank Winnefeld
	SU	SUPP10-Development of sustainable alternative building materials based on oil shale ash , Idan Dagan, Alva Peled and Gabriela Bar-Nes
	SU	SUPP16-On the Use of Steel Slags as Supplementary Cementitious Materials , Maurizio Bellotto, Maria Chiara Dalconi, Veronica Pasinato, Enrico Garbin, and Gilberto Artioli

11:40 to 11:50 – 10 minute break

Session 5

11:50 to 13:30

<p>Session 5A Activated clays & Nanomaterials</p> <p>Chair: Mostafa Benzaazoua</p>	SP	ID38-Effect of temperature on the hydration of Portland cement blended with metakaolin , Natechanok Chitvoranund, Barbara Lothenbach, Jorgen Skibsted, and Karen Scrivener
	SP	ID50-Kaolinite clay for enhancing the properties of alkali-activated slag and fly ash binders Chathurani Chandrasiria, Zihui Li, and Sulapha Peethamparan
	SP	ID24-Preliminary studies on the influence of nano-cellulose and nano-alumina fibers on UHPFRC Marta Roig-Flores, Eduardo J. Mezquida-Alcaraz, Ariel A. Breton-Rodriguez, Juan Navarro-Gregori and Pedro Serna
	SU	SUPP-The development of electron conductive cement based materials The development of electron conductive cement based materials Nancy Soliman, Franz-Josef Ulm
<p>Session 5B Alternative supplementary cementitious materials</p> <p>Chair: Leandro Sanchez</p>	SP	ID31-Early hydration process of a low shrinkage and high strength packing density optimised mortar-mixture made of an alternative NPC-CSA-CA blend Tim Schade and Bernhard Middendorf
	SP	ID3-Early-age shrinkage of cement paste containing humic substances as that from river dredging sediments in France Hamza Beddaa, Amor Ben Fraj, Francis Lavergne, and Jean-Michel Torrenti
	SU	SUPP6-Shrinkage of eco-friendly concretes made with limestone rich cements Christian Herget, Moien Rezvani and Tilo Proske
	SU	SUPP12-Evaluation of the Potential Use of a New Aluminum Silicate in Conventional Concrete Formulations , P.-C. Nkinamubanzi, L. Raki and P. H. J. Mercier

Wednesday, June 9, 2021

Session 6

7:00 to 8:40

<p>Session 6A Alkali activated materials</p> <p>Chair: Francisca Puertas</p>	SP	ID5-Shrinkage and Geopolymers Corentin Le Talludec, Annabelle Phelipot-Mardelé, and Christophe Lanos
	SU	SUPP17-Binary metakaolin-fly ash geopolymer grout mixtures for soil reinforcement Abdelilah Aboulayt, Faten Souayfan, Reda Jaafri, Anass Cherki El Idrissi, Emmanuel Roziere, Redouane Moussa, and Ahmed Loukili
	SU	SUPP3-New binder resulting from alkali-activation of calcareous components Annelise Cousture, Norbert Renault, Khadim Ndiaye and Jean-Louis Gallias
	SU	SUPP20-The influence of heat curing and calcium oxide addition on the properties of one-part fly ash/slag alkali activated materials Luigi Coppola, Denny Coffetti, Elena Crotti, Gabriele Gazzaniga
<p>Session 6B Mechanical properties and durability</p> <p>Chair: Alejandro Duran-Herrera</p>	SP	ID44-Investigating dual sulfate attack mechanisms using unidirectional penetration approach Qiao Wang, William Wilson, and Karen Scrivener
	SP	ID10-Studying the influence of the filler effect of SCMs on the sulfate requirement of blended cements , Franco Zunino and Karen Scrivener
	SU	SUPP21-Recovery of mechanical properties of a cement mortar containing Iron-Silicate Fines subjected to different exposure environments Estefania Cuenca, Emanuela Manolova, and Liberato Ferrara
	SU	SUPP- Effect of temperature and sodium sulfate concentration on concrete resistance to physical sulfate attack , Redha Esselami, William Wilson, Arezki Tagnit-Hamou

8:40 to 8:50 – 10 minute break

Session 7

8:50 to 10:30

<p>Session 7A Alkali activated materials</p> <p>Chair: Ahmed Louikili</p>	SP	ID35-Durability of alkali-activated slag/fly ash pastes and concretes: an overview of performance regarding freezing and thawing, surface scaling, shrinkage and ASR Alexandre Rodrigue, Josée Duchesne, Benoit Fournier, and Benoit Bissonnette
	SP	ID15-Effect of Recycled Aggregate and Steel Fibers on the Mechanical Properties of Alkali-Activated Slag/Fly Ash Blended Concrete Jamal Medlji, Hilal El-Hassan, and Tamer El-Maaddawy
	SU	SUPP7-Chloride-induced corrosion between ordinary and alkali-activated concrete Patrick Azar, Gabriel Samson, Fabrice Deby, Hugo Lahalle, Virginie Benavent, Vincent Trincal, and Martin Cyr
	SU	SUPP33-Performance evaluation of alkali-activated concrete for structural applications Virginie Benavent, H. Lahalle, V. Trincal, Y. Jainin, T. Vidal, G. Samson, R. Bucher, F. Cussigh, L. Fouin, and M. Cyr
<p>Session 7B Mechanical properties and durability & Life cycle assessment</p> <p>Chair: Ammar Yahia</p>	SP	ID49-Improving Performance and Reducing the CO2 Footprint of Concrete using Multiple Approaches R.D Hooton
	SP	ID45-Prediction of time-to-corrosion cracking of reinforced concrete using deep learning approach Bakhta Boukhatem, Ablam Zidol, and Arezki Tagnit-Hamou
	SP	ID27-Unintended consequences of the global reduction in clinker-to-cement ratio Jean-Martin Lessard, Guillaume Habert, Arezki Tagnit-Hamou, and Ben Amor
	SP	ID46-Environmental impact evaluation of a slag/fly ash-based strain hardening geopolymer composite (SHGC) Shizhe Zhang, Qingge Feng, Dongbo Wang, and Guang Ye

10:30 to 10:40 – 10-minute break

Session 8

10:40 to 11:55

<p>Session 8A Alkali activated materials</p> <p>Chair: Josée Duchesne</p>	SP	ID39-Durability issues of one-part alkali-activated mortars in aggressive environments Luigi Coppola, Denny Coffetti, Elena Crotti, and Gabriele Gazzaniga
	SP	ID19-Rheology and mechanical properties of different geopolymer composites J. Archez, N. Texier-Mandoki, X. Bourbon, J.F. Caron, and S. Rossignol
	SU	SUPP23-Time evolution of ultrasonic pulse velocity in fly ash based geopolymer mortars Izabela Hager, Mateusz Sitarz, and Marta Choinska
<p>Session 8B Standard and test method development</p> <p>Chair: Doug Hooton</p>	SP	ID16-New Pre-saturation method for Accelerated Sulfate Attack Testing of Concrete Specimens Hocine Siad, Mohamed Lachemi, and Mustafa Sahmaran
	SP	ID17-The Influence of the Binder and Aggregate Type on concrete Electrical Resistivity Hugo V. Deda, Leandro F.M. Sanchez, and Mayra T. De Grazia
	SU	SUPP34- A mini-migration test to investigate effective chloride diffusion coefficients in blended-cement pastes William Wilson, Kshitij Bansal, Fabien Georget, and Karen Scrivener

Thursday, June 10, 2021

Session 9

7:00 to 8:40

<p>Session 9A Alkali activated materials</p> <p>Chair: Michael Thomas</p>	SP	ID9-Performance of Eco-Friendly One-Part Alkali-Activated Self-Consolidated Concrete with Multi-Activators Dima Kanaan and Ahmed Soliman
	SU	SUPP25-Formation of zeolitic phases in geopolymers to induce multi-functionality: a review Hammad R. Khalid
	SU	SUPP8-Stability investigation of geopolymer paste resaturated with cementitious solutions H. Lahalle, C. Patapy, V. Benavent, M. Glid, G.Renaudin, and M. Cyr
	SU	SUPP26-The effects of calcium aluminate cement on physicochemical properties of geopolymer-supported zeolites Hee-Jeong Kim, Hammad R. Khalid, H.K. Lee
<p>Session 9B Biosourced materials & sustainable concretes</p> <p>Chair: Pierre-Claver Nkinamubanzi</p>	SP	ID18-Carbonation of 100-year bridges as a guide to preventing modern concrete from degrading Ivan Janotka, Michal Bacuvcik, Peter Paulik, and Lukas Hulek
	SU	SUPP5-Experimental Investigation of Cementitious Mixtures with Lignocellulosic Residue Carlos Calado, Aires Camoes, Bruna Dantas, Bruna Lima, and Thalita Martins
	SU	SUPP15-Biodeterioration of sustainable binders in anaerobic digestion systems Marie Giroudon, Matthieu Peyre Lavigne, Cédric Patapy, and Alexandra Bertron

8:40 to 8:50 – 10-minute break

Session 10

8:50 to 10:30

<p>Session 10A Concrete mix designs for sustainable development</p> <p>Chair: Richard Gagné</p>	SP	ID53-The Use of Ground Glass as a Pozzolan Thomas, M., Smith, D. and Moffatt, E.G., and Kasaniya, M.
	SU	SUPP14-Development and Characterization of Glass Composite System based on Glass Cullet Powder and Ground Granulated Blast Furnace Slag Louise Lemesre, Rachida Idir, and Martin Cyr
	SU	SUPP37-Nano-engineering strain-hardening cementitious composites for enhanced strength and ductility Ousmane Ahmat Hisseine and Arezki Tagnit-Hamou
	SU	SUPP18-Assessment of the fresh state behaviour of eco-efficient steel fiber reinforced concrete (SFRC) Mohammed Eid, Leandro F.M. Sanchez, and Aline de Souza Oliveira
<p>Session 10B Recycled materials</p> <p>Chair: Luigi Coppola</p>	SP	ID51-Performance of NO2 sequestered recycled concrete aggregates (NRCA) incorporated concrete: influence of parent concrete properties Erandi Ariyachandra and Sulapha Peethamparan
	SP	ID30-Mechanical and Physical Properties of Concrete Incorporating Rubber Saleh Faisal.A.H, Kaid Nouria, Kada AYED, Rabah SOLTANI and Kerdal Djamel-Eddine
	SP	ID52-Influence of quality of recycled concrete aggregates paste on the internal cure phenomenon Thibaut Marchi, Marie Salgues, Eric Garcia Diaz, Jean Claude Souche, and Philippe Devillers
	SU	SUPP19-Low-sulfide mining waste rock as aggregates for concrete: Mechanical properties and durability Y. Benarchid, A. Zidol, A. Tagnit-Hamou, Y. Taha, and M. Benzaazoua

10:30 to 10:40 – 10-minute break

Session 11

10:40 to 11:55

<p>Session 11A Concrete mix designs for sustainable development & Modeling of concrete properties</p> <p>Chair: Terry Holland</p>	SP	ID23-Boron rich mortars for neutron shielding, mechanical and attenuation properties. Maria Chiara Dalconi, Enrico Garbin, Francesco Grazi, and Gilberto Artioli, and Giorgio Ferrari
	SP	ID12-An innovative power-law equation of optimal grading curves for dense packing Gerard Roquier
	SP	ID13-Assessment of properties of low cement content pasteusing interparticle separation as an insight on fresh state Gonzalo Lozano Rengifo, Mayra Tagliaferri de Grazia, Leandro Francisco Moretti Sanchez, and Edward Sherwood
<p>Session 11B Recycled materials</p> <p>Chair: Benoit Fournier</p>	SP	ID6-Flash Calcination for Recycled Gypsum Recovery Damien Gaudrel, Annabelle Phelipot-Mardelé, Christophe Lanos, and Marie Glorennec
	SU	SUPP1-Valorization of phosphate mine waste as aggregates for concrete Aiman Elmachi, SafaaMabroum, Yassine Taha, Arezki Tagnit-Hamou, Mostafa Benzaazoua and Rachid Hakkou
	SU	SUPP30-High Performance Fiber Reinforced Concrete: optimization of the concrete matrix with porcelain stoneware powder Clementina Del Prete, Anna Vinciguerra, Nicola Buratti, and Claudio Mazzotti

11:55 to 12:05 – 10-minute break

Plenary session 3

12:05 to 13:00

Activity	Title
Awardee	<i>Concrete is at the same time the fruit of a simple technology and of a complex science : 1970-2020 Fifty years of progress but a lot remains to be done</i> Pierre-Claude Aïtcin
Closing remarks	ICCM2021 Chairman, Arezki Tagnit-Hamou