

Monday June 20

Institutional welcome **09.00 - 09.30**

Chair: Ferrara  
Assistant: Marcucci

Keynote lecture 1 - (De Donato room)  
**09.30 - 10.30** Ugo Lafont  
title TBC

Break **10.30 - 11.00**

Parallel sessions **11.00 - 13.00**

Emerging technologies - (De Donato room) Chair: Ferrara-Grande Assistant: Marcucci	Capsules (in cement based materials) - (Beltrami room) Chair: Al Tabbaa-Antonaci Assistant: Rizzieri	Polymers, composites and coatings - (Castigliano room) Chair: Santiago Garcia-Hernandez Assistant: Cibelli
<ol style="list-style-type: none"><li>1. Pernigoni, Lafont, Grande: "Self-healing polymers for inflatable space structures"</li><li>2. Dijwar Yilmaz Lewandowski, Perraud, Llevot, Carlotti: "Self-healing polymers for space applications"</li><li>3. Ritzen, Montano, Garcia: "3D Printing of a Self-Healing Thermoplastic Polyurethane through FDM"</li><li>4. Katcharava, Zhou, Bhandary, Marinow, Binder: "Vitrimeric, self-healing 3D printable polymer networks as potential electrolytes for lithium-ion batteries"</li><li>5. Roels, Terryn, Van Assche, Vanderborght, Brancart: "From self-healing polymer to soft robot"</li><li>6. Pozo Esquivia, Bosman: "Quick Self-Healing in Tough Polymeric Materials"</li><li>7. Mustapha, AlMheiri, AlShehhi, Rajput, Joshi, Antunes, AlTeneiji: "The microencapsulation of tung oil with a natural hydrocolloid emulsifier for extrinsic self-healing applications"</li><li>8. Yen Fang Su, Chen, Bagonyi, Al-Tabbaa: "Chemically informed machine learning model for self-healing performance prediction of mineral additive based cementitious materials"</li></ol>	<ol style="list-style-type: none"><li>1. Riordan, Al-Tabbaa, Anglani, Tulliani, Antonaci, Palmer: "Investigation of novel production methods for macro-capsules and micro-capsules and subsequent comparison of self-sealing effectiveness in capsule-containing mortar specimens"</li><li>2. Kumar, Al-Tabbaa: "Durability recovery potential of an encapsulated organic healing agents in conventional repair mortars"</li><li>3. Ribeiro da Sousa, Freeman, Al-Tabbaa: "Tailoring the shell properties for physically triggered self-healing in cementitious materials"</li><li>4. Sina, Chang, He, Schlangen, Jefferson, Mihai: "Microcapsules triggering probability in self-healing cementitious material: A parametric study"</li><li>5. Anglani, Tulliani, Antonaci: "Encapsulated polyurethane for self-healing concrete applications using cementitious macro-capsules"</li><li>6. Papaioannou, Gournis, Kilikoglou, Karatasios: "Synthesis, optimization and healing efficiency of cement-based, macro-scale capsules for cement mixtures"</li><li>7. Piedrahita, Asensio, Perilla, Csar Narvjez, Cadavid, Guerrero: "Study of the influence of hybrid organic/inorganic microcapsule-based system for self-healing cementitious materials with low carbon footprint"</li><li>8. Hermawan, Riordan, Al-Tabbaa, Gruyaert: "Evaluation of workability, mechanical and self-sealing properties of concrete containing PU shell "water repellent cargo microcapsules"</li></ol>	<ol style="list-style-type: none"><li>1. Garcia, Montano, Urban, Hornat, van der Zwaag: "On the relation between polymer architecture, entropy-driven damage closure and barrier restoration in self-healing polyurethane coatings"</li><li>2. Katcharava, Bhandary, Marinow, Binder: "Self-healing poly(ionic liquid)-based iongels as potential electrolytes for lithium-ion batteries"</li><li>3. Arati, Bley, Brandelero, Teyssedre: "Electrical properties and recovery of trans-esterification based vitrimers for the electronic field"</li><li>4. Natasa Tomic: "Nanocomposite conductive hydrogels based on PVA with improved self-healing efficiency by cellulosic modifiers"</li><li>5. Costa Cornellà, Brancart, Van Assche: "Self-healing, recyclable, and degradable castor oil-based elastomers for sustainable soft robotics"</li><li>6. Hager: "Self-healing ionomers " from zwitterionic ionomers to bio-based materials"</li><li>7. Yoshie, Kim, Seshimo, Ejima, Houjou, Xia, Nakagawa: "Self-healing by flexible and strong hydrogen bonds in Polymers"</li><li>8. Veermesch, Mangialetto, De Vleeschouwer, Van Den Brande, Van Mele: "How can computational methods support experimental research to study self-healing polymer networks? A case study on the effect of hydrogen bonds on the kinetics of reversible Diels-Alder reactions"</li></ol>

Lunch **13.15 - 14.15**

**14.15 - 15.00** Nele De Belie

*Progress regarding Smart, Multi-functional, Advanced Repair Technologies In Cementitious Systems obtained through the EC Project SMARTINCS*

Parallel sessions **15.15 - 17.15**

<b>Polymers, composites and coatings - (De Donato room)</b> Chair: Grande- Turteltaub Assistant: Pernigoni	<b>Bacteria in Concrete - (Beltrami room)</b> Chair: Paine - Borg Assistant: di Summa	<b>Nanoengineered self healing (Castigliano room)</b> Chair: Cuenca - Carsana Assistant: Kannikachalam
<ol style="list-style-type: none"> <li>1. Bhandari: "Self-healable ionic liquid based electrolytes for Li-ion batteries tuned by Li-salt content and quadrupolar H-bonding"</li> <li>2. Kaymazlar, Andac, Garcia: "Self-healable and recyclable polydimethylsiloxane elastomers through metal- ligand coordination"</li> <li>3. Turteltaub, Kumthekar, Ponnusami, van der Zwaag: "Uncertainty Quantification of the lifetime of Self-Healing Thermal Barrier Coatings"</li> <li>4. Grande, Benazzo, Rigamonti, Bettini, Sala: "On the fracture healing response of an aeronautic-grade fiber reinforced epoxy vitrimer composite"</li> <li>5. Patrick: "Sustained Self-healing of Laminated Fiber-Composites via in situ Thermal Remending"</li> <li>6. Zechel, Abend, Dahlke, Schubert, Hager: "Approaches for the quantification of scratch-healing of polymers"</li> <li>7. Zhang, Xiao: "High-Performance Self-Healing Epoxy Based on Microencapsulated Epoxy-Amine Chemistry"</li> <li>8. Furia, Roels, Terryn, Vanderborght, Van Assche, Brancart: "Fused Granulate Fabrication of self-healing polymers composite"</li> </ol>	<ol style="list-style-type: none"> <li>1. Sandalci, Tezer, Bundur: "Effect of mineral characteristics on self-healing ability of bacterial cement based mortars"</li> <li>2. Minoru Takagi, Lima, Mederiors-Junior, Resende, Couto Ribeiro: "Antibiosis and watertightness of self-healing concrete with antimicrobial crystalline admixture for water and wastewater structures"</li> <li>3. Ghahremaninezhad, Baffoe: "Bio-inspired Self-healing Cementitious Materials"</li> <li>4. Abu Askar, Zdeb: "Behavior of Bacillus Bacteria from Sewage Water as a Self-Healing Agent for concrete cracks"</li> <li>5. Paine, Tan, Skevi, Justo-Reinoso, Hamley-Bennett, Reeksting, Gebhard: "Aerobic non-ureolytic bacteria-based self-healing concrete: Effects of environmental and exposure conditions"</li> <li>6. Tezer, Nele De Belie, Nico Boon, Michael Harbottle: "Non-axenic biomasses as bacterial self-healing agents in cementitious mortar "</li> <li>7. Ofiteru, Bagga, Justo-Reinoso, Hamley-Bennett, Paine, Gebhard: "Self-healing concrete the surprise in the wastewater"</li> </ol>	<ol style="list-style-type: none"> <li>1. Cuenca, Ferrara: "Use of nanomaterials for improving durability of self-healing concrete elements"</li> <li>2. Ksencamalar: "Design and Characterization of Self-Healing Geopolymer Mortar Containing Magnetic Nanoparticle Obtained by Green Synthesis Method"</li> <li>3. Tsampali: "Influence of cellulose fiber addition on self-healing and water absorption of cement mortar"</li> <li>4. Feng, Qian: "Rapid self-sealing of macro cracks of cementitious composites by in-situ crosslinking"</li> <li>5. Suh, Byungsun Park, Gwang-Myong Lee, Sanghwa Jung, Young-Keun Cho: "Evaluation of Coated Inorganic Materials on the Properties of Cement Hydra"</li> <li>6. Risdaraneni: "The Healing Performance of Mortar Containing Bacteria Impregnated Expanded Clay Aggregate Coated with Sodium Alginate"</li> <li>7. Tri Nguyen: "Development of Self-Healing System in Concrete using Bacillus Subtilis Natto Immobilized in Light Weight Aggregate"</li> </ol>

Aperitif **17.30 - 19.00**

Tuesday June 21

Keynote lecture - (De Donato room)

Chair: Carvelli  
Assistant: Azadi

**08.45 - 09.45** Tony Jefferson

*The challenge of simulating the self-healing behaviour of cementitious composites*

Keynote lecture 4

**09.45 - 10.15** Hernandez Santana

*Self-healing and recyclable nitrile rubber: a myriad solution for the automotive industry*

Break **10.45 - 11.15**

Parallel sessions **11.15 - 13.15**

Aggressive environments - (De Donato room) Chair: Bolzoni, Jonkers Assistant: Kompella	Modelling and life cycle - (Beltrami room) Chair: di Luzio - Freeman Assistant: Xi	UHPC - (Castigliano room) Chair: Schlangen - Lo Monte Assistant: Davolio
<ol style="list-style-type: none"> <li>1. Pourhaji, Serna Ros, Alonso: "Assessment of the effect of self-healing on the chloride penetration of concrete in the cracked and uncracked zones"</li> <li>2. Rossi, Copuroglu, Jonkers: "How self-healing induced by bacteria-based self-healing precursors affected the chloride penetration resistance of cracked mortar specimens"</li> <li>3. Van Mullem, De Brabandere, Van de Voorde, Kong, Snoeck, De Belie: "Chloride Resistance of Self-healing Mortar Containing Superabsorbent Polymers Quantified via Chloride Diffusion Testing"</li> <li>4. De Brabandere, Van Mullem, Van de Voorde, Kong, Snoeck, De Belie: "Chloride Resistance of Self-healing Mortar containing Superabsorbent Polymers measured via a (Quasi) Steady-State Migration Test"</li> <li>5. Borg: "Investigation of the Durability and Self-Healing properties of Ultra-High Performance Concrete based on Crystalline Admixtures and Nano-Additives, exposed to a Chloride-rich Aggressive Environment"</li> <li>6. Cibelli, Ahmed, Di Luzio, Ferrara: "Chloride penetration tests in cracked and healed UHPFRCC: numerical simulation via a discrete multiphysics model"</li> <li>7. Cappellesso, van Mullem, Gruyaert, Van Tittelboom, De Belie: "Self-healing products stability in cracked concrete under cyclic freeze-thaw condition"</li> <li>8. Afroughsabet, Al-Tabbaa: "Influence of Superabsorbent Polymer (SAP) and Ground Granulated Blast-furnace Slag (GGBS) on the Freeze-thaw Resistance of Concrete Pavement"</li> </ol>	<ol style="list-style-type: none"> <li>1. Masoero, Alex, Ofiteru: "MASKE+NUFEB: particle-based simulations of bacterial self-healing in concrete"</li> <li>2. Narayanasamy, Castro-Alonso, Macias-Franco, Sajinchez-Muoz, Oropeza-Navarro, Cortes-Martinez, Betancourt-Chjvez, Balagurusamy: "Validation of the survival and activity of inoculated bacterial strains in bioconcrete using molecular tools: gene sequence analyses and expression"</li> <li>3. Cibelli, Ferrara, Di Luzio: "Numerical simulation of self-healing in plain and fibre-reinforced concrete via a discrete multiphysics model: two case studies"</li> <li>4. di Summa, Parpanesi, De Belie, Ferrara: "How to address sustainability and economic viability of advanced cementitious based materials by means of Life Cycle Assessment (LCA) and Life Cycle Cost (LCC) tools integrated into a holistic design-wise approach"</li> <li>5. Maddalena, Sweeney, Tuinea-Bobe, Balzano, Arena, Jefferson: "Life cycle Assessment of self-healing concrete with shape memory polymers"</li> <li>6. Maeda, Ozaki, Osada: "Finite Element Analysis of Repeated Crack-Healing Behavior in alumina/SiC Composite Ceramics for Specimen with Chevron Notch"</li> <li>7. Freeman, De Nardi, Gardner, Jefferson: "Tailoring healing agents for self-healing cementitious materials using predictive modelling and physical testing"</li> <li>8. Perelmuter: "Modeling materials self-healing with bridged crack approach"</li> </ol>	<ol style="list-style-type: none"> <li>1. Zahabi Zadeh, Neves, Almeida, Miranda, Cunha, Pereira: "Digital Image Correlation (DIC) for Assessment of Self-healing Capacity of Thin Concrete Slabs"</li> <li>2. Luque: "Study of self-healing at short ages for a 3D printable ECC material"</li> <li>3. Tamilarasan, Blanco, Goodier: "Effect of steam curing on the recovery of mechanical and durability performance of Engineered Cementitious Composites (ECC)"</li> <li>4. He, Schlangen: "Self-healing performance of strain hardening cementitious composite (SHCC) incorporating bacterial embedded polylactic acid (PLA) particles"</li> <li>5. Al Obaidi, He, Schlangen, Ferrara: "Self-Healing Effect on Steel Fiber - UHPC Matrix Interface Pre- Damaged and Exposed to Different Exposure Conditions"</li> <li>6. Xi, Huang, Al-Obaidi, Lo Monte, Ferrara: "Evolution of long-term self-healing performance of UHPC exposed to different aggressive environments under sustained load"</li> </ol>

Lunch **13.15 - 14.45**

**14.45 - 15.45 Olga Speck**

**Plant-inspired damage control: An inspiration for efficient use of resources and reduction of waste generation**

Parallel sessions **15.45 - 17.45**

<b>Research and case studies from European projects - (De Donato room)</b> Chair: de Belie – Alonso Assistant: Marcucci	<b>Metals/ceramics - (Beltrami room)</b> Chair: Brancaart - Bosman Assistant: Cibelli	<b>Advanced binders in cement based materials - (Castigliano room)</b> Chair: Lo Monte - Carvelli Assistant: Al Obaidi
<ol style="list-style-type: none"> <li>1. Davolio, Altomare, Al Obaidi, Ferrara: "A methodology to assess the evolution of the UHPC performance as affected by autogenous healing, sustained load, and aggressive environments"</li> <li>2. Kannikachalam, Clerque Vela, Ginori Ocampo Pacheco, Lo Monte, De Belie, Ferrara: "Methodology to evaluate self-healing effects on fatigue capacity of Ultra High-Performance Concrete"</li> <li>3. Kannikachalam, Snoeck, Cailleux, De Belie, Ferrara: "Self-healing capabilities of Ultra High-Performance Concrete subjected to impact loading"</li> <li>4. Charron, Lauch, Desmettre: "Comprehensive evaluation of self-healing of concrete containing different admixture under realistic conditions"</li> <li>5. Roig Flores: "Evaluation of the self-healing efficiency of concrete with a crystalline admixture: Interlaboratory analysis from COST Sarcos RRT3 group"</li> <li>6. Tang, Al-Tabbaa: "Effect of combined mineral and polymer additives on self-healing strain-hardening cementitious composites (SH2CC) for cyclic loading conditions"</li> <li>7. Krelani, Kryeziu, Ahmeti, Ferrara: "Self-Healing Concrete Under severe conditions, wet/dry saline water and chloride environment including freeze/thaw cycles combining different mechanical loading"</li> <li>8. Barros, Knockaert: "Facilitators and hurdles influencing the commercialization of self-healing technologies in the construction industry"</li> </ol>	<ol style="list-style-type: none"> <li>1. Fu, van der Zwaag, van Dijk: "Self healing of creep-induced damage in a ternary Fe-3Au-4W alloy by multiple healing agents"</li> <li>2. Sekine, Nakao: "Advanced self-healing design controlled by kinetic competition of chemical reactions in self-healing ceramics"</li> <li>3. Akutsu, Nakao: "Effect of high temperature viscoelasticity glass on self-healing ability in self-healing ceramics"</li> <li>4. Arsenko, Hannard, Kashiwar, Ding, Villanova, Zhao, Maire, Idrissi, Simar: "Design, Friction Stir Processing and characterization of a new healable aluminium alloy"</li> <li>5. Huong Nguyen, Kuo, Nanko: "Crack-healing performance and oxidation behavior of SiC dispersed in Yttrium silicate composites"</li> <li>6. Khlaisongkham, Kuo, Nanko: Crack healing via thermal oxidation of AlN-dispersed Al<sub>2</sub>O<sub>3</sub> composites</li> <li>7. Gheysen, Pyka, Hannard, Villanova, Winiarski, Brinek, Chirazi, Simar: "Investigation of the healing ability of a newly developed AlMg alloy produced for Laser Powder Bed Fusion (LPBF)"</li> <li>8. Molteni, Confalonieri, Grande, Gariboldi: "Thermally-triggered self-healing mechanism in Al-Sn composite Phase Change Materials"</li> <li>9. Ding, Brouwer, Popovich, Hermans, Sloof: Mo(Al<sub>x</sub>,Si<sub>1-x</sub>)<sub>2</sub> healing particles for high temperature ceramics</li> </ol>	<ol style="list-style-type: none"> <li>1. Chen, Hamad, Al-Tabbaa: "Effect of Mineral Admixtures on Self-Healing Performance of Low-Carbon Infrastructure Materials with Supplementary Cementitious Materials"</li> <li>2. Cirak: "Reducing Shrinkage Reinforcement with Self-Healing Concrete"</li> <li>3. Nguyen, Carvelli, Ismail, Illikainen, Kinnunen: "Autogenous self-healing of polypropylene fiber reinforced ettringite-based composite"</li> <li>4. Tsangouri: "Acoustic Emission as an essential tool for healing assessment"</li> <li>5. Lo Monte, Ferrara: "Link between structural durability and sustainability in the framework of the H2020 project ReSHEALience: the importance of Self-Healing in Ultra High-Performance Fibre-Reinforced Cementitious Composites"</li> <li>6. Da Rocha Gomes, Ferrara, Moreno, Sanchez: Cementitious grouts containing crystalline admixtures to improve autogenous healing</li> <li>7. Dabral: "Experimental comparison of crack width and spacing provisions according to different structural codes and recommendations for RC beams with concrete from traditional concrete to UHPFRC"</li> </ol>

Conference dinner **19.30 – 00.00**

## Wednesday June 22

Keynote lecture 6 - (De Donato room)

Chair: van der Zwaag  
Assistant: di Summa

**09.30 - 10.30** Joost Brancart  
*Self healing soft robotics*

Break **10.30 - 11.00**

Parallel sessions **11.00 - 12.30**

<b>Polymers, composites and coatings</b> - (De Donato room) Chair: Bamonte - Grande Assistant: Pernigoni	<b>Vascular networks (in concrete/cements)</b> - (Castigliano room) Chair: Justo Reinoso-Gardner Assistant: Chemello	<b>Multifunctional (Self sensing/shape memory)</b> - (Castigliano room) Chair: Vlachakis-Maddalena Assistant: di Summa
<ol style="list-style-type: none"><li>1. Bose: "Electroactive Self-healing Soft Robotic Gripper Using Reversible Diels-Alder Reactions"</li><li>2. Langenbach, Bakkali-Hassani, Tournilhac, Norvez: "Self-Healing ENR-based Elastomers with Fast Elastic Return for Soft Robotics"</li><li>3. El Diwiny: "Physical Intelligence for Delaying Damage In Soft Multi-Materials"</li><li>4. Chenming Li, Binde: "Synthesis and Characterization of Hydrogen Bonded, Self-Healing Polymeric Ionic Liquids as Potential Electrolytes"</li><li>5. Mangialetto, Ehrhardt, Hennecke, Van Durme, Van Mele, Van den Brande: "Influence of hydrogen-bonding, phase-separation and Diels-Alder chemistry on the rate of self-healing of thermoreversible thermosetting networks"</li><li>6. Terry, Brancart, Roels, Kashef Tabrizian, Hardman, Thuruthel, Ferrentino, Sahraeezartamar, Iida, Van Assche, Vanderborgh: "Self-healable soft robots, flexible electronics and electronic skins"</li></ol>	<ol style="list-style-type: none"><li>1. He, Schlangen: "Experimental validation of a discrete lattice model for simulating mechanical regains in a vascular self-healing cementitious material"</li><li>2. Justo Reinoso, De Nardi, Reeksting, Gardner, Jefferson, Gebhard, Paine: "Use of 3D mini-vascular networks to protect and deliver bacterial spores in self-healing concretes"</li><li>3. Salman, De Nardi, Gardner: "A Study of Damage Healing Cycles in Vascular Networks Containing Silicate-Based Healing Agents"</li><li>4. Shields, De Nardi, Cappelleso, Jefferson, De Belie, Van Tittelboom: "A comparison of brittle versus ductile vascular networks: why ductile networks are preferable for scaling up"</li><li>5. Gardner, Coopamootoo, De Nardi, Jefferson: "3D-printed mini-vascular networks for crack-sealing in the concrete cover zone"</li><li>6. Zhi Wan, Savija: "Mechanical properties and healing efficiency of 3D-printed ABS vascular based self-healing cementitious composite"</li></ol>	<ol style="list-style-type: none"><li>1. Vlachakis, Al-Tabbaa: "Investigation of the stress and strain sensing properties of filler-free geopolymers coatings for structural health monitoring"</li><li>2. Balzano: "The Journey of the hybrid shape memory polymer tendons: challenges, improvements, and future research directions"</li><li>3. Wang, Haigh, Al-Tabbaa: "Novel measurement techniques of piezoresistive properties for self-sensing concrete"</li><li>4. Milone, Tulliani, Al-Tabbaa: "Electrical and physical characterisation of cementitious composites with carbon-based additives"</li><li>5. Zheng, Al-Tabbaa: "Graphene-enabled plastic fibre: a sustainable alternative for self-sensing cementitious materials"</li><li>6. Orozco: "Electroactive performance and cost evaluation of carbon nanotubes and carbon black as conductive fillers in self-healing shape memory polymers and other composites"</li></ol>

Keynote lecture 7 - (De Donato room)

Chair: Grande  
Assistant: Al-Obaidi

**12.30 - 13.15** Sybrand van der Zwaag  
*Future perspective*

Closing **13.15 - 13.45**

Lunch **13.45 - ONWARD**