PHILADELPHIA 2026

JULY 8-10

ICSHM

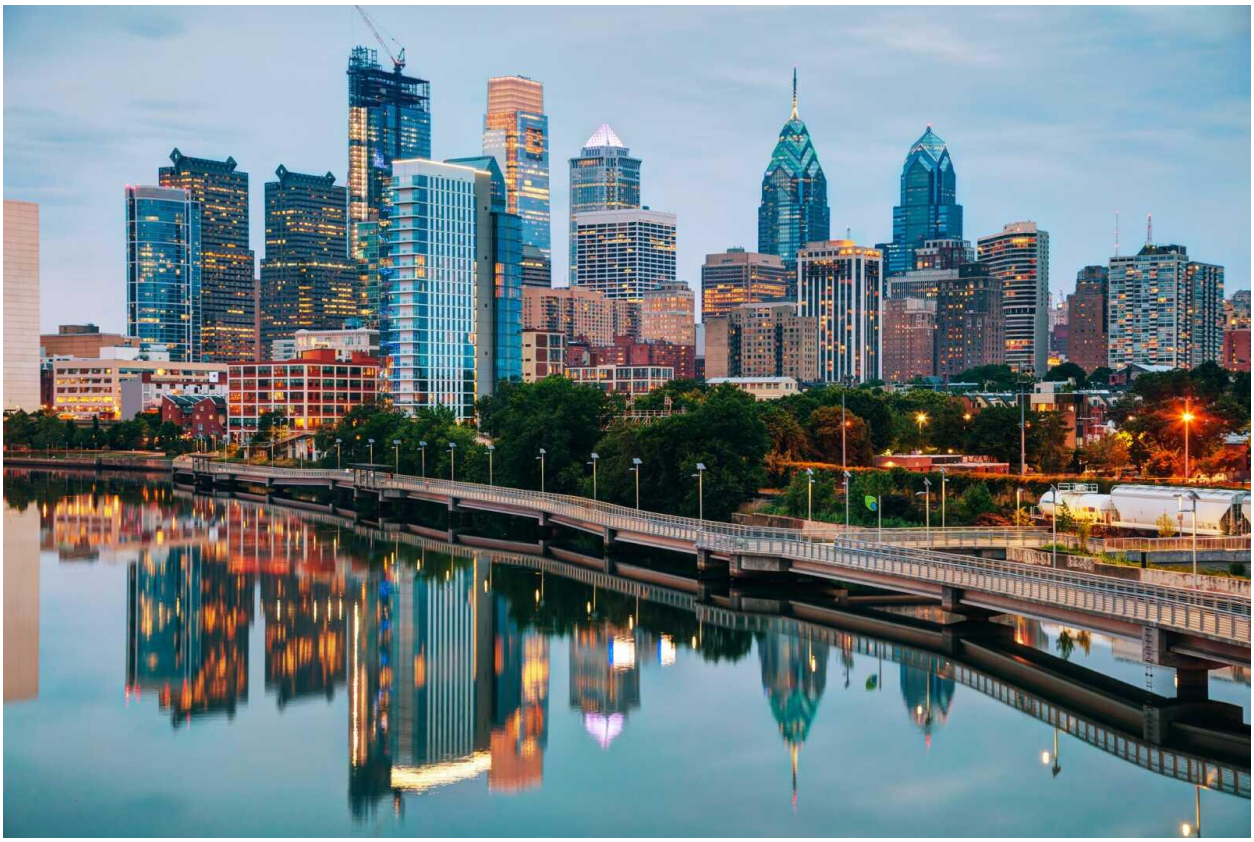
10th International Conference on Self-healing Materials

10th International Conference on Self-Healing Materials (ICSHM2026)

Preliminary Program

Dates: July 8–10, 2026

Venue: Bossone Research Enterprise Center, Drexel University, Philadelphia, PA, USA, Address: 3140 Market Street, Philadelphia, PA 19104 (**View location on Google Maps**)



Conference Overview:

The 10th International Conference on Self-Healing Materials (ICSHM2026) will take place from July 8-10, 2026, at Drexel University in Philadelphia, PA, USA. ICSHM2026 continues the long-standing tradition of this biennial conference to bring together leading researchers, engineers, and practitioners from around the globe to discuss and advance the field of self-healing materials. Since the inaugural conference in Noordwijk, Netherlands (2007), ICSHM has been hosted in Chicago, USA (2009); Bath, UK (2011); Ghent, Belgium (2013); Durham, USA (2015); Friedrichshafen, Germany (2017); Yokohama, Japan (2019); Milan, Italy (2022); and Madrid, Spain (2024). Through these successful editions, the global self-healing materials community has continued to grow and thrive.

At this 10th edition, we will again provide a high-quality international platform for showcasing the latest developments in self-healing materials and related technologies including advancements in understanding chemistry, processing, characterization, modeling, applications, and beyond.

Conference Organizers:

ICSHM 2026 is organized by a dedicated team of researchers, professionals, and volunteers committed to advancing the field of self-healing materials. Building on the successful tradition of the International Conference on Self-Healing Materials (ICSHM), the organizing committee is proud to welcome the global self-healing community to Drexel University in Philadelphia for ICSHM 2026.

Professor Yaghoob (Amir) Farnam

Conference Chair

Professor, Drexel University, USA

Department of Civil, Architectural, & Environmental Engineering
Department of Materials Science & Engineering (Affiliate)
Department of Chemical and Biological Engineering (Affiliate)

Professor Jason Patrick

Conference Co-Chair

Associate Professor, NC State University, USA

Department of Civil, Construction, & Environmental Engineering
Department of Mechanical & Aerospace Engineering (Affiliate)

Executive Committee:

- Dr. Geetika Mishra *(Drexel University, USA)*
- Prof. Ahmad Najafi *(Drexel University, USA)*
- Prof. Christopher Sales *(Drexel University, USA)*
- Prof. Jialuo He *(Widener University, USA)*

Conference Scientific Committee:

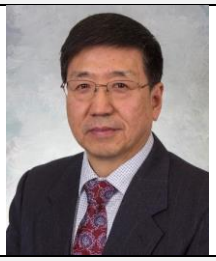
- Prof. Amir Alavi (University of Pittsburgh, USA)
- Prof. Abir Al-Tabbaa (University of Cambridge, UK)
- Prof. Dimitrios Angelis (Vrije Universiteit Brussel, Belgium)
- Prof. Zhenan Bao (Stanford University, USA)
- Prof. Nele De Belie (Ghent University, Belgium)
- Dr. Cristina De Nardi (Cardiff University, UK)
- Prof. Charles Diesendruck (Technion, Israel)
- Prof. Santiago Garcia Espallargas (TU Delft, Netherlands)
- Prof. Liberato Ferrara (Politecnico di Milano, Italy)
- Prof. Diane Gardner (Cardiff University, UK)
- Prof. Ali Ghahremaninezhad (University of Miami, USA)
- Prof. Yury Gogotsi (Drexel University, USA)
- Prof. Mija Helena Hubler (University of Colorado Boulder, USA)
- Prof. Henk Jonkers (TU Delft, Netherlands)
- Prof. Riccardo Maddalena (Cardiff University, UK)
- Prof. Mo Li (University of California Irvine, USA)
- Prof. Reza Moini (Princeton University, USA)
- Prof. Abhijit Mukherjee (Curtin University, Australia)
- Prof. Kalyana Nakshatrala (University of Houston, USA)
- Prof. Jose Norambuena-Contreras (Swansea University, UK)
- Prof. Kevin Paine (University of Bath, UK)
- Prof. Etelvina Javierre Pérez (Universidad de Zaragoza, Spain)
- Prof. Moe Pourghaz (North Carolina State University, USA)
- Prof. Marianella Hernández Santana (Institute of Polymer Science and Technology, Spain)
- Prof. Erik Schlangen (TU Delft, Netherlands)
- Prof. Nancy Sottos (University of Illinois Urbana-Champaign, USA)
- Prof. Didier Snoeck (Université libre de Bruxelles, Belgium)
- Prof. Wil V. Srubar (University of Colorado Boulder, USA)
- Prof. Kim Van Tittelboom (Ghent University, Belgium)
- Prof. Russell Varley (RMIT University, Australia)
- Prof. Pablo Zavattieri (Purdue University, USA)

Conference Keynote Speakers:

This year's keynote program brings together internationally recognized leaders whose groundbreaking research continues to shape the future of self-healing materials, biomaterials, sustainable infrastructure, robotics, and multifunctional systems.

Professor Nancy Sottos
University of Illinois Urbana-Champaign

Keynote Title: Space: The final frontier for self-healing polymers



Professor Peter X Ma
University of Michigan, Ann Arbor

Keynote Title: Multi-scaled biomimetic materials to regulate tissue regeneration

Professor Erik Schlangen
Delft University of Technology

Keynote Title: 20 years self-healing construction materials

Professor Anna Balazs
University of Pittsburgh

Keynote Title: Temporal sequence in the growth of hard and soft domains in polymer layers affects final morphology

Professor Didier Snoeck
Université Libre de Bruxelles
(Mid-Career Award Keynote)

Keynote Title: Healing and beyond: Superabsorbent polymers in cement-based materials

Professor Seppe Terryn
Vrije Universiteit Brussel
(Early-Career Award Keynote)

Keynote Title: Self-healing soft robots: Bridging material and system-level research

About the Technical Program:

The ICSHM 2026 Technical Program brings together leading researchers, engineers, and innovators from more than 17 countries across 6 continents to share the latest advances in self-healing materials. The conference features more than 70 presentations, including keynote and plenary lectures by internationally recognized leaders, technical presentations, poster presentations featured in an interactive poster session, and a commercialization and technology transfer forum. Spanning concrete, polymers, composites, bio-inspired materials, modeling, and emerging applications, the program highlights the breadth, diversity, and global impact of research in self-healing materials.

In addition to a comprehensive technical program, ICSHM 2026 offers several opportunities for networking and community engagement. The conference will begin with an Opening Reception on Wednesday evening, providing attendees with an opportunity to reconnect with colleagues, meet new collaborators, and engage with the international self-healing materials community in an informal setting. The conference Gala Dinner, held at the Museum of the American Revolution, will celebrate the achievements of our field while fostering meaningful interactions among researchers, industry professionals, and students.

Presentation Guidelines:

- **Oral Presentations:** Technical presentations are allocated approximately **18 minutes**, including time for audience questions and discussion. Presenters are kindly requested to manage their time accordingly to ensure a smooth transition between talks and to maintain the conference schedule.
- **Presentation Upload:** To facilitate efficient session management and avoid technical delays, all presenters should upload their PowerPoint presentation files at the **registration desk upon arrival**. Presentations will be transferred to a shared conference laptop that will be used during all sessions. Presenters are encouraged to bring their files on a USB drive and verify proper display of multimedia content, animations, and embedded videos.
- **Poster Presentations:** Posters should be prepared in **portrait orientation** with dimensions of **36 × 48 inches (91.4 × 121.9 cm)**. **A0-size posters (84.1 × 118.9 cm)** are also acceptable. Authors are encouraged to ensure that text, figures, and tables are clearly legible from a distance of approximately 1–2 meters and to be present during the designated poster session to discuss their work with attendees.

Technical Program Details:

A detailed preliminary agenda for ICSHM 2026 is provided at the end of this document in a convenient table format. The agenda outlines the full conference schedule, including keynote and plenary presentations, technical sessions, poster activities, networking events, and special programs. Attendees are encouraged to review the schedule carefully and note that minor adjustments may be made as the conference date approaches.

Sponsors and Supporters:

The Organizing Committee of ICSHM 2026 gratefully acknowledges the generous support of our sponsors and partners. Their contributions play a vital role in making this conference possible by supporting technical sessions, student participation, networking events, awards, and other conference activities. We sincerely thank them for their commitment to advancing research, innovation, and collaboration in the field of self-healing materials. We extend special appreciation to the following sponsors and partners:

PENETRON for their Platinum-level and Gala dinner sponsorship:

Alchemco for their Silver-level sponsorship:

STRUCTERYX for their Bronze-level sponsorship:

Drexel University, ACI, RILEM, ACerS and MRS for their support:

Time	Wednesday, July 8, 2026	
08:00 – 08:30	**Registration with Breakfast** *(Location: Bossone Lobby)*	
08:30 – 09:00	**Opening Session and Welcome** *(Moderator: Amir Farnam; Location: Mitchell Auditorium)*	
8:30	Prof. Amir Farnam, ICSHM 2026 Chair, Drexel University	
8:40	Prof. Aleister Saunders, Vice Provost for Research & Innovation, Drexel Univerity	
8:50	Prof. dr. ir. Nele De Belie, Chair of the ICSHM Steering Committee and RILEM President, Ghent University	
09:00 – 10:30	**Keynote Planery Session** *(Moderator: Jason Patrick; Location: Mitchell Auditorium)*	
9:00	Space: The Final Frontier for Self-healing Polymers; *by Prof. Nancy Sottos, University of Illinois Urbana-Champaign, USA*	
9:45	Multi-scaled Biomimetic Materials to Regulate Tissue Regeneration; *by Prof. Peter X. Ma, University of Michigan, Ann Arbor, USA*	
10:30 – 11:00	**Coffee Break** *(Location: Bossone Lobby)*	
11:00 – 12:30	**Parallel Technical Sessions** *(Location: Session A in Mitchell Auditorium, and Session B in Hill Conference Room)*	
	Session A1: Fundamentals, Limitations, and Advanced Strategies in Concrete Self-Healing; *Moderator: Nele De Belie*	**Session B1:** Dynamic Self-healing Polymers; *Moderator: Charles Diesendruck*
11:00	Self-Healing Concrete with Emphasis on Bio-Based Techniques; *by Abhijit Mukherjee (Curtin University, Australia)*	Interface Behavior of Periodic Dynamic Polymers with Identical Backbones and Distinct Dynamic Bonds; *by Alexandra Ramos Figueroa (Stanford University, USA)*
11:18	Beyond Bacteria: What Really Drives Carbonate-based Self-healing in Cementitious Cracks; *by Martyna Janek (Lublin University of Technology, Poland)*	Proof-of-Concept: Healable and Recyclable Flax Fiber Composites with Catalyst-Free Vitrimer Matrix for Infrastructure Applications; *by Shagata Das (University of Delaware, USA)*
11:36	Self-healing Functionalisation Strategies of Textile-Reinforced Mortars; *by Liberato Ferrara (Politecnico di Milano, Italy)*	High-Performance Epoxy Anhydride Vitrimers for Repairable and Recyclable Composite Structures; *by Russell Varley (RMIT University, Australia)*
11:54	Electrical Impedance Tomography and Spectroscopy for Imaging Bio-Mediated Healing in Vascularized Concrete; by *Moe Pourghaz (North Carolina State University, USA)*	Moisture-Activated Durable and Autonomous Self-Healing Epoxy Coating Using Boronic Ester Dynamic Bonds; *by Sachini Dissanayake (Deakin University, Australia) & Russell Varley (RMIT University, Australia)*
12:12	Self-Healing Mechanisms in Ultra-Ductile High-Strength Cementitious Materials and Structural Components; *by Mo Li (University of California, Irvine, USA)*	Self-Healing Mitigation Strategies for Droplet-Induced Impact Damage in Wind Turbine Blade Leading-Edge Coatings; *by Po-Wen Wang (University of Illinois Urbana-Champaign, USA)*
12:30 – 14:00	**Lunch Break** *(Location: Bossone Atrium, 3rd floor)*	
14:00 – 15:30	**Parallel Technical Sessions** *(Location: Session A in Mitchell Auditorium, and Session B in Hill Conference Room)*	
	Session A2: Healing Performance and Efficiency in Cement-based Composites; *Moderator: Aveline Darquennes*	**Session B2:** Self-healing Composites & Manufacturing; *Moderator: Russell Varley*
14:00	Gelatin as a Nucleation Scaffold to Enhance Enzyme-Induced $CaCO_3$ Precipitation for Self-Healing Concrete; *by: Chris Sales (Drexel University, USA)*	Additive Manufacturing for Scalable Fabrication of Self-Healing Thermoplastic Composites; *by Daniel Therriault (Polytechnique Montréal, Canada)*
14:18	Exploring Fungal-Induced Mineralization for Crack Healing in Cementitious Mortar; *by Nuo Bao (Louisiana State University, USA)*	Self-Healing Biomanufactured Protein Fibers; *by Hasanur Rahman (Penn State University, USA)*
14:36	Bacterial Nanocellulose for Repair and Repeated Self-healing of Concrete; by Mija Hubler *(University of Colorado at Boulder, USA)*	Self-Healing Energetic Materials; *by Charles Diesendruck (Technion – Israel Institute of Technology, Israel)*
14:54	Fatigue-Induced Healing Mechanisms in Self-Compacting Natural Hydraulic Lime Concretes; *by Gonzalo Ruiz (Universidad Rey Juan Carlos, Madrid, Spain)*	Repeatable Self-Healing of Interlaminar Fracture in Prepreg Composites via In Situ Thermal Remending; *by Yerassyl Kuan (North Carolina State University, USA)*
15:12	Evaluation of the Healing Capacity of Limestone Calcined Clay Mortars; *by Marwa Hassan (Universite de Rennes, France)*	Study of the Reaction of Pyrex Powder and $BaCO_3$ as a Function of Temperature as a Probe for Generated Silica Reactivity; *by Jacob Hormadaly (Ben-Gurion University, Israel)*
15:30 – 16:00	**Coffee Break** *(Location: Bossone Lobby)*	
16:00 – 17:30	**Parallel Technical Sessions** *(Location: Session A in Mitchell Auditorium, and Session B in Hill Conference Room)*	
	Session A3: Self-healing Concrete Durability; *Moderator: Wojciech Franus*	**Session B3:** Nature-inspired Self-Healing Strategies; *Moderator: Liberato Ferrara*
16:00	Effect of Crack Pre-healing on Sulfate Degradation for Self-healing Concrete with Bacteria-based or Crystalline Admixture Healing Agents; *by: Nele De Belie (Ghent University, Belgium)*	Bone-Inspired Self-Adaptive and Self-Healing Materials for Resilient Future; *by Sung Hoon Kang (Korea Advanced Institute of Science and Technology, Republic of Korea)*
16:18	Influence of Micro-climate Conditions on Concrete Carbonation; *by Kosmas Sideris (Democritus University of Thrace, Greece)*	Design and Integration of Architected Vascular Network in Cementitious Materials; *by Niyousha Niknezhad (Drexel University, USA)*
16:36	Case Study in the Tren Maya Project, Mexico using Enzyme Based Waterproofing; *by Mario Baggio (Alchemco, USA)*	Biomimetic Vascular Networks for Cyclic Self-Healing of Lime Mortars in Heritage Masonry; *by Cristina De Nardi (Cardiff University, UK)*
16:54	Antimicrobial Self-Healing Concrete to Mitigate Biogenic Sulfuric Acid Corrosion: Confocal Microscopy and SEM Evidence from Pseudomonas aeruginosa Biofilms; *by Emilio Takagi (Aeronautical Institute of Technology, Brazil)*	Frontier of Extrusion-Based 3D-Printing for Design of Complex Tubular and 3D Vascular Architected Toolpaths; *by Shashank Gupta (Princeton University, USA)*
17:12		From Root Canal to Concrete: Endodontics-Inspired Vasculature for Targeted Bio-Healing of Aged Cementitious Materials; *by Mohammad Irfan Iqbal (Drexel University, USA)*
18:30 – 21:30	**Opening Reception *(Location: Drexel Main Building Court, 3141 Chestnut Street Philadelphia, PA)***	
20:30	Conference Photoshoot	

Time	Thursday, July 9, 2026	
08:00 – 09:00	**Registration with Breakfast** *(Location: Bossone Lobby)*	
09:00 – 10:30	**Keynote Planery Session** *(Moderator: Mo Li; Location: Mitchell Auditorium)*	
9:00	20 Years of Self-healing Construction Materials; *by Prof. Erik Schlangen, Delft University of Technology, Netherlands*	
9:45	Temporal Sequence in the Growth of Hard and Soft Domains in Polymer Layers Affects Final Morphology; *by Prof. Anna Balazs, University of Pittsburgh, USA*	
10:30 – 11:00	**Coffee Break** *(Location: Bossone Lobby)*	
11:00 – 12:30	**Parallel Technical Sessions** *(Location: Session A in Mitchell Auditorium, and Session B in Hill Conference Room)*	
	Session A4: Fracture Mechanics and Modeling in Concrete Self-Healing; *Moderator: Moe Pourghaz*	**Session B4:** Gelatin-Based Self-Healing Strategies; *Moderator: Mija Hubler*
11:00	Prolonged Crack Healing in Concrete with Microencapsulated Secondary Healing: A Numerical Study; *by Ahmad Najafi (Drexel University, USA)*	The Effect of Temperature, Relative Humidity and Binder-Sand Ratio Variations on Compressive Strength of Living Building Materials; *by Gadisa Merdassa (University of Colorado Boulder, USA)*
11:18	Fracture and Statistical Mechanics for Design of Architected Cementitious Composites: Experiment, Theory, and Simulation; *by Reza Moini (Princeton University, USA)*	Super Tough Multi-Bond Network Hydrogels with Self-Healable Properties; *by Xu-Ming Xie (Tsinghua University, China)*
11:36	Multi-physics Modeling of Fracture-healing Response in Self-healing Concrete with MICCP and Phase-field Model; *by Hsiao Wei Lee (Cheng Kung University, Taiwan)*	Internal-External CO_2 Curing Synergy: Enzymatic Hydrogel Strategy for Improved Carbonation of Wollastonite-Based Cementitious Materials; *by Mehdi Khanzadeh Moradllo (Temple University, USA)*
11:54	Laboratory Assessment and Numerical Modeling of Self-healing Concrete with Lightweight Aggregates Encapsulated by Modified PVA; *by Jialuo He (Widener University, USA)*	Mechanically Activated Autonomous Self-Healing of Volcanic-Clay Cement Pastes Using a Novel Superabsorbent Hydrogel–Cellulose Microfiber System; *by Ángel De La Rosa Velasco (Universidad Rey Juan Carlos, Spain)*
12:12	Direct Tensile Testing and Fracture Behavior of Microcapsules; *by Alireza Ashkpour (Drexel University, USA)*	Self-Healing Performance of Cementitious Materials with Hydrogel under Marine Environment; *by Farzad Rezaeicherati (University of Miami, USA)*
12:30 – 14:00	**Lunch Break** *(Location: Bossone Atrium, 3rd floor)*	
14:00 – 15:30	**Parallel Technical Sessions** *(Location: Session A in Mitchell Auditorium, and Session B in Hill Conference Room)*	
	Session A5: Long-term Performance and Case Studies in Self-Healing Concrete; *Moderotor: Abhijit Mukherjee*	**Session B5:** Polymeric Self-healing & Self-sensing; *Moderator: Daniel Therriault*
14:00	Durability Indicators and Concrete Service Life: Difference in Values Measured in the Laboratory Concrete and On-Site Concrete; *by Kosmas Sideris (Democritus University of Thrace, Greece)*	Recyclable and Reconfigurable Soft, Self-Healing Electronics: A Reality or a Myth?; *by Ehsan Mirabdollah & Seppe Terryn (Vrije Universiteit Brussel, Belgium)*
14:18	Self-healing Properties of Hennebique Concrete over 130 Years Old; *by Didier Snoeck (Universie Libre de Bruxelles, Belgium)*	Design and Material Principles for Autonomous Alignment and Healing Multilayer Soft Electronics; *by Alexandra Ramos Figueroa (Stanford University, USA)*
14:36	Case Study – The Use of the Crystalizing Additive in the Mitigation of Leakage in a Water Treatment Plant; *by Mitchell Glaze (THOMCO Inc.) & Leonardo Coutinho (Alchemco, Brazil)*	Autonomous Alignment and Healing in Multilayers of Immiscible Dynamic Polymers for Damage-Perceptive Soft Electronics; *by Samuel Root (Case Western Reserve University, USA)*
14:54	Building the Bridge: Bringing European Concrete Innovation into the American Construction Market; *by Anna Jensen (Restoration Partners, USA)*	Designing Bio-Inspired Networks for Sensing Mechanical Deformation; *by Anna Balazs (University of Pittsburgh, USA)*
15:12	Life-Cycle Cost Optimization of Concrete Repairs: Reducing Total Ownership Cost Without Increasing Risk; *by Mario Baggio (Alchemco, USA)*	Sustained Self-Sensing and Autonomous Self-Healing via Electro-Thermal Coupling in Fiber-Reinforced Composites; *by Jack Turicek (North Carolina State University, USA)*
15:30 – 16:00	**Coffee Break** *(Location: Bossone Lobby)*	
16:00 – 17:30	**Special Plenary Forum Session: Commercialization & Technology Transfer** *(Moderator: Reza Moini; Location: Mitchell Auditorium)*	
16:00	Building Confidence in Commercializing Self-Healing Materials: From Research Validation to Field Implementation; *by Mario Baggio Bionote, Alchemco*	
16:12	Planning for Commercialization during Ideation; *by Mija Hubler, University of Colorado at Boulder*	
16:24	The Startup Path to Commercialization: from Incorporation to Exit; *by Dennis Gilmore, Structeryx, Inc.*	
16:36	Navigating Commercial Needs and Cultural Differences; *by Anna Jensen, Restoration Partners*	
16:50	Q&A Forum	
18:30 – 22:30	**Gala Dinner *(Location: Museum of the American Revolution, 101 S 3rd St, Philadelphia, PA)*** Sponsored by PENETRON	
18:30	Cocktail Reception and Museum Access *(Location: Oneida Atrium and Museum)*	
19:45	Dinner *(Location: Liberty Hall)*	

Time	Friday, July 10, 2026	
8:30 – 9:30	**Parallel Technical Sessions** *(Location: Session A in Mitchell Auditorium, and Session B in Hill Conference Room)*	
	Session A6: Microbial Induced Calcite Precipitation for Self-Healing in Concrete; *Moderator: Cristina De Nardi*	**Session B6:** Modeling and AI for Self-healing Polymers; *Moderator: Hsiao Wei Lee*
8:30	Understanding Calcium Carbonate Polymorph Formation during Microbially Induced Calcium Carbonate Precipitation; *by Yacoub Alqenai (Drexel University, USA)*	AI Meets Self-Healing Polymers: PINN-Driven Approach in Unlocking Structure-Property Relationships of Reversible Diels–Alder Polymers; *by Seppe Terryn (Vrije Universiteit Brussel (VUB), Belgium)*
8:50	Enhancing MICCP Process in Self-Healing Concrete by Addressing Cell Encapsulation and Investigating the Impact of Exogenous Carbonate Ions; *by Kiana Ahmari (Drexel University, USA)*	A Model Reaction for Metathesis-Based Self-Healing in Conductive Polymers; *by Henrike Zacher (TU Ilmenau, Germany)*
9:10	Harnessing Bacillus subtilis for Self-Healing Concrete: A Case Study on Sandcrete Mortar; *by Ewane Micheal Ebongpende (University of Buea, Cameroon)*	
9:30 – 11:00	**Poster Session with American-style Brunch** *(Moderator: Chris Sales and Jialuo He; Location: Bossone Lobby)*	
11:00 – 13:00	**Closing Session & Awardees' Keynote Lectures Ceremony** *(Moderators: Amir Farnam, Jason Patrick, and Nele De Belie ; Location: Mitchell Auditorium)*	
11:00	**Mid-Career Award Keynote:** Healing and Beyond: Superabsorbent Polymers in Cement-based Materials, *by Prof. Didier Snoeck, Université Libre de Bruxelles, Belgium*	
11:45	**Early-Career Award Keynote:** Self-healing Soft Robots: Bridging Material and System-level Research, *by Prof. Seppe Terryn, Vrije Universiteit Brussel, Belgium*	
12:30	Best Research, Oral Presentation and Poster Winner Announcements	
12:40	ICSHM 2026 Team Recognition	
12:50	ICSHM2028 Announcement and Closing Remarks	