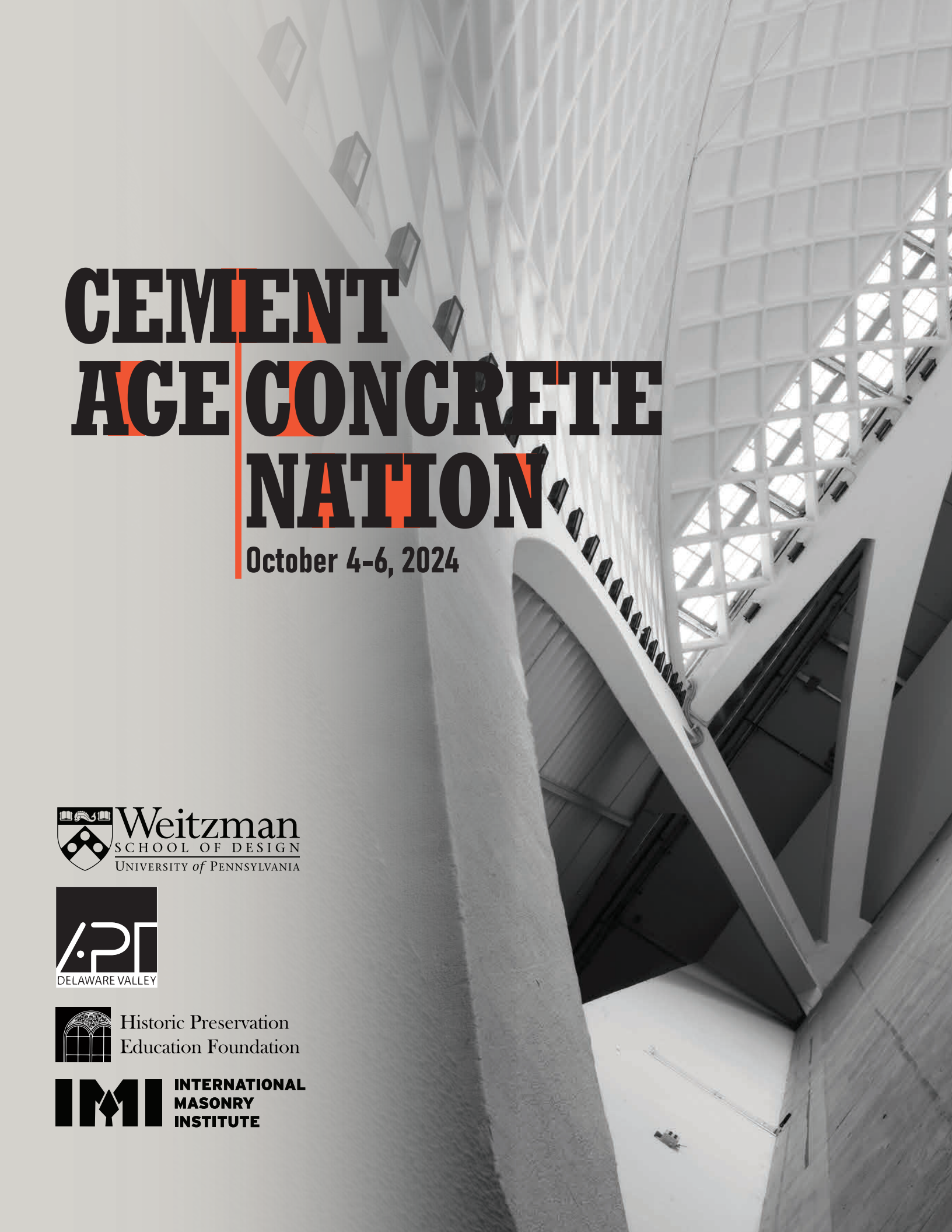


CEMENT AGE CONCRETE NATION

October 4-6, 2024

Weitzman SCHOOL OF DESIGN
UNIVERSITY of PENNSYLVANIA

APT DELAWARE VALLEY

Historic Preservation Education Foundation

IMI INTERNATIONAL MASONRY INSTITUTE

ABOUT

200 years have now passed since the introduction of artificial Portland cement in 1824. No other building material since the Industrial Revolution has so transformed the built environment, ushering in the modern age. As the main ingredient in concrete, cement is the most widely used substance on Earth after water. It is also recognized as the third largest carbon dioxide emitter in the world.

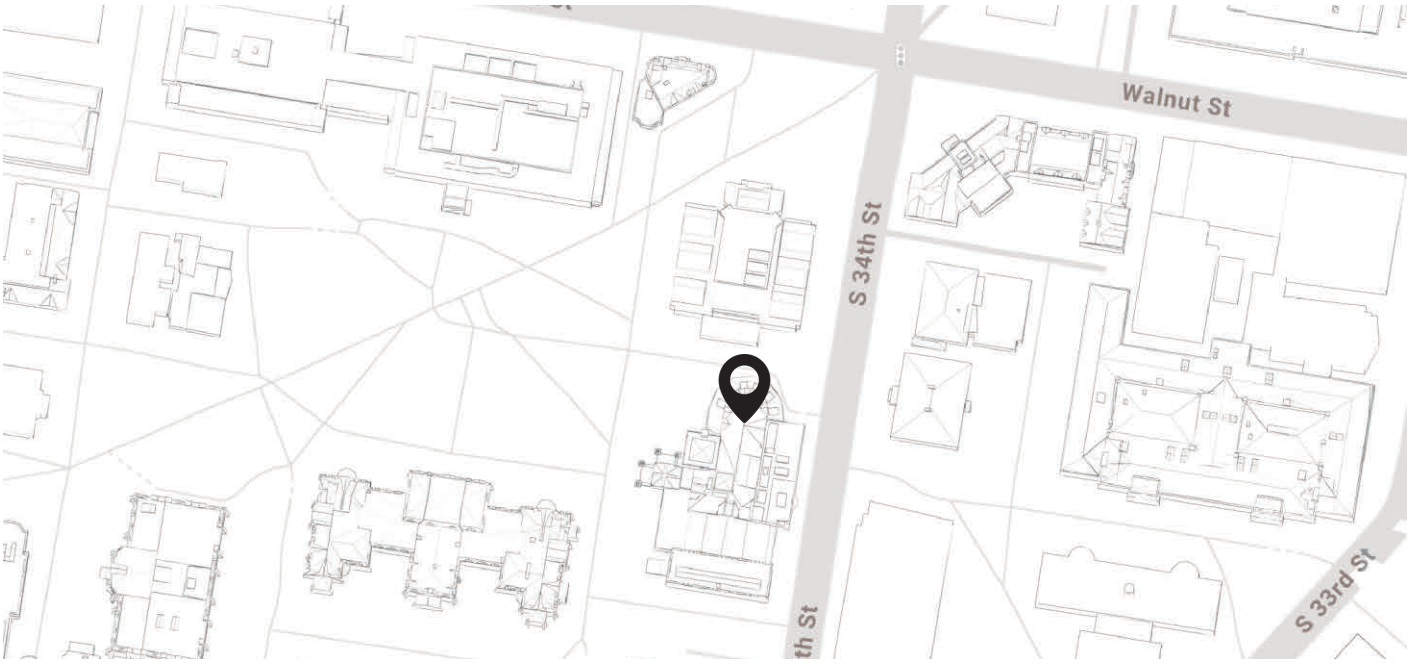
The technology and use of concrete in engineering and architecture have evolved greatly from its introduction in the 3rd century BCE by Roman engineers to its reemergence in the 19th century and prominence as the signature material of modern architecture and the development of 20th century cities. With over a century of building, modern concrete 'heritage' is now a critical topic of interest for design and preservation professionals alike.

Cement Age/Concrete Nation will offer an in-depth study of the origins of modern concrete heritage, its conservation issues and methods, and current demands for sustainability and ecological transition. Philadelphia, by virtue of its rich collection of concrete architecture by influential architects and engineers spanning the 20th century, and its proximity to the Lehigh Valley, birthplace of American artificial cement in 1871, provides a unique setting for the celebration of this milestone in building technology.

Cover image: Torino Esposizioni by Pier Luigi Nervi, Turin, Italy. Photo by Mario Carrieri, courtesy Pier Luigi Nervi Foundation Project

LOCATION

STUART WEITZMAN SCHOOL OF DESIGN **FISHER FINE ARTS LIBRARY**
220 S 34TH ST, PHILADELPHIA, PA 19104



SCHEDULE

FRIDAY, OCTOBER 4 Kleinman Forum, Fisher Fine Arts Library

Technical History | Session Chair: Frank Matero

8:00 – 8:45 AM Registration & Breakfast / Fisher Fine Arts Library Lobby

8:45 – 9:00 AM ***Frank Matero:*** Welcome and Introduction

9:00 – 10:00 AM ***Amy E. Slaton:*** Keynote | Accounting for Concrete: Social and Labor Relations in United States Construction History

10:00 – 10:45 AM ***Sarah Nichols:*** Keynote | Constructing Concrete: The Power of Discourse Across the 19th and 20th Centuries

10:45 – 11:00 AM Break

11:00 – 11:45 AM ***John J. Walsh:*** A Microscopic View of Portland Cement: Its Evolution and Diversity of Uses in the United States During the 19th and 20th Centuries

11:45 – 1:00 PM Lunch & View Exhibit

1:00 – 1:45 PM ***Richard Pieper:*** The Evolution of Historic "Cast Stone"

1:45 – 2:30 PM ***Jack Pyburn & Wido Quist:*** Shokbeton: From Dutch Innovation to Architectural Impact in the United States

2:30 – 2:45 PM Remarks & Questions

2:45 – 3:00 PM Break

Regional Histories | Session Chair: Casey Weisdock

3:00 – 3:40 PM ***Tyler Sprague:*** Thin-Shell Concrete in the Pacific Northwest: Material of Innovation

3:40 – 4:20 PM ***Beatriz del Cueto:*** The Genesis of Concrete Use in Cuba, Puerto Rico, and the Dominican Republic

4:20 – 5:00 PM ***Bhawna Dandona:*** Concrete in India

5:00 – 5:15 PM Remarks & Questions

5:15 – 7:00 PM Cocktail Reception / Fisher Fine Arts Library Lobby

SATURDAY, OCTOBER 5 Kleinman Forum, Fisher Fine Arts Library

Selected Projects | Session Chair: Irene Matteini

8:00 – 8:45 AM Registration & Breakfast / Fisher Fine Arts Library Lobby

8:45 – 9:00 AM ***Irene Matteini:*** Welcome and Introduction

9:00 – 9:45 AM ***Greta Bruschi:*** From Analysis to Intervention Issues: Exposed Concrete at the Brion Memorial by Carlo Scarpa

SATURDAY, OCTOBER 5 Kleinman Forum, Fisher Fine Arts Library

9:45 – 10:30 AM	***Bob Armbruster:*** Beautiful Concrete: John J. Earley, the Baha'i Temple and its Restoration
10:30 – 10:40 AM	Break
10:40 – 11:25 AM	***Gunny Harboe & Blake Rago:*** Restoring the Exterior Concrete of Unity Temple
11:25 – 11:45 PM	***Tyler Sprague:*** A "Virtuoso Performance" in Pre-Stressed Concrete: The United States Science Pavilion at the 1962 Seattle World's Fair
11:45 – 12:00 PM	Remarks & Questions
12:00 – 1:10 PM	Lunch
1:10 – 2:10 PM	Preservation Case Studies | Moderated by Justin M. Spivey ***Deborah Slaton, Katherine Frey, Keith Kesner, Joshua Freedland & Tim Redar, Justin M. Spivey, Jingyi Luo, Elizabeth Davidson, Edward FitzGerald***

Education | Session Chair: Deborah Slaton

2:10 – 2:40 PM	***Ana Paula Arato Gonçalves:*** Advancing the Concrete Conservation Field: Contributions from the Getty Conservation Institute
2:40 – 3:10 PM	***Peter Kohl:*** International Masonry Training and Education Foundation: Technical Expertise for Historic Concrete Repair
3:10 – 3:40 PM	***Irene Matteini:*** CONCRETO Academy
3:40 – 3:50 PM	Remarks & Questions
3:50 – 4:00 PM	Break

Concrete Futures | Session Chair: Roy Ingraffia

4:00 – 4:30 PM	***James Farny:*** Cements of the United States in the 21st Century
4:30 – 5:00 PM	***Randolph Kirchain:*** Unlocking Pervasive Decarbonization Strategies in Cement-Based Products by Looking at the Use and End-of-Life Opportunities
5:00 – 5:30 PM	***Mija Hubler:*** The Evolution and Application of Biological Concrete Materials
5:30 – 6:00 PM	***Thomas Schumacher:*** The Role of Non-Destructive Evaluation in the Engineering and Preservation of Concrete Structures
6:00 – 6:15 PM	Remarks & Questions
6:15 – 6:30 PM	***Norman Weiss:*** Closing Remarks

ON DISPLAY

Concrete on Paper

Curators: Frank Matero and Irene Matteini
Curatorial Assistants: Daniel Saldaña Ayala, Kate Whitney-Schubb, and Siqi Zhao

While the practice of combining gravel, sand, and a mineral binder such as clay or lime for construction dates back millennia, the invention of Portland cement in 1824 was the catalyst necessary for the revival of concrete as a construction system by the late 19th century. ***Concrete on Paper*** follows concrete's reintroduction, first through scientific papers on hydraulic materials and specialized imitation stone products in the late 18th century to popular do-it-yourself house building manuals of the mid-19th century.

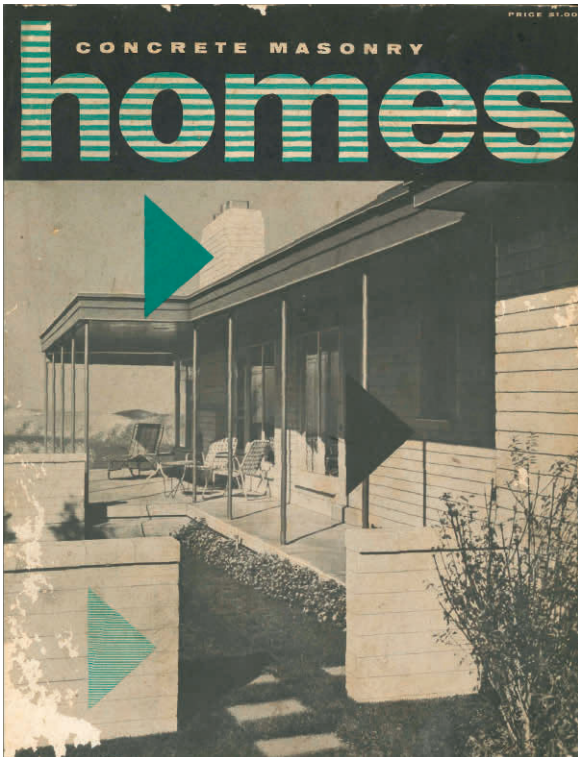


Image: Collection of Frank Matero

As with any new material and construction process (reinforced concrete was both), concrete's reception was shaped first by practical and aesthetic concerns about its use and treatment. With the rise of the cement industry, professionals demanded material standards, and the industry was keen to comply, creating a plethora of commercial literature and trade journals for suppliers and users. As the material rose in popularity, engineers and architects required textbooks, and contractors needed manuals to properly design and execute the work, while the public sought advice through the many popular shelter magazines that advocated concrete as a modern choice for modern living.

Concrete is here to stay. As the industry explores more sustainable production and high performance building practices, including material recycling, the vast volume of existing concrete structures and infrastructure demand our attention, through both retention of the everyday and preservation of the exceptional landmarks.

On view: September 25, 2024 – May 1, 2025
Fisher Fine Arts Library, first floor
Library Hours During Conference:
Friday Oct 4: 9 AM – 6 PM
Saturday Oct 5: 10 AM – 6 PM

Special thanks to Tesselle, BAC Local 1, and the International Masonry Institute for their support in the construction of the concrete blocks used in the exhibition space.

PRECAST SPONSOR

CEMENT SPONSOR

GRAVEL SPONSOR

SAND SPONSORS

FOOD & DRINK SPONSORS

FRIDAY, OCTOBER 4

8:45 AM – 2:45 PM | Technical History

Session Chair: Frank Matero

Welcome & Introduction

Speaker: Frank Matero *8:45 – 9:00 AM*

Keynote Presentation | Accounting for Concrete: Social and Labor Relations in United States Construction History

Speaker: Amy E. Slaton *9:00 – 10:00 AM*

Histories of modern concrete use have rested largely on two features of the material, both deriving from its fluid nature: its relatively inexpensive character for large-scale application compared to older "batch" methods such as masonry or carpentry; and its suitability for expressing elaborate aesthetic intentions. While these narratives have helped us see the profoundly interconnected nature of materiality and design in the history of building, a deeply consequential pattern of social relations might also be exposed by historicizing this familiar material: a set of conditions associated with capitalism and its labor systems that have undergirded both the commercial and aesthetic appeal of concrete construction in the United States.

Through a critical history of commercial cement and concrete use, we can probe prevailing conceptions of efficient and affordable building processes and how these determinations have supported capital investment. The priority long given by building firms and owners to cost savings, in other words, frames the historical question, not the answer, to our investigations of concrete's unceasing popularity. We can find in the 20th-century expansion of concrete use in the US a powerful record of industrial labor relations, including ideas of fair occupational opportunities, reliable technical knowledge, and the origins of both in racial and gender ideologies. By bringing out the role of majority interests in the wide take-up of concrete, we confront the embeddedness of architecture in timelines of wealth and social influence, and engage with the inescapable problem of how as historians we can most fully account for our built and social environments.

Keynote Presentation | Constructing Concrete: The Power of Discourse Across the 19th and 20th Centuries

Speaker: Sarah Nichols *10:00 – 10:45 AM*

For as much as we tend to think of materials as given things, what a material is is historically and disciplinarily contingent. This talk will look at the long period between the industrialization of Portland cement production in the 19th century through to the unprecedented mass deployment of concrete in the postwar period. In doing so, it will trace the impact of the institutions, ideas, and techniques in Western Europe from the turn of the 20th century through the interwar period that helped unleash the flood of concrete in the postwar period.

This will be a history of the concrete in architecture rather than architecture in concrete, with the aim of understanding the ways a material is designed on the way to becoming a structure. Yet, to be clear, this is not viewed as a one-way relationship in which architects or architecture received and made use of something that had already been conceptualized and produced. Architects and architecture were key actors in shaping concrete.

Concrete was not a fixed material. It was not—as one dominant narrative goes—introduced as a new material in the 19th century and then mastered by engineers and later architects. Over and over again, concrete was designed and redesigned. Its composition changed. Its consistency changed. Its intended uses changed. The means of delivery changed. Its surface changed. And, perhaps most powerfully, conceptions of the material also changed. While trying to understand what is embedded in materials, this talk will also reveal the power of discourse. Concepts about concrete often developed as guiding visions for what the material would become, even at times when such ideas were hard to square with concrete as it existed at the time such visions were put forward. Once established, these notions about concrete continued to change, again reflecting larger societal concerns.

Break *10:45 – 11:00 AM*

A Microscopic View of Portland Cement: Its Evolution and Diversity of Uses in the United States During the 19th and 20th Centuries

Speaker: John J. Walsh *11:00 – 11:45 AM*

With the naked eye, it's hard to see how a drab gray powder has made such an impact on modern society. Yet, under the microscope, Portland cement is shown to be a carefully engineered artificial rock made to suit an ever-growing number of structural, functional, and aesthetic purposes. While we celebrate the anniversary of Aspdin's invention, it is important to recognize that portland cement development was as much evolution as revolution. From the mid-eighteenth century, discoveries of rocks that naturally produce hydraulic binders when calcined instigated a search for an artificial cement recipe better suited to industrial process. Improvements in that recipe continue to be made today.

Viewing portland cement under the microscope allows us to track the evolution of the product and observe how designers have made best use of its properties. At its earliest in the United States, engineers imported British cement to create artificial stone that could not be made successfully with any other American product. Once made in the United States, innovative designers such as Rafael Gaustavino could adapt the now inexpensive and reliable product to the creation of sound-absorbing tiles for his soaring vaults and domes. A small modification of the cement chemistry provided the industry with a non-staining product for marble and limestone masonry of any scale. Major infrastructural projects of the 20th century benefited from the Abrams water-cement ratio law and early belite-rich cements that were volume stable. Further benefit to infrastructure relied on the addition of supplementary cementitious materials that react with Portland cement hydrates to yield a more chemically stable and water-resistant matrix.

FRIDAY, OCTOBER 4

Lunch & View Exhibit

11:45 AM – 1:00 PM

The Evolution of Historic "Cast Stone"

Speaker: Richard Pieper

1:00 – 1:45 PM

"Cast stone," also known as "concrete stone," was precast concrete intended to imitate natural stone. This building material evolved dramatically in the United States at the end of the 19th and the beginning of the 20th centuries. In the third quarter of the 19th century, before domestically produced Portland cement became widely available, a number of different cementing systems were used, generally with natural sands as aggregates. After Portland was adopted, greater verisimilitude was achieved by using crushed stone and slag as aggregates, chiefly to imitate uniform fine-grained granites, as well as limestones and marbles. As the material became widely popular, significant increases in production were enabled by switching from casting in rigid molds (cast iron, or plaster and gelatin) to sand casting in a clay sand mix, similar to that used to cast iron. This method increased production dramatically, but also required surface tooling of the cast elements to remove a cement-rich mold skin. This tooling gave the cast elements an even more realistic appearance.

Changing tastes in natural stone for architecture in the beginning of the 20th century necessitated different methods of production to imitate newly popular banded and figured sandstones, coquinaceous limestones, and colored granites. Numerous techniques were used, and the resulting products vary dramatically in appearance.

This talk will review the changes in production that allowed cast stone fabricators to respond to increased demand as well as changing tastes in stone for architecture.

Schokbeton: From Dutch Innovation to Architectural Impact in the United States

Speakers: Jack Pyburn & Wido Quist

1:45 – 2:30 PM

Schokbeton was a company and patented system of Dutch origin for prefabricating reinforced concrete building components. Originally patented in 1934, Schokbeton was hugely successful, as evidenced by its export, licensing, and franchising around the globe. The essence of the Schokbeton patent was lifting and dropping the mould at a high frequency while pouring the concrete (with a low water-cement-factor), instantly compacting the concrete, resulting in very dense concrete, hardly permeable for water and oxygen.

Concrete precasting was a response to a variety of economic, environmental, and social forces working against in-situ concrete construction. After the turn of the 20th century, ever-increasing labor costs made in-situ construction economically uncompetitive, particularly for architectural-quality concrete. In response, precasting introduced systematized concrete production in a weather-protected plant for more efficient production, manageable construction schedules, consistency, and elevated quality than site construction could achieve.

Schokbeton arrived in the Untied States with the first mainland franchise in 1960 to a newly formed company, Eastern Schokbeton. Eventually, Schokbeton was licensed and franchised nationwide in the US and produced architectural precast concrete for many prominent American mid-century architects. The intrinsic durability of the material, the high quality of engineering and technical design within the company, as well as the cooperation with renowned architects, allow for a retrospective analysis of the architectural legacy and impact of Schokbeton.

This duo-presentation will trace Schokbeton's interesting postwar path from the Netherlands to the US and its distribution of franchisees and licensees across the US It will show many buildings, dive into concrete recipes, and refer to archival material to elaborate on the introduction, growth, maturity, and decline of Schokbeton. By doing so, it will explore how precasting changed how concrete architecture was designed and constructed.

Remarks & Questions *2:30 – 2:45 PM*

Break *2:45 – 3:00 PM*

3:00 – 5:15 PM | Regional Histories

Session Chair: Casey Weisdock

Thin-Shell Concrete in the Pacific Northwest: Material of Innovation

Speaker: Tyler Sprague *3:00 – 3:40 PM*

Reinforced concrete was an integral part of the construction and development of the Pacific Northwest in the 20th century. In the 1920s, concrete 'skyscrapers' remade a downtown core. During the Great Depression and World War II, concrete box girder bridges became so lightweight they began to float. In the post-war period, geometrically precise formwork led to unparalleled thinness and efficiency in thin-shell concrete construction.

In the early 1950s, the architectural engineer Jack Christiansen emerged as a significant designer of thin-shell structures, bringing a logic of construction and economic efficiency to the architecturally expressive medium. Because of this approach, Christiansen was able to design hundreds of cost-effective, thin-shell structures in the Northwest and beyond, joining a global cohort of thin-shell designers like Felix Candela and Heinz Isler as one of the most prolific in the world. His design work culminated in the Seattle Kingdome (1976-2000)—the largest free-standing concrete dome in the world in its time.

Christiansen's design career provides insight into the particularities of thin shells of reinforced concrete, revealing their latent capabilities and potentials, as well as their shortcomings. The range of structural forms and architectural uses speaks to their strength and versatility. However, building performance concerns of waterproofing, insulation, and acoustical treatment often complicated their future success.

FRIDAY, OCTOBER 4

The Genesis of Cement Use in Cuba, Puerto Rico, and the Dominican Republic

Speaker: Beatriz del Cueto *3:40 – 4:20 PM*

In the Spanish Caribbean (Cuba, Puerto Rico, and the Dominican Republic), imported materials and construction techniques helped produce buildings that were fire-, water-, and vermin-proof during the first decades of the 20th century. Prefabrication, standardization, manufacturing speed, and installation, as well as innovative means and methods, revolutionized the construction industry of the region. Often earlier than in the United States, and almost immediately adopted, was imported Portland cement. As one of the most innovative materials of the 19th century, cement in barrels as well as prefabricated ornamental floor tiles were imported, embraced, and used in these island-countries since the late 1900s. Cement was used to produce blocks or artificial stone, cast stone, ornamental floor tiles, reinforced concrete, and many other molded cladding materials used as covering for steel-framed structures. The use of cement (quick-setting due to the high humidity of the local tropical climate) produced long-lasting individual components and buildings that would survive indefinitely in these territories affected by high marine salinity, earthquakes, and hurricanes.

Regional cement factories were established as early as 1895 in Cuba, facilitating faster fabrication methods, since the lighter new buildings were constructed with the use of repetitive processes facilitated using reusable molds. This mostly early-20th-century molded architecture, with an infinite series of combinable elements such as columns, balconies, ornament, as well as roofs and walls made with Portland cement, quickly filled neighborhoods in Cuban, Puerto Rican, and Dominican environs. Catalogs produced in each of these countries included innovative prefabricated cement architectural elements, which would maintain the essence of local traditional architecture, translated into cement and reinforced concrete. The new cataloged "cement architectural kit of parts" would help evolve original designs, while maintaining popular layouts with the front balcony as a recurring and important architectural element for cultural communication.

Interior patio of the concrete block and cast-stone Rubens Palace (1906) in Mariel, Cuba. Pantel del Cueto & Associates LLC, 2015.

Concrete in India

Speaker: Bhawna Dandona *4:20 – 5:00 PM*

Concrete was employed as a building material in India during the first half of the 20th century. However, the modern architectural movement developed after India's independence in 1947, shaped by the first Prime Minister's vision of new democracy and industrialization. During this period, concrete was primarily used for structural framing.

Beton brut, or exposed concrete in its raw, unaltered form, emerged with its innovative implementation in Chandigarh and Ahmedabad, paving the way for brutalist architecture in India. In the 1960s and 1970s, Indian architects and engineers started experimenting with concrete to develop distinctive architectural forms and finishes. This included the use of large cantilevers, folded plates, diaphragm plates, shear walls, and ribbed and radial beams, all crafted as monolithic concrete, representing a significant departure from earlier practices. Previously unseen aesthetic finishes were achieved, showcasing unadorned, form-finished concrete with textured surfaces created through meticulously handcrafted formwork and the careful selection of aggregates. All these advancements were accomplished despite the difficulties of working with new techniques, inadequately trained workforce, and resources suited for such specialized work. After more than fifty years in the tropics, combined with the effects of climate change and the challenges of concrete conservation as a new field in India, most of these buildings are now exhibiting signs of distress.

These buildings are outstanding examples of nation-building through design, technological, and material innovation, contributing to the context of the 20th-century modern Indian narrative, and yet their significance in India remains largely unrecognized. The lack of identification, conservation, and insufficient protection has led to the recent demolition of many notable buildings, destroying a vital part of the cultural heritage.

This paper will examine the culture of exposed concrete in India, focusing on transnational exchanges, key contributors, and the development of innovative techniques. It will draw on interviews, publications, archival drawings and images, trade journals, and concrete handbooks.

Remarks & Questions *5:00 – 5:15 PM*

SATURDAY, OCTOBER 5

8:45 AM – 2:10 PM | Selected Projects

Session Chair: Irene Matteini

Welcome & Introduction

Speaker: Irene Matteini *8:45 – 9:00 AM*

From Analysis to Intervention Issues: Exposed Concrete at the Brion Memorial by Carlo Scarpa

Speaker: Greta Bruschi *9:00 – 9:45 AM*

The Brion Memorial (1969-78) by Carlo Scarpa (1906-1978) is an exceptional study case because of its monumental character, combined with the author's desire to imagine its aging, (not its damage) over time. The almost exclusive use of reinforced concrete for the built architecture and the choice of experimental technical solutions place this architectural complex within the field of contemporary architecture preservation, due to the theoretical and operational difficulties in defining the intervention. Furthermore, the preservation problems of exposed concrete characterized by peculiar formal values are well known. Actually, Scarpa's concrete processing techniques provide a wide range of surfaces and related forms of degradation, which require specific approaches to their preservation.

An original and complex system of surveying and interpreting the construction elements is applied, also proposing a specific rendering methodology—graphic, photographic, and descriptive—in order to represent both technological characteristics and degradation phenomena, as well as operative indications, such as diagnostic investigations or preservation and maintenance interventions.

This knowledge path led to the definition of the necessary interventions: the outcome of the investigation phase allowed the interventions to be tested on a portion of the artifact (2018); once validated, it was extended to the entire complex. The restoration of the Brion Memorial provided an extraordinary opportunity to reflect on the methods and limits of preservation interventions and to update the current state of the art in terms of technical solutions. The restoration was completed in 2020.

Beautiful Concrete: John J. Earley, the Baha'i Temple and its Restoration

Speaker: Bob Armbruster *9:45 – 10:30 AM*

108 years ago, architectural sculptor John J. Earley unveiled the potential for exposed aggregate concrete as an architectural finish material. Over the next three decades, he established not just a single architectural finish, but a family of techniques to create a vast range of forms, colors, and textures with concrete. In their total effect, John J. Earley's innovations breathed life and spirit into concrete as a modern architectural material.

Earley's greatest project was the stunning Baha'i House of Worship in Wilmette, Illinois. The Temple's design

presented Earley with both an opportunity and a set of new challenges that required ingenious technical developments. In 1933, for the Temple's dome, Earley Studio created some of the first architectural precast concrete panels installed on a structural steel framework. For seventeen more years, the Studio produced ornamentation for the Temple's exquisitely beautiful architectural finishes.

Photo courtesy the Armbruster Company.

When areas of the Baha'i Temple needed restoration, no similar repairs of exposed aggregate concrete had been done. The team not only had to identify the problems' causes and design solutions; it also had to rediscover John J. Earley's process and adapt his historical methods to the requirements of modern material science. Restoration projects between 1987 and 2010 required extensive research, testing, and experimentation to create repairs that match John J. Earley's original work.

This presentation will survey John J. Earley's key projects and technical innovations, dive into Earley Studio's construction of the Baha'i Temple's cladding, and share methods developed for restoration of extraordinary architectural concrete.

Break

10:30 – 10:40 AM

Restoring the Exterior Concrete of Unity Temple

Speakers: Gunny Harboe & Blake Rago

10:40 – 11:25 AM

Completed in 1908 and featured on the cover of Frank Lloyd Wright's Wasmuth Portfolio, Unity Temple changed the course of architecture. While not the first building made solely of cast-in-place concrete, it was an early use of the material, and forcefully demonstrated the power and possibilities of this modern material. Being an early example of concrete being used in this way, its long-term behavior was poorly understood. As a result, by the 1970s, the building exhibited significant deterioration. A repair program was prepared by removing approximately an inch of the existing concrete surfaces and applying "shotcrete" to protect the underlying structure. This stemmed the tide of deterioration for some time, but by the late 1990s the overhangs were in a deplorable state and needed major repairs. That work was completed by removing and recasting the overhangs and applying shotcrete to the underside. While these repairs addressed the most pressing problems, the rest of the building was in dire need of attention. The Unity Temple Restoration Master Plan was completed in 2006 and, finally, in fall of 2014, funding was in place and the planning began for complete $25 million restoration of the building.

The restoration included addressing the entire concrete façade. The work in the 1970s and been done in a manner that made matching the existing surfaces extraordinarily challenging. Months of planning and mockup trials were needed to establish an acceptable methodology and matching protocol for the work. Once that was completed, the work proceeded in an orderly manner with only a few instances of problems that were eventually resolved. The result was a return of Unity Temple to its stunning presence on Lake Street in Oak Park. The building is now one of eight Frank Lloyd Wright sites listed at World Heritage.

The presentation will describe the restoration process in detail, and will be made by the architect and specialty contracting team who executed the work.

A "Virtuoso Performance" in Pre-Stressed Concrete: The United States Science Pavilion at the 1962 Seattle World's Fair

Speaker: Tyler Sprague *11:25 – 11:45 PM*

The 1962 Seattle World's Fair was a global exposition of technological ambition in the Space Age. The US Science Pavilion at the fair, designed by the architect Minoru Yamasaki and structural engineer Jack Christiansen, pushed the technological and practical boundaries of prestressed concrete to create a light, expressive, and durable Pavilion complex. Aligned with the mission of the Pavilion to promote scientific advancements, the pre-stressed concrete itself was celebrated a legitimate "material of the future."

The US Science Pavilion consisted of five low-rise rectangular buildings grouped around a central courtyard. Each building was made of ribbed precast concrete bearing walls that supported long-span prestressed concrete T-beams. Intricately patterned and faced with crushed quartz, the panel walls were pure white and glistened in the sun. The courtyard was marked by a series of post-tensioned elevated platforms and overhead lattice domes—which were playfully referred to as having a "Space Gothic" design. Combined, these structures created a dramatic yet serene oasis in the middle of the busy fair.

Execution of the US Science Center was only possible because of close collaboration between Yamasaki, Christiansen, and the precast concrete contractors—drawing on a growing local knowledge base in prestress. Tight coordination of mix design, tolerances, and construction schedule were essential to a successful project, and resulted in a remarkably durable Pavilion. Current renovation efforts have largely preserved the original design intent and revealed few instances of concrete in need of repair or preservation. Operating today as the Pacific Science Center, the Pavilion continues to celebrate scientific achievement and attract young visitors.

Remarks & Questions *11:45 AM – 12:00 PM*

Lunch *12:00 – 1:10 PM*

Case Study Presentations

Moderator: Justin M. Spivey *1:10 – 2:10 PM*

Deborah Slaton | Three Moments in Historic Concrete

Katherine Frey | Rehabilitation of John J. Earley Concrete at Meridian Hill Park

Keith Kesner | Long-Term Protection of Franklin Field

Joshua Freedland & Tim Redar | Jackson Lake Lodge

Justin M. Spivey | Above Deck: Through Girders, Trusses, & Other Explorations in Concrete Structural Form

Jingyi Luo | Reinforced Bush-Hammered Concrete

Elizabeth Davidson | The Hill House

Edward FitzGerald | Conservation of Costantino Nivola's Concrete Play Horses

2:10 – 3:50 PM | Education

Session Chair: Deborah Slaton

Advancing the Concrete Conservation Field: Contributions from the Getty Conservation Institute

Speaker: Ana Paula Arato Gonçalves *2:10 – 2:40 PM*

In 2014, the Getty Conservation Institute (GCI) organized an experts meeting to assess the concrete conservation field and identify actions that could help practitioners deal with the many technical challenges in conserving this material. This was based on a recognition that reinforced concrete is an integral part of much of the 20th century's built heritage worldwide, and an important contributor to the cultural significance of these sites. The conclusions from this experts meeting have been guiding GCI's activities to date.

In response, part of GCI's work has focused on making existing knowledge more accessible to conservation practitioners through publications and training opportunities. In addition, these dissemination activities aimed to reinforce the connections between the broader concrete field and conservation. That is the guiding premise of the methodology presented in the Conservation Principles for Concrete of Cultural Significance, published in 2020.

More recently, the GCI embarked in an international collaboration with Historic England and Laboratoire de Recherche des Monuments Historiques, France, to study the performance of patch repairs executed

with the intent to match architectural concrete surfaces. The evaluation of 21 sites across the three participating countries was conducted in two phases, starting with documentation and non-destructive assessment of all sites, followed by in-depth investigation of a select number of sites, including sample collection for laboratory analysis. The results of this research reinforce the need for more consistent adoption of a methodology based on sound concrete repair and conservation knowledge, and the need for more craftspeople, engineers, architects, and conservators skilled in concrete conservation. The goal is to use these results to provide practical guidance in the repair of culturally significant concrete, adding to the already existing resources to help guide and train more professionals in the concrete conservation field.

International Masonry Training and Education Foundation: Technical Expertise for Historic Concrete Repair

Speaker: Peter Kohl *2:40 – 3:10 PM*

The presentation will cover who the International Masonry Institute and International Masonry Training and Education Foundation are and what our function is with the Bricklayers Union. We will talk about our collaboration with International Concrete Repair Institute (ICRI) and the certificate program. We will also talk about our other certificate programs and how they function in specification language in construction projects. We will talk about how and why the concrete repair certificate program was developed and what training we do for the concrete program. We will dive into our infrastructure here in the United States and what will be needed for concrete repair. We will talk about condition assessment concerning concrete and how to better educate our craftworkers not only of the repairs themselves but also for them to gain knowledge to what can cause certain failures and some of the testing that associated with condition assessment. After the diagnostic part of the repair class, we get into repair materials, methods, and techniques. We will talk about mix design for repairing historic concrete structures. The mix design will cover the use of different types of gravels, sands, and Portland cements. We will cover consolidation and compaction of materials along with key application requirements and finishes to match existing concrete structures.

CONCRETO Academy

Speaker: Irene Matteini *3:10 – 3:40 PM*

CONCRETO is an Alliance for Enterprises and Education Project within the Erasmus Plus program, spearheaded by the Pier Luigi Nervi Foundation. Launched in January 2024, CONCRETO unites a broad consortium of 13 partners from five countries: four EU countries (Italy, Spain, Belgium, the Netherlands) and one extra EU country (Türkiye). This diverse group includes organizations focused on modern heritage preservation, universities, vocational training organizations, and national trade associations of architects and engineers. The consortium brings together public and private entities, academic researchers, and practicing professionals with the mission to bridge the gap between academia and the professional world, with a focus on modern concrete heritage.

Inspired by the great architectural legacy of Pier Luigi Nervi, CONCRETO responds to the urgent need to develop specialized skills for the safeguard of the modern concrete heritage. The program aims to

foster and promote the expertise necessary for this task through an innovative and collaborative training program.

Each year, students from architecture and engineering schools, craftworkers, and young professionals are selected to take part in this 1-year program. The CONCRETO Journey starts with distance learning and the program slowly becomes more practical, culminating with a full immersion hands-on experience, transforming the students into apprentices during the MASTERPIECE in Ivrea. The CONCRETO MASTERPIECE is the closing activity of the program and takes place at the UNESCO Site of the Industrial City of Olivetti in Ivrea, Italy.

The CONCRETO Academy represents an enduring opportunity of knowledge, growth, and exchange. The overall aim of CONCRETO Academy is to transmit and promote the green rehabilitation of European concrete heritage architecture.

Remarks & Questions

3:40 – 3:50 PM

Break

3:50 – 4:00 PM

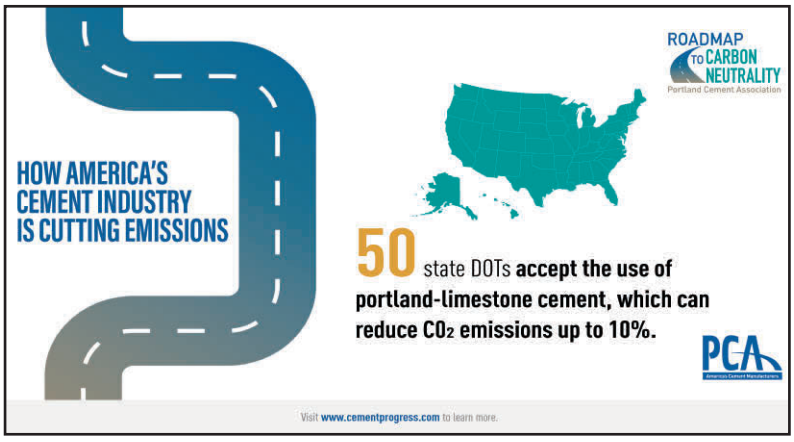
4:00 – 6:30 PM | Concrete Futures

Session Chair: Roy Ingraffia

Cements of the United States in the 21st Century

Speaker: James Farny

4:00 – 4:30 PM



The future of cementitious materials is changing, and this session lays out the vision for the pursuit of greater sustainability for construction by the cement and concrete industry. The Portland Cement Association's Roadmap to Carbon Neutrality outlines opportunities at all stages of the value chain for cement-based construction.

One way that cement manufacturers are responding to environmental concerns is with an increased range of products and formulations. Blended cements offer an opportunity to reduce the global warming potential (GWP) of cement that, in turn, reduces the carbon footprint for concrete construction. The ASTM C595 blended cement standard provides four blended cement types to offer greater choices to specifiers and other

users. As of mid-2023, more than 50% of cement used in the US was blended cement, largely due to the increased uptake of Type IL Portland-limestone cement (PLC) that began in 2021. In 2024, cement manufacturers continue to explore additional blended cement formulations to reduce their environmental impacts. A switch from ASTM C150 Portland cement to an ASTM C595 blended cement requires evaluation of fresh and hardened concrete properties to understand appropriate adjustments to mixtures and installation practices when necessary. Based on lessons learned from the experience with PLC, this session describes common issues to consider and potential modifications to practices that will enable successful implementation of any blended cement.

Unlocking Pervasive Decarbonization Strategies in Cement-Based Products By Looking at Use and End-of-Life Opportunities

Speaker: Randolph Kirchain *4:30 – 5:00 PM*

Much of the discussion of decarbonization focuses on changes to cement production. However, there are many opportunities for reducing the carbon emissions associated with concrete construction that can be applied pervasively and immediately when we look beyond the cement plant. This presentation will provide a comprehensive overview of strategies for reducing life cycle emissions from cement-based products. We will take a detailed look at one misunderstood mechanism for decarbonization—permanent storage of carbon dioxide in cement-based products during its use and at end-of-life. Specifically, this presentation will discuss what we know about the rate and extent of carbon uptake in cement based products, such as cast-in-place and masonry concrete, how those are enhanced, and what are some of the key remaining knowledge gaps.

The Evolution and Application of Biological Concrete Materials

Speaker: Mija Hubler *5:00 – 5:30 PM*

Portland cement has a long history, but recent goals for enhanced durability, recyclability, and carbon neutrality have raised questions about what we might build with in the future. Innovative alternatives to Portland cement include biologically derived binders. These binders employ bacteria, fungi, and algae to create a bonded matrix without the environmental burden of sintering. Additionally, some approaches leverage bacteria for the manufacture of grains or limestone. Introducing these materials into practice raises interesting new questions and challenges. Placement requirements of some alternative cements results in different optimal geometries for hardening. This opens the doors to new designs for masonry units. Differences in mechanical performance enable structural forms, such as arches, due to higher tensile capacity. This talk will conclude with a discussion laboratory implementation of various innovative products in a wall and floor system.

The Role of Non-Destructive Evaluation in the Engineering and Preservation of Concrete Structures

Speaker: Thomas Schumacher *5:30 – 6:00 PM*

Non-destructive evaluation (NDE) is an umbrella term for structural health monitoring (SHM) as well as non-destructive testing (NDT). While the former includes techniques that use sensors to monitor changes of structural performance over time, the latter provides a snapshot of the properties of a structural member and its condition. The objective of NDE is to ensure the proper functioning and safety of a structure during the service period. Additionally, the information generated can be used to enable optimal asset management and preservation. This presentation gives an overview of NDE, proposes a framework that integrates SHM and NDT, and discusses some recent case studies in which NDE was used to extend the service life of concrete structures. Finally, a new educational program will be discussed, aimed at educating a future workforce in engineering and preservation of structures, a focus area that is currently not offered widely.

Remarks & Questions *6:00 – 6:15 PM*

Closing Remarks

Speaker: Norman Weiss *6:15 – 6:30 PM*

SPEAKERS

ROBERT F. (BOB) ARMBRUSTER is president of the Armbruster Company and an expert in the restoration of historic, exposed aggregate, architectural concrete and mosaic concrete artworks. Bob is a leading authority on John J. Earley and restoration of Earley Studio's work. Bob provided program management, engineering, and construction for complex restorations of historic properties. His studio has designed and produced civic artwork in mosaic concrete. Bob directed restoration of the Baha'i Temple and gardens in Wilmette, IL. Notable projects also include Meridian Hill Park, Biltmore Estate, Iwo Jima Memorial, Nashville Parthenon, Thomas Edison Memorial Tower, Longwood Gardens, and Battle Maps in the US Memorial to Pacific Wars.

GRETA BRUSCHI is an architect, graduated in "History and Preservation of Architectural and Environmental Heritage" in 2002 and in "Architecture for Preservation" in 2005 at Iuav University of Venice. She obtained her PhD in "History of architecture and urbanism - restoration and preservation curriculum" in 2016 at Iuav. She is currently Adjunct professor (RdtA) in Heritage Restoration and Preservation at Iuav. She works on issues related to the conservation of 20th-century materials and architectures, as well as vulnerability in relation to seismic risk and climate change.

BEATRIZ DEL CUETO is a licensed conservation architect, who holds a PhD in architecture, building, urbanism, and landscape from the Universidad Politécnica de Valencia, Spain. She is founding partner of Pantel, del Cueto & Associates, LLC in Puerto Rico, Fellow of the American Institute of Architects, the American Academy in Rome, and the James Marston Fitch Foundation. As an active professional, she continues to research and specify compatible materials and conservation methods for historic structures.

BHAWNA DANDONA is a conservation architect with a Master of Science in Architectural Materials Conservation from the University of Pennsylvania. She has worked extensively with heritage sites in both India and the United States. Her expertise includes documenting, assessing conditions, and developing sustainable conservation strategies using scientific methods. She has a keen interest in construction histories, the impact of climate change on building materials, and investigative techniques for preserving heritage sites. She was honored with a scholarship for her research on Lakhori brick. Currently, she is focused on researching and mapping modern Indian architecture, with a particular emphasis on Brutalist structures.

ELIZABETH DAVIDSON is the director of the Hill House project for the National Trust for Scotland. Her background is in conservation and regeneration with a career including director of Glasgow Building Preservation Trust, the Scottish Civic Trust, Historic Environment Scotland, and Glasgow City Council as head of conservation and city design. She has chaired the UK Association of Preservation Trusts and been a trustee of the National Heritage Lottery Fund, Historic Buildings Council for Scotland, and the Architectural Heritage Fund.

JAMES A. (JAMIE) FARNY is the director of environmental measurement and metrics at the Portland Cement Association (PCA). Farny promotes the use of cement-based materials by focusing on key benefits like sustainability and resilience. He belongs to several codes and standards developing organizations that cover concrete and masonry, including the American Concrete Institute, ASTM International, and The Masonry Society. Farny helped develop PCA's campaign to raise awareness of Portland-limestone cements (PLCs) and its Roadmap to Carbon Neutrality and is working to expand those efforts to other blended cements. He holds a BS in civil engineering from the Illinois Institute of Technology and in spring 2024 was named a fellow of the American Concrete Institute.

EDWARD G. FITZGERALD is a senior associate with Jablonski Building Conservation, Inc. (JBC) in New York City where he has worked since 2015. Ed supports JBC with conditions surveys, field and laboratory testing, project management services,

and designs and executes innovative conservation treatments. Ed is a professional associate of the American Institute for Conservation and a registered professional member of the Association for Preservation Technology International. He helps to develop industry standards through his work on ASTM Subcommittee C18.07 on Environmental Properties, Behavior, and Cleaning of Dimension Stone and Subcommittee E06.24 on Building Preservation and Rehabilitation Technology. Ed previously worked for the National Park Service's National Center for Preservation Technology and Training.

JOSHUA FREEDLAND is the director of historic preservation for Bulley & Andrews, where he serves as a technical resource to the project team. Joshua has a MS in Historic Preservation from the Weitzman School of Design at the University of Pennsylvania. He is a professional member of the American Institute for Conservation (AIC), past chair of the Architectural Specialty Group, and associate editor of the *Journal of AIC*. He serves on the Emeritus Board for Landmarks Illinois.

KATHERINE FREY is a senior associate at Mills + Schnoering Architects, LLC in Princeton, NJ, and a graduate of the Penn preservation program. She is an experienced historic preservationist and project manager with a varied portfolio of institutional, ecclesiastical, and cultural preservation projects. She has spoken and published on preservation and conservation topics ranging from the restoration of masonry and ironwork to preservation contracting. Recent institutional and cultural projects include a restoration of the cupola and accessibility renovations at Princeton University's Nassau Hall; exterior restoration at Carpenters' Hall; and the exterior restoration of the Wheeler Opera House, in Aspen, Colorado.

ANA PAULA ARATO GONÇALVES joined the Getty Conservation Institute (GCI) in 2017. She is currently an associate project specialist and her work focuses on the conservation of modern concrete. She has a bachelor's degree in architecture from the School of Architecture and Urbanism at the University of São Paulo and earned an MS in Historic Preservation from the University of Pennsylvania in 2011. In Brazil, she worked as an architect in private practice and for public institutions engaged in the conservation of modern buildings. She co-authored GCI's "Conservation Principles for Concrete of Cultural Significance" with Susan Macdonald.

THOMAS "GUNNY" HARBOE is the president of Harboe Architects, PC and an internationally recognized architect dedicated to the conservation of the world's cultural heritage. Gunny has over 35 years of experience and runs his own Chicago based firm with a focus on preservation and sustainable design. He has received dozens of awards for his work on many iconic modern masterpieces including numerous works by Mies van der Rohe, Frank Lloyd Wright and Louis Sullivan. Gunny was a founding member of Docomomo US and a founding member and past president of the ICOMOS International Scientific Committee on 20th Century Heritage (ISC20C). He is an adjunct professor at IIT and is NCARB-certified and licensed in nine states and the District of Columbia.

MIJA H. HUBLER received her BS in structural engineering from the University of Illinois at Urbana-Champaign, her MS from Cornell University, and her PhD from Northwestern University. She is currently an associate professor at the University of Colorado, Boulder. She is the co-founder of Prometheus Materials. Her research has been recognized with the Leonardo Da Vinci Award from the Experimental Mechanics Institute, the Gustavo Colonnetti Medal from RILEM, and an NSF Early Career Award. Her research interests include the aging of construction materials, concrete infrastructure design and construction methods, and the design of alternative concrete materials.

ROY INGRAFFIA is the national director of industry management at the International Masonry Institute. In his leadership role, Roy manages all aspects of day-to-day operations and long-term partnerships and initiatives. As an architectural conservator with

technical experience in design and contracting capacities, his professional work has primarily focused on the preservation of historic masonry structures through research of traditional materials/ methods and development of contemporary restoration techniques.

He is an associate of the American Institute of Architects (AIA) and a professional associate of the American Institute for Conservation of Historic and Artistic Works (AIC), and recognized professional of the Association for Preservation Technology International (APT). In addition to his work with IMI, Roy teaches the Masonry Conservation Seminar within the Department of Historic Preservation at the University of Pennsylvania.

KEITH KESNER is a project director with Simpson Gumpertz & Heger, Inc. in Philadelphia. He is a fellow of the American Concrete Institute (ACI) and received several awards from ACI for his contributions related to the development of codes and standards for the repair of existing concrete structures. He received his BSE in civil and environmental engineering from the University of Connecticut and his MS and PhD in civil and environmental engineering from Cornell University. He is a registered professional engineer in several states and a registered structural engineer in Illinois and Hawaii.

RANDOLPH KIRCHAIN is a principal research scientist within the MIT Materials Systems Lab and serves as the director of the MIT Concrete Sustainability Hub. Dr. Kirchain's research focuses on the environmental and economic implications of materials selection. As part of the CSHub team, he has developed tools to help decision makers better understand the impact of materials decisions in both buildings and pavements.

ALEXANDER (PETE) J. KOHL III is the International Training Center coordinator with the International Masonry Institute. He is an 8-plus-year member of Local 5 Pennsylvania, and has worked at the International Center for over 8 years. He has over 25 years of construction related experience in project management, superintendent and foreman roles.

Day to day duties include everyday operations of the training center, overseeing instructors, the training programs for each of 8 represented crafts. Involved in delivering Historical Masonry Preservation Certificate hands on portion as well as composite stone repair classes, and ICRI-IMI classroom and hands on training for the BAC membership.

JINGYI LUO is an intern architect who holds a Master of Science in Historic Preservation with a concentration in architectural conservation from the University of Pennsylvania's Weitzman School of Design and a Bachelor of Architecture from the California College of the Arts. She recently completed her thesis investigating the effects of climate change on two contemporary bush-hammered concrete buildings by I. M. Pei. Prior to her study in Philadelphia, she gained practical experience with Page & Turnbull and Studio Gang in San Francisco. Jingyi is also the recipient of the Charles E. Peterson Award 2024 and the AIA COTE Top Ten Student Project 2020 Award winner.

FRANK MATERO received his education in anthropology, architectural preservation, and material conservation. As an educator and conservation practitioner, Matero has shaped architectural conservation discourse and practice in the US and abroad for over 35 years. He is the Gonick Family Professor and chair of the Department in Historic Preservation at the Stuart Weitzman School of Design at the University of Pennsylvania. He is director and founder of the Center for Architectural Conservation, a member of the Graduate Group in the Department of Art History, and research associate of the University Museum of Archaeology and Anthropology. He is founder and editor-in-chief of Change Over Time, the international journal on conservation and the built environment published by University of Pennsylvania Press. He serves on the Advisory Council on Historic Preservation and is a

professional associate of the American Institute for Conservation of Historic and Artistic Works.

IRENE MATTEINI was professionally trained as an architect at the Politecnico di Torino in Turin, Italy, and at the Illinois Institute of Technology in Chicago. After completing her architectural studies, Irene pursued a specialization in heritage conservation at the University of Pennsylvania Weitzman School of Design in Philadelphia. In the past decade, Irene has worked on a diverse range of international projects focusing on concrete heritage conservation. Irene is currently a lecturer in the Historic Preservation Department at the Weitzman School of Design and the Scientific Director of CONCRETO Academy.

SARAH NICHOLS is an assistant professor of architecture at EPFL and director of the lab THEMA (Theory of Environment and Materials in Architecture). Her scholarly work examines the environmental and political entanglements of construction, particularly through building materials. Her material retrospective "Beton" was recently shown at the Swiss Architecture Museum in Basel. She is currently working on a book manuscript, *Opération Béton: Constructing Concrete in Switzerland*, based on her dissertation for which she was awarded the ETH Medal.

RICHARD PIEPER is an architectural conservator specializing in the conservation of masonry and metals. Since 1995, Pieper has been an adjunct professor of historic preservation at Columbia University's Graduate School of Architecture, Planning, and Preservation, where he teaches a course on the conservation of architectural metals. Pieper authored Preservation Brief No. 42, *The Maintenance, Repair and Replacement of Historic Cast Stone,* for the National Park Service. His article "The Stylistic Evolution of Historic Cast Stone" was published in *APT Bulletin* Vol. 53, No. 2/3 (2022).

JACK PYBURN is a principal at Lord Aeck Sargent, Planning and Design and a preservation architect with over 50 years of experience. For over a decade, he has researched, written, and lectured on the history of concrete precasting and its influence on concrete architecture, including the Dutch precasting system Schokbeton. Jack is the recent past president of the ICOMOS International Scientific Committee on 20th Century Heritage, served as Chair of the AIA Historic Resources Committee, and is a past board member of Docomomo/US. He is currently a fellow of the National Trust for Historic Preservation's African American Cultural Heritage Action Fund.

W.J. (WIDO) QUIST is associate professor in heritage and technology and leading the section Heritage & Architecture at Faculty of Architecture and the Built Environment (TU Delft, The Netherlands). He is secretary general of Docomomo International and editor in chief of the SCOPUS indexed Docomomo Journal. Wido has been active in many different national and international projects and has published extensively in the fields of construction history, adaptive reuse, and modern heritage. His research and teaching centers around the preservation and adaptive reuse of the built legacy of the 20th century, connecting the specialist disciplines.

BLAKE RAGO is owner and president of RH Ward & Associates, a concrete repair contractor that specializes in wet method shotcrete. Blake has been with Ward & Associates for over 22 years with experience that extends from being an ACI certified shotcrete nozzleman to estimating, bidding, and managing shotcrete projects around the country. In 2015 Blake took over as owner and president. Blake has restored Unity Temple, the Eternal Indian Blackhawk Statue, the Francis Scott Key Bridge in Washington, DC, the 3rd Avenue Bridge in Minneapolis, and is currently restoring the Old Conduit, Washington, DC's first aqueduct. Blake has been an active member of ACI, ACI Illinois chapter, ICRI, ICRI Chicago.

THOMAS SCHUMACHER is professor and associate chair of graduate programs in civil

and environmental engineering at Portland State University. Prof. Schumacher's primary research interests are in non-destructive evaluation (NDE) of civil structures with a focus on concrete structures. He is mainly interested in stress wave and vibration-based methods such as acoustic emission and ultrasonic monitoring and impulse response testing, respectively. Additional interests include multimodal imaging and image fusion, video-based vibration monitoring, and self-sensing carbon nanotube-based sensors for structural repair and rehabilitation. Schumacher is a licensed professional engineer in the state of Delaware and currently serves as the Chair of ACI Committee 228, Nondestructive Testing of Concrete. He offers courses in structural analysis, dynamics, NDE, and preservation.

AMY E. SLATON is Professor Emerita in the Department of History at Drexel University. She holds a PhD in the history and sociology of science from the University of Pennsylvania and is co-editor of the journal *History+Technology*. Her work has centered on the role of technical labor and education in ongoing projects of white supremacy in US history.

DEBORAH SLATON is a principal with Wiss, Janney, Elstner Associates, Inc., in Northbrook, Illinois, specializing in historic preservation and materials conservation. Her work includes investigation and repair of historic concrete structures, ranging from coastal fortifications to icons of Modernism. Deborah has published extensively and has co-chaired several conferences on preservation of recent past resources. She is co-author of National Park Service Preservation Brief No. 15, *Preservation of Historic Concrete*. Deborah is a fellow of the Association for Preservation Technology International, a director of the Historic Preservation Education Foundation, and a member of the Society of Architectural Historians Heritage Conservation Committee.

JUSTIN M. SPIVEY enjoys telling stories about the built environment and is passionate about rail transportation, bridges, and shared-wall buildings from rowhouses to main streets. He has documented dozens of bridges for the National Park Service's Historic American Engineering Record and helped organize the 2022 Rowhouse City symposium at Penn. His tireless advocacy for knowledge sharing and collaboration is expressed in service to the Association for Preservation Technology International (APT) and its Delaware Valley Chapter, and in managing multi-layered design and construction teams at Axiom Project Development Services, LLC. He is a licensed professional engineer in ten states, an APT Fellow, and an APT Recognized Professional.

TYLER S. SPRAGUE is a structural engineer and a historian, with appointments as an associate professor in the Department of Architecture and as an adjunct associate professor in Civil and Environmental Engineering at the University of Washington. He earned engineering degrees from the University of California, Berkeley and the University of Washington, and worked professionally as a structural engineer, before completing his PhD in architectural history. His book, *Sculpture on a Grand Scale: The Thin Shell Modernism of Jack Christiansen*, was published by UW Press in 2019. His current research examines historic timber construction in the United States.

JOHN J. WALSH is the founder, president, and senior petrographer at Highbridge Materials Consulting. His expertise is in the characterization and performance evaluation of historical American masonry. John holds a masters degree from Columbia University as an NSF graduate research fellow, and a BS in geology with honors from Queens College, CUNY. He is a former adjunct assistant arofessor at Columbia University's GSAPP. John is an active member of the Association for Preservation Technology International and was the proud recipient of the 2023 Harley J. McKee Award for outstanding contributions to the preservation technology field. John is active with ASTM where he has co-authored an appendix for historical mortar analysis methods.

CASEY WEISDOCK is the director of industry development and technical services at the International Masonry Institute. Casey is an architectural conservator whose professional experience spans preservation design, project management, and contracting/implementation. She is a graduate of Temple University and the University of Pennsylvania. Previously, Casey served as an architectural conservator and site manager, focused primarily on the preservation of historic structures through research of traditional materials, and implementation of traditional repair methods and contemporary restoration techniques. Today, Casey supports the masonry restoration industry internationally, and is also a regional director, providing support for all masonry projects, new and existing, at the local level. She's a developer and instructor of the Historic Masonry Preservation Certificate (HMPC) training offered through the International Masonry Training and Education Foundation (IMTEF). Casey is also the Board Chair Emeritus of the Association for Preservation Technology–Delaware Valley Chapter (APT-DVC).

NORMAN R. WEISS is recognized for his decades of activity in the field of architectural cleaning and repair. He has worked on countless concrete and masonry structures. He is director of scientific research of Integrated Conservation Resources, based in New York City. Among his best-known projects are the Frank Lloyd Wright masterpieces Fallingwater and the Solomon R. Guggenheim Museum. A fellow of the American Institute for Conservation (AIC) and of the Association for Preservation Technology International (APT), he has taught at Columbia University since 1977, and served on the Preservation Technology and Training Board of the National Park Service. Weiss is consultant editor of the UK-based *Journal of Architectural Conservation*, and a fellow of the Society of Antiquaries of London. He has lectured at World of Concrete, and at the Concrete Service Life Extension workshops of NACE, on the history, chemical treatment, and restoration of concrete.

Organizing Committee

Lauren Drapala | Historic Preservation Education Foundation
Roy Ingraffia | International Masonry Institute
Amanda Lewkowicz | Historic Preservation Education Foundation
Quinn Evans Architects
Frank G. Matero | University of Pennsylvania Weitzman School of Design Department of Historic Preservation
Irene Matteini | University of Pennsylvania Weitzman School of Design Department of Historic Preservation
CONCRETO Academy
Richard Pieper | Historic Preservation Education Foundation
Columbia University Graduate School of Architecture, Planning, and Preservation
Deborah Slaton | Historic Preservation Education Foundation
Wiss, Janney, Elstner Associates, Inc.
Justin M. Spivey | Association for Preservation Technology – Delaware Valley Chapter
Axiom Project Development Services, LLC
Casey Weisdock | International Masonry Institute

Program Support

Micah Dornfeld | Department Coordinator, University of Pennsylvania Weitzman School of Design Department of Historic Preservation
Laney Myers | Administrative & Communications Coordinator, University of Pennsylvania Weitzman School of Design Department of Historic Preservation