APT NORTHEAST

TESTED BY FIRE
FIRED MATERIALS

March 3, 2023
Salem, Massachusetts

Association for Preservation Technology
NORTHEAST CHAPTER

2023

Annual Meeting & Symposium

APTNE 2023
Annual Meeting
& Symposium

APTNE
www.aptne.org
aptne
aptne_
apt_northeast
linkedin.com/company/apt-northeast/

TESTED BY FIRE: FIRED MATERIALS

The Association of Preservation Technology Northeast Chapter (APTNE) is happy to present the 2023 APTNE Annual Meeting & Symposium, on Friday, March 3, 2023, with an in-person event held in Salem, MA, as well as a virtual program. The overarching theme of the 2023 APTNE Annual Meeting & Symposium is fired materials and will feature presentations from professionals, emerging professionals, and local students.

Fired materials run the gamut from utilitarian clay sewer pipes and brick masonry, to ornate art tile and polychrome terra cotta. Their usage has allowed buildings, cities, and regions to grow rapidly or take on unique visual characteristics.

How have these materials evolved over time and how have our cities and towns evolved with them? What challenges are present when trying to restore or protect fired materials manufactured in a different time period with different processes and materials? Have some past restoration techniques evolved, while others have stood the test of time? What role do fired materials have in the evolution of fireproofing in buildings?

PRESENTATIONS MUST BE TIED TO ONE OF THE FOLLOWING TRACKS:

1. History and evolution of fired materials- brick, ceramics, terra cotta, glass, singed heavy timber
2. Analysis of fired materials and evolving research
3. Challenges of matching historic fired materials in a changing economy and regulatory environment (glazes, limited manufacturing, aesthetics, etc.)
4. Cultural significance of fired materials in vernacular architecture
5. New interventions and revisiting previous restoration techniques

COVER
Color-matched coating on glazed terra cotta, 20 years after application. Photo Credit: Michael Edison.

SCHEDULE OF EVENTS

THURSDAY, MARCH 2

4:00 PM - 5:00 PM	**Tour 1: Trolley Tour** Salem Trolley

FRIDAY, MARCH 3

8:00 AM - 9:00 AM	**Registration and Breakfast** First Floor
9:00 AM - 9:10 AM	**APTNE WELCOME ADDRESS** Outgoing APTNE President, Helena Currie, PE & Incoming APTNE President, Corey Spitzer
9:10 AM - 9:55 AM	**MORNING KEYNOTE PRESENTATION** **How Masonry Will Save the World** Roy Ingraffia, AIA, PA-AIC, APT-RP, International Masonry Institute
9:55 AM - 10:20 AM	**Brick Masonry Gymnastics: Pushing the Structural Limits on Historic 17th through Mid-19th Century Chimney Masses** Elizabeth Acly, PE, APT-RP, Cirrus Structural Engineering
10:20 AM - 10:35 AM	**The Coplay Kilns and Birth of the American Portland Cement Industry** Preston Hull, Building Conservation Associates, Inc.
10:35 AM - 10:45 AM	**Q&A** Michelle Dallhoff, RA, WJE Engineers & Architects
10:45 AM - 11:05 AM	**Coffee Break**
11:05 AM - 11:20 AM	**Salem Prepares to Commemorate its Quadricentennial** Patricia Kelleher, Salem Department of Planning and Community Development
11:20 AM - 11:45 AM	**Subway Tile: From Platform to Backsplash** Edward FitzGerald, Jablonski Building Conservation, Inc.
11:45 AM - 12:10 PM	**Structural Restoration and Renovation of Terra Cotta Materials** Jonathan Hernandez, PE, SECB, & Mark Beltramello, PE Gilsanz Murray Steficek
12:10 PM - 12:20 PM	**Q&A** Michelle Dallhoff, RA, WJE Engineers & Architects
12:20 PM - 12:30 PM	**CHAPTER HIGHLIGHTS** APTNE President, Helena Currie, PE
12:30 PM - 2:00 PM	**Lunch,** Second Floor **APTNE Annual Board Meeting,** The Library
2:00 PM - 2:45 PM	**AFTERNOON KEYNOTE PRESENTATION** **Guastavino Vaulting and the Art of Fireproof Building** John Oschendorf, PhD, Massachusetts Institute of Technology
2:45 PM - 3:10 PM	**Preserving Gauged Brick Arches at Old South Meeting House, Boston** Ivan Myjer, Building and Monument Conservation
3:10 PM - 3:35 PM	**Splatter Up! Repairing and Replicating Guastavino Tile at the Iconic Plymouth Rock Portico** Jack Glassman, AIA, LEED AP, National Park Service
3:35 PM - 3:50 PM	**Use of Rainscreen Cladding Building Systems to Promote the Rebuild of Historic Terra Cotta Assemblies** Joshua Jaskowiak, PE & Matthew Haberling, PE, WJE Engineers & Architects
3:50 PM - 4:00 PM	**Q&A** Jennifer Kearney, Jablonski Building Conservation
4:00 PM - 4:20 PM	**Coffee Break**
4:20 PM - 4:45 PM	**Collar Joint Stabilization in Fired Clay Masonry Assemblies** John Wathne, PE, VoidSpan Technologies, LLC & Norman Weiss, FAIC, FAPT, FSA
4:45 PM - 5:10 PM	**Performance Testing of Materials to Repair Terra Cotta Glaze Spalls** Lauren DiCenzo, PE & Carolyn Searls, PE, Simpson Gumpertz & Heger Inc.
5:10 PM - 5:35 PM	**Traditional Chinese Roofing Tiles in Salem, MA** William Brandow & Clay Palazzo, AIA, LEED AP, John G. Waite Associates, Architects
5:35 PM - 5:45 PM	**Q&A** Jen Kearney, Jablonski Building Conservation
5:45 PM - 5:50 PM	**CLOSING REMARKS** APTNE President, Helena Currie, PE
6:00 PM - 8:00 PM	**RECEPTION** Peabody Essex Museum/East India Hall

SATURDAY, MARCH 4

ALL DAY	**Discounted Tickets to Peabody Essex Museum**
10:00 AM - 12:00 PM	**Tour 2: House of the Seven Gables** Paul Wright, Director of Preservation
10:15 AM - 11:00 AM 11:00 AM - 11:45 AM	**Tour 3: Specialized Tour of Yin Yu Tang House at the Peabody Essex Museum** William Brandow & Clay Palazzo, AIA, LEED AP, John G. Waite Associates, Architects

WHO WE ARE

Originally founded as the APT New York Chapter in the mid-1980s, the organization was restructured in 2003 as the **Association for Preservation Technology Northeast Chapter** (APTNE) encompassing New England, New York State, and northern New Jersey. At present, we have over 300 active members.

APTNE is committed to serving this geographic community with regional and local preservation events and outreach. We conduct workshops, co-sponsor events with local and statewide preservation organizations, and sponsor symposia, including our annual meeting in early March. We support students interested in preservation by offering free student membership and discounted young professional membership and event admission, as well as annual scholarship opportunities.

2022-2023 BOARD MEMBERS

Helena Currie
President

Corey Spitzer
Vice President

Patricia S. Palmiere
Secretary

Jacqueline Bascetta
Treasurer

Alafia Akhtar

Mark Anderson

Scott Aquilina

Sloane Bullough

Adrienne Cali

Brigitte Cook

Michelle Dallhoff

Kevin Daly

Ken Follett

Jennifer Kearney

Charles Kramer

Ellen Lane

Connie Mugno

James Norberg

Jess Ouwerkerk

Stacey Thomas

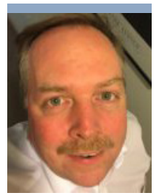
Jill Verhosek
(through April 30, 2022)

THANK YOU!

As of March 3, 2023, four of our Directors are stepping off of the **Board of Directors**.

We'd like to take the opportunity to thank each of them for their time and dedication to making APTNE excellent during their terms.

CONNIE MUGNO
6 years of service



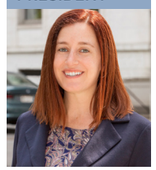
MARK ANDERSON
6 years of service

SCOTT AQUILINA
3 years of service

JILL VERHOSEK
7 years of service

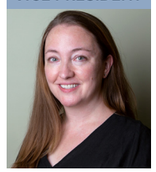
NEW INCOMING EXECUTIVE BOARD

PRESIDENT



COREY SPITZER

VICE PRESIDENT



JENNIFER KEARNEY

TREASURER

KEVIN DALY

SECRETARY

BRIGITTE COOK

PLEASE WELCOME OUR 4 NEW BOARD MEMBERS!

AMANDA SANDERS

is from Boston and works at RODE Architects as an Associate. With 18 years of industry experience focusing on historic preservation, adaptive reuse, and institutional clients within the higher education field, Amanda has been instrumental to RODE's success not only with projects, as well as playing key role as mentor. She recently spearheaded the firm-wide initiative of signing on to the AIA 2030 Commitment and leads the Sustainability Committee, ensuring that all of the firm's projects and internal operations meet established goals. Amanda studied at Iowa State University, where she obtained her Bachelor of Architecture degree. Prior to joining RODE, she was a Senior Associate at Goody Clancy. Amanda has been an active member of the Boston Preservation Alliance since 2014, where she participates on the Advocacy Committee and Awards Committee. Amanda has been involved in APT at both the international and regional level since 2011 as a member, participant, and presenter.

PAMELA CLEMENS

is from Massachusetts and works for Goody Clancy where she is an Associate. She brings an expertise in sensitive renovations to historic structures, revitalizing buildings that communities will cherish for years to come. Her projects have ranged from restoration of the 1790 Akin House Museum, whose mission focused on teaching local history to young students, to overhauling a 1970's dormitory building into a vibrant, open place focused on community. She believes that historic buildings create a connection between past, present and future occupants strengthening a multi-generational community bond. To every project, she brings an excitement to understanding that community connection focuses on guiding the adaptation and preservation of an existing building as a means of accommodating present and future uses. She received her B.S./M.Arch from Roger Williams University.

BENJAMIN LUECK

is from Rhode Island and works for DBVW Architects where he is an Associate. Ben is a registered architect specializing in the preservation, restoration, and rehabilitation of existing structures. His work currently focuses on condition assessments and restoration designs for late 19th- and early 20th-century masonry structures, and improvements to contemporary and historic building enclosure systems. Ben has over 10 years of wide-ranging professional experience on projects located throughout the country. He has worked on a number of properties listed on the National Register of Historic Places, as well as structures managed by the National Park Service from Hawaii to Boston. Ben has a Bachelor of Fine Art from the University of Rhode Island, followed by a Master of Architecture and a Master of Science in Civil Engineering from the University of California, Berkeley.

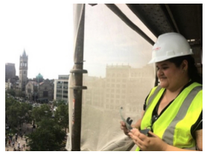
DEREK DANDURAND

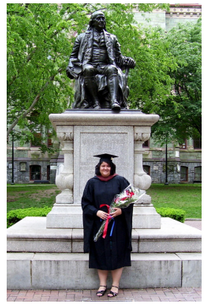
is from New Jersey and works for Shawmut Design and Construction where he is the Director of Historic Preservation. He holds a Master of Science in Historic Preservation and Bachelor of Science in Historic Preservation and Art & Architectural History from Roger Williams University. He is dedicated to the study of historic buildings and the architects who designed them, as well as the construction methods and even the tools used to build them. Derek provides clients with technical guidance in historic preservation, from planning and approvals through project execution. His years of personal hands-on historic restoration, rehabilitation and project management experience has laid the foundation for his role as a strong, experienced advocate for quality preservation work. Derek has held previous positions at NYC Landmarks Preservation Commission, NYC Dept. of Parks & Recreation, and the Historic House Trust of NYC.

IN MEMORY OF

JILL VERHOSEK

1977 - 2022





JILL THANH-PHUONG VERHOSEK born June 21, 1977, in Ashtabula, Ohio, passed away in Boston on the evening of April 30, 2022, after being admitted to Beth Israel Hospital. Family and friends were by her side and she did not suffer.

An extraordinary preservation architect, a diehard Atlanta Braves fan, and a follower of comedian Kathleen Madigan, Jill began each day watching live cam videos of sea otters, because, as she said, the playful animals helped keep life in perspective and made her laugh.

Jill grew up in North Charleston, South Carolina, where she graduated from R. B. Stall High School, Class of '95. She graduated Magna cum Laude with a Bachelor of Science in Design from Clemson University in 1999 and earned a Master of Science in Historic Preservation from the University of Pennsylvania in 2006. Her lifelong love of travel was a reflection of her insatiable curiosity for different cultures and places; it led her to explore the world, and its historic buildings, far and wide. She brought that same commitment and curiosity to her work as a historic preservationist. As a Senior Associate at Goody Clancy, a Boston design firm, Jill was an essential member of the firm's preservation practice group and the technical advisor on their most prestigious and complex projects throughout the Northeast and Mid-Atlantic.

Jill was a strong, smart woman who many were lucky to call a friend and colleague. She is survived by her parents Larry and Lan Verhosek. Her brother Bill and wife Rhoda Verhosek, her sister Lynne Verhosek and partner Linda Stoeckert, and her nephew and niece Edward and Dasha whom she adored.

As a long-time APTNE board member and chair of the APTNE Events Committee, she helped develop a robust events program within the organization, as well as spearheaded the development of our virtual programs beginning in 2019. She always aimed to bring our membership's knowledge and experience to everyone seeking to learn.

JILL VERHOSEK SCHOLARSHIP FUND

The **Jill Verhosek Scholarship fund** was created and named in honor of our late friend, colleague, and APTNE Board Member. This fund will be used to support an annual scholarship for students and emerging professionals who are passionate about the field of preservation.

In APT, she found peers and friends in the diverse professions that celebrate and sustain heritage. APTNE is proud to share Jill's profound impact on the preservation community and carry forward her legacy.

To donate to this fund, please go to our website or scan this QR code, which will bring you directly to the donation page.

aptne.memberclicks.net/jill-verhosek-scholarship-fund

CONGRATULATIONS TO APTNE'S 2023 STUDENT SCHOLARSHIP RECIPIENTS!

ANGELA FERNANDES

Cornell University, New York

APTNE is proud to announce that Angela Fernandes is the **2023 Jill Verhosek Scholarship Fund Recipient.**

Understanding the impact of climate change on historic districts and the integral role of preservation in mitigation planning, Angela collaborated with the Mayor's Office of Climate and Environmental Justice to study climate resiliency strategies in disinvested neighborhoods throughout the state of New York. Through this experience and her academic coursework, Angela is experienced in a range of preservation tools for mapping and analysis that help develop targeted interventions to mitigate climate hazards, such as coastal flooding and heat surge. Her thesis aims to review existing regulations and guidelines related to climate adaptation and mitigation of historic districts, buildings and sites, within the context of preservation standards and principles, to propose context-driven policies that promote preservation as a critical climate mitigation tool. Angela's passion for preservation and plan to make actionable change is an inspiration.

JAMES CHURCHILL

Columbia University, New York

APTNE is proud to announce that James Churchill is the **2023 Melissa Morrissey Scholarship Fund Recipient.**

James stands out as a highly active, engaged and accomplished "non-traditional" student member of APTNE. In the years since receiving his bachelor's degree, James worked in various preservation-related positions and became actively involved in several APT Chapters. In the past year, James presented at APTI's Annual Conference in Detroit and organized a tour of the "Lucy the Elephant" restoration project for the APT Delaware Valley Chapter. Currently working towards his Masters in Architecture in New York, James brings his wide range of professional and academic experiences to the Northeast Chapter. By continuing to broaden his academic knowledge, professional experiences, and preservation skillsets, he hopes to bring the multi-disciplinary preservation field closer together. James' story emphasizes the importance of continuous learning and sharing professional experiences to propel the industry forward.

9:10AM - 9:55AM

MORNING KEYNOTE

HOW MASONRY WILL SAVE THE WORLD

Presented By **Roy Ingraffia**, AIA, PA-AIC, APT-RP

Photo Credit: Henry & Co. Pexels.com

THE PRESERVATION & RESTORATION FIELD, like so many other industries and areas of practice is at a unique crossroads. Issues that were once either ignored or passed off for others to address are now very much at the forefront and in the open for discussion. Technical and philosophical strategies for repair and preservation of our cultural resources cannot and should not be attempted without discussing how they impact and address social equity, skilled & fair labor practices, and sustainability. We, as practicing preservation professionals, have a very important role to play in people-based preservation as well as an obligation to tackle these critical issues.

The environmental issues of our generation were set in motion decades ago. And while we try and triage the immediate problems related to our unique professional field, we need to be laying the groundwork for our successors to tackle and manage the outcome of choices brought about by our own actions. The architectural community has the 2030 Challenge, structural engineers have the SE 2050 Challenge, where is the Preservation Challenge? More than any one group of professionals, we have the ability to alter the course of how we as a society use and reuse buildings while preserving our cultural heritage. We also understand the value of place and the significance of methodology, and the benefits of a multi-disciplinary approach to problem solving. We are problem solvers. So why have we not attempted to tackle this problem as a field? This should be our call to action.

This presentation will explore both challenges and opportunities for the future of our field and in particular how the masonry and tile industry is tackling some of these critical issues.

ROY INGRAFFIA directs IMI's marketing, industry development, research, and technical services programs nationwide. 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 Graduate Program in Historic Preservation at the University of Pennsylvania.

Journey-level restoration mason and member of the Bricklayers and Allied Craftworkers, Area District Council 1 of Illinois performing cleaning at Cook County Hospital in Chicago, IL. Photo Credit: Eric Nordstrom

"The architectural community has the 2030 Challenge, structural engineers have the SE 2050 Challenge, where is the Preservation Challenge?"

Restoration apprentice and member of the Bricklayers and Allied Craftworkers Local 3 New York performing skills training at local IMI training center in Rochester, NY. Photo Credit: John Schlia Photography

9:55AM - 10:20AM

BRICK MASONRY GYMNASTICS:
PUSHING THE STRUCTURAL LIMITS ON HISTORIC 17TH THROUGH MID-19TH C. CHIMNEY MASSES

Presented By **Elizabeth Acly**, PE, APT-RP

Photo Credit: Madison Inouye. Pexels.com

WHILE VERNACULAR 17TH, 18TH AND MID-19TH CENTURY chimneys, fireboxes, and their architectural chimney breasts have received much focus in the architectural history and preservation spheres, the chimney masses concealed behind the walls that connect the visible architectural elements have not. These chimney masses are mostly concealed behind walls in finished spaces but are often exposed in basements and attics. These structures are almost completely utilitarian. Like other historic components, the form and construction of chimney masses evolved in concert with societal and building technology. This paper gives a glimpse behind the walls of 17th through mid-19th century vernacular architecture from the northeast

"Like other historic components, the form and construction of chimney masses evolved in concert with societal and building technology."

to learn more about the evolution of the chimney mass, the role that brick plays in its construction, and the structural surprises that we find in the construction of the various elements of the chimney masses.

The use of clay-fired brick in chimney masses allowed early northeasterners to build and use utilitarian chimney masses to heat their homes, heat water and cook, among other things. They served the same purpose as today's furnaces, fireplaces, boilers, stoves and ovens combined. Brick masonry was often used in conjunction with stone masonry for these chimney masses. The brick served as the material of choice where better heat transfer and more complicated structural form were required. The form of brick masonry in chimney masses followed the evolution of function in response to developments in scientific understanding and occupant needs. Understanding this form and function as an anchor in time allows us to prescribe the most historically sensitive and structurally appropriate treatments and serve as an additional aid for dating chimney masses and their buildings. •

Circa 1750 Basement Chimney Mass Barrel Vault in Basement. Photo Credit: Elizabeth Acly

Governor Jonathan Trumbull House Wishbone Chimney Before and During Restoration. Photo Credit: Elizabeth Acly

ELIZABETH ACLY, PE, APT-RP is a preservation structural engineer and principal at Cirrus Structural Engineering in Columbia, CT. She has over 20 years of experience investigating, analyzing, and restoring historic buildings. Ms. Acly founded Cirrus in 2010 around her passion for preserving historic, cultural and environmental resources. Ms. Acly and Cirrus specialize in structural engineering, building envelope engineering and construction history, emphasizing holistic assessment and treatments and supporting historic building stewards throughout the northeast.

Ms. Acly holds a bachelor's degree in Civil Engineering from Bucknell University and a master's degree in Structural Engineering from Georgia Tech. Ms. Acly is a professionally licensed Structural Engineer in multiple states in the northeast and an APT Registered Professional. She currently sits on the Connecticut Historic Preservation Council and served on APTNE's Board of Directors from 2006 to 2014.

10:20AM - 10:35AM

THE COPLAY KILNS AND THE BIRTH OF THE AMERICAN PORTLAND CEMENT INDUSTRY

Presented By **Preston Hull**

The Coplay Cement Company's Aalborg kilns in 2016. Photo Credit: Preston Hull

"The "Aalborg" kilns constructed in Coplay are the only known surviving examples of one such design that was constructed from Canada to China."

THE COPLAY CEMENT COMPANY KILNS are monuments to the Lehigh Valley's role as the birthplace of the United States cement industry. Coplay Cement was founded by David O. Saylor, who first proved that modern, "portland" cement could be successfully manufactured in the United States instead of imported from Europe (and whose name adorns bags of portland to this day). The nine kilns, now standing in the middle of a community park, were once part of an entire complex of cement plants along the Lehigh River. Today, the kiln complex—an important symbol to the tiny borough of Coplay—is deteriorating dramatically. In particular, several large brick "blowouts" have prompted Lehigh County to fence the site off.

The Coplay kilns represent a transitional technology in the evolution of portland cement manufacturing. Early cements were fired in intermittent "bottle" kilns similar to those used for many other fired materials. In contrast, the continuous rotary kiln has been emblematic of portland cement manufacture since the early 20th century. But in the late 19th century, inventors experimented with a variety of kiln designs that sought to achieve efficient, continuous firing without the warmup and cooldown periods associated with traditional methods. The "Aalborg" kilns constructed in Coplay are the only known surviving examples of one such design that was constructed from Canada to China.

Background: Elevation and section of an Aalborg kiln showing its relationship to the floors of the mill building. Photo Credit: The Engineering Record 17 No. 3 (1897)

The presentation will examine the kilns' history, from their invention in Denmark to the present day, and that history's implication in the kilns' current condition. The kilns have experienced dramatic changes in their use and environment since their first firing in 1895: originally enclosed within a four-story building, they were left exposed to the elements upon its demolition in 1950. In 1975, a greenhouse-like museum was constructed at the kilns' base, which closed due to moisture issues in the 1990s. The kilns' history highlights the special considerations involved in conserving industrial heritage sites—particularly of structural machines such as kilns. •

PRESTON HULL has been an Architectural Conservator at the Philadelphia office of Building Conservation Associates, Inc. since 2016. He specializes in research in all forms—particularly in synthesizing field investigations and "building archaeology" with archival research. He has prepared Historic Structure Reports, including an 18th-century plantation house and a 19th-century tenant farmer house owned by the Smithsonian Environmental Research Center in Edgewater, Maryland; eight domestic outbuildings at Hampton National Historic Site in Towson, Maryland; and a lock tender's house located along the former Schuylkill Canal in Montgomery County, Pennsylvania.

Before joining BCA, Mr. Hull worked on a range of projects, from a GIS-based survey of historic rowhouses in the Sharswood neighborhood of Philadelphia to comprehensive documentation of slate and cement industrial sites in the Lehigh Valley. Mr. Hull's thesis work delved deeper into this industrial history, tracing the technological evolution and later deterioration of a complex of 19th-century cement kilns in Coplay, Pennsylvania.

A native of Gettysburg, Mr. Hull has a strong interest in preserving the built history of the Mid-Atlantic, with a particular focus on vernacular architecture and industrial sites. He is on the Board of Directors of the Association for Preservation Technology's Delaware Valley Chapter (APT-DVC), and an instructor in the Historic Preservation program at Bucks County Community College.

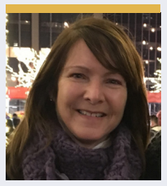
11:05AM - 11:20AM

SALEM PREPARES TO COMMEMORATE ITS QUADRICENTENNIAL

Presented By **Patricia Kelleher**

As Salem prepares to commemorate its quadricentennial in 2026, the city is honoring its past 400+ years as it looks towards the future. The community's rich history is woven throughout its physical fabric and its historic buildings chronicle Salem's four centuries of growth and development.

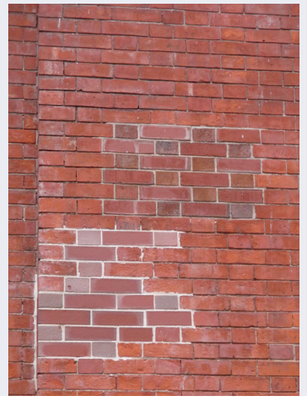
Masonry, particularly fired brick, has been an integral construction material in Salem used for building foundations, exterior envelopes and chimneys, as well as for structures such as lighthouses and fortifications. In the early 20th century, fired masonry played a crucial role in the city's rebuilding efforts after the Great Salem Fire of 1914 destroyed more than 1,300 structures and entire neighborhoods. Today, Salem's brick buildings - ranging from Georgian and Federal era mansions on Chestnut Street and the Salem Common, to monumental civic and commercial buildings along the harbor and in the downtown, as well as early and mid-20th century Classical Revival apartment buildings in the fire rebuilding area – stand as visual reminders of Salem's heritage. The Salem Historical Commission, which oversees community wide preservation planning and regulatory design review in the city's four locally designated historic districts, advocates for the preservation of these buildings through its newly updated design guidelines for brick repair and restoration, which includes guidance on replicating historic repointing techniques, mortar composition, and bond patterns as well as appropriate cleaning methods.



PATRICIA KELLEHER has served as the City of Salem's Preservation Planner for the past seven years, providing guidance to the Salem Historical Commission on proposed building projects in Salem's four local historic districts as well as preservation projects citywide. She has more than 25 years of experience in historic preservation planning.

Background: Old Town Hall (1816)

Left to Right: Chestnut Street mansions, Essex County Superior Courthouse (1862) exterior, Downtown Salem, Brick from Historical Commission Design Guidelines, Essex County Superior Courthouse (1862) interior. Photo Credit: Patti Kelleher



11:20AM - 11:45AM

SUBWAY TILE: FROM PLATFORM TO BACKSPLASH

Presented By **Edward FitzGerald**

OVER THE PAST DECADE, subway tile has seen a major resurgence in popularity in people's kitchens and bathrooms. But where did this 3- by 6-inch white tile come from? Popular legend says that it was invented for the first New York City subway stations. However, that is more lore than fact. Subway tile is a type of tile work known as *sanitary tile* that was popular from approximately 1900 to 1930. This presentation will explore the origins of sanitary tile as the product of the 20th-century rise in industrialization and a newfound emphasis on hygiene and public sanitation. The presentation will cover the character-defining features of sanitary tile along with its manufacture and traditional installation methods. Examples of successful tile preservation projects will be provided.

In the early 19th century, tiles were handmade in a process utilizing wet clay. They were expensive, usually imported from Europe, and were primarily used for decoration in the homes of the wealthy. The development of the dust-pressed manufacturing process and growth of the tile industry in the United States dramatically reduced production times and costs. While hand-made tiles could be produced at the rate of one to two hundred per day, dust-pressed tiles could be output in the thousands, partly because tiles made from wet clay must be thoroughly dried before firing in a kiln. In contrast, the dust-pressed process utilizes a dry clay mixture that can be fired immediately without substantial warpage and shrinkage.

19th Century advancements in manufacturing technology brought increasing numbers of people to cities to work in factories. As urban populations grew, so too did their sanitation problems. Diseases like cholera, smallpox, and typhus plagued city dwellers. New theories about germs and the origins of disease sparked a revolution in household hygiene and city sanitation. In 1849, New York City began constructing its first modern sewer system. The state legislature passed a law requiring large cities to provide public bathing facilities in 1895, and the Tenement Act of 1901 required flush toilets in new apartments.

Header: Sanitary tile was available in a wide range of radiused trim shapes, eliminating hard-to-clean corners and allowing for complete coverage of surfaces. Photo Credit: Associated Tile Manufacturers, 1921

"This tile stripped away artistic embossed textures and decorative glazes to provide a perfectly flat face and "sanitary" gloss white or ivory glaze that would be impervious against germs and easy to clean."

Capitalizing on the new craze for cleanliness, an art tile manufacturer, the American Encaustic Tiling Company (AET Co.), began to market a new "sanitary" tile with advertisements suggesting uses in hospitals, kitchens, public baths, and bathrooms. This tile stripped away artistic embossed textures and decorative glazes to provide a perfectly flat face and "sanitary" gloss white or ivory glaze that would be impervious against germs and easy to clean. Moreover, they offered a wide range of radiused trim shapes to eliminate 90-degree corners that could trap dirt and allow for continuous tile coverage of any surface. Furthermore, each tile's edges were perfectly square, allowing narrow, often "pencil line" thickness, grout joints less susceptible to soiling.

When work began on New York's first subway in 1900, AET Co's sanitary tile features made it a seemingly perfect choice to line the stations' platforms. The gloss white glaze also offered a way to brighten up the dimly lit stations. But it was not meant to be. Designers instead opted for tiles made of opaque white glass, restored examples of which can be seen at today's Bleecker Street and 145th Street stations, and other tile finishes. Fortunately for AET Co, glass had a short run on station walls and, by 1902, plans for new stations included AETCo's 3 x 6 -inch format, presumably to complement the proportions of the brick wainscot used at the bottom of walls. Not long after, subways in London and Paris followed suit with their versions of this iconic tile. Sanitary tiles quickly became associated with subway walls and the name "subway tile" caught on. •

Restored 1910 platform wall at Times Square Station, 42nd Street Shuttle, showing an early use of sanitary tile in the New York subway system. Photo Credit: Ed FitzGerald

In 1901, AET Co installed this mockup of their 3 x 6 sanitary tile at 59th Street-Columbus Circle Station hoping to win the contract to tile New York City's subway walls. While they did not win the battle, they certainly won the war. Today, their tile is the prototype for subway tile. Photo Credit: Ed FitzGerald

EDWARD G. FITZGERALD is a senior associate with Jablonski Building Conservation, Inc. (JBC) in New York City, where he has worked since 2015. His specialties include architectural wood, masonry, and ceramic materials. Ed supports JBC with conditions surveys, field and laboratory testing, project management services, and designs and executes innovative conservation treatments. He has worked on rehabilitating over one dozen New York City subway stations and is currently completing a multi-year rehabilitation of the Brooklyn Bridge. Ed is a Professional Associate of the American Institute for Conservation. 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, where he conducted laboratory and field testing of building materials and conservation treatments. His work included preparing technical information and guidance for public consumption, and organizing technical workshops for preservation professionals.

11:45AM - 12:10PM

STRUCTURAL RESTORATION AND RENOVATION OF TERRACOTTA MATERIALS

Presented By **Jonathan Hernandez**, PE and **Mark Beltramello**, PE

Photo Credit: Ryutaro Tsukata. Pexels.com

LIKE MANY CITIES IN THE NORTHEAST, New York City has hundreds of buildings that were built for a purpose that is now outdated. In this presentation we will review some of our recent renovation case studies – each has original floors made of terra-cotta arches which create strong, lightweight, fire-resistant floors. Many historic buildings dating to the 1890s were constructed of cast iron columns and terracotta slabs supported on steel framing. These buildings were typically designed for industrial use with high live load capacities. Hollow terracotta blocks are laid on falsework either parallel, perpendicular, or a combination thereof to the floor beams, and are set using a key block placed at the center of the span.

Terracotta arch floors can accommodate large live loads if properly cared for, but often, prior alterations have not been kind to this material – the arch blocks are damaged by running piping, or ductwork through the floors without properly supporting the tiles or removing large swaths and infilling with metal deck and concrete.

As the need for industrial buildings located in the heart of the city declined, these buildings were converted into office buildings. With the advent of centralized heating and air conditioning, it became necessary to upgrade the MEP infrastructure of the buildings to address modern requirements. The need for vertical shafts that reached the full height of the building required floor and wall penetrations through the existing terracotta floors. Many of these renovations damaged the appearance of the terracotta and compromised its structural integrity.

New openings for elevator shafts and interconnecting stairs also required large penetrations through the existing terracotta floors. Another question encountered in the modernization and renovation of these terracotta buildings was the capacity of the terracotta slabs to support the required ceilings, lights, ductwork, conduits, and other MEP equipment systems.

We will discuss the methods and techniques used in the restoration of terracotta tiles both structurally and aesthetically. This includes the techniques we used in the addition of vertical shafts for elevators and raceways as well as communicating stairs. The testing methodology that was adopted to determine the in situ capacity of the terracotta will be presented. •

"These buildings were typically designed for industrial use with high live load capacities."

Flatiron Building - tour of existing conditions. Photo Credit: GMS / Sabah Parsa

Global Media Headquarters - 9th floor restored. Photo Credit: GMS / Hannah Garfield

JONATHAN C. HERNANDEZ is a Professional Engineer and Partner at Gilsanz Murray Steficek. He has designed new construction work as well as renovations, rehabilitations and feasibility studies, and has extensive experience working with building owners, developers, and architects to provide innovative and cost effective structural solutions for even the most difficult building challenges. Jonathan's projects include the infrastructure upgrade of JP Morgan Chase Headquarters at 270 Park Avenue, the rehabilitation of the historic Sculpture Center in NY, renovation of a 2-story townhouse for the Artists Foundation, and infrastructure upgrades at Lenox Hill Hospital.

Jonathan is Past-President of the Structural Engineers Association of New York (SEAoNY) and a past-member of the Board of Directors of the National Council of Structural Engineers Associations (NCSEA). He is certified by the Structural Engineering Certification Board (SECB), and a member of the American Concrete Institute (ACI), CoreNet Global, The Architectural League of New York, the American Society Civil Engineers (ASCE) and licensed in multiple states.

MARK BELTRAMELLO is an Associate with Gilsanz Murray Steficek. He is a registered Professional Civil Engineer in California and is certified as a Special Inspector. He has worked on a variety of projects at GMS including retail, banks, townhouses, and interior fit-outs. His most recent projects include the redevelopment of the Eaton Hotel in Washington, D.C. and multiple projects in New York City including, the addition of five-stories onto an existing six-story factory building at 515 West 29th Street, the renovation of approximately 240,000 sf for a global financial firm's offices at 225 Liberty Street, and the new Gensler offices in the Theater District. Mark is a member of ASCE, SEAoNY, AISC, and the ACE Mentoring Program. Mark received his undergraduate in Civil Engineering from Bucknell University and his Masters in Structural Engineering from Lehigh University.

Global Media Headquarters - 8th floor. Photo Credit: GMS / Hannah Garfield

2:00PM - 2:45PM

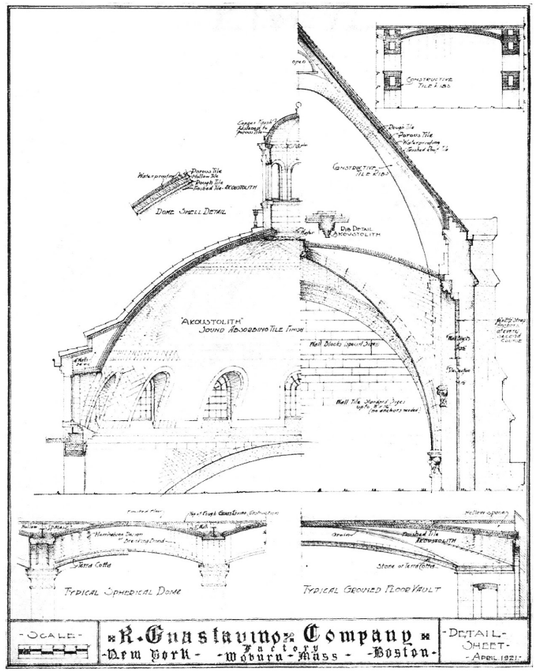
AFTERNOON KEYNOTE

GUASTAVINO VAULTING AND THE ART OF FIREPROOF BUILDING

Presented By **John Oschendorf**, PhD

Drawing of 5th and 6th Floor Terra Cotta Window Surround–Corbin Building. Photo Credit: Library of Congress Prints and Photographs Division

THE DEVELOPMENT OF GUASTAVINO VAULTING is an incredible story in construction history. This presentation will provide an overview of the architectural and structural innovation in the tile vaulting work of the R. Guastavino Company. The Guastavino Family built more than 10,000 structural tile vaults across the country exploring complex geometries. This presentation will provide an overview of the architectural and structural innovation in the tile vaulting work of the R. Guastavino Company. We will see the architectural and technological feats these builders were entrusted with creating as we consider the challenges and importance of preserving them.. •



A dome and vault "Detail Sheet", April 1921 by Guastavino Company
Photo Credit: Pencil Points, Vol. 3, No. 2, February 1922; Public Domain

JOHN OSCHENDORF is the Class of 1942 Professor of Engineering and Architecture at the Massachusetts Institute of Technology. He has been a MacArthur Fellow, director of the American Academy of Rome and founding director of the MIT Morningside Academy for Design. He is the author of Guastavino Vaulting: The Art of Structural Tile (2010) and he served as lead curator of the exhibition Palaces for the People: Guastavino and America's Great Public Spaces. Ochsendorf trained in structural engineering at Cornell, Princeton, and the University of Cambridge.

John's work merges the history of construction, preservation of historic structures and architectural design. Through historical studies, including his investigations into Guastavino tile structures, John works alongside his students and colleagues to prove the stability of complex architectural forms by developing structural analysis models to understand and preserve these intelligent designs of the past without detrimental alterations. His work draws upon lessons learned from historical forms to develop design tools derived out of graphic statics that can be used to generate new architectural forms.

The original Della Robbia Room, Vanderbilt Hotel, New York
Photo Credit: Architecture, Plate XVI, February 1912; Public Domain

2:45PM - 3:10PM

PRESERVING GAUGED BRICK ARCHES AT OLD SOUTH MEETING HOUSE - BOSTON

Presented By **Ivan Myjer**

IN THE 1720'S, when the Old South Meeting House was being constructed in Boston, the best available brickmaking technology of the time produced hard fired bricks that were strong and durable, but very irregular in size and shape. These bricks were not square and did not have parallel tops and bottoms. In order to construct the type of brick arches with tight fitting brick voussoirs and very thin joints that were fashionable in England at the time, non-structural arches were constructed using soft fired bricks that were cut and shaped after the firing process was complete. These single-wythe decorative arches were placed in front of either wood lintels or structural arches with very wide joints made from the hard-fired wall bricks. The soft bricks that were used to create the decorative arches were called "gauged bricks" because they were cut to a precise shape. They were also referred to as "rubbers" because the shaping process was done with a coarse rubbing stone. To make the bricks workable, and to create a smooth presentation surface, very little ground fired clay (grog) was added to the clay body used to make the gauged bricks.

Old South Meeting House is one of the few buildings located in England's former North American colonies that retains a high percentage of its original "gauged" bricks. Low fired bricks are softer and more permeable than hard fired bricks and therefore deteriorate at a faster rate. Most of the gauged brick arches on surviving buildings of that period have been replaced with high fired bricks set in wide joints. The hard bricks and wide joints change the distinctive appearance of the original masonry. Where the original tightly set cut brick arches contrasted with the adjacent hard fired bricks walls, the replacement arches blended with the adjacent walls.

Preserving the distinctive appearance of these decorative arches on the exterior of early 18th century brick buildings in the United States involves conserving the existing sound bricks and replacing the highly deteriorated bricks with ones that match the originals. As the Georgian style of architecture which was initially prevalent in the American colonies, gave way to the Federal style, adopted by the new republic, the need for soft fired bricks that could be shaped by hand ended. Currently, there are no brick yards in the United States (and only one in the United Kingdom) that manufacture soft fired bricks that can be shaped with rubbing stones.

This presentation will address the importance of preserving not only the distinct appearance of soft fired brick arches, but also the technological know-how and craftsmanship that went into producing them in the first decades of the 18th century. Reviving a masonry craft tradition that had been abandoned roughly 275 years ago turned out not to be as difficult as it first seemed it would be. The key to the success of the project lay in giving skilled masons the time to experiment with unfamiliar materials and methods. •

IVAN MYJER is the owner and lead conservator of Building and Monument Conservation, a firm that offers hands-on conservation and consulting services for the restoration and conservation of traditional masonry buildings, architectural sculpture and monuments, and grave markers. Prior to founding the firm, Ivan was the director of the SPNEA Conservation Center (currently Historic New England) and the Director of Restoration at the Cathedral of Saint John the Divine in New York City. Ivan's building assessment projects include studies of historic buildings such as The White House and the Alamo, while hands-on conservation projects have ranged from the treatment of dinosaur footprints in the Connecticut River Valley to the stabilization of Plymouth Rock. Current projects include the conservation of sculptural reliefs completed by Fredric Bartholdi in 1878 located at the top of the tower of H. H. Richardson's First Baptist Church in Boston. Ivan studied philosophy and religion at New College and after graduation trained in several conservation ateliers and stone workshops.

Left: Old South Meeting House Original Gauged Brick Arches Pretreatment, Right: Old South Meeting House Restored Gauged Brick Arch with conserved original bricks and replacement bricks. Photo Credit: Ivan Myjer

Old South Meeting House Completed Gauged Brick Arch with New Bricks tinted to match weathered originals.
Photo Credit: Ivan Myjer

3:10PM - 3:35PM

SPLATTER UP! REPAIRING AND REPLICATING GUASTAVINO TILE AT THE ICONIC PLYMOUTH ROCK PORTICO

Presented By **Jack Glassman**, AIA, LEED AP

Progress photo, after failed tile removed. Photo Credit: Jack Glassman AIA / BH+A

Old and new 'Guastavino' tile. Photo Credit: Jack Glassman AIA

Old and new 'Guastavino' tile. Photo Credit: Jack Glassman AIA

IN 1921, THE PLYMOUTH, MASSACHUSETTS WATERFRONT was redeveloped as a promenade, and a neoclassical portico was erected over the famous Plymouth Rock to celebrate the Tercentenary of the Pilgrims' arrival in 1620. The McKim, Mead and White design features a Guastavino barrel vault with domical ends, supported by granite columns surmounted by a neoclassical entablature. The Portico's design and setting at the edge of Cape Cod Bay allows the tides to wash in and out and the structure is subjected to salt-air, coastal storms and cycles of wet-dry and freeze-thaw typical of the New England climate.

In 1999, maintenance staff at the (now) Massachusetts Department of Conservation and Recreation (DCR) discovered one of the Guastavino face tiles sitting on the plaza below. Discoloration, delamination and spalling of tiles continued over several subsequent seasons. In April 2005, the agency retained a team of experts led by Bargmann Hendrie + Archetype (BH+A) to evaluate the condition of the vaulting and recommend a course of action.

Reproductions of the original construction drawings depicted an embedded steel frame at the cornice level, including I-beams turned sideways to laterally restrain the perimeter of the vaulting and stiffen the structure. The drawings included a "Guastavino Vault" label but did not delineate the critical connection between tile vault and the steel -- which was clearly playing a role in the damage and deterioration. A copy of the original R. Guastavino Co. working drawing illustrated corner reinforcement and illuminated details concerning the relationship between the steel framing and the tile assembly.

The 2005 field work commenced with a close visual assessment and hammer-sounding survey of a representative sampling of Guastavino face tile by Vertical Access LLC, which confirmed the poor condition of the border areas. The proximity of the innermost flanges of the 18" steel beams to the face tile explained rust-expansion issues in the tile border, but the Guastavino Co. drawing prompted other questions. The initial condition assessment concluded with team recommendations to repoint the granite masonry and repair the vaulting, but also to study the feasibility of protecting the embedded frame via a cathodic protection system known as impressed-current cathodic protection (ICCP) system.

Restored Plymouth Rock Portico, 2010. Photo Credit Jack Glassman AIA

In 2007, Robert Silman Associates facilitated pre-construction structural probes, and CorrPro Companies tested the electrical continuity. Three probes exposed steel framing in excellent condition, and the trial CP installation proved that an ICCP system could effectively protect the frame from future corrosion. Hands-on inspection of each tile within the portico during the restoration revealed more deterioration than anticipated; some "intact" tiles were in fact failing cohesively and several areas of structural tile were disintegrating. A substantial void beneath the steel beams was filled with Type "O" dry pack grout, scored to facilitate bonding of replacement tiles. A disconcerting vertical gap between the edges of the structural tile and the steel beam flanges was filled with fluid-injection grout to maintain continuous contact between the steel frame and the masonry electrolyte.

Nearly 50% of the herringbone face Guastavino tiles were removed. The exposures revealed a series of parallel cracks and isolated sections of "rotten" structural tile/grout laminations, whereby the mortar between tile layers was competent, but the tile was friable. A detailed structural tile removal and replacement sequence was designed to knit new and old at damaged areas and at the probes; new layers of tile were "racked back" to avoid stacking tile, following a specific lapping sequence and making up for the original mortar thickness between tiles. Replacement face tiles and hand-scored red clay structural tiles were custom manufactured and installed as part of the restoration process. •

"The drawings included a "Guastavino Vault" label but did not delineate the critical connection between tile vault and the steel -- which was clearly playing a role in the damage and deterioration."

As a Historical Architect for the National Park Service Interior Region 1, **JACK GLASSMAN'S** responsibilities include preparation of design and construction drawings, technical specifications and cost estimates. He also provides technical advice to managers of Gettysburg, Eisenhower, Colonial, Richmond, and other Parks and has served as a Contracting Officer's Technical Representative.

Jack's current and recent repair and preservation projects include: Minute Man NHP leasing-program houses; the William Floyd Estate on Long Island, NY; the Custom House at Salem Maritime NHS; and Appomattox Manor outbuildings in Hopewell, Virginia.

Previously employed as the Director of Historic Preservation at Bargmann Hendrie + Archetype, Inc. (Boston, MA), Jack managed dozens of public-sector condition assessments, studies and design and engineering projects, guiding many of them from initial concepts through bidding and construction administration.

For ten years, Jack served as Chair of the Boston Society of Architects (BSA) Historic Resources Committee (HRC). Under his leadership, the HRC tracked current events involving historic resources, supported best practices in preservation, and hosted dozens of featured guest speakers.

Red clay structural tile infill–face tile layout begins. Photo Credit: Jack Glassman AIA / BH+A

3:35PM - 3:50PM

USE OF RAINSCREEN CLADDING BUILDING SYSTEMS TO PROMOTE THE REBUILD OF HISTORIC TERRA COTTA ASSEMBLIES

Presented By **Joshua Jaskowiak**, PE, and **Matthew Haberling**, PE,

ARCHITECTURAL TERRA COTTA ASSEMBLIES have served as defining aspects of a variety of nineteenth and twentieth-century architectural styles and represent the creativity and variety displayed by historic fired clay materials. With contemporary rainscreen systems, terra cotta has seen a resurgence in today's architectural community. However, when dealing with historic buildings, preservation and building heritage professionals are being increasingly tasked to assess heritage terra cotta assemblies as part of facade ordinance programs, condition assessments, and building maintenance plans for proactive building owners. In turn, these invaluable exercises can identify a variety of failure modes which require a range of repair methods from minor in-situ repairs to individual unit replacement to full multi-unit assembly replacement. This latter scenario, full unit replacement, can present significant logistical and financial impacts due to long fabrication lead times and the resulting costs associated with extended construction schedules. There are also significant costs involved with installing large and heavy terra cotta units in a traditional manner, which requires additional labor and equipment just to get the units into place. These factors can in turn lead building owners to consider alternative less historically appropriate materials that don't have the same in-service track records.

These considerations led a team of WJE professionals in partnership with Central Building & Preservation L.P., a Chicago-based masonry preservation contractor, to develop a prototype terra cotta rainscreen cladding system as part of Boston Valley Terra Cotta's annual Architectural Ceramics Assemblies Workshop (ACAW). The goal of this exercise was to develop a concept that could be adapted to a variety of architectural assemblies and styles while incorporating contemporary terra cotta unit extrusion manufacturing technology and anchorage developed for terra cotta rainscreen systems.

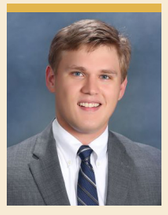
"...full unit replacement, can present significant logistical and financial impacts due to long fabrication lead times and the resulting costs associated with extended construction schedules."

The team used the International Masonry Institute (IMI) Terra Cotta Detailing Series cornice assembly mock-up for pressed and extruded assemblies as a basis-of-design for a terra cotta cladding assembly. The WJE prototype is based on the concept of using extruded rainscreen units. These units are typically able to be fabricated significantly quicker than hand-pressed units and are ideal for repetitive assemblies (e.g. cornices, watertables, and faux-cladding units). The prototype features extruded, glazed units typically between 2-to-6 inches in depth supported on a modular rainscreen support frame.

The design was intended to represent two potential scenarios. First, an existing hand-pressed historic assembly with significant deterioration requiring replacement of entire elements but funds or budget is limited to allow for replication of the historic hand-pressed units. Second, an instance where a historic assembly was previously removed and project stakeholders wish to reconstruct the historic assembly and restore the historic appearance of the building. This concept can also be used as part of the facade systems within new construction. The application can provide greater flexibility to architects seeking to respond to the character and fabric of the surrounding built environment. The use of this prototype is not intended to replace careful in-kind replacement of existing units or an in-kind reconstruction of an existing assembly. During the charette, the design team acknowledged that the prototype system can be a tool in the overall balanced considerations of a design professional but is not applicable for all project scenarios.

During this presentation, the authors will discuss the design charette process, the collaboration with an experienced terra cotta masonry contractor, the construction of a full-scale mock-up, and participation in the 2022 ACAW. The authors will also discuss findings from ongoing in-house research evaluating the environmental performance of the prototypical rainscreen units. The presentation will conclude with the team's lessons learned and a discussion of how this concept can be adapted to the toolbox of design professionals.

Header Photo Credit: Pexels.com



Since joining Wiss, Janney, Elstner Associates, Inc. as a full-time associate in 2016, **JOSH JASKOWIAK** has gained experience in performing facade investigations, condition assessments of new and existing buildings, and structural failure investigations. His is now a Senior Associate and has worked on a variety of projects, including historic and existing facade rehabilitation, brick and stone mass-masonry, transitional, and veneer wall systems, wood-framed structures, and historic structural system analysis and retrofit. He has also been actively engaged in projects related to construction observation of new building envelope systems. Mr. Jaskowiak has previously been involved with the APT Preservation Engineering Technical Committee (PETC) Student Competition Planning Committee as a reviewer of written student submissions and as a volunteer.

MATTHEW HABERLING has extensive experience with forensic investigation of existing building envelope systems for historic and contemporary buildings. Previous projects include restoration services for stone, masonry, stucco, and curtain wall facades, as well a variety of fenestration types and roofing. Mr. Haberling also has experience working on historic site projects involving restoration and waterproofing of traditional hardscapes and historic stairways. He has worked on a range of projects from large institutional complexes to single-family residences; and has provided consulting services on the application of preservation principals to architects for facade and roof restoration. Mr. Haberling has been involved with projects which received awards from organizations such as the American Institute of Architects, National Trust for Historic Preservation, Preservation League of New York State, and New York Landmarks Conservancy. He has also lectured throughout the United States and Canada on the subjects of historic roofing, window restoration, and historic plaza and facade restoration.

Terra cotta rainscreen assembly profile. Photo Credit: Wiss, Janney, Elstner Associates, Inc.

Completed terra cotta rainscreen assembly. Photo Credit: Wiss, Janney, Elstner Associates, Inc.

WJE and Central 2022 ACAW team assembled during the mock-up construction
Photo Credit: Wiss, Janney, Elstner Associates, Inc.

4:20PM - 4:45PM

COLLAR JOINT STABILIZATION IN FIRED CLAY MASONRY ASSEMBLIES

Presented By **John Wathne**, PE and **Norman Weiss**, FAIC, FAPT, FSA

Pre-dampening with water trickle at Neilson Library, Smith College, Northampton, MA. Photo Credit John Wathne

FIRED CLAY MASONRY UNITS, consisting most commonly of brick, terra cotta, and structural clay tile, present a unique set of opportunities and challenges when it comes to their use in a masonry assembly and to the rehabilitation of that assembly. These units are most often smaller in size than other types of masonry units and therefore there tends to be a greater ratio of mortar-to-unit in clay masonry assemblies than assemblies that contain stone. Fired clay units are also often more absorbent and may be susceptible to moisture-related dimensional changes, depending upon their age. In this presentation we will primarily focus on mass masonry brick assemblies, but similar challenges exist for other fired masonry assemblies.

Bricks, when used in mass masonry, are typically laid in regular three-dimensional patterns, called "bond". Bond affects not only the appearance, but the performance of the assembly, especially where multiple layers (wythes) of brick are needed to attain the dimensions of the assembly. In most bond patterns, the long dimensions of the bricks run parallel to the primary plane of the assembly with the wide dimension of the brick running perpendicular. The short dimension most typically runs vertically, with the majority of all units laid parallel to each other.

Structurally, the most critical joints are the bed joints, which support the primary loads within the assembly and are almost always compressed. Second in importance are the concealed collar joints, which need to maintain the relationship between the different wythes of brick. Head joints are the least structurally critical and primarily function, along with the bed joints, to maintain a watertight exterior.

As the masonry assembly ages, the head and bed joints commonly deteriorate from the exterior inward but are easily restored by cutting and pointing. Collar joints are never visible and often poorly mortar-filled (as they are also not easily inspectable). When the mortar becomes compromised, these joints represent unreachable planes of weakness within the masonry and are commonly the place where structural failure

"In most bond patterns, the long dimensions of the bricks run parallel to the primary plane of the assembly with the wide dimension of the brick running perpendicular."

of the masonry assembly initiates. The brick wythes start to separate, usually before there is any significant deterioration of the bed joints, which are compressed under load, or of the head joints, which are restrained due to the interweaving of the bricks in the longitudinal horizontal direction.

If one can access the collar joint and stabilize it before significant separation occurs, then one can usually save the entire assembly. •

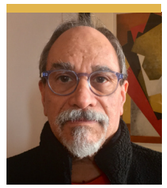
Pre-dampening crack in dome prior to injection at the Cathedral of Saint John the Divine, New York, NY. Photo Credit: John Wathne

Grout injection at Neilson Library, Smith College, Northampton, MA. Photo Credit: John Wathne

Grout injection at Neilson Library, Smith College, Northampton, MA. Photo Credit: John Wathne

JOHN WATHNE is a Structural Engineer, specializing in the evaluation, stabilization, and restoration of historic structures, with an emphasis on masonry and timber structures. A graduate of Lehigh University, he is the founder and president of VoidSpan Technologies which provides grouts, anchors, and other related products and services specific to the restoration and stabilization of historic masonry structures and is the president of Structures North Consulting Engineers. John is the chair of the ASTM Task Group that wrote and recently published ASTM C1713, the *Standard Specification for Mortar for Repair of Historic Masonry*, and the primary author of its commentary. He is the former Co-Chair of the International Concrete Repair Institute's Committee 410.

John is an expert in the evaluation and stabilization of historic masonry structures, having invented the grout-injecting Port Anchor, for which he holds two patents. He has also worked collaboratively in the development of compatible restoration grouts and mortars, along with pre-dampening and injection systems. Recent grouting projects include the Cathedral of Saint John the Divine, the New Jersey State Capitol, and Fort Wood at the base of the Statue of Liberty.



NORMAN WEISS is a technical specialist in the analysis and preservation of traditional building materials. Trained as an analytical chemist at New York University and the Massachusetts Institute of Technology, he is recognized for his decades of activities in the field of masonry cleaning and repair. He has worked on hundreds of stone, brick and terra cotta buildings, principally in North America. Among his best-known projects are the west front of the US Capitol, New York City's Trinity Church, and Frank Lloyd Wright's concrete masterpieces, Fallingwater and the Guggenheim Museum. His most current research is on the consolidation of limestone and marble, and the development of novel lime-based mortars, grouts, and paints.

A Fellow of the American Institute for Conservation and of the Association for Preservation Technology, he has taught at Columbia University since 1977, and is currently Chair of the PTT Board of the National Park Service. He is a frequent lecturer for preservation societies and masonry industry organizations throughout the United States. Prof. Weiss is Consultant Editor of the UK-based Journal of Architectural Conservation, and a Fellow of the Society of Antiquaries of London. He was Vice President of MCC Materials, where he worked to create innovative treatment-oriented materials for use by conservators.

4:45PM - 5:10PM

PERFORMANCE TESTING OF MATERIALS TO REPAIR TERRA COTTA GLAZE SPALLS

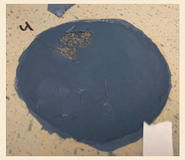
Presented By **Lauren DiCenzo**, PE and **Carolyn Searls**, PE

AN ONGOING CHALLENGE IN TERRA COTTA RESTORATION is finding durable coatings for in-situ glaze spall repairs that can be field applied in a variety of environmental conditions. Unlike the original factory-fired glaze, field-applied coatings are subjected to a variety of substrate conditions, such as moisture, that can significantly affect the curing and long-term performance of the repair. We are often faced with repairing terra cotta below leaking water tables and similar features that cannot sufficiently dry over the course of a typical construction schedule due to the exceptionally slow drying rate of terra cotta. This complicates the repair options, as most coatings require a dry substrate at the time of application. The purpose of our testing was to determine which field-applied products, if any, could deliver satisfactory results when installed over a moisture-laden substrate, as is often required in practice.

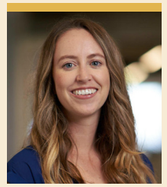
To investigate possible solutions, we tested a variety of coating technologies both from traditional preservation practices and alternative approaches implemented in other industries, such as flooring. Testing included sample pre-conditioning and storage conditions to simulate an initially wet wall allowed to dry and a continuously wet wall for a three-month test duration. We found that all systems cured without visible deficiencies when the wet terra cotta was allowed to dry after coating application. Our testing found only one system to be successful over a continuously wet substrate: a polyurethane paint over an epoxy-based primer. While further research is needed to determine the long-term performance attributes of epoxy-based primer systems for terra cotta repairs, this testing shows promise for use on limited applications when comprehensive drying of the substrate is not feasible and when used appropriately with other related repairs to optimize moisture protection. •

Testing In Progress - Samples Stored in Water after Coating Application
Photo Credit: Lauren DiCenzo

Acrylic Failure: Efflorescence



Silicate Failure: Delamination



LAUREN DICENZO is a Senior Consulting Engineer at Simpson Gumpertz & Heger Inc. (SGH) where she designs, investigates, and rehabilitates building enclosures to ensure building performance and longevity, with experience in both new construction and historic preservation projects. She values partnership and collaboration, and consults with architects, contractors, and building owners to deliver technically sound projects that maintain the architectural intent of the building enclosure. Her recent notable projects have involved restoring historic structures in the San Francisco Bay Area, including the Matson Building and the Breuner Building.

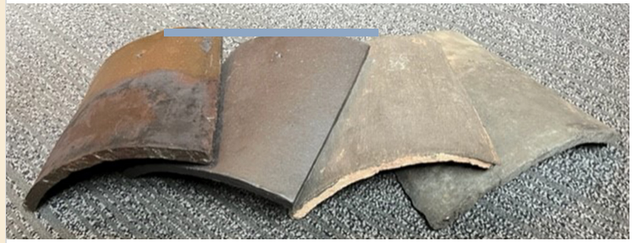
CAROLYN SEARLS is a Senior Principal at Simpson Gumpertz & Heger Inc. (SGH) and has experience in investigation, design, and construction contract administration of building enclosure repairs on historic and contemporary structures throughout the United States. In her career, she has investigated more than 1,000 buildings and structures. Active through speaking engagements, project commissions, and published papers, Carolyn has been recognized as an expert in the field of preservation of masonry and concrete on historic buildings, in addition to her work in cladding and waterproofing systems on contemporary buildings.

Glaze Spall Repair Failure: Paint over Glaze. Photo Credit: Carolyn Searls

5:10PM - 5:35PM

TRADITIONAL CHINESE ROOFING TILES IN SALEM, MASSACHUSETTS

Presented By **William Brandow** and **Clay Palazzo**, AIA, LEED AP



Top: Installation of the tile roof at Yin Yu Tang. Bottom: Sample replacement tiles in 2022.
Photo Credits: John G. Waite Associates, Architects

TWENTY YEARS AGO, Yin Yu Tang, an eighteenth-century Chinese merchant's house, was re-erected in Salem, Massachusetts, contributing to the Peabody Essex Museum's extensive collections related to the China trade, and serving as a counterpoint to the eighteenth-century homes of shipping merchants in the museum's collection. In the late 1990s, the house was painstakingly dismantled from the site where it was built in the Huizhou region of China. Once in America, the documentation, conservation, and re-erection efforts were led by John G. Waite Associates, Architects in close association with the Brookfield Arts Foundation and the Peabody Essex Museum. The firm was tasked with reassembling the house as closely as possible to the condition of the home when last inhabited.

The salvaged historic building materials were reused in the re-erection of the building, including a significant quantity of architectural ceramics. The bricks used in the wall construction, the molded and carved decorative bricks that form the majority of the building's external architectural embellishment, and the clay roof tiles are all fired materials.

None of these materials are glazed; the gray fired-clay finish is left exposed in many locations. However, the common-brick walls are covered in a lime-based render to protect the porous bricks. It is in the building's clay tile roof and parapet walls where fired ceramics are most prevalent. The tiles form the fields of the roofs, the ridges and valleys, and the copings on the decorative horsehead walls. It is in these locations that the building's original materials are most exposed and most tested by the seaside climate of New England.

In an effort to maintain authenticity, the original tiles were reused in all but their most susceptible, and least accessible locations. While the majority of the roof's visible surface is made up of original tile, an innovative compound base tile was designed to form the drainage troughs between the more visible cover tiles. These larger compound tiles, which each represent four traditional tiles, were made to accommodate the weight of access planking for roof maintenance. This allows for regular replacement of the more delicate cover tiles.

continued >

While the new roofing system is more resilient than the original roofing, it is nearly identical in appearance and left an abundant attic stock of original roof tiles for replacement.

When the house was re-erected, materials made in the traditional way could still be sourced from China. For various reasons, that is no longer the case. With the need for additional roof tiles and decorative bricks for the horsehead parapet walls, a new source of materials, which both match the original appearance and meet the requirements of the building's northern marine climate, was required.

John G. Waite Associates, Architects has been working closely with Northern Roof Tiles in Canada and Dreadnought Tiles in the United Kingdom since early 2022 to produce tiles that match the original Chinese tiles, while meeting applicable testing standards for strength, absorption, and freeze/thaw cycling. This effort demonstrates the use of traditional materials in new ways to meet the conditions of a more demanding climate. •

Tile roof at Yin Yu Tang. Photo Credit: John G. Waite Associates, Architects

WILLIAM BRANDOW is an Associate with John G. Waite Associates, Architects, and has served as Masonry Conservation Specialist and Project Manager on the firm's most significant restoration and preservation projects for over 15 years. In his time with the firm, he has contributed to the success of a variety of preservation projects including the stabilization and relocation of the 1816 Farmington Meetinghouse, Farmington, NY; the restoration of the Parish of All Saints, Ashmont in Dorchester, MA; the restoration of Kingston City Hall, Kingston, NY; the re-erection of Yin Yu Tang for the Peabody Essex Museum in Salem, MA; and the restoration of the iconic Art Deco style Cincinnati Union Terminal, Cincinnati, OH.

Mr. Brandow has contributed to initiatives such as the "This Place Matters" project through the Historic Albany Foundation, and tours of the Empire State Plaza in Albany, NY in support of the documentary "The Neighborhood That Disappeared". He has given numerous lectures around the Capital Region in support of the book Architects in Albany and he has written the article "The Hudson Valley's Dutch Brick House" in The Old House Journal.

Mr. Brandow is a Past President and current Board Member of both the Historic Albany Foundation and the Washington Park Conservancy, and Vice Chair of the City of Albany Historic Resource Commission. He earned his Master of Architectural Conservation from the University of York, Institute of Advanced Architectural Studies in York England. He earned his Bachelor of Science in Historic Preservation and Bachelor of Arts in History from Roger Williams University, School of Architecture in Bristol, RI.

CLAY PALAZZO is a Principal with John G. Waite Associates, Architects. He has managed some of the firm's most prestigious projects, including the restoration and re-erection of Yin Yu Tang, a late eighteenth-century Chinese merchant's house at the Peabody Essex Museum in Salem, Massachusetts; the restoration of Cincinnati Union Terminal in Cincinnati, Ohio; the restoration of the Rotunda at the University of Virginia (Charlottesville, VA); and numerous National Park Service projects ranging from the Statue of Liberty, to the Grand Memorial Arch at Valley Forge, to the restoration of Vanderbilt Mansion (Hyde Park, NY). He is currently the principal in charge of the historic structure report for Biltmore in Asheville, North Carolina; the restoration of the Jefferson Hotel in Richmond, VA; and the exterior restoration of Sheldon Hall at SUNY Oswego.

Mr. Palazzo's responsibilities have ranged from the preparation of feasibility studies, historic structure reports, and conservation studies to the design and construction administration of restoration and adaptive use projects. All of these projects have been characterized by innovative, state-of-the-art solutions to restoration problems, and a consistent commitment to thoroughness, design excellence, and client satisfaction. Two of his projects (the Rotunda and Cincinnati Union Terminal) received National Honor Awards from the American Institute of Architects.

Mr. Palazzo earned undergraduate and graduate degrees in economics and architecture from the University of Virginia, and a Master of Science in Historic Preservation from Columbia University. He joined JGWA in 1989.

A SPECIAL THANK YOU TO OUR SPONSORS

Not a sponsor yet? You can still get sponsor recognition at unique events throughout 2023!

See our website for more details on all sponsorship benefits

www.aptne.org/sponsorship-benefits

MARBLE SPONSOR

Nicholson & Galloway, Inc. N&G Since 1849

GRANITE SPONSORS

CANY · Stone & Lime Masonry Restoration Services · Colors Forever. Keim · SGH · Gladding McBean · Brand Safway · Western Specialty Contractors, Formerly Brisk Waterproofing Company · The Grenadier Corporation · Pullman Restoration, Preservation, and Repositioning · Span Void

LIMESTONE SPONSORS

Atkinson-Noland & Associates · John Canning Perfecting Preservation · WJE Engineers Architects Materials Scientists, Wiss, Janney, Elstner Associates, Inc. · Highbridge Materials Consulting, Inc. · Vertical Access · JBC Jablonski Building Conservation, Inc. Architectural Conservators · KaLam · 40 Years 1983–2023 · Silman · Femenella & Associates · Shawmut

BROWNSTONE SPONSORS

Echem Consultants · ne Norfast Engineering · Liberty Stained Glass Conservation · LFG · Evergreene Architectural Arts · wsp · John D Nakrosis

BLUESTONE SPONSORS

plan B Structural Engineers · ICR ICC · Old Structures · Celebrating 50 Years Gale · Jenkins Architecture Design • Restoration • Preservation · Kim & David Follett

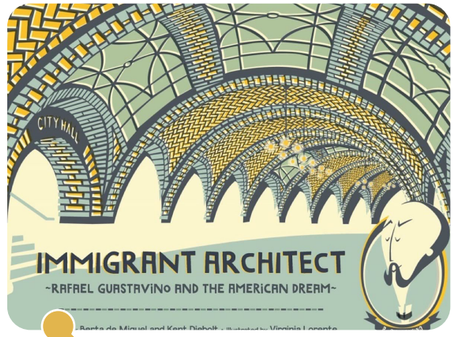
FIELDSTONE SPONSORS

AYON Studio Architecture and Preservation · Allegrone Companies · Cirrus Structural Engineering · Cole Company Construction Management · Historic Preservation · Conspec Associates, Inc. · cultural heritage conservation · ECORAD · Kaese Architecture PLLC · Mugno Consulting · Ryan Biggs Clark Davis Engineering & Surveying · The VMJR Companies Competence Integrity Reliability Quality · Adirondack Construction · Sweet Constructors · Henson Architecture

2022 YEAR-END REVIEW

HUDSON, NY
FEBRUARY 25, 2022
9AM-8PM
APTNE Annual Meeting and Symposium

NEW YORK CITY, NY
MAY 21, 2022
1PM-2PM
Guastavino Children's Book & Tour



CONEY ISLAND, NY
AUGUST 19, 2022
7PM-10PM
Brooklyn Cyclones Game

VIRTUAL
SEPTEMBER 21, 2022
5PM-6PM
Mitigating Fire Risk: Codes, Obstacles, and Opportunities

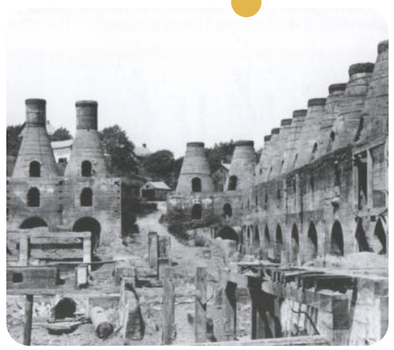
NEW YORK CITY, NY
OCTOBER 21, 2022
3:30PM-6PM
Palace Theatre Restoration Hard Hat Tour

NEW YORK CITY, NY
DECEMBER 5, 2022
6:30PM-9:30PM
Winter Holiday Party in NYC

NEWTON, MA
APRIL 28, 2022
4PM-6PM
Grace Episcopal Church Hard Hat Tour

MAY 12, 2022
4PM-6PM
Grace Episcopal Church Hard Hat Tour: Student Edition

VIRTUAL
JUNE 8, 2022
5PM-6PM
Battle of the Cements: Portland Cement Repairs and Original Natural Cement Mortars



HASTINGS-ON-HUDSON, NY
SEPTEMBER 8, 2022
11AM-8PM
APTNE Annual Golf Outing at St. Andrews Gold Club

GREENWICH, CT
OCTOBER 1, 2022
1PM-3PM
Building Stone Walking Tour

SARATOGA SPRINGS, NY
OCTOBER 8, 2022
9AM-3PM
Saratoga Springs Race Track Tour

NEW YORK, NY
DECEMBER 9, 2022
3PM-5PM
Student Outreach Scavenger Hunt

APT NORTHEAST

Association for Preservation Technology Northeast
APTNE 2023 Annual Meeting & Symposium

Program Design by Amanda Morante Wolin
www.amandamorante.com