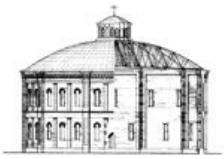

SOCIETY FOR INDUSTRIAL ARCHEOLOGY

Presentations

42nd Annual Conference
Hotel St. Paul
St. Paul, Minnesota

Saturday, June 1, 2013

Presentation Committee:
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Cover photo and design by Amanda Gronhovd
Flour mills and tailraces at Mill Ruins Park in the Minneapolis West Side Milling District

Track 1

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Session 1B: Chain of Energy: From Animal to Machine

Session 1C: Mining and the Upper Midwest Region

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Track 2

Session 2A: Industrial Communities

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Track 3: 23rd Historic Bridge Symposium

Co-sponsored by the Historic Bridge Foundation

Session 3A

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Interpretation in the Middle of the Mississippi: Water Power Park

Hess, Roise and Company was hired by Xcel Energy, the local electrical utility, to develop and implement an interpretive plan for a new public park on Hennepin Island, located in the Mississippi River at St. Anthony Falls on the edge of downtown Minneapolis. It was an exciting challenge in an area with a long and rich history. When we focused on themes that would be the most compelling for the dramatic mid-river site, however, there was a clear winner: waterpower. This presentation will discuss the site's history, the challenges of developing the interpretation, the rationale for the final selection of themes and topics, and reflections on how the park and the interpretation have been received.

Hennepin Island once separated the east and west sections of St. Anthony Falls, a remarkable natural asset that attracted settlers to the nascent city of Minneapolis in the mid-nineteenth century. Sawmills extended from the island to the east bank, and one of the nation's first central hydroelectric stations was established between the island and the west bank. More sawmills and other industrial facilities were on the island itself.

For power, the mills and factories relied first on waterwheels, then direct-drive turbines, and finally hydroelectricity. The Main Street Power Station, which opened between the island and the east bank in 1894, provided virtually all of the electricity for Minneapolis for over a decade. In 1908, the Hennepin Island hydroelectric station went into operation, taking advantage of water rights that went unused on Sundays and other off-peak times. The power it generated was dedicated solely to the city's streetcar system.

As the twentieth century progressed, the channel between the island and the east bank was gradually filled in, making Hennepin an island in name only. As industries relied less and less on waterpower, the University of Minnesota's St. Anthony Falls Hydraulic Laboratory was established in the 1930s on the site of an abandoned municipal pumping plant. It brought an innovative new use to the island, channeling some of the river's flow directly through this unique experimental facility, which continues to this day to draw scholars and engineers from around the world.

Ironically, although the island became indistinguishable from the east bank, it grew less accessible as Northern States Power (NSP) fenced off most of the upstream section. Change came in the early twenty-first century, however, when NSP's successor, Xcel Energy, needed to relicense the Hennepin Island plant. A recreation plan required as part of the relicensing led to Xcel's commitment to reopen the island for public use. Interpretation was to be an important component of the new park. Hess, Roise helped Xcel through the Section 106 review process for the project and collaborated with engineers and landscape architects to select sites for the eighteen interpretive panels that we developed.

The park opened in 2007. It has become a popular seasonal amenity, offering the chance for unique interaction with the river and the history associated with this important locale.

Charlene K. Roise is a founding partner of Hess, Roise and Company, which was established in 1990, and has served as the company's president since 1997. Her projects involve a broad spectrum of cultural resources ranging from bridges and aircraft hangars to high-style commercial buildings and landscapes. Her recent work includes National Register nominations for Peavey Plaza, which opened in downtown Minneapolis in 1975, and a 1,300-unit high-rise apartment complex, Cedar Square West, completed in 1973. Holding an advanced degree in historic preservation from Boston University and an undergraduate degree with majors in history, American studies, and German from St. Olaf College in Northfield, Minnesota, she currently serves on the boards of the Cultural Landscape Foundation and the Minnesota Chapter of Lambda Alpha International.

"Loomed in the Land of Lakes": A Case Study of Woolen Milling in Minnesota

Minnesota is known for its flour and lumber milling industries, but other industries have also thrived in the state. Early woolen mills took advantage of the state's isolation from eastern suppliers to create a local textile industry. As the state developed and railroad networks connected the country, the woolen mills also grew and some, like the North Star Woolen Mill in Minneapolis, developed a national reputation.

One of the state's earliest woolen mills was located in Faribault, Minnesota, fifty miles south of Minneapolis. The Faribault Woolen Mill Company started as a small family-owned business in 1865 with a local market. It grew to become the largest and longest-surviving woolen mill in the state. The company survived the contraction of the American textile industry in the twentieth century with the mill's most profitable period arriving after World War II, when it came to dominate the American woolen industry. The current building dates from 1892 but with additions through the 1980s that reflect technological changes to milling and the incremental growth of the company. The property was listed in the National Register of Historic Places in 2012 for its importance to the Minnesota textile industry.

The presentation will include a brief history of woolen milling in Minnesota before focusing on the Faribault Woolen Mill Company as the longest surviving company in the state. It will discuss the success of the Faribault Woolen Mill Company in adapting to changes in the textile industry in the twentieth century, and its continued operation as a fully integrated woolen mill, which continues to produce blankets and other woolen goods today.

Elizabeth Gales has a graduate degree in historic preservation from the University of Georgia. She worked as a consultant in the Rio Grande Valley of Texas before joining Hess, Roise and Company, historical consultants, in 2002. Her work has included historic documentation of bridges, hydroelectric dams, and wastewater treatment plants; National Register nominations for a variety of property types; and historic rehabilitation tax credit projects to save historic properties. Ms. Gales prepared the National Register nomination for the Faribault Woolen Mill Company and has overseen the historic rehabilitation tax credit process for the property. She has served on the boards of the Minnesota Chapter of the Society of Architectural Historians and the Minnesota Chapter of DOCOMOMO US. She is currently president of Preserve Minneapolis, a non-profit organization dedicated to raising awareness of cultural resources in Minneapolis.

Equipped with the Latest Improvements: Hydropower in Redwood Falls, Minnesota

The Falls of St. Anthony led to the establishment of Minneapolis and provided the water power for lumber and flour milling, the two early industries that built the city. Hydropower played just as important a role in the growth and development of the economies and infrastructures of towns and cities throughout the state. Beginning in the late nineteenth century, communities around Minnesota were tapping into the region's many rivers for the water power they provided. Hydropower fueled local industries and provided the electricity that modernized and connected rural outposts. Redwood Falls, situated on the Redwood River in southwestern Minnesota's agricultural region, demonstrates how a Minnesota city evolved after the adoption of water power.

By the late 1860s, local businessmen were already utilizing the Redwood River for flour milling, but it was not until German immigrant August Burmeister purchased the Redwood Roller Mill in 1889 that the potential of hydropower would be fully recognized. Although his flour milling enterprise was successful, in 1897, Burmeister expanded his service by making an agreement with the city to give its downtown its first taste of electricity. The demands on Burmeister's mills and electrical supplies grew continuously, and in 1909, a new, modern power plant was constructed. Burmeister chose a new site downriver and downhill from his flour mill to take advantage of an 86-foot (26-m) head, one of the highest in the state. This was accomplished with a 1,400-foot (430-m) tunnel excavated through solid rock. With increased capacity and larger machinery, the Redwood Falls Power and Light Company could keep up with the ever-increasing customer and commercial demand.

After Burmeister's death in 1940, his family continued to operate the company for six more years before the city successfully purchased the dam and plant and established the Public Utilities Company (PUC). Under municipal ownership, the plant was quickly expanded to accommodate postwar electrical demand. By the early 1950s, the PUC realized that the plant would not be able to provide enough power to meet customer needs, so electricity was purchased from providers outside of the city. The hydroelectric plant was kept on as a back-up power source, a function it continues to serve to this day.

This paper will discuss the history of hydropower in Redwood Falls and how, under the entrepreneurship of August Burmeister, the Redwood Falls Light and Power Company brought electricity to an ever-increasing customer base. The development of the power plant site in conjunction with expanding demand will be considered and the building examined as a representation of the growth and change of Redwood Falls' demand for and relationship with hydroelectricity.

Stephanie K. Atwood has a B.A. in English from Macalester College and an M.S. in Industrial Archaeology from Michigan Technological University. She worked as an independent consultant in Michigan's Keweenaw Peninsula, where she was involved with projects related to the region's copper mining industry. Currently employed as a historical consultant at Hess, Roise and Company in Minneapolis, her work includes listing properties in the National Register of Historic Places and the Minnesota Historic Property Record, as well as preparing tax credit projects to rehabilitate and preserve historic buildings.

Furniture Manufacturing in the Twin Cities

Furniture manufacturing was a major industry in the Twin Cities in the early 1900s, as noted in this newspaper excerpt:

> To many people in many cities and towns throughout the United States, furniture is just another way of spelling Minneapolis. The reason for this is that annually Minneapolis exports to all parts of the country Minneapolis made furniture with the stamp "Minneapolis" on each piece whether it be bedstead, commode, chair, table, bookcase, or chiffonier. In this way Minneapolis-made furniture directly advertises the city of Minneapolis.

The furniture industry included not only regional companies, but also such national brands as Simmons and Sealy mattresses, which are still active in the industrial Midway of St. Paul. This presentation will examine the underlying reasons for the emergence of the furniture cluster, starting with a plentiful supply of timber along the upper Mississippi River, which was floated down to the sawmills at the St. Anthony Falls in Minneapolis. Later, the large concentration of railroads would service the furniture industry supply chains.

On the "upstream side" of the supply chain, there was a plentiful supply of lumber coming into the Twin Cities as a result of such locally-based companies as Weyerhaeuser and Brooks Brothers Lumber. "Midstream," a critical mass of chemical companies developed around the furniture industry to provide glue, varnish, paint, shellac, dyes, putty, and other needed materials. Among the companies were Peter Cooper's glue factory, E. I. du Pont de Nemours and Company, Grasselli Chemical, Archer-Daniels Linseed Oil, and Patterson Sargent Paint Company. Many of these companies had their origins in the byproducts of local agricultural and meatpacking industries. In addition, other products, such as hardware and window weights, were supplied by local companies. Finally, there was a very strong network of professional associations for all aspects of the furniture industry including manufacturing, wholesaling, and retailing. One of the important results of this social infrastructure was the creation of two Furniture Exposition buildings, which helped market products throughout the country.

Brian McMahon is a trained architect, with degrees from the University of Notre Dame and the Pratt Institute School of Architecture. He has written widely on the subject of urban history and has received a number of research grants from, among others, the Minnesota Humanities Commission, the Minnesota Historical Society, the Minnesota Labor Interpretive Center, the Minnesota Legacy Project, and the Minnesota Sesquicentennial Project. He has a long-standing association with the Ramsey County Historical Society, having written a number of articles for *Ramsey County History* and organized a number of exhibits. He is the author of an upcoming book on the history of the Ford Motor Company in Minnesota, to be published by the University of Minnesota Press, and another book on the history of the industrial Midway. He has delivered papers at the Society of Industrial Archeology (Duluth conference), the Minnesota Chapter of the Society of Architectural Historians, the Society of Automobile Historians (Los Angeles conference), and the Working Class Studies Association.

Making Hay While the Sun Shines: Animal Fodder, Animal Laborers, and Energy Flows in Michigan's Copper Country

This presentation will argue first that students of the industrial past should consider draft animals as laborers in need of support from local food systems; and second, that these local food systems represent energy flows, where the production of hay serves as fuel for industrial processes. Despite difficult growing conditions, beginning in the mid-1800s, farms of varying sizes arose to help provision the emerging mining communities of Michigan's Copper Country; some of these were commercial enterprises which specialized in animal fodder as their primary cash crop. In this period, draft animals were used to transport materials and supplies within and between the mines themselves as well as within and between mining communities.

When mining began in earnest in the area, transport of foodstuffs into the Copper Country was limited by a combination of harsh climate and poor accessibility. Prior to the arrival of the railroad to the area in 1883, supplies for both humans and beasts of burden toiling for the mines was either imported by ship when the waterways were clear of ice or grown locally. Bammert Farm, located in what is now Keweenaw County, served nearby copper mines such as Central, Phoenix, and Cliff mines. In addition to what the food they produced for human consumption, a substantial part of Bammert Farm's contribution to the regional food system was its supply of sustenance to the animals who labored for local industry and local communities.

As railroads became a more viable way to transport material into the Copper Country after 1883, it is likely that the food system of the area relied more heavily on rail to import much of the foodstuffs intended for human consumption, while larger-scale local farms emphasized producing hay and grain-based fodder for draft animals. Animals provided labor to industry and industrial communities and the energy they needed must be taken into account when evaluating the historical food systems of those places.

Anna Lee Presley is a Ph.D. student in the Industrial Heritage and Archaeology program at Michigan Technological University. Being affiliated with Michigan Tech has afforded her an opportunity to apply her experience in archaeological faunal analysis and biogeography to nineteenth-century industrial contexts. Her dissertation research focuses on the development of the historical food system in the Copper Country, utilizing a landscape archaeology approach to explore how residents of its newly industrialized communities adapted to challenging local conditions and integrated themselves into larger markets. Her work integrates nature and culture to apply contemporary issues of food security to the practice of industrial heritage. Her areas of interest include: food systems, zooarchaeology, historical archaeology, industrial communities, commodity chains/commerce, industrial food production, gender, and feminist anthropology.

Horse Railroad and Industrial Archaeology of the Southwest Corridor Project, Boston

In the late 1970s and early 1980s, a series of major archaeological surveys and excavations were conducted in advance of construction of the Orange Line subway branch in the Roxbury neighborhood of Boston, Massachusetts. Archaeological staff of the Museum of African American History excavated sites along the corridor that was previously cleared for the cancelled construction of a major highway that would have connected Route 128 to the heart of downtown Boston. The aim of this paper is to review and highlight the contributions of this project, dubbed the Southwest Corridor Project, to industrial urban archaeology. Sites documented include a pumping station, tannery facility, foundry, and horse railroad complex. The final site will be discussed in greater detail in recognition of renewed research on the excavations of the car repair and stable facilities of this early Boston horse railroad, the Metropolitan Railroad Company.

Constructed in 1869-70, the Elmwood Street Pumping Station contained the boiler room and engine room for the Fort Hill Standpipe, the first high-service facilities (besides reservoirs) in the City of Boston. Excavations helped reconstruct the original plan and subsequent alterations to the engine room portion of the station.

Excavation of the Guild and White Company Tannery site revealed that two post-tannery building phases—an undocumented warehouse from circa 1891 and another phase from circa 1925—had seriously damaged the remains of the circa 1847-89 tannery. Structural remains of three tannery buildings—the leaching room, the boiler room, and the bark house—were found.

Archaeological excavation of portions of the Highland Stove Foundry site, in operation from 1845-1920, primarily focused on its cupola furnace area and molding room. A substantial collection of artifacts was recovered, representing the wide range of foundry products, equipment, tools, and byproducts of the sand molding and foundry operations. Evidence of structural changes made to the foundry was also uncovered, along with much architectural material and construction hardware that reflected the fabric of the foundry structures.

New examinations of the archaeological materials of the Metropolitan Railroad Company (MRC) Complex site in Roxbury, Massachusetts, explore issues revolving around industrial labor, animal care, and the needs of urban transportation. The MRC operated a horse-powered railroad system in Boston between 1855 and 1886. Excavation of the company's Roxbury Crossing trolley house and horse maintenance complex recovered objects related to harnessing, grooming, and veterinary care of its horse population and the blacksmithing, painting, and leatherworking undertaken to maintain the railroad's horses and railcars. Comparative description of these materials to other industrial examples and treatises aims to describe human and animal labor conditions at the MRC complex, its functional layout, and its management in an industrial urban setting during a time of technological transition from animal to electric power. Furthermore, this research offers the opportunity to recognize human and animal contributions to increasing the efficiency of transportation infrastructure between the economic core of Boston and its growing suburbs during the latter half of the nineteenth century.

Miles Shugar attended Millersville University of Pennsylvania after obtaining early volunteer experience in archaeology. After conducting fieldwork on colonial sites in Lancaster County, Pennsylvania, and Bermuda, he obtained his bachelor's degree in both history and anthropology, with a concentration in archaeology. After spending a few years in the professional realm, at first managing Millersville's labs and fieldwork and then spending some valuable time in the CRM realm, Shugar re-entered academia at the University of Massachusetts, Boston, to work towards his master's in historical archaeology. Under the direction of Dr. Stephen Mrozowski, Shugar now leads the research team investigating an early nineteenth-century Native American homestead in Grafton, Massachusetts. He is also working on his thesis, which explores the collections of the Metropolitan Horse Railroad Complex site in Roxbury, Massachusetts. He seeks to explore human and animal labor conditions on site, as well as better understand how this support facility helped spur the growth of Boston's suburbs.

Baldwin & Criss Lumber: Industry of Our Recent Past

In the 1960s, two men joined to form Baldwin & Criss Lumber in rural Cayuga County, New York. Don Baldwin began logging in the 1950s and had a small mill operation on the side. Dave Criss was a co-owner of another portable mill venture who needed a new partner. Initially, Baldwin continued to log, cutting the timber to supply the mill, while Criss ran the sawing operations. Within five years, it was apparent that changes were needed to keep up with the growth of the business. In December 1971, the firm installed a new hydraulic sawmill at the site, a Jackson Lumber Harvester. Manufactured in Wisconsin, the Jackson was one of the first automated mills in operation in the area. The mill house was revamped to support the new sawmill. Both men devoted their talents to facility operations: Criss manned the head saw and Baldwin managed the yard. Logs were purchased and lumber was shipped to a variety of firms. Baldwin and Criss provided wood products to the surrounding farm community; supplied specialty hardwoods to manufacturers such as Stickley Furniture and the Marsellus Casket Company, maker of high-end caskets purchased for presidents and other dignitaries; and sold dimension lumber to Baillie Lumber Company, one of North America's largest hardwood lumber manufacturers, distributors, and exporters.

The mill was an organic operation, changing to meet the demands of the business. Buildings and structures were built to address these needs. The story of the mill and those who worked there is one of struggles with Mother Nature and personal challenges. With the installation of the automated mill, supporting machinery was also updated to meet the new capacity; however, the work was dangerous and demanding. Everything produced, whether lumber or byproducts like sawdust and slab wood, was treated as a commodity and sold. The mill required a labor force of seven to ten workers, which fluctuated depending on the season and mill activity. It was also a family affair—where various family members worked at the mill at one time or another—and home to local personalities within a tightly knit community.

The presentation will document the mill, provide an overview of the sawmill and its operation from the 1960s through the twenty-first century, and will address the changing industrial landscape associated with logging and family-operated sawmills of the mid-twentieth century. The mill closed in 2003-04, marking the end of an era in central New York State. A drive down the road, past vernacular wood buildings amidst a weed-cluttered yard, one can hardly image the activity once housed here: trucks and trailers loaded with logs or lumber, the rumble of the head saw, the steady movement in the yard, and those who toiled to the hiss of the saw. The presentation will focus on the process of turning logs into lumber, the distribution of the products, the equipment used, and impact of a local sawmill as it relates to the regional logging industry.

Deborah Baldwin Van Steen has been involved in community and professional development and preservation activities for 15 years. She is an architectural historian and historic preservation professional, is a native of New York State, and currently lives in Ossining, New York. Ms. Van Steen serves as Vice President of the Ossining Historical Society Museum, is Village Historian for the Village of Ossining, and is a member of the Ossining Historic Preservation Commission. As a cultural resource professional, she has documented a wide variety of historic resources, including transportation, residential, academic, agricultural, urban, and rural properties in New York, New Jersey, Pennsylvania, and Illinois. As a member of the Ossining Historical Society Museum's Board of Trustees, Ms. Van Steen wrote and administered historic preservation grants for the conservation treatment of historic objects and buildings; has prepared brochures, pamphlets, and exhibits; and has given presentations on local history. Ms. Van Steen is contributor to *Ossining Remembered* (1999) and *The Ossining Story: A Bicentennial Celebration, 1813-2013,* due to come out this year.

Cultural Resource Reconnaissance Survey of Lake Vermilion State Park and Identification of the Early Mining Exploration of the Vermilion Iron Range of Minnesota

In 2010, the State of Minnesota acquired 3,000 acres (1,200 hectares) of land on the south shore of Lake Vermilion in northern Minnesota from the U.S. Steel Corporation and dedicated it as Lake Vermilion State Park. This property lies adjacent to Soudan Underground Mine State Park, a National Historic Landmark, and is situated in the heart of the Vermilion Iron Range. The Minnesota State Parks and Trails Cultural Resource Management Program (MSPATCRMP) of the Archaeology Department of the Minnesota Historical Society has conducted archaeological reconnaissance surveys in these two state parks over the past three field seasons. A significant number of features relating to the establishment of the late nineteenth-century iron ore mining industry in the area have been identified, as well as evidence of earlier gold mining exploration dating to the mid-1860s Lake Vermilion Gold Rush.

The vast majority of the nearly 500 features identified during the reconnaissance surveys have been hand-excavated test pits, varying in size from 6 to 25 feet (2 to 8 m) in diameter and up to 10 feet (3 m) in depth, and trenches. The pits that relate to the iron ore exploration are strategically placed on the landscape on north-south transects situated approximately 300 feet (90 m) apart. The number of pits on each transect varies from three to eighteen, and they have been excavated through till to the bedrock in order to determine the presence of iron-bearing base materials. The exploration process demonstrates a rigorous methodological approach to the search for iron ore deposits, focusing on the geological formations in which the ore occurs. This methodology is the same method established by Professor A. H. Chester of Hamilton College, who was employed by Charlemagne Tower in the 1870s and 1880s, to determine the viability of iron ore deposits to create an iron ore mining industry. Subsequent to the initial test pit excavations, some hollow-core diamond drilling, introduced in 1892, also appears to have been conducted in selected test pits, as drill pipes and vertical rail sections have been found at approximately one dozen locations.

Gold mining exploration pits are less frequently encountered and consist of vertical cut faces in quartz-bearing bedrock. These gold test pits are rectangular in form and appear to be placed only at locations where gold might be encountered. There is no apparent regular sampling strategy to the placement of these gold test pits and most have been identified on the Soudan Underground Mine portion of the survey area.

Reconnaissance survey investigations will be ongoing as development plans for the state park are generated. Currently, MSPATCRMP is addressing proposed plans that will impact several score of the test pits and is involved with determining how to preserve as many of the pits as possible while continuing to develop the park for public access. A potential outcome of this work may be the designation of a National Register Historic District related to the early exploration for iron ore on the Vermilion Range.

Douglas C. George has worked in Minnesota archaeology since his undergraduate days at Hamline University in St. Paul. He was employed in the Archaeology Department of the Minnesota Historical Society during the 1970s and left to pursue graduate studies at Boston University during the 1980s. Since 1988, he has been a Senior Research Archaeologist in the Archaeology Department of the Minnesota Historical Society assigned to the Minnesota Department of Natural Resources, Division of Parks and Recreation and Division of Parks and Trails Cultural Resource Management Programs. Mr. George's main area of interest is the post-contact period of Euro-American settlement of the upper Midwest and western Great Lakes regions. While not his first foray into the discipline of industrial archaeology, the current study of early gold and iron ore mining exploration at Lake Vermilion State Park is his most in-depth involvement with topics in this area.

David S. Radford has been employed as an archaeologist in the Archaeology Department of the Minnesota Historical Society since 1984. As principal investigator for MSPATCRMP, Radford has directed hundreds of cultural resource surveys in Minnesota State Parks and on other Minnesota Department of Natural Resources lands. While most of Radford's experience is related to pre-contact period archaeology and historic settlement archaeology, the recent acquisition and development of the new Lake Vermilion State Park in northern Minnesota has prompted a focus on industrial archaeology and industrial landscape preservation related to gold and iron ore prospecting and mining. Radford received a B.A. degree in biology from Hamline University in St. Paul, Minnesota, and an M.S. degree in archaeological science from the University of Southampton in England.

Iron Mining in the Cuyuna Range: The Legacy of a 20th-Century Mining District

The former iron mining district known as the Cuyuna Range was contained within Crow Wing County in central Minnesota. Ore shipments from this district spanned most of the twentieth century, from 1910 to 1980 approximately. Many legacies of this mining era survive into the present and are now beginning to receive scholarly attention.

Research into the development of and achievements within the Cuyuna Range has been conducted by Michigan Technological University graduate student Frederick Sutherland for his Ph.D. in Industrial Archaeology. The source materials for this presentation combine written, photographic, oral history, and personal observations from several mining communities and mine remnants in the former district. The presentation will cover aspects of Mr. Sutherland's ongoing dissertation research, which investigates how the Cuyuna Range was distinctive from Minnesota's other well-known iron mining districts, the Mesabi and Vermilion ranges.

One feature of the Cuyuna Range was the extensive use of iron ore sintering technology. Eventually, these iron ore processing facilities developed into some of the largest of their kind in North America. Another feature of the Cuyuna Range was the importance of manganese minerals found within the district's iron ore bodies. These manganese-iron deposits became a vital strategic supply for the North American steel industry during both world wars.

Another set of distinctive features in the Cuyuna Range were the achievements of businesses, communities, and institutions that successfully developed solutions to the challenges of sustaining the mining district. In the Mesabi and Vermillion ranges, developed under the aegis of the powerful U.S. Steel Corporation, smaller mining companies were at a significant disadvantage because U.S. Steel favored suppliers that could produce large quantities of marketable ore. In contrast, the Cuyuna Range became a mining district of small- to medium-sized mining companies that had to innovate and collaborate in order to successfully compete against much larger regional and national mining operations from neighboring mining districts.

The conclusion of this presentation will include Mr. Sutherland's plans to study surface remnants at mine locations in the Cuyuna Range to better understand how relationships between companies, communities, and other institutions influenced the development of the mining district. Possible sites to be investigated include the Portsmouth Mine, which had what some texts claim was the largest iron ore sintering plant in North America. The Rowe Mine location contains remnants from one of the earliest attempts at iron ore benefaction in the Cuyuna Range, which may have influenced later ore processing facilities. Investigating the surface remains of the Milford Mine, where a terrible accident occurred in 1924, could provide information about how mine safety changed after that event.

Frederick Sutherland has been a practicing archaeologist for over 10 years. Mr. Sutherland has a bachelor's degree in archaeology from Boston University and a master's degree in anthropology with a concentration in historical archaeology from the University of Massachusetts, Boston. Since 2009, he has been studying for his doctorate in the Industrial Archaeology Ph.D. program at Michigan Technological University. His professional interests include public archaeology, nineteenth-century iron furnaces, industrial communities, and historic architecture.

Environmental Impact of the Torch Lake Industrial Waterfront

The research that is currently in progress involving Torch Lake in the Keweenaw Peninsula of Michigan is extremely important to the story of mining and pollution. This presentation will give preliminary results of findings from an interdisciplinary study to demonstrate the collaboration potential between industrial archaeologists and environmental engineers. This area was a site for stamp mills, smelting, and copper reclamation plants between 1900 and 1970. Today it is the location of an Environmental Protection Agency (EPA) Superfund Site and Area of Concern because of the mining pollution, and some clean-up actions have taken place to remediate that pollution. Our research is to relate the high levels of polychlorinated biphenyls (PCBs) in the water and on the shoreline to the industrial history of the Torch Lake waterfront, with a focus on the period after 1930, when the Calumet and Hecla (C&H) and Quincy mining companies devoted their resources to the recovery of copper from stamp sands and recycled metals. We are identifying specific buildings and researching their histories in order to define areas of further study and sediment removal. Funded by Sea Grant Michigan (part of the National Oceanic and Atmospheric Administration), the research team brings together environmental engineers with industrial archaeologists to provide information that will help target the clean-up of PCB hot spots and inform local citizens of the pollution issues.

The presenter will discuss the benefits of collaboration between the archival research and the scientific mapping and sampling. By identifying the locations of buildings with likely PCB contamination along the shoreline and importing them into GIS software, we are able to overlay them onto layers showing the sampling levels of PCBs from up-shore sites and offshore lake sediments. These maps and the accompanying industrial history will help us to aid the state and federal officials responsible for clean-up, as well as the citizens surrounding Torch Lake. We find that the archival material proves essential to the discovery of sources of the PCBs. We are documenting the distribution of electric power after 1930, when PCBs were introduced, to see the primary buildings involved in copper recovery and how that created future pollution sites. Annual reports, company records, and oral history interviews are the primary research tools for discovering how their electric systems and machinery processes changed over time. These sources show that PCBs were present in the oils used in sub-stations and also in the oils used to lubricate different machines.

This project is an example of the role that industrial archaeology can play in detection of environmental pollution and the type of collaboration that can result from a multi-disciplinary approach to remediation.

Emma Schwaiger is a master's candidate in the Industrial Archaeology program at Michigan Technological University. She graduated in the spring of 2012 with a B.A. in history from Michigan Tech. Originally from Manistee, Michigan, she enjoys outdoor activities and has always been interested in the environment and how industrialism changed the landscape. Her thesis focus is how the Torch Lake copper technology changed over time, from stamping amygdaloid and conglomerate rock, to reclamation of the stamp sands, and finally, to the importation of scrap metals and the extraction of copper. Her prospective graduation date is in the spring of 2014 and her current plans are to continue her education with a Ph.D.

Identifying and Evaluating Mine Waste in Michigan's Copper Country

Over a century of mining native copper in Michigan produced several million tons of workable metal, and an even greater amount of waste byproducts. Poor rock, mill tailings, and slag were deposited around mining lands, riverbanks, and lakeshores. Each of these waste types represent a separate step in the process of hard rock mining, and provide tangible links to an historic industry that shaped a landscape that covers over 2,500 square miles (6,500 km^2). As Michigan faces efforts to reopen former mining lands and to remediate areas impacted by historic mining activity, identifying and evaluating the number and extent of historic mine waste deposits is becoming increasingly important.

In late summer of 2012, the Keweenaw National Historic Park's Advisory Commission funded a survey of mine waste associated with Michigan's native copper mining industry. Sean M. Gohman, representing Michigan Technological University's Industrial Heritage and Archaeology program, visited over 100 mining-related locations and recorded over 350 separate sites of mine waste. These ranged from multi-acre tailings deposits to slag heaps and rock piles occupying less than 50 square feet (5 m^2) of land.

Each deposit was recorded and then evaluated using the guidelines laid out by the National Register of Historic Places. Their National Register eligibility, integrity, morphology, visibility, and access were all considered and then scored with the intention of compiling a comprehensive list useful for heritage managers interested in acquisition and/or interpretation of waste deposits.

The presentation will discuss the practice of mine waste creation and deposition in Michigan's Copper Country, as well as the survey's methodology, scoring rubric, and findings. These findings are not only useful not only to the Keweenaw National Historic Park and its volunteer Advisory Commission, but also to those of us who understand that the byproducts of industrial processes are as important (and as at risk) as the structures and technology that created them.

Sean M. Gohman is a native of Minnesota and currently entering his sixth year in the Industrial Archaeology program at Michigan Technological University. His first two years in the program were spent working towards a master's degree, which he completed in the summer of 2010. Currently, Sean is engaged in survey work in and around Michigan's Copper Country, and is in his fourth year of involvement with Michigan Tech's archaeological field school program. His Ph.D. research is concerned with nineteenth-century mining landscapes, the role of Cornish technology and practice in the formation of those landscapes, and ongoing issues in managing and interpreting those landscapes.

Industrial Archaeology within a Historic Placer Mining Landscape: Fairbanks, Alaska

At the turn of the twentieth century, Fairbanks, Alaska, was home to the last great North American gold rush. Experienced miners from the Klondike set off on foot and by steamer from Dawson, settling near a shallow bend on the northern banks of the Tanana River in Alaska's interior. Originally these miners focused solely on displaced placer gold, located near streambeds and valley floors, but they later shifted their focus upstream and upslope, searching for source veins of the yellow stuff in hard-rock deposits. For the past three years, archaeologists from Michigan Technological University and the University of Alaska Anchorage have been working with the Bureau of Land Management to conduct archaeological surveys within historic mining areas in the Fairbanks region. These surveys have produced meaningful data, including both material culture and landscape features, that help archaeologists to better understand the workplaces and broader workspaces of these miners.

The eastern region of the Fairbanks Mining District experienced concentrated placer and hard-rock mining activity over a span of nearly 100 years. This activity created archaeological features that are evident in both material culture and within the landscape in the form of abandoned machinery, structures, pits, cuts, and waste rock piles, all of which are telltale signs of their historic technologies and mining systems that we are now discovering during our investigations. These miners left tools that reflect a chronology of technological change and economic development. As increased funds flowed into the interior, miners switched from simple wood-fired, steam-powered boilers, hoists, and shovels, to larger, sophisticated diesel- and electric-powered engines, bulldozers, and dredges. Recognizing these technological changes helps us better understand the origins of the surrounding landscape features present in the historic workspaces.

Change is also evident in the landscape features, moving from older ephemeral hand-dug pits to more extensive bulldozer cuts. The landscape features reflect the evolving mining systems used in both placer and hard-rock operations. In the field, these landscape features sometimes appear as random occurrences, crisscrossing the terrain. Making sense of these landscape features is difficult, but by using GPS to map these pits, trenches, and ditches, patterns of prospecting and development within the workspace become apparent. These patterns not only show the extent of mining activity but also show the miners' acute sense of the local geology. This presentation gives an overview of the rich historic narrative of Fairbanks, and an analysis of archaeological data concerning the historic mining workspace, mining trends, and landscape patterns created within the Fairbanks Mining District.

John Baeten is a Ph.D. student in the Industrial Heritage and Archaeology Program at Michigan Technological University. He has worked as an archaeologist for over a decade, and is interested in industrial communities and their landscapes, and the interaction between culture, technology, and the environment.

Phantom Dredges

Toward the end of the nineteenth century and at the beginning of the twentieth, multi-story mechanical placer mining machines were developed for the purpose of extracting gold from creek drainages. The process is known as dredging and is a form of placer mining, whose basic extraction principles are similar to gold panning, but on an industrial scale. Two of these gold dredges were placed on small creeks fed by drainage from the Sangre de Cristo Mountains in Colorado's San Luis Valley. Their story has largely been forgotten in local and regional histories of the region, and many local historians could not fathom that large-scale dredging was possible, given the small scale of the creeks where dredging occurred. Nevertheless, research indicates that large-scale dredging projects were in operation beginning in 1898. This research has opened a previously overlooked, but important, dimension to the historical development of the area.

The two primary dredge projects studied thus far were made possible through massive investments in capital and materials in order to operate the dredges. The projects were largely unsuccessful in large part due to a lack of technical expertise, poor choice of materials, lack of pay dirt, and bad luck. This paper explores some of the attitudes that allowed projects such as large-scale gold dredging to occur during this time period.

A common attitude of the era is that of the mining operators, and investors, which can be seen in the large-scale investment into dredging. The technology at the time made the prospect of massive amounts of gold in creek drainages through mechanical, as opposed to manual, digging. This led to large investments of capital into projects, which often produced few results. It also illustrates the development of corporate investment that was common in the mining industry.

Another aspect explored is the societal attitudes toward the environmental impacts of dredging. Local communities were often affected by these processes and present an intriguing comparison to modern sensibilities. Current attitudes towards the hydraulic fracturing or "fracking" of oil wells are a modern example of how contemporary attitudes contrast with those of the past. This debate is particularly relevant considering the current contentious debate occurring in both the San Luis Valley and the state of Colorado.

Material evidence of locally dredged creeks, as well as spatial analysis of their features and changes, is evaluated to identify the extent of environmental disturbance created by these machines. The results of which illustrate changes in technology between the two different types of dredges that operated in the area, and what these changes meant to the environment as well as to local communities.

Jeremy C. Brunette is a student at Adams State University, where he is completing a bachelor's degree in anthropology and currently applying for graduate school. He attended the 2012 Archaeological Field School at Fort Massachusetts, which sparked an interest in a series of unnatural features along the creek drainage. This project is a result of his curiosity about these features.

Investigation and Reconstruction of a Historic Mining Structure: The Hanging Flume of Southwestern Colorado

Within the Dolores River Canyon in Montrose County, Colorado, are remnants of the Hanging Flume, constructed by the Montrose Placer Mining Company in the late nineteenth century. This unique engineering marvel, listed on the National Register of Historic Places, originally extended for approximately 10 miles (16 km) and is the only hanging flume in the country in a condition suitable for preservation. Sections of the flume were constructed along the face of a 400-foot (120-m) sandstone cliff, presenting a number of logistical challenges. In recognition of the flume's significance of and the danger of losing this unique window into U.S. history, Colorado Preservation, Inc., placed it on its 1999 endangered list and in 2006, the World Monuments Fund placed it on their "100 Most Endangered Sites" List.

The flume was constructed over the course of three years in the late 1880s, and after three years of operation, the enterprise was deemed a financial failure and closed. Most of the secondary structural elements and the flume box were salvaged by the local community after cessation of the mining operation. As a result, what remains are the primary structural elements, many of which are in quite good condition.

In the spring of 2005, an interdisciplinary team of investigators was convened at the site in order to document and evaluate the construction techniques and technologies used to build the flume. The team included historians, archaeologists, structural engineers, a wood scientist, a geologist, and a specialty company that provided access to the structure. A report and video outlining the findings and recommendations were prepared and submitted to the Western Colorado Interpretive Association, along with an interpretive plan for specific sections of the flume.

Additional funds were then procured for reconstruction of a short section of the flume, for interpretive and demonstration purposes. Reconstruction took place in the spring of 2012, and a 48-foot (15-m) section of the flume was faithfully reconstructed based on the findings of the 2005 work.

At SIA's 2010 Annual Conference in Colorado Springs, the findings of the 2005 investigative work, focusing on documentation of the construction and engineering of the flume, were presented. That presentation addressed the HAER-level documentation and different types of construction that were observed at different locations along the flume. This presentation will expand on the construction methodology findings and present the reconstruction efforts of 2012 in detail.

Kent Diebolt is a founding partner at Vertical Access, LLC, a company that employs industrial rope access techniques in order to undertake investigations and documentation of existing conditions on a wide variety of structures including building facades, bridges, dams, chimneys, and monuments. In the role of subcontractors to architects and engineers, Vertical Access specializes in investigations of monumental historic structures across the United States and Canada. Kent is a former President of the Board of Directors of the Association for Preservation Technology International (APTI); Historic Ithaca, in Ithaca, New York; and was also the APTI liaison to the US/ICOMOS Board of Directors for two years. Kent was elected to the APTI College of Fellows in 2005.

Ronald W. Anthony is President and Wood Scientist at Anthony & Associates, Inc. He received an M.S. in Wood Science and Technology from Colorado State University. Prior to forming Anthony & Associates in 1999, he conducted research and consulted on wood properties and the use of wood in construction applications. Mr. Anthony's research activities have focused on nondestructive evaluation and materials testing to better understand how wood interacts with other materials and performs over time. He participates in historic preservation projects, conducts forensic investigations, and assists with timber design issues. Mr. Anthony was the 2002 recipient of the James Marston Fitch Foundation Grant for his approach to evaluating wood in historic buildings.

Timber, Rail, Ship, and Social Identity: 19th-Century California Industrial Immigrant Labor

In the first decades following California's 1849 Gold Rush, the state witnessed nearly unbridled development. As cities grew in both population and scale, enterprises as diverse as timber harvesting and cement production, to shipping and railroading, supported expansion and fostered growth in an integrated system. In the background of these industries were immigrants of various ethnicities, whose contribution to California's rise and prominence as the gateway to the Pacific has been largely unstudied except in particularistic manner. As these enterprises became integrated into industrial systems, various minorities became associated with specific industries. Familiar associations include Chinese immigrants with railroad construction or Italians with fishing, but less studied cases are the Portuguese associated with shore whaling or Norwegians with coastal shipping. Many groups were further isolated and relegated to marginal occupations through blatantly racist legislation. Yet many minority groups endured and emerged as significant contributors to the prosperity of California.

This presentation introduces the context and background of a proposed San Jose State University archaeological field school in association with the California Department of Parks and Recreation, which will examine the nexus of ethnic identities and industry as it played out in timber production and related industries in the once heavily timbered Santa Cruz area. The site of investigation once was the scene of large-scale clear-cutting in jagged mountains and retains tangible evidence of industrial debitage on the landscape shrouded in a century-old, second-growth redwood forest. The goal is to examine the regional integration of industry and the diverse communities that participated in it. The specific site is located in the Forest at Niseen Marks State Park, and includes abandoned rolling stock, rail grades, standing architecture from the Chinese camp, and company buildings. A rich trove of archival photographs and related documents is held by the California State Parks and yields the first clues to industrial activity.

Marco Meniketti is an Associate Professor and senior archaeologist at San Jose State University. He received a B.A. in anthropology from the University of California, Berkeley, a master's in industrial archaeology from Michigan Tech, and a Ph.D. in historical archaeology at Michigan State. The focus of his research since 1996 has been the early colonial sugar industry and labor in the Caribbean within a context of environmental change. He is director of San Jose State's RPA-certified archaeological field school on the island of Nevis, West Indies. Meniketti has published in several journals and is a recipient of the Vogel Prize from SIA. He was elected a National Fellow of the Explorers Club in 2010.

Harvey, Illinois: The Development of a Late 19th-Century Industrial Suburb

The postwar years of the nineteenth century witnessed an important period of Chicago's industrial development. Chicago's industries changed their role and assumed national importance. Beginning in the late nineteenth century, the rising cost of urban property had pushed Chicago companies out of the city, and this tendency increased with the economic revival. In this context, such corporations had the capital to develop new industrial sites. As factories moved to the suburbs, industrial workers settled in areas near the expanding employers. As a result of this tendency, many suburban manufacturing towns that date from the late nineteenth century were built within and outside the city of Chicago.

This presentation examines the community of Harvey, Illinois, which was settled at the end of the nineteenth century as a planned industrial suburb in Chicago area. As one of the industrial satellites on the South Side of the city, the town was a less comprehensive version of nearby Pullman, which has been called the first planned industrial community in the United States. Located in the great plains of Midwestern United States, Harvey was ideally fitted for the industrial city that it became. Furthermore, Harvey had access to multiple rail lines, and the railroad played an important role in settlement. Two separate industrial areas within the town were planned, each separated from residential areas by the railroad tracks. The Harvey community included employee housing and other urban amenities, such as churches, schools, a library, and a theater, as well as modern factories.

The purpose of this presentation is to discuss the importance of Harvey in terms of American industrial history. The presentation has two parts. The first part investigates the historical context of industrial suburbs in the South Chicago area. The second part includes investigations of the town's characteristics and its early manufacturing establishments. The presentation is an explanatory overview the importance of Harvey and similar suburbs in the Golden Age of Chicago's industrial development.

Dr. Esra Özkan Yazgan received her Ph.D. in architecture at Gazi University in 2012. She received her master's degree from the same institution and her bachelor's degree from the Department of Architecture at Uludag University in Turkey. She has been involved in a variety of conservation and restoration projects. She researched the industrial heritage of the South Chicago area at Penn State University as a post-doctoral researcher between August 2012 and January 2013. Dr. Özkan Yazgan is currently working as an instructor in the Gazi University Faculty of Architecture. Her research interests include the conservation of architectural heritage, adaptive reuse of historic buildings, and urban regeneration.

Dr. Thomas E. Boothby, P.E., R.A., F.ASCE has been on the faculty of the Department of Architectural Engineering at Penn State University for 21 years. During this time, he has conducted studies of the engineering of historic bridges and buildings, both from the perspective of the original builders, and from a modern perspective. His book on nineteenth-century engineering, entitled *Stone and Iron in the Gilded Age,* is scheduled be published by ASCE Press in 2014.

Archaeology of North Dakota Man Camps

The North Dakota Man Camp Project seeks to document the material and social environment of crew camps associated with the Bakken Oil Patch in western North Dakota. Our collaboration brings together research questions from world archaeology with those central to the study of the American West and labor history. Our research has focused on the communities created by the Bakken Oil Patch boom, namely man or crew camps established to provide accommodations for workers who came into the area to work in the oil industry or in related services.

Crew, work, and man camps associated with resource extraction are a well-known historical phenomenon with precedents in the nineteenth-century American West and even earlier in a global context. The continued development of this practice into the twenty-first century is hardly surprising as remote locations continue to pose logistical and economic challenges for resource extraction. With the boom in oil production in the Bakken range in the western part of North Dakota, man camps (or more properly called crew camps) have appeared to provide housing for work crews in the sparsely settled western North Dakota counties. Clustered outside or around the fringes of the longstanding towns in the area, the temporary settlements represent both the practical needs of an itinerant workforce, as well as a continuation of longstanding practices common to the periphery.

We have developed a preliminary typology of the man camps in the area: Type 1 camps are built by large, typically non-regional corporations and have the most complete amenities including clean quarters with water and electricity, recreation and dining facilities, laundry, controlled access, security, and spacious, clean grounds. Most of the units are the same and prefabricated and organized in a single unified way. Type 2 camps are less formal and uniform, but tend to be centrally organized at a local level. They feature recreational vehicles (RVs) attached to masts providing power and, in most cases, water. The types of vehicles vary and, in some cases, residents own the vehicles. Type 3 camps are the least formal, uniform, and offer the fewest amenities. They lack power or water masts, lack regular organization, and sometimes are little more than groups of RVs or tents sheltering their itinerant occupants in a windbreak or tree belt. Type 3 camps tend to exist outside any legal framework for housing.

The Man Camp project is documenting these sites through a variety of means including written documentation, photography, aerial photography, and interviews. Field surveys were completed in August 2012 and February 2013 and this longitudinal study will continue for the foreseeable future. Preliminary results not only indicate significant potential to understand the material culture and social structures of the current Bakken boom, but also will prove useful as an interpretive framework for archaeological remains from similar periods of resource extraction.

Dr. Richard Rothaus is President of Trefoil Cultural and Environmental, a private consulting firm, and a staff member of the Center for Heritage Renewal at North Dakota State University. He has experience in large-scale archaeological survey, Geographic Information Systems (GIS) and remote sensing applications, probability modeling, palaeoenvironmental research, and geomorphological and geological analysis. He is the author of numerous reports, articles, and a book.

Dr. William Caraher is an Associate Professor of History at the University of North Dakota. He currently co-directs the Pyla-Koutsopetria Archaeological Project on Cyprus and is working on two publications on Christian basilicas with the Princeton Polis Expedition on Cyprus.

Dr. Bret Weber is an Assistant Professor of Social Work at the University of North Dakota. He has a strong interest in twentieth-century U.S. history and environmental and economic justice. He is the recipient of the 2012 University of North Dakota Public Scholar Award.

Dr. Kostis Kourelis is an Assistant Professor of Art History at Franklin and Marshall College. He is an architectural historian and archaeologist of the medieval Mediterranean, with specialties in urbanism, historic preservation, landscape archaeology, and architectural theory. Kourelis was trained as an architect and he has a strong interest in contemporary architectural discourse.

Aaron Barth is a Ph.D. student in the history department at North Dakota State University. He has been involved in cultural resource management and historic preservation since 2002. He is a board member of the North Dakota Humanities Council.

Red Lights along the Riverfront

During the nineteenth century, Minneapolis was busily erecting bridges to serve the burgeoning sawmilling, flour milling, and jobbing industries along the central riverfront. At the same time, the commercial sex trade, although less frequently acknowledged, was growing alongside the other businesses.

By the early years of the twentieth century, Minneapolis had three recognized red-light districts on the riverfront, all conveniently located near bridgeheads, train stations, and streetcar lines. The physical manifestations of this trade are almost nonexistent today.

In Minneapolis, the prostitution industry was largely controlled by a group of entrepreneurial females, who, as a group, exerted a surprising amount of influence over the city. Their enterprises provided fodder for purity crusades, incited the activities of several organized reform groups, and drove city fathers to either suppress the sex trade or to accommodate it, depending on how the political winds were blowing at the time. They also offered economic alternatives to poorly paid women in respectable occupations or those who had fallen on hard times.

The successful madams hired prominent architects to design their bordellos and, in at least one instance, redesigned a neighborhood to serve their particular needs. Some madams were in business for decades and regularly appeared in newspaper accounts. While the accomplishments of other successful Minneapolis owners of businesses and factories were often celebrated in history books, today no one knows the names of these women.

This presentation will briefly trace the history of the red-light districts and place them in the context of the Liquor Patrol Limits, which were established in 1884 and the rise of commercialized leisure and entertainment districts. It will establish the location of these districts with the use of detailed maps. It will identify the last purpose-built bordello dating from the era of tolerated prostitution in Minneapolis that ended in 1910.

Penny Petersen works as a researcher for Hess, Roise and Company, historical consultants in Minneapolis. She is the author of *Hiding in Plain Sight: Minneapolis' First Neighborhood* and *Minneapolis Madams: The Lost History of Prostitution on the Riverfront,* which will be published by the University of Minnesota Press this summer.

Steam Mills in a Seaport: The Textile Industry of New Bedford

Everyone knows that the antebellum wealth of New Bedford, Massachusetts, came from the killing and processing of great marine mammals. The dramatic aura of whaling is still with us, still attracting thousands of visitors to the New Bedford Whaling Museum, but no one is standing in line to see the skeletons of the massive textile industry that carried this city buoyantly into the twentieth century, and then left it gasping for survival during the Great Depression. This presentation will focus on the steam-powered textile mills of the city, their locations, the ways they received and used coal, and the impressive engines that drove their operations. New Bedford was, arguably, the greatest of all American textile manufacturing centers. Many of the mills, including some with large weave sheds and saw-toothed roofs, have survived. Recent investigation of the work that noted engine designer George Corliss did for major manufacturers, such as Wamsutta, has been particularly fruitful. The enormous scale of one engine (unfortunately long gone) will surprise even the knowledgeable steam buffs in SIA. Another surprising finding is that most mills in this busy seaport were not situated to take advantage of direct coal delivery by maritime vessels or railroad cars. Local wagons and, later, automotive trucks delivered most of the coal for boilers. With the eventual development of infrastructure for a municipal water system, there was enough fresh water to feed boilers, but not enough to allow any extensive bleaching, printing, or dyeing of textiles. Fabric usually had to be sent elsewhere for "finishing." The research on this topic is contributing to the design of a new exhibit on "Commerce and Industry" at New Bedford's Whaling Museum.

Dr. Patrick M. Malone is Professor Emeritus of American Studies and Urban Studies at Brown University. In addition to serving on the Brown faculty since 1972, he has worked as a metallurgical engineer, taught at the University of Pennsylvania, and directed the Slater Mill Historic Site. SIA elected him as its president in 1982. His research covers the urban built environment, the history of technology, and the archaeology of industry. He is the author or co-author of four books, one of which, *Waterpower in Lowell,* won the international Neaverson Prize from the Association for Industrial Archaeology in 2010.

Brick Manufacturing in the Cortez Mining District, Nevada

This presentation will focus on the results of archival and archaeological research at two brick manufacturing sites associated with central Nevada's Cortez Mining District. In 1885, thousands of bricks were ordered as a key component for the District's new mill. The mill used the new Russell lixiviation process to process the silver ores, and needed brick for the numerous roasting and amalgamating components. Rather than importing such a large and bulky commodity, they chose to manufacture the brick locally. Archaeologists identified two brick making sites in the district, and both were excavated as part of a large mitigation project. The sites were limited affairs, reflecting their short-term use. One site contained evidence of mining local clay, molding and firing brick, and both sites had evidence of brick clamps (kilns). The sites were dependent on an artificial water supply, and there are some hints of Chinese workers being involved. The archaeological evidence suggests the manufacturing technique was not complicated, yet the quality of the brick was consistent and reliable. While manufacturing brick in Nevada's physically remote mining districts was not uncommon, these are the only sites in the state known to have been systematically excavated. The two sites complement one another and provide a picture of small-scale, nineteenth-century brick manufacturing as practiced in this period.

Robert McQueen is a Principal Investigator with Summit Envirosolutions, Inc., in Reno, Nevada, and has been a member of the SIA since 1995. Rob received his degree in Industrial Archaeology from Michigan Technological University in 1995 and has been plying Nevada's Great Basin desert since 1997. Specializing on the nineteenth-century industrial frontier, Rob has authored and contributed to hundreds of historic, archival, and archaeological research projects on logging, mining, mineral processing, and transportation sites in Nevada, Utah, and California. Rob has been working in the Cortez Mining District since 2004. In 2008-09 he directed excavations of over 100 historic and industrial sites in that district.

JoEllen Ross-Hauer is a staff archaeologist and architectural historian at Summit Envirosolutions, Inc., in Reno, Nevada. Ms. Ross-Hauer received her degree in Land Use Planning with an emphasis in historic preservation from the University of Nevada, Reno, in 2010. Her thesis, "A Comparison of Pre- and Post-war Suburbs in Reno, Nevada," focuses on the changes to American suburbs that accompanied the postwar housing boom. A member of the Society of Architectural Historians and the Society for American Archaeology, Ms. Ross-Hauer has worked in the field of archaeology for nearly 20 years, with expertise in the archaeology of mining and ranching in the American West.

Excavations at the Dyottville Glass Works in Philadelphia, Pennsylvania

The Pennsylvania Department of Transportation is currently undertaking extensive improvements to a three-mile section of Interstate 95 through portions of Philadelphia. Since 2009, URS has carried out archaeological investigations in advance of construction, resulting in a wealth of information about the prehistoric and historic residents of the previously little-explored Kensington, Fishtown, and Port Richmond waterfront neighborhoods.

This presentation focuses on the results of archaeological excavations, historical research, and artifact analysis at the former site of the Dyottville Glass Works, located on the Delaware River in Kensington. This unique glass factory was part of a larger five-acre (2-hectare) factory complex that included the Philadelphia Glass Works, begun in 1771. In 1774, John Hewson erected a calico printing works between the north bank of Gunner's Run and the Philadelphia Glass Works. This was to be the future site of the Dyottville Glass Works. Glass manufacturing continued into the twentieth century, producing many well-known glass bottles, flasks, and other glassware distributed widely throughout the country.

The glass factory building that was the focus of the excavation appears to have undergone at least four building episodes, all constructed onto fill placed on the mud flats of Gunner's Run. The building that began as the John Hewson calico printing works was probably a stone and brick building with substantial stone bulkhead and spread footer foundations constructed along the edge of Gunner's Run. In 1816, John Hewson, Jr., constructed a glass works called the Kensington Glass Works on the site of the former printing works. Excavation has revealed evidence of multiple phases of the glass factory, with earlier structures was incorporated into the later phases of the glass works. The sand house, which stored sand for the glass making process, had a well-preserved wood floor and plank walls with sand one foot (30 cm) thick still covering the floor inside the structure. Further excavation revealed brick foundations from the annealing ovens and a vaulted furnace access tunnel.

Thomas W. Dyott was an Englishman who arrived in Philadelphia in the first decade of the nineteenth century. He experienced both great success and abysmal failure over the next five decades in his adopted city. He was a colorful character who established a business empire with the help of family and friends based on the manufacturing and marketing of patent medicines and the operation of the Kensington Glass Works, which he renamed. The fame of the Dyottville Glass Works spread far and wide in large part because he established Dyottville, a community for his glassworkers and a living testament to his social and religious ideals.

Ingrid Wuebber has been a member of the SIA for 30 years and currently serves on the Board of Directors. For the past 11 years, she has been employed in the Burlington, New Jersey, office of the Archaeology and Historic Architecture Group of URS. Her career in the field of cultural resource management has allowed her to research and co-author reports on a wide range of historical resources, including industrial, military, transportation, commercial, and residential properties in the Northeast, Mid-Atlantic, Southeast, and Midwest.

Industry on the Playground: Manufacturing and Developing the Giant Stride

The American playground movement of the early twentieth century focused on the health, social habits, and organic strength of children, manifesting itself in the tall, challenging playground equipment comprised of gymnasiums, ladders, poles, merry-go-rounds, swings, and one particular apparatus referred to as the "giant stride." Best described as a tall pole with a rotating cap from which long ropes hung, children held on to the ropes and ran in circles around the pole fast enough for their feet to leave the ground as if they were flying. Like the other apparatus elements, the giant stride required strength and would look quite unfamiliar on today's playgrounds. The giant stride stands as a good example of the collaboration between manufacturing advances, social and health trends of the early twentieth century, and do-it-yourself imitations, all contributing to the shared history of technology and resourcefulness.

Despite the popularity of the giant stride, it faded from the playground scene due to safety regulations; few remain in existence today. The giant stride experienced its greatest evolution and popularity in the first decades of the twentieth century. Though its origins remain uncertain, primitive versions appear in publications from late nineteenth-century England. In the United States, its ubiquitous use on playgrounds is well documented in 1909-29 issues of the periodical, *The Playground,* and its development is thoroughly illustrated by U.S. patents from 1904 to 1928.

Advances to the giant stride followed two patterns: manufactured and homemade. Manufacturers focused on the function of the apparatus, specifically the revolving head or cap and the ropes or ladders (i.e., handles), and promoted the hot-dip galvanized steel used in the equipment. More than one company manufactured the giant stride and variations of it. These companies included the Medart Manufacturing Company, Giant Manufacturing Company, and the National Playground Apparatus Corporation, among others. While manufacturing advances continued to improve the giant stride, not everyone could afford the steel apparatus. To remedy that factor, people employed their own creativity and constructed homemade giant strides using materials such as wood poles, wagon wheels, and rope.

This presentation will include a discussion of the giant stride's development within the social and industrial context, complemented with historic images, advertisements, patents, and present-day photographs.

Kaitlin O'Shea is the Historic Preservation Specialist for the Vermont Agency of Transportation. Her background includes an M.S. in historic preservation from the University of Vermont and a B.A. in historic preservation from the University of Mary Washington. Previously O'Shea worked as an oral historian for the Fort Bragg Cultural Resources Program in North Carolina, as well as for the Town of Hartford, Vermont. Kaitlin writes the historic preservation blog Preservation in Pink (www.preservationinpink.com), which aims to convey to the masses that preservation in all of its facets is an applicable and approachable field.

Historic Preservation in the Atomic Age: Documenting the Legacy of a Nuclear Research Laboratory

Argonne National Laboratory is an energy research laboratory that has its roots in the Manhattan Project. Established in 1946 as the nuclear reactor research center for the U.S. Atomic Energy Commission, Argonne engineers designed and built some of the first electric power reactors and helped to train the operators of the world's first commercial nuclear power plants. Argonne was chosen as the reactor center because of its location in the middle of the country, 30 miles (50 km) southwest of Chicago. It also was located close to the numerous universities in the Chicago area and the area's extensive transportation network made Argonne easily accessible.

Many of the technologies needed to study radioactive material were developed at Argonne during the 1950s and 1960s. New technologies were also developed to harness the byproducts of a nuclear reaction. Through the years, research at Argonne expanded beyond nuclear power to include its current focus on nano-materials studies and high-end computing. A new challenge related to the development of nuclear power is the documentation and preservation of this legacy for future generations.

This presentation will provide a brief history of the laboratory and an overview of the U.S. Department of Energy's historic preservation efforts at Argonne. It will also highlight the Illinois Historic American Engineering Record documentation of the Chicago Pile-5 Reactor, Zero Power Reactors 5 and 6, the Intense Pulsed Neutron Source, and the Physics and Metallurgy Hot Laboratory. The presentation will also consider some of the unique challenges encountered when attempting to present the history of U.S. nuclear research, such as national security, communicating advanced physics to the general public, and contamination issues.

Argonne National Laboratory's work was supported by the U.S. Department of Energy under contract number DE-AC02-06CH11357.

Daniel J. O'Rourke is a graduate of the M.S. program in Industrial Archaeology at Michigan Technological University. He also has a bachelor's degree in history and anthropology from Michigan State University. He has practical experience in historic preservation policy and National Environmental Policy Act (NEPA) projects. His past research includes examination of the Rock Kilns site located in the Hiawatha National Forest, examination of industrial remains in the Pullman neighborhood on the south side of Chicago, investigation of the remains of the Ferris Wheel for the 1893 World's Columbian Exposition at the University of Chicago, as well as several research buildings at the University of Chicago. While at Argonne, he has been involved in NEPA projects for the U.S. Department of Energy, Bureau of Land Management, Nuclear Regulatory Agency, and Department of Defense in locations across the continental United States, Alaska, and Japan.

Minnesota's Computer Industry: History, Legacies, Traces

In 1961, ten years before Silicon Valley was named, Minnesota was a leading center of the country's computer industry. Three large integrated computer-manufacturing firms were located in the Twin Cities (Sperry Rand Univac, Control Data, and Honeywell), a fourth was located in Rochester (IBM), and there were a host of smaller and medium-sized specialty and supplier firms. Boston, Philadelphia, upstate New York, and Dayton, Ohio, were other computing centers; California, at the time, specialized in components. This presentation—based on the author's forthcoming book *Digital State: The Story of Minnesota's Computer Industry* (University of Minnesota Press, 2013)—gives an overview of the three decades or more (1950s–1980s) when Minnesota's computer companies shaped the state's high-technology economy. The state's computing industry had its origins in St. Paul in 1946, when a secret government cryptography facility was moved there; the Engineering Research Associates was reorganized several times, emerging as a corporate division of the Sperry Rand conglomerate. Control Data was a 1957 spinoff from Univac that employed such notable figures as William Norris and Seymour Cray, the famed supercomputer designer. Honeywell, already a leading supplier of high-tech military technology during the 1940s and 1950s, moved strongly into computing by the 1960s. Additionally, IBM's brand-new Rochester facility, founded in 1956, also evolved into a prominent site for design, development, and manufacturing of computers. The illustrated presentation will also focus on several extant traces of this history visible today, in specific locations in St. Paul, Minneapolis, and the southern suburbs.

Dr. Thomas J. Misa is a historian specializing in the interactions of technology and modern culture. His undergraduate degree is from M.I.T. and his Ph.D. is from the University of Pennsylvania. He has been active in the Society for the History of Technology, the international Tensions of Europe network, and several collaborative research and book projects. Presently he directs the Charles Babbage Institute, holding the ERA Land-Grant Chair in History of Technology with an appointment in the Department of Electrical and Computer Engineering.

Report from the 15th International TICCIH Congress, Taipei, Taiwan, November 4-11, 2012

The Society for Industrial Archeology represents the United States in The International Committee for the Conservation of the Industrial Heritage (TICCIH). This presentation will review the five-day 15th International Congress held in November 2012 in Taiwan.

Virtually all of Taiwan's industrial heritage is a legacy of the Japanese colonial rule in the period 1895 to 1945, which for much of the last half of the century was continued as state-owned enterprises. In the last two decades, much of this industry has shut down as globalization and the move toward a free-market economy have made many of Taiwan's traditional exports less competitive. So, as in eastern Germany, where TICCIH met for its 2009 Congress, the real challenge for Taiwan has been to find uses for an industrial heritage that has only recently gone out of service. Thus, the theme of the Congress was "Post-Colonialism and the Reinterpretation of Industrial Heritage."

The Congress included tours to the "reinterpreted" industry of Taipei and central Taiwan, as well as two days of paper sessions, two technical workshops, and TICCIH's formal General Assembly. The meeting was TICCIH's first time in Asia, with a large contingent of Chinese participants who were active in the meeting, as well as an enthusiastic Japanese contingent. While it was a smaller group than met in at the last Congress in Freiburg three years ago, nevertheless some sixty participants attended from Europe, with the United Kingdom (especially Scotland) providing the largest contingent of Europeans. Only two were from the United States: SIA's own Patrick Martin as TICCIH President and Peter Stott, the presenter.

TICCIH is now making a major effort to become better known globally, and the meeting has sparked the establishment of an Asian Heritage Network, which the organization hopes will strengthen TICCIH's long-term presence on the continent. Simultaneously, a new guidebook, *Industrial Heritage Retooled,* launched with the help of the J. M. Kaplan Fund at a 2010 symposium in Tarrytown, New York, should help to get both TICCIH's name and its theme better represented in preservation circles. The new TICCIH Secretary, Stephen Hughes, is planning to re-launch the series of international theme studies of various industries, and combined with a more robust database, should help to make TICCIH more relevant as a global authority on industrial heritage.

Peter Stott is a long-time member of SIA and is SIA's national TICCIH Representative.

Diamonds in the Rough: "Mining" the Industrial Collections in the Archives Center

Down the escalator from Dorothy's Ruby Slippers and across the hall from Julia's Kitchen is the home of a number of wonderful treasures, commonly known as the Archives Center. This presentation will introduce the audience to the Archives Center's function in the Smithsonian's National Museum of American History (NMAH), list archival collections of potential interest to SIA members, and explain how to access these collections for their personal research.

This presentation will first include an overview of archival material in various media and formats that document America's history, technology, and diverse cultures. The NMAH Archives Center strongly feels that these primary resources are to be used by researchers, not kept in deep storage behind locked doors. Currently we have over 1,300 collections, many of which are related to the ten core categories used in the *Society for Industrial Archaeology Newsletter*'s Publications of Interest. These collections may include trade cards, advertising, business records, ledgers, samples, oral histories, invoices and receipts, correspondence, scrapbooks, account books, minutes, newsletters, diaries, laboratory notes, catalogs, technical drawings, blueprints, maps, photographs, negatives, film, video, and audio.

The presentation will then highlight a few of the many collections of potential interest to SIA members. A handout listing the collection names and their SIA-related subject matter (Buildings and Structures, Bridges, Tools, Communications Technology, Mines and Mining, Textiles, Iron and Steel, Power Generation, Water Transport, or Railroads) will be provided via e-mail to those interested.

Lastly, the presentation will focus on research at the Archives Center. Each of the Archives Center collections has a brief description in the Smithsonian Institution Research Information System (SIRIS). This is a publicly accessible online searchable catalog system similar to online library catalogs. Many of these collections also have a finding aid available online. A collection finding aid is a more detailed collection description, containing an inventory of the box and folder contents. The presentation will illustrate how to use the SIRIS system and finding aids, provide information about researching collections in the Archives Center, and discuss options for conducting research long-distance.

Kay Peterson is a graduate of Iowa State University. She's been working at the Archives Center since 2002 as the Client Services Archivist, handling requests for usage permission, digital scans, audio/video duplications, large photocopy orders, and hourly research, and also responding to inquiries from remote researchers.

New York State's Barge Canal

Three natural water routes lead into the center of North America: the Mississippi River, the St. Lawrence River and Great Lakes, and Hudson's Bay. New York State's canal system, begun in 1792, overcame geographical barriers between the Great Lakes and the sea to divert trade from its natural outlet at Montréal. The Erie Canal, opened in 1825 and subsequently enlarged, was phenomenally successful at first but faced increasing competition from railroads and other water routes.

By the end of the nineteenth century, New York State's canals carried a miniscule part of the grain coming into the Port of New York. Midwesterners advocated for a St. Lawrence ship canal for ocean-going cargo ships, claiming that half the cost of moving wheat from Duluth to Liverpool was in transferring cargo at Buffalo and New York. New York barge canal supporters feared placing a strategic asset partly in foreign waters and asserted that no single type of vessel could economically operate in lakes, canals, and the ocean. They said that permitting a successful St. Lawrence canal would be commercial suicide for New York.

The New York Produce Exchange (NYPE), a powerful trade organization, lobbied for a modernized canal accommodating barges of 1,000-ton (900 metric ton) capacity—up from 240 tons (220 metric tons)—primarily as a way to regulate rail rates. The NYPE said that railroad rates discriminated against New York City. In their defense, the railroads serving New York faced serious obstacles getting cargos from congested New Jersey terminals across the harbor. In 1903, New Yorkers approved a $101-million bond issue for building the "1,000-ton Canal." The project expanded to a 2,000-ton (1,800 metric ton) canal with larger locks and came to include terminals and grain elevators. In 1918, the new state-of-the-art "Barge Canal" opened but it never approached its theoretical capacity, which maxed out in 1951.

Initially promoted for carrying grain, the canal's cargo after 1928 was dominated by manufactured goods, primarily petroleum products, coming up from the New Jersey-New York area. Expansion of the Erie section of the Barge Canal was hampered by its distance and by numerous fixed bridges. Between 1933 and 1968, the federal government funded a modest improvement on the Oswego and eastern Erie sections as the 1932 enlargement of Canada's Welland Canal allowed larger vessels to bypass Niagara Falls. Raising the air draft by five feet (1.5 m) and deepening the locks by two feet (0.6 m) had no material impact. Ocean-going ships now pass through the St. Lawrence Seaway and Welland Canal. Commercial traffic on New York's canals is almost extinct but occasionally proposals are made to use them as a low-energy use transportation system. The problems of intermodality have never been resolved and the state continues, albeit with diminishing resources, to maintain the canals almost exclusively for recreation.

Large-scale infrastructure projects are significant gambles with public treasure on economic models, which may or may not accurately predict the future. The example of Canada's tardiness in improving their waterways, since remedied, demonstrates that the gamble must be taken.

Dr. Simon Litten holds a B.A. in history from the University of Oregon and a Ph.D. from Syracuse University's Department of Civil Engineering. Now retired, Dr. Litten worked for the New York State Department of Environmental Conservation for 31 years. For much of his career he worked with the Port Authority of New York and New Jersey on harbor dredging issues.

The Delaware, Lackawanna & Western Railroad Ferry Terminal at Hoboken, New Jersey: The Renewal of a Hudson River Landmark

A Successful Marriage of Preservation and Progress

The rehabilitation of the Hoboken Ferry Terminal was a three-phased, eight-year, $120 million project that restored the historic ferry terminal for use in modern ferry operations. The project was conducted from April 2004 to November 2011 and opening ceremonies were held on December 7, 2011. This project demonstrates how an outmoded industrial structure can be adapted to its original use but with significant interior renovations.

The Hoboken Ferry Terminal is part of the Delaware, Lackawanna & Western (DL&W) Railroad and Ferry Terminal at Hoboken, an intermodal transportation complex. The terminal, built in 1907, is significant as an important transportation hub and for its association with the development of rail and ferry transportation in the metropolitan New York area.

The new DL&W Railroad and Ferry Terminal opened to the public at 6:00 a.m. on February 25, 1907. In that first year, the DL&W carried nearly 40 million passengers between Hoboken and the Manhattan ferry terminals at Barclay Street, Christopher Street, and 23rd Street. But only a year after the DL&W Hoboken Ferry Terminal opened for business, major improvements in trans-Hudson transportation that provided access to Manhattan began to erode the ferries' passenger traffic base. One by one, each of the ferry services ceased operations.

Transportation officials called for the demolition of the Hoboken Railroad and Ferry Terminal and advocated its replacement with a smaller railroad station with a high-rise office building above. However, preservationists mounted a campaign to designate what was then known as the Erie-Lackawanna Railroad and Ferry Terminal as an official landmark; it was listed on the New Jersey Register of Historic Places on June 13, 1973, and listed on the National Register of Historic Places on July 24, 1973.

By the 1980s, the growth of automobile and truck traffic using Hudson River bridges and tunnels was causing tremendous congestion and the need for a resumption of ferry service between New Jersey and Manhattan became apparent.

In November 2002, the Port Authority of New York and New Jersey signed an agreement with New Jersey Transit (NJT) to lease the terminal on a long-term basis, and to assist in the funding of the rehabilitation of Hoboken Ferry Terminal so that commuter ferry services to Manhattan could be reinstated.

In 2003, when the renovation began, the Ferry Terminal had sat vacant since 1967. The Hoboken Ferry Terminal rehabilitation project consisted of demolition of deteriorated historic fabric, new construction to accommodate the modern waiting room and modern ferry boats, and restoration and replication of missing or deteriorated significant historic features.

Lynn Drobbin, Principal of Lynn Drobbin & Associates, has been conducting cultural resource evaluations for over 35 years out of her office in the historic Sanborn Map Company Building in Pelham, New York. Ms. Drobbin is primarily known for her extensive experience in the field of transportation; she has successfully adapted many historic transportation structures to new uses and has worked on cultural resource evaluations for many new rail and highway corridors. Her projects range from the rehabilitation of train stations, ferry terminals, and bridges, to more unusual structures such as the Coney Island Parachute Jump and the Waterfalls Art Installation in the East River of New York City. She is a member of the Old Long Ridge Historic District Commission in her home town of Stamford, Connecticut, where she is active in many of the city's preservation projects. She is also a vocalist in Kritical Mass, a Connecticut rock and roll band, where she sings vintage female rock.

23rd Historic Bridge Symposium

Co-sponsored by the Historic Bridge Foundation

Welcome and Introduction

Kitty Henderson will deliver remarks to open the symposium.

Kitty Henderson is the Executive Director of the Historic Bridge Foundation, the national advocacy organization for the preservation of historic bridges in the United States. Kitty works to provide technical assistance to local groups working to preserve their historic bridges and serves as a consulting party on bridge projects at the request of state and federal agencies. Prior to the Historic Bridge Foundation, Kitty worked for the Texas Historical Commission as assistant project manager for the Texas Travel Trails program. She also served as the Heritage Education Coordinator for these regional trails and developed workshops for primary and secondary school teachers and educational materials for students.

Restoration of the Oaklawn Concrete Bridge

Built between 1905 and 1906, the Oaklawn Concrete Bridge in South Pasadena, California, is the second oldest reinforced concrete bridge west of the Mississippi River. Listed on the National Register of Historic Places, it is the only bridge designed by Greene and Greene Architects, internationally known for their contributions to the Craftsman style of architecture. The bridge is about 310 feet (94 m) long and 20 feet (6 m) wide and has five tapered arched spans varying from 41 to 87 feet (12 to 27 m). Soon after the original formwork was removed, cracks appeared in the roadbed and the parapet walls near many of the pier columns. The railroad company whose tracks ran under the main 87-foot-long span at that time required the addition of a concrete shoring column near mid-span. This ruined the aesthetics of the bridge from the famous designers' viewpoint, and they abandoned the project.

The bridge has remained in place for over a century as a seldom-used pedestrian link between a historic residential area and a business district, and has suffered from deferred maintenance. Through some creative financing from a variety of sources including federal funding, the Getty Foundation, and local contributions, the bridge was completely restored in 2003. This work included the removal of the objectionable shoring column adjacent to the new regional light rail system below, and the project received awards from the Los Angeles Conservancy and the California Preservation Foundation.

This paper will describe the original materials testing program by the architects to demonstrate the adequacy of the main span soon after the cracks appeared. Using some of the results of the original testing program in 1906, the presentation will describe the 2003 project, new testing of the existing materials, reasons for the original crack formation, structural design alternatives compatible with the Secretary of Interior's Standards, and the construction sequence of the agreed-upon scheme. In the Greene family folklore, the 1906 project was always referred to as "that damned bridge" and the granddaughter of Henry Greene, noted landscape architect Isabel Greene, felt her grandfather and great uncle would have been pleased and vindicated to see their original design completely restored.

Michael Krakower, P.E., F.ASCE, is principal of Krakower & Associates, Structural Engineers in Arcadia, California. His practice focuses on structural engineering of existing buildings and bridges, many that are eligible or listed on historic registers. Educated at Cal Poly San Luis Obispo in California, with a B.S. in architectural engineering, Mr. Krakower is a licensed civil and structural engineer in California. He is a Fellow of the American Society of Civil Engineers and maintains membership in historic preservation organizations including the National Trust for Historic Preservation. Current projects include the restoration of the 100-year-old Pacific Electric Concrete Railroad Bridge in Torrance, California, and the reconstruction of the original Sutter's Sawmill at the site of the first gold discovery in California along the American River.

History vs. Technology: Emergency Repairs to the Route 33 Bridge, Hightstown, New Jersey

On August 28, 2011, Hurricane Irene (more correctly Tropical Storm Irene) made landfall in southern New Jersey. The storm caused catastrophic flooding throughout the northeastern U.S. In Hightstown, New Jersey, Rocky Brook surged over its banks and over the Route 33 Bridge, causing loss of most of the 100-year-old bridge's parapets and railing system, as well as erosion of adjacent walkways.

The Route 33 Bridge over Rocky Brook carries New Jersey State Highway Route 33 (Main Street) over Rocky Brook in the center of Hightstown Borough. The low-rise, four-span, rubble-coursed stone arch bridge dates from circa 1900 and has been determined eligible for listing on the National Register of Historic Places by the New Jersey Historic Preservation Office. The bridge occupies a location important in New Jersey transportation history and is the site of a long succession of bridges since the 1690s constructed along the Post Road, the first improved road across New Jersey and part of a "Great Thorough Fair" between the northern and southern colonies. The bridge site has a long history as one of the earliest crossings, a mill site, and a succession of major transportation achievements; it includes a channelized portion of the stream, a dam and pond, and former railroad bridge abutments.

As a crossing on one of New Jersey's current state highways, the New Jersey Department of Transportation (DOT) sought not only to undertake emergency repairs on the bridge so that travel across it could resume quickly after the storm, but also to upgrade the bridge parapets and railing system to meet current standards as part of their project. The work included the repair of the parapets and railing system, placement of temporary scaffolding in Rocky Brook, construction and replacement of inlets and pipes along Route 33 (Main Street), and restoration of the pedestrian walkway while traffic flow across the bridge was maintained. The post-Irene repairs were not the first time the bridge had been ravaged by flooding and subsequently improved.

The presentation will examine the history of the site and how this bridge has changed over time to meet changing industrial, traffic, and pedestrian needs, address changes in aesthetic tastes, and implement safety initiatives. The presentation will address the implementation of new structural elements and how they were incorporated into the historically sensitive redesign of the bridge parapets while retaining the character of the bridge. Issues involving materials salvage, new materials selection, construction issues, SHPO coordination, and local municipal input will be included. The design plans won this year's American Council of Engineering Companies New Jersey Engineering Excellence Awards and reflects the multidisciplinary approach of engineers, preservation professionals, Hightstown Borough, and the New Jersey DOT.

Deborah Baldwin Van Steen has been involved in community and professional development and preservation activities for 15 years. She is an architectural historian and historic preservation professional, is a native of New York State, and currently lives in Ossining, New York. Ms. Van Steen serves as Vice President of the Ossining Historical Society Museum, is Village Historian for the Village of Ossining, and is a member of the Ossining Historic Preservation Commission. As a cultural resource professional, she has documented a wide variety of historic resources, including transportation, residential, academic, agricultural, urban, and rural properties in New York, New Jersey, Pennsylvania, and Illinois. As a member of the Ossining Historical Society Museum's Board of Trustees, Ms. Van Steen wrote and administered historic preservation grants for the conservation treatment of historic objects and buildings; has prepared brochures, pamphlets, and exhibits; and has given presentations on local history. Ms. Van Steen is contributor to *Ossining Remembered* (1999) and *The Ossining Story: A Bicentennial Celebration, 1813-2013,* due to come out this year.

Salvation, Documentation, and Reconstruction of the Moose Brook Bridge Howe Truss

Unlike most railroads in the early twentieth century, the Boston and Maine Railroad (B&M) continued to build some wooden bridges for short 30- to 60-foot (9- to 18-m) crossings, both road overcrossings and short railroad stream crossings. One example is the bridge over Moose Brook, a small stream near Gorham, New Hampshire, built in 1918. The B&M designed a boxed Howe pony truss for the 40-foot (12-m) span, using steel vertical rods, cast iron nodes or shoes, and southern yellow pine members (possibly combined with some Douglas fir). Over time the rail line was abandoned and later converted to a hiking trail.

By the 1990s, only two boxed pony trusses designed to carry railroad loads were extant in the U.S.: the Moose Brook Bridge and the nearby Snyder Brook Bridge, also a Howe truss but with a smaller span of about 30 feet (9 m). In May 2004, vandals set fire to the Moose Brook Bridge, leaving only a charred ruin. After the fire, the New Hampshire Division of Parks and Recreation built a replacement bridge but state authorities transferred ownership of the burned bridge to the National Society for the Preservation of Covered Bridges (NSPCB) and allowed them to remove the original bridge from its abutments to a nearby site. James Garvin, the New Hampshire State Architectural Historian, completed a set of drawings documenting the bridge. However, the burned bridge sat for five years before finding a party willing to save it.

In 2009, as part of the Federal Highway Administration (FHWA) National Historic Covered Bridge Research Program, the Historic American Engineering Record (HAER) selected the Moose Brook Bridge for Level 1 documentation. At the same time, Case Western Reserve University (CWRU) was awarded a research grant to study the behavior and performance of Howe trusses. After learning of the bridge's availability, HAER and CWRU collaborated and restructured the FHWA grant to reconstruct the Moose Brook Bridge and use it for the academic study. CWRU entered into an agreement with NSPCB for the reconstruction of the Moose Brook Bridge, and NSPCB subcontracted the work to bridgewright Tim Andrews of Barns and Bridges of New England.

While nearly all of the burned timbers were unsalvageable, most of the extant iron hardware was thought to be reusable. However, after transport of the salvaged parts to his shop in Guilford, New Hampshire, Andrews discovered that several of the steel rods were bent and several of the castings had cracks. The steel rods were straightened at an elevated temperature and, after several unsuccessful attempts to repair the castings, they were shipped to Lansing Community College in Michigan for brazing. The original bottom chords consisted of two sticks of wood, 10 by 16 inches (25 by 40 cm) in cross section and 48 feet (15 m) long, with no joints. Sticks of southern yellow pine with such dimensions were not available, so coastal Douglas fir from Oregon was substituted. Missing details, such as counter-diagonals in the end panels, were inferred from the Snyder Brook Bridge.

After the trusses were fabricated and assembled, they were disassembled and shipped to CWRU. The first truss was delivered in August 2011, and the second in March 2012. This process captured one of the great advantages of the Howe truss: the feasibility of prefabrication and reassembly. As the publisher John Weale wrote in 1843 regarding another Howe truss bridge, "the several frames for each opening must be accurately fitted and put together in the carpenter's yard. When the piers and abutments have been carried up to the proper height to receive the [falsework] platform, the frames are then taken to pieces and re-erected in their permanent positions." The two trusses at CWRU have been instrumented and post-tensioned, and data is being acquired on the time-dependent behavior of Howe trusses. After approximately one year, the trusses will be returned to New Hampshire for reuse by the NSPCB.

Christopher H. Marston has been with the National Park Service's HAER program since 1989, after receiving architecture degrees from the University of Virginia and Carnegie Mellon University. He has led HAER documentation projects on a variety of historic engineering sites and has led the National Covered Bridge Recording Project since 2002. He served as co-editor of the award-winning *America's National Park Roads and Parkways: Drawings from the Historic American Engineering Record* and as associate curator of the Smithsonian traveling exhibit, *Covered Bridges: Spanning the American Landscape.* Christopher has presented at a variety of professional conferences and is an active member of preservation organizations including SIA, Preserving the Historic Road, the Transportation Research Board's Committee for Historic Preservation and Archaeology, the Rustic Roads Advisory Committee in Montgomery County, Maryland, and the Advisory Council of the Architecture Program at Montgomery College. He is chair of the upcoming Second National Covered Bridge Conference in Dayton, Ohio.

Historic Bridge Projects: A Preservation Reality Check

Historic bridges continue to deteriorate, many past the point of rehabilitation. Real and perceived obstacles to saving bridges are driving the agenda: engineering, finances, liability, load ratings, public perceptions, questions of continuing ownership, unproductive dialogue, and more. As a historic preservation regulator in a state department of transportation over the past 12 years, the presenter has had to make decisions in many cases that included compromises among stakeholders. This has meant constant reality checks, with cost and safety playing key roles in which rehabilitation projects can be advanced, and how they are advanced. This presentation will explore three case studies in Vermont involving historic metal truss bridges. Each project faced different challenges and had a different preservation outcome, ranging from minimal intervention to context-sensitive replacement. A common element was honest appraisal and open dialogue about what the options were and what compromises needed to be made.

The Richmond Village Bridge project faced engineering concerns and public opposition, the latter derived in large part from the former. Bridge engineers favored replacement of the 1928 Parker through truss, stating that a rehabilitation would last a maximum of 25 years, which failed the life-cycle test. When pressed, an open dialogue followed to precisely identify which bridge components were at issue and what could be done to extend their life. What followed was constructive dialogue about remedying specific engineering issues, leading to rehabilitation of the bridge. Not surprisingly, once the engineers were on board, the public was more inclined to view the bridge as an asset in their community. The presentation will identify the bridge components in question and how the engineering and other issues were resolved.

The Checkered House Bridge is a 350-foot (107-m), single-span, Pennsylvania steel truss built in 1928 after the 1927 flood washed away its predecessor and hundreds of other spans. It was the longest bridge built as part of the post-flood reconstruction program and remains the longest single-span through truss in Vermont. Located on U.S. Route 2, a major collector highway, the biggest issue was its 19-foot, 9-inch (6-m) travel way, which did not meet minimum state standards and was considered unsafe. Discussions of its fate began in the early 1990s, including options for rehabilitation, replacement, and bypass, all of which had major issues and none of which developed much traction. Rehabilitation at the existing width was untenable from the traffic engineer's perspective and demolition was a non-starter for preservation regulators. No one favored a bypass, which would have added a third bridge at this location with little multimodal potential for the historic span. In 2006, the idea of widening the bridge was floated, which—after years of off-and-on discussions about alternatives—finally appeared to be an idea that stakeholders could embrace. Feasibility studies followed, with all keeping their fingers crossed. As it turned out, if you want to widen a long steel truss, a Pennsylvania truss is a good place to begin.

The Bridgewater Corners Bridge was a single-span, Pratt through truss constructed in 1928. The state management plan called for rehabilitation, but 15 years had passed since the plan's adoption, during which time the bridge deteriorated substantially. The project called for a safe crossing and left the door open to all options. Predictably, stakeholder discussions centered on geometric deficiencies, with the public calling for complete replacement. After exhausting rehabilitation options to address the existing geometry, including a new cantilevered sidewalk, the project manager and preservation regulators agreed to widen the structure as was planned for the Checkered House truss. Before construction began, however, engineers determined that the bridge was unsuitable for widening because of its deteriorated condition and the additional strength needed to carry the wider span. The Bridgewater Corners Bridge was significant not only for its engineering, but also because President Calvin Coolidge traversed the bridge regularly from his home in nearby Plymouth Notch. For this reason, maintaining an authentic truss at the site was considered important, and planning began to build a new Pratt truss with all-bolted connections. The finished product was considered a sensitive preservation solution, and lauded as a success by all stakeholders.

Scott Newman is the Historic Preservation Officer for the Vermont Agency of Transportation, a position he has held since 1999. From 1990 to 1999, Mr. Newman was the founding principal of Cultural Resource Management Consultants, serving public and private clients in New York, Vermont, and Québec with a full range of historic preservation services. Scott has a B.A. in Environmental Economics from Concordia University, a M.S. in Conservation of the Built Environment from University of Montréal, and is currently enrolled in the Environmental Conflict Resolution Program at Vermont Law School.

Bridge Engineering from the Bottom Up: Substructure Matters on the Red River of the North

Historians conducting historic bridge studies and surveys typically focus on superstructure with less attention to substructure. In some situations, however, challenging site conditions have required more engineering effort with substructures, raising the level of the substructure's significance. Such is the case with the Red River of the North's shifting soils, which challenged engineers to develop innovative designs for approaches, piers, bents, and abutments. Today, 28 vehicular bridges, dating from the 1920s to the present, span the Red River of the North, linking North Dakota and Minnesota, as the river provides a natural geographical boundary between the two states. Knowledge of the engineering techniques used to accommodate the Red River's unstable soils will allow historians to further understand and evaluate designs of both substructure and superstructure.

Bridge construction across the Red River of the North presented bridge engineers with particularly difficult soil conditions along the river embankments. Deep clay and silty soils resulted in bridge foundations that gradually moved and shifted inward from the banks toward more solid soils in the center of the river channel. Discussed in this presentation are two innovative approaches to bridge substructure design by North Dakota Highway Engineer Clifford Johnson to accommodate the river's shifting and moving embankments.

First, this presentation will discuss the innovative technique that Johnson developed in 1929 for the design of a two-span, Parker through-truss bridge (the Sorlie Memorial Bridge) to connect the urban areas of Grand Forks, North Dakota, and East Grand Forks, Minnesota. Due to its urban location and the constraints on the bridge's length, Johnson confronted the soil issue at the bridge's abutments. With a stable middle pier, Johnson designed the truss span's substructure end bearings with telescoping joints and four 38-inch (97-cm) roller bearings at the bridge abutments. The joints and bearings allowed for the abutments to move up to 2 feet (0.6 m) with the gradual movement of the banks and the natural expansion and contraction of the truss superstructure. Johnson's technique was highlighted as "a feature of exceptional interest" in the May 29, 1930, edition of *Engineering News-Record.* Johnson indicated in the 1929 Souvenir Historical Program for the bridge's dedication that the design marked "the boldest attempt yet made at resisting or absorbing the bank movement of the Red River with a permanent structure."

Later, in 1951 at a rural location having no constraints on structure length, Johnson engineered a very different solution to the problem. He devised a series of flexible approach spans to cross the embankments on either side of the main truss spans, which rested on stable concrete piers in the river channel. Johnson's 1951 bridge at Drayton is gone, but the extant 1959 Warren through truss at Oslo, Minnesota, provides another example of the design. Here, following Johnson's concept, Walter Butler Company bridge engineer O. W. Imer designed multiple approach spans at each end of the bridge to absorb the lateral soil movement, with cantilevered beams connected by swivel devices, moveable rocker bents, and large finger-joints in the deck. These techniques were designed to allow the Red River's banks to move a substantial distance toward the river without affecting the bridge's stability. Johnson's—and Imer's—methods to accommodate the river's shifting banks were incorporated in other bridges on the Red River. For example, a version of Johnson's technique of accommodating movement at the bridge abutments was used in a 1939 Parker through-truss near Grafton, North Dakota. Similar rocker bents and flexible approach spans were used on at least three additional bridges over the Red River by 1960.

Katherine Haun is a historic preservation specialist for Mead & Hunt, Inc., an employee-owned consulting firm with experts in multiple fields, including planning, design, engineering, and architecture. With more than three years of experience in Mead & Hunt's Minneapolis office, she has been responsible historic resource surveys and historic bridge evaluation and review, including historic bridge surveys, individual bridge determinations of eligibility, and historic context reports. Haun has a master's degree in Historic Preservation from Ball State University.

The Bailey Bridge: Misconceptions in Identification, Significance, and Preservation

At the onset of World War II, Allied forces determined that existing temporary bridges did not meet the requirements of modern tanks. Donald Bailey, the chief engineer at the British Experimental Bridging Establishment, developed the concept of the Bailey bridge in 1940. This small but versatile bridge was eventually utilized extensively by British and American forces during World War II. The Bailey bridge's design was heavily focused on its temporary purpose, with an emphasis on portability and simplicity—elements that should be considered when evaluating any Bailey bridge for National Register of Historic Places eligibility. Identifying the age and model of an existing Bailey bridge can be a challenge to those trying to quickly assess historic bridges. Fortunately, historic military documents and other data can provide factual clues toward understanding the history of any individual Bailey bridge.

This paper will highlight a contextual history for the Bailey bridge, dating from its development to the present day. The significance of the Bailey bridge can be analyzed in two phases: the first covering its innovative role in World War II and the second involving its standard use post-World War II. The design of the Bailey bridge can be directly tied to the two different phases of its significance, as the bridge was redesigned in 1948 to increase the roadway width and has remained relatively unchanged since that date. Within the United States military, the Bailey bridge is categorized as a piece of moveable equipment, not as a permanent bridge structure. For this reason, the preservation of a Bailey bridge as a structure in the post-World War II era may appear questionable to the military community.

This paper will discuss the significance of the Bailey bridge in determining National Register of Historic Places eligibility of existing Bailey bridges. Although the number of Bailey bridges that may meet the 50-year threshold for eligibility is diminutive, the long-term placement of any Bailey bridge is highly uncommon. Those that remain extant may be more commonly found on military installations, although Bailey bridges have been applied as a bridging solution in other settings. The paper will use the historic Bailey bridge found at Camp Atterbury, Indiana, as an example throughout, highlighting several challenges and misconceptions presented during the identification, subsequent move, and preservation of this Bailey bridge. This example will highlight the challenges in making a case for the National Register Criteria Consideration B for the relocation of a Bailey bridge, even when the bridge is inherently designed to be moved. While discussing the preservation and future of the Bailey bridge as a historic resource and using the Camp Atterbury bridge as an example, it is possible to draw conclusions on errors made in the identification and National Register evaluation of Bailey bridges in the United States.

Raina Regan is an architectural historian for the Indiana Army National Guard. Her work encompasses statewide cultural resource projects with National Register of Historic Places-eligible or listed structures. Projects include providing technical support for the rehabilitation of historic bridges, armories, and aviation facilities throughout the state of Indiana. Raina has a M.S. in Historic Preservation from Ball State University and a B.A. in Art History and Visual Culture from Michigan State University.

How to Date a Bridge: Case Studies on Steel Truss Design

Steel trusses are, by design, reusable. They are lightweight and relatively durable, allowing a single truss to be re-erected many times by many different owners. In the process of this reuse, the information regarding the bridge builder, year built, and original construction location is easily lost. Often, in historic bridge inventories these bridges remain a mystery, and are often overlooked due to limited information or the incorrect application of a later move date. This presentation focuses on three case studies of steel truss bridges, their mysterious origins, and the method used in their research during the Oregon Department of Transportation 2012 Historic Bridge Inventory.

The South Umpqua River Bridge in Douglas County, the Cobleigh Road Bridge in Jackson County, and the Cow Creek Bridge in Malheur County each revealed a distinct story of bridge reuse, yet the research process was similar for all. As expected, the analysis revealed that all three bridges were significantly older than the dates given in the National Bridge Inventory (NBI). The information was drawn from a number of common sources, including early bridge company records, local newspapers, and 1950s-era bridge inspections.

Additionally, the research utilized a novel database, partially developed in the course of the bridge inventory, which documents the steel mill rolling marks on the members of the truss. The mill marks are cross-listed with any bridges with firm construction dates, locations, or fabricators. As the marks were unique to each steel manufacturer and changed over time, they allow a bridge to be at least roughly dated. Where multiple marks are present, the window can be further narrowed. In one of the presented cases, an examination of the marks also revealed later alterations to the truss. The mill mark database, though, is currently based on a limited sample size. As most steel trusses remaining in Oregon were constructed during the 1920s and 1930s, the pool of marks was heavily skewed toward that era, limiting its usefulness for earlier trusses. Further research, and a broader pool of bridges, will enable the database to be more universally useful. It is hoped that by making this presentation, others will consider collecting information on the mill marks in their states. The functionality of the resulting database would not be limited to the dating of steel trusses, but it could also aid in the investigation of other steel structures and reveal patterns in the use of steel nationwide.

Rebecca Burrow is currently employed as an associate engineer at the Oregon Department of Transportation, where she has been central to the completion of their 2012 Historic Bridge Inventory and associated Historic Bridge Field Guide. Her educational background includes bachelor's degrees in engineering and history from Swarthmore College and an M.A. in Conservation Studies (Historic Buildings) from the University of York (UK). Future work includes the publication of a public access book on Oregon's historic highway bridges.

Creative Bridge Building in Early 20th-Century Chicago

Chicago has a rich history in regard to bridges, as the city has required many to span the several waterways within it. Many of these bridges carried heavy traffic, while accommodating marine traffic below, which resulted in the city's many movable bridges. It has frequently been claimed that no other city in the world had as many movable bridges as Chicago. This discussion will briefly review the basic movable bridge types and significant individuals involved with their design. This will be followed by a discussion of several noteworthy and unusual bridge construction projects.

Among those discussed will be the Eight-Track Bridge. The first bridge on this site was an unusual fixed steel arch bridge capable of being converted into a double-leaf bascule. However, after only a few years of service a new bascule bridge was constructed instead on the argument that the cost was reasonable and would provide an even stronger bridge. The bridge that stands today is an unusual group of four single-leaf bascule bridges. The mechanical equipment for each leaf had to be alternated so that they fit in the limited physical space.

The replacement of the Deering Bridge with the existing historic Strauss heel-trunnion bascule bridge will also be discussed. Each day, two hundred trains continued to cross an old swing bridge while the new span was built in the raised position. When the new bridge was complete, the old bridge was swung open and the center was cut out so that the bascule leaf could be lowered and the deck completed, allowing workers to demolish the remainder of the swing bridge at their leisure. This specially executed transition to the new bridge limited the track closure to 18 hours.

Another bridge that will be discussed is the Kinzie Street Railroad Bridge. This is the site of one of the first two all-steel railroad bridges built in the country. It was later replaced with a lattice truss swing bridge, which was then replaced in the early twentieth century by one of Joseph Strauss's earliest surviving bascule bridges and a prototypical forerunner to his heel-trunnion design. To keep the previous bridge functioning during construction, while not blocking construction of the bascule bridge on a parallel alignment, the swing bridge was turned into a bobtail swing bridge by cutting part of the truss out and adding a counterweight.

This fascinating history is not only an indication of the historic significance of these surviving bridges in Chicago, but also a record of the impressive design skills displayed by bridge engineers in Chicago and the abilities of workers to execute their plans.

Nathan Holth holds a B.A. in secondary education with a political science major and a history minor. He has 10 years' experience studying and working with historic bridges. Holth is the author of HistoricBridges.org and has personally visited and photo-documented thousands of old and historic bridges. He is an active advocate for the preservation of historic bridges and has given a number of historic bridge-related presentations and speeches and has participated as a consulting party for Section 106 Review of historic bridges in many different states.

Bridges of the Recent Past: Three Texas Case Studies

Cultural resource managers nationwide are confronting the implications of the "50-year rule," now applying to resources constructed in the mid-1960s. This paper seeks to look to the even more recent past with a dialogue on the question: When is a bridge less than 50 years old of such exceptional significance to be eligible for listing on the National Register? Three Texas bridges illustrate some of the issues. The 1980 rehabilitation of the 1910 open-spandrel concrete arch Ann Richards (a.k.a. Congress Avenue) Bridge unintentionally created an economically important local tourist attraction. The 1986 Barton Creek Boulevard Bridge was the first "fin-back" bridge in the country. Dallas's 2012 Margaret Hunt Hill Bridge is the nation's first highway bridge designed by Santiago Calatrava.

Dr. Mark M. Brown is a historian with the Environmental Affairs Division of the Texas Department of Transportation. He earned his Ph.D. in American Art and Architectural History at the University of Pittsburgh and is a veteran of several HAER bridge documentation teams.

Two Lessons for Historic Urban Bridge Protection Offered by San Antonio's Hays Street Bridge

San Antonio is not necessarily known for its bridges, although, to those familiar with its charms, it could just as easily be known as the Bridge City as the Riverwalk City. The San Antonio River has made bridges necessary, and it is the Riverwalk that has made possible appreciation of their magnificence. When viewed from below, bridges take on an enhanced aesthetic dimension not easily perceived from street level. The grandeur of a bridge is most readily appreciated when it is visible from a variety of angles. That point is so obvious that we tend to take it for granted. It should not be. Urban railroad viaducts and bridges are often less well-appreciated because they emerged from a distinct context and exist in an environment that often renders them less visible. The Hays Street Bridge, long underappreciated as a local landmark, offers highly instructive examples of how an endangered bridge can need protection from additional threats even after the salvation of an outstanding restoration process.

Key Role of Open Space

There is a reason that open space is fundamental to the perception of a bridge within its environment. Most bridges are readily visible from or through the open space which they span (such as a body of water, a gorge, or a canyon). That is not the case with the Hays Street Bridge because what it spans are less frequently traveled railroad tracks and neighboring warehouses. For any structure to be perceived as a landmark, it must first be highly visible. Because the Hays Street Bridge is already crowded by large warehouses, its relationship to any projected new structures requires careful examination of their impact on the few remaining views to the bridge from surrounding streets, and the vital role played by open space. A large structure that rises higher than the platform of the bridge itself would constitute an encroachment that extinguishes the dramatic impact of the bridge and practically erases its role as a landmark. A relatively small bridge surrounded by more massive and taller buildings essentially become about as visible as a tunnel, for there is no open space to render its span visible. The construction of massive structures on the surrounding land would intrude on the sightlines to the bridge, rendering it no longer visible from adjacent streets. Moreover, the views from the bridge obstructed thereby would limit its new role as an observation platform, especially toward the northeast and southwest.

The above reasons are why a park is the most respectful use for the last publicly owned parcel of land adjacent to San Antonio's Hays Street Bridge, for only through careful management of the meager remaining open space can its iconic views be preserved. It is no coincidence that most beloved urban bridges across the United States are complemented by huge areas of open space, often defined by a major park at one end. If existing development plans are implemented, the community could be left with better views of the Hays Street Bridge from the northbound lanes of Interstate 37 than from its neighborhood streets. That would represent a substantial loss and a missed opportunity.

Design Enhancements and "Percentage for the Arts" Are Not Without Risks

While design enhancements can be brilliantly appropriate as a feature of new construction, they may not be altogether satisfactory in historic preservation projects. When not approached with extreme sensitivity, the results can be gratuitous, misleading, and discordant when added as a component of historic preservation efforts. The metal silhouettes added to the approaches to the Hays Street Bridge do very little to complement its history and the spirit that drove its restoration. It raises the question of whether any modern artistic statement is appropriate when the structure it seeks to complement is itself determined to be work of art or a landmark. At the very least, a twenty-first-century artistic statement should pass a high level of scrutiny before being attached to a nineteenth-century landmark. This is especially true in this case, where the artist did not participate in the preliminary planning process alongside architects and engineers. In the case of the Hays Street Bridge, the "design enhancement" materialized as a pure afterthought. The project's integrity may have been better served by no "enhancements" at all.

Gary W. Houston lectured on urban and environmental issues at institutions of higher education in San Antonio for the past 35 years, the last 17 of which were as a member of the faculty of the Department of Political Science and Geography at the University of Texas at San Antonio. Houston holds a bachelor's degree in Urban Studies from Dartmouth College and a master's in Urban Planning from the Yale School of Art and Architecture. He has been on a leave of absence from UTSA since 2010.

Minnesota's Bridges: Lessons Learned and Current Best Practices

The historic bridges of Minnesota represent a variety of engineering advances, aesthetic styles, and transportation system developments. Minnesota is home to over 200 historic bridges, identified through over 20 years of study. The Minnesota Department of Transportation (MnDOT) owns 15 percent of the state's historic bridges, while counties and cities own the remaining 85 percent. This presentation will provide an update on Minnesota overall historic bridge program, describing its components, players, and roles. Next, and in greater depth, the presentation will address the current efforts of MnDOT and its consultants to meet the needs of local owners. Lessons learned from the past decade of successful rehabilitations, as well as from bridges lost and ongoing owner frustrations about process and requirements, will be shared. The presentation will highlight state and locally owned bridges that have been recently rehabilitated in Minnesota, with a focus on design challenges addressed. MnDOT's comprehensive identification of the state's historic bridge population has resulted in overall program savings. With historic bridges identified, the state's efforts turned to issues of bridge management. MnDOT's innovative approach to historic bridge management uses a team method that pairs a professional historian with a professional engineer. Working interactively, they survey a historic bridge and prepare a management plan. The plan summarizes pertinent historical and engineering data, records current conditions, and recommends specific treatments for stabilization, preservation, and annual maintenance that meet engineering standards as well as the *Secretary of the Interior's Standards for the Treatment of Historic Properties.* This method effectively brings historic preservation and bridge engineering into a dialogue to address difficult bridge issues, such as load capacity, railing replacement, and structural deterioration. MnDOT used the team approach to prepare plans for 22 state-owned bridges and has completed rehabilitation of six of these bridges since 2006, with seven more currently underway. The state is now making plans to complete bridge-specific plans for local owners to guide and facilitate their preservation efforts. An important component is engaging with local bridge owners. In 2012, MnDOT conducted regional meetings with more than 60 local bridge owners. While owners have voiced their appreciation for MnDOT undertaking this initiative, they have also expressed the ongoing need to continue to improve communication between local owners and state agencies and improve processes as follows:

- Further streamline and accelerate the review process for historic bridges,
- Educate owners on range of topics from the Secretary of the Interior's Standards to how to address current bridge design and safety standards, and
- Address funding shortfalls and other limitations to preserving historic bridges.

Amy Squitieri is Vice President of Engineering and Historical Services at Mead & Hunt, a nationwide professional services firm. She is well known for her historic bridge work with 20 years of experience helping state departments of transportation identify historic bridges and prioritize the best examples for preservation. Amy received an Executive MBA from the University of Wisconsin and a master's degree in Architectural History from the University of Virginia. She has served on national task forces for historic bridge preservation and helped found the Historic Bridge Alliance, which she now chairs. Amy has worked on projects to rehabilitate and preserve truss, arch, and movable bridges and is currently working on MnDOT's statewide initiative focused on locally owned bridges.

Kristen Zschomler is the Unit Supervisor for MnDOT's Cultural Resources Unit, and is a professionally qualified historian and archaeologist. She received bachelor's degrees in history and anthropology from the University of Minnesota, Morris, and a master's degree in anthropology from the University of Alabama. Kristen has been the lead manager on the Historic Bridge Programmatic Agreement, the completion of the Minnesota Historic Bridge Management Plans for MnDOT's historic bridges, the recently completed study of bridges built between 1956 and 1970 for their historical significance, and the current local historic bridge study for the State Aid office. Kristen has overseen the rehabilitation, or is currently involved in the development of rehabilitation plans, for 20 historic bridges in the state.

Crowd-Sourcing Historic Bridge Research

This presentation will explore the potential uses of distributed knowledge networks, or crowd-sourcing, to guide traditional archival research, in the specific context of determining the historical significance of transportation structures such as bridges. While free online reference sources are frequently incomplete and less than completely reliable, they can provide vantage points that are not available from individual paper records. As a supplement to state historic bridge inventories and other contextual studies, online resources provide additional—and different—perspectives on a bridge's significance in terms of age, design, location, etc., that can lead to surprising conclusions.

Trained historians might eschew conducting research on Wikipedia, LinkedIn, and other online sources because of the potential for factual errors made by volunteer contributors. To turn this perception on its head, this presentation will assert that the primary benefit of these sites is not the information that they contain, but the massive networks of connections they make between people and information. To disdain Wikipedia on the basis of its occasional factual errors is to ignore the efforts of volunteers who are motivated by a sincere desire to share deep local knowledge, a knack for finding connections between things, a skill for unearthing new bibliographical references, or simply an obsession with making lists.

Beyond their roles as repositories of information, free online sources are also a collection of valuable software tools for aggregating data in new ways. Mash-ups such as GeoHack (Wikipedia entries overlaid on a map) provide low-cost and effective spatial visualization tools. The use of these tools will be demonstrated with examples created by the presenter.

Turning to the subject of historic bridges, the presentation will contrast definitions of notability derived from formal regulatory requirements (the Historic American Engineering Record and the Section 106 mitigation process) to those derived from crowd-sourcing. Three case studies will be presented, constructed from cross-references between the HAER collection and Wikipedia entries for bridges in Pennsylvania, Illinois, and Delaware. Different correlations between formal and crowd-sourced notability in each state will expose inconsistencies in the selection of structures for inclusion in the HAER collection.

To show that crowd-sourcing is not necessarily a new idea, the example of HAER's Pennsylvania Historic Railroad Bridges Recording Project will be considered. The list of structures documented by this project in the late 1990s was quite literally "crowd-sourced" from a panel of experts convened in Philadelphia and from surveys mailed to libraries and historical societies. Not unsurprisingly, this methodology resulted in some of the same limitations that would be encountered with free online sources today.

The presentation will conclude by advocating a "viral" approach to promoting SIA and historic bridge preservation groups by adding links within these knowledge networks that will lead potential supporters to our websites.

Justin M. Spivey, P.E., is the Secretary of SIA and a Senior Associate in the Princeton, New Jersey, office of Wiss, Janney, Elstner Associates, Inc. His professional interests include forensic engineering, adaptive reuse of existing structures, historic bridges, and the history of structural engineering. He has compiled or edited Historic American Engineering Record documentation for hundreds of historic bridges and is a licensed professional engineer in six states.