NOVEMBER 21, 2017

SEPTEMBER 24 - 28

WORLD CANALS 2017 CONFERENCE

Erie Canal | Syracuse, New York | USA

PROGRAM ABSTRACTS

CONFERENCE HOSTS:

ERIE CANALWAY NATIONAL HERITAGE CORRIDOR

NYS CANAL CORPORATION

PROGRAM ABSTRACTS

ABOUT THE CONFERENCE

The World canals Conference brings together hundreds of canal enthusiasts, professionals and scholars from around the world to exchange best practices on canals and inland waterways. The conference has been held in North America, the British Isles, Europe, and Asia.

OUR VITAL WATERWAYS: AGENTS OF TRANSFORMATION

The 2017 World Canals Conference, held on the Erie Canal in Syracuse, New York, focused on canals and inland waterways as agents of transformation. Once the mothers of cities and ports, transformers of landscapes and builders of nations, canals are now the focus of revitalizing communities, the makers of power and the suppliers of essential water.

The conference encouraged conversations about the operation and maintenance of new and historic canals, canals within larger landscapes, environmental issues, economic and community revitalization, navigation, tourism, recreation, historic preservation and interpretation. The conference provided opportunities for cross-fertilization—of disciplines, organizations and nations—that is one of the hallmarks of World Canals Conferences.

PRESENTATION ABSTRACTS

More than fifty presenters shared their experiences and insights with attendees from 19 U.S. states, five Canadian provinces, 14 countries, and three continents. Abstracts of their presentations follow, along with brief biographies and contact information for the speakers.

We encourage readers to continue conversions started at WCC2017 to further the transformative power of canals and inland waterways.

CONFERENCE COMMITTEE

Sharon Leighton, NYS Canal Corporation, WCC2017 Chair
Duncan Hay, Erie Canalway National Heritage Corridor, Program Chair
Tom Grasso, Canal Society of New York State
Bill Miles, Bergmann Associates

WORLD CANALS CONFERENCE 2017, SYRACUSE, NEW YORK, USA

September 25-28, 2017

Abstracts of Presentations, Speaker Biographies & Contact Information

Contents

Opening Session & Welcome

Welcome to Syracuse & Central New York. Dr. Cornelius B. (Neil) Murphy, WCC2017 Honorary Chair,

Senior Fellow for Environmental and Sustainable Systems, State University of New York, College of Environmental Science & Forestry, Syracuse, NY 13210, USA
cbmurphy@esf.edu

Welcome to WCC2017. Sharon Leighton, WCC2017 Chair

Director, Community & Economic Development, NYS Canal Corporation, 30 South Pearl St., Albany, NY 12207, USA
Sharon.Leighton@canals.ny.gov

Welcome on Behalf of Inland Waterways International. David Edwards-May, President IWI, Grenoble, FR

David Edwards-May succeeded Dave Ballinger as president of IWI after last year's World Canals Conference in Inverness. Previously vice-president, his work as an advocate for inland waterways was conducted in parallel with consultancy and publishing in this field. He has authored nearly 100 studies on the economic value and feasibility of waterways, covering a wide range of issues of funding, operation, management and development, for all functions from tourism and transport to restoring and interpreting waterways and their structures as cultural heritage.

Initially as CEO of Euromapping, since 2014 as a director of Transmanche Consultants (France), David has also designed and published maps and directories for European and North American waterways, and other works of reference (in English and French).

Most consulting assignments have been conducted within the 8500km French waterway network, but international assignments have also been undertaken for the UK (with The Canals Group) on the funding of overseas waterways, and in Finland (survey of potential for a cruise ship product on Lake Saimaa), and within the EU on various cooperation programs such as the 'Voies d'eau vivantes' (VEV) project, which brought together 11 partners from 5 countries 1998 and 2002, and the 'Blue Links' project for restoration of the cross-border Canal de Roubaix/Canal de l'Espierres (2003-2009).

Studies have contributed to enhancement of the various functions of inland waterways: transport, tourism, recreation and urban regeneration: restoration of the river Lot navigation, listing of the Canal du Midi as a UNESCO World Heritage site, organisation of the World Canals Conferences in Serbia in 2009 and in Toulouse in 2013 (secretary of scientific committee).

David chaired the PIANC working group on standards for recreational waterways in 1998-2000. Formerly a journalist, he was editor of IWI's World Wide Waterways and Newsletter from 2003 to 2017.

dem@transmanche.net

Celebrating 200 Years of Transformation. Brian U. Stratton, Director, NYS Canal Corporation, Albany, NY and Gil C. Quiones, President & C.E.O., New York Power Authority, White Plains, NY, USA

Reimagining the Canals. The New York Power Authority and the New York State Canal Corporation are looking for visionary, implementable concepts and initiatives that promote the Canal System's heritage, foster economic development and tourism, and improve the Canal System's long-term financial sustainability.

Today's New York State Canal System is a 524-mile network comprised of the Erie Canal, the Oswego Canal, the Cayuga-Seneca Canal and the Champlain Canal. Constructed between 1905 and 1918 as the Barge Canal, the four branches of the Canal System are direct successors to the canals that New York State began building in 1817 and that established New York's commercial primacy by connecting New York City to the Great Lakes and the American Midwest.

Earlier this year, the New York Power Authority (NYPA) assumed control of the Canal System from the New York State Thruway Authority. NYPA is the nation's largest public power authority and runs 16 power-generating plants, including three hydroelectric facilities on the Erie Canal. It has initiated a strategic planning process to assure the long-term vitality of the Canal System.

The Canal System is one of the most transformative public works projects in American history. The entire system was listed as a National Historic District on the National Register of Historic Places in 2014 and designated as a National Historic Landmark in 2017 for its role in shaping the American economy and urban development.

Despite its past success, vessel traffic on the Canal System has steadily declined over the last century. Deindustrialization and competition from rail, pipelines, roadways and the St. Lawrence Seaway, put the Canals at a disadvantage in transporting freight. Today, commercial traffic is limited and represents only a small fraction of the millions of tons of cargo once shipped annually. Due, in part, to the population decline in certain communities along the Canal System, pleasure boating activity levels have likewise fallen and are today only half what they once were. Yet, despite the decreasing volumes of commercial and recreational traffic, the Canal System's infrastructure – including locks, guard gates, and lift bridges – requires continued maintenance and investment to guarantee safe passage.

In contrast to the decreasing maritime activity on the Canal System, recreational uses along it – from hiking and bicycling in spring, summer, and fall to cross-country skiing and ice fishing in winter – have grown in popularity. The 750-mile Empire State Trail, which will run from New York City to Canada and from Albany to Buffalo, is expected to be completed in 2020. It will further enhance opportunities for recreation along portions of the Canal System. To date, however, much of the Canal System's potential to stimulate tourism and economic activity in the communities along its corridor remains untapped.

To address the challenges and opportunities facing the Canal System, the Competition seeks visionary ideas for physical infrastructure projects as well as programming initiatives that promote:

- the Canal System as a tourist destination and recreational asset
- sustainable economic development along the canals and beyond

- the heritage and historic values of the Canal System
- the long-term financial sustainability of the Canal System

Solutions that recognize the Canal System's historic ties to its communities while enhancing its long-term financial sustainability are of particular interest. Ideas that consider a specific section of the Canal System are encouraged, though submissions may also be site-specific or address the Canal System in its entirety.

A jury of experts from a variety of related fields will assist NYPA and the Canal Corporation in shortlisting a group of finalists and in making recommendations for final awards.

www.canals.ny.gov/reimagine

Brian Stratton was appointed Director of the New York State Canal Corporation in April 2011. He was appointed at the recommendation of Governor Andrew M. Cuomo, and serves as a member of the Governor's Cabinet. Prior to joining the Canal Corporation Mr. Stratton was elected Mayor of the City of Schenectady on November 7, 2003, and re-elected to a second term in 2007.

During his tenure, Mayor Stratton successfully identified and corrected the City's serious inherited financial problems, returning Schenectady's municipal credit rating from the lowest in New York State to investment grade, including a sustained A- rating by Standard & Poor's. During his seven years as mayor, he worked with local leaders to attract more than $300 million in new private investment in the City of Schenectady, creating and retaining more than 2,000 jobs.

As Mayor, Mr. Stratton also served from 2009-2011 as Co-Chair of the United States Conference of Mayors Water Council, leading mayors of more than 300 American cities in the discussion and national policy formation of issues impacting how cities provide safe and affordable water and wastewater services.

His numerous awards include the National Association of Government Accountants (AGA) Distinguished Local Government Leadership Award in 2009 and the AGA New York Chapter Outstanding Achievement Award in 2008.

Mr. Stratton received his Bachelor of Arts Degree from SUNY Oswego in 1980.

Brian.Stratton@canals.ny.gov

Gil C. Quiniones has served as President and Chief Executive Officer of the New York Power Authority (NYPA), the nation's largest state-owned electric utility, since 2011. He is responsible for developing and implementing the statewide utility's strategic vision and mission and for supervising its operations, legal and financial matters and relationships with external stakeholders.

Under his leadership, NYPA is currently playing a key role in the Governor's Reforming the Energy Vision initiative to use market forces and new technology to empower customers and encourage the growth of clean renewable energy and energy efficiency.

Mr. Quiniones is Co-Chair of the Board of Directors of the Alliance to Save Energy and serves on the Boards of the New York State Energy Research and Development Authority and the Large Public Power Council. He is also NYPA's principal representative to the American Public Power Association, from which

he received the Alex Radin Distinguished Service Award in 2017. Quiniones was also named as the 2017 Smart Electric Power Alliance Power Player of the Year, an award that recognizes those on the front lines of energy transformation in the United States.

Mr. Quiniones was Co-Chair of the New York Energy Highway Task Force, which helped carry out Governor Andrew M. Cuomo's vision for reimagining New York State's energy system through partnerships between the public and private sectors. He also served as Chairman of the Board of Directors of the Electric Power Research Institute in 2015, the electric power industry's international research and development organization.

Before joining NYPA in 2007 as Executive Vice President of Energy Marketing and Corporate Affairs, Mr. Quiniones served in several positions in the administration of New York City Mayor Michael R. Bloomberg, including more than four years as Senior Vice President of Energy and Telecommunications. He previously worked for Con Edison for 16 years and was one of four co-founders of Con Edison Solutions, the utility's unregulated energy services company.

Saying "I Do": Marrying Canal Heritage and Community Revitalization. Bob Radliff, Executive Director, Erie Canalway National Heritage Corridor, Waterford, NY, USA

New York State's continuously operating canal system has inspired ingenuity and passion since the "Wedding of the Waters" in 1825. The enduring heritage of the canal continues to provide ample opportunities to drive and anchor community revitalization efforts today. Since 2000, the Erie Canalway National Heritage Corridor (ECNHC) has worked to help people, businesses and communities recognize the transformational benefits of marrying canal heritage and community revitalization and say "I Do" to heritage development.

The Corridor's 524 miles of continuously navigable waterways include more than 230 communities and 3.2 million residents. ECNHC (co-host of the 2017 World Canals Conference) was established by the U.S. Congress in order to recognize the national significance of the Erie Canal and its lateral canals (Champlain, Oswego and Cayuga-Seneca). Guided by its award-winning *Preservation & Management Plan* (https://eriecanalway.org/resources/preserve-plan), the ECNHC's goals are to protect the distinctive sense of place, maximize recreational opportunities, reach a high quality of natural resources, make the Corridor a "must-do" travel experience and pursue sustainable economic growth in harmony with heritage resources. The ECNHC is the only national heritage area in the United States centered on a historic canal that remains in operation as a living waterway.

Bob Radliff is the Executive Director of the Erie Canalway National Heritage Corridor, a public-private partnership that works to preserve and promote the historic, cultural, recreational, and natural resources of a 524 mile long corridor and foster vibrant communities along its legendary waterways. Prior to joining the Corridor, he served for 17 years (1996-2013) as the Executive Director of the Community Loan Fund of the Capital Region, a nonprofit financial institution capitalized by socially concerned investors. From 2010-2013, he simultaneously served as the Executive Director of the Albany Center for Economic Success, a small business incubator and community development facility. From 1990-1995, he was the Executive Director of the Albany Community Land Trust, a nonprofit corporation

holding land in trust while providing long-term access to meet community needs. He has an environmental science undergraduate degree and received his MBA from the State University of New York system.

Bob Radliff, Executive Director
Erie Canalway National Heritage Corridor, Peebles Island, P.O. Box 219, Waterford, NY 12188
bob_radliff@partner.nps.gov
518-237-7000

Getting Oriented to WCC2017: Where are we and what are we doing here? Duncan Hay, WCC2017 Program Chair, Erie Canalway National Heritage Corridor
duncan_hay@nps.gov

Opening Plenary – Our Inland Waterways: Agents of Transformation

The Transformative Power of Canals. Steve Dunlop, CEO, Scottish Canals, Glasgow, Scotland, UK

Steve will blitz through the highs and lows of the 250 years of Scotland's canal history. He will take us on a journey from the Scottish enlightenment when the nation's canals were pioneered through to the dark days when Scotland turned its back on our industrial heritage. He will evidence the catastrophic and lasting economic and societal downside of long term under investment on communities across Scotland. But it won't all be bad! Steve and his team are leading an amazing renaissance and are concentrating on not ' what' are canals for, but ' who' they are for and 'how' they can drive change!! He will share a story of renewal, confidence, innovation and transformation. Listen out for mythical beasts, hilltop villages and night time rainbows…things have changed!

Steve Dunlop has been leading Scottish Canals for twelve years. Before that he led many public bodies across the UK focused on delivering real public value. He is a public entrepreneur, a visionary in his field and someone who is dedicated to inclusion and diversity. He is also a non executive director for Scotland's national marketing agency VisitScotland. He is a mentor for a number of public, private and third sector CEOs and a passionate believer in the power of disruptive thinking/challenging the norm. A keen cyclist and walker, he can often be found exploring the wilderness of Scotland's mountains, canals and coasts.

Steve Dunlop, C.E.O.
Scottish Canals, Canal House, Applecross Street, Glasgow G4 9SP, Scotland, UK
Steve.Dunlop@scottishcanals.co.uk

Historic Cleanup of Onondaga Lake; Public's Desire to Reclaim Community Jewel.

John McAuliffe, Project Manager, Honeywell, Syracuse, NY, USA

Background: More than 100 years of industrial development and a growing urban population, which led to increases in sewage and industrial discharges, took their toll on Onondaga Lake's water quality. Following decades of investigation, evaluations, and engineering design, Honeywell, a successor to Allied Signal, began the cleanup of Onondaga Lake in 2012.

Approach/Activities: The Onondaga Lake cleanup, based on sound science, input from top national and local scientists, engineers, field experts, government agencies and community members, is one of the largest lake remediation projects in the country. The State University of New York College of Environmental Science and Forestry has been a key contributor in developing the Onondaga Lake Habitat Restoration Plan, which identified and is implementing plans to restore habitats in and around Onondaga Lake. A total of 2.2 million cubic yards of sediment dredging was completed in November 2014, a year ahead of schedule. The sediment cap, a process of creating a new, clean lake bottom, consists of approximately 3 million cubic yards of natural materials and was placed over 475 acres of the lake bottom.

To date, 74 acres of wetlands have been created or enhanced in and around Onondaga Lake and more than 180 species of fish, birds, and mammals have returned to restored areas, including several on New York State's list of threatened species.

The significant progress being made is due in large measure to collaborations and partnerships among the local community, academicians, environmental experts, nonprofits, and businesses, and Honeywell's engineering and construction management team.

Results/Lessons Learned: Onondaga Lake is now becoming a source of pride and optimism for local residents and an economic driver for the region, thanks to the extraordinary efforts of state and federal regulators, Honeywell, Onondaga County, educational institutions, elected officials, and the community. In July 2016, thousands of people attended the inaugural Onondaga Cup and Lakefest, including New York State Governor Andrew Cuomo.

John McAuliffe is Honeywell's Syracuse Program Director with responsibility for Honeywell activities being conducted for Onondaga Lake and associated sites and former Allied Signal properties. Special interests include the areas of environmental stewardship, and green remediation.

John is a lifelong resident of Central New York with over 30 years' experience in environmental remediation and construction. He began his career as an Environmental Engineer with the consulting firm of O'Brien & Gere in Syracuse, NY. Subsequently, he was with Parsons in Liverpool, NY, for 17 years as a Project Manager and Vice President and NY Operations Manager. He has been with Honeywell for approximately 15 years. He is a Registered Professional Engineer with a Bachelors Degree in Civil Engineering and a Masters Degree in Environmental Engineering from Clarkson University.

John McAuliffe, Program Director, Syracuse
Honeywell, 301 Plainfield Rd, Ste. 220, Syracuse, NY 13212, 315-552-9782
John.McAuliffe@Honeywell.com

Journey Along the Erie Canal – "You're Gonna Do What?" John Robinson, CEO, Our Ability, Inc., Glenmont, NY, USA

In January of 2013 John Robinson, a quadruple amputee, and Doug Hamlin, a quadriplegic, walked and rolled into the headquarters of the New York State Canal Corporation. They met with the Director and a few staff and told them of their intention to ride adaptive bikes three-hundred-seventy-three miles from Buffalo to Albany that summer. Not long before that meeting John had been donated a bike and his wife Andrea (an avid runner) suggested they "take a little ride". John pictured a Sunday afternoon with family, Andrea pictured the Erie Canal Trail … she won.

The Director and his staff were gracious, very helpful, and (we found out later) a little incredulous.

Fast forward to 2017…

This July will mark the fifth Journey Along the Erie Canal. A core group of ten of John and Doug's friends and family complete the entire Journey every year and they have been joined along the way by thousands of individuals with a wide variety of abilities.

Why do we do it?

This event has proven to be far more than a physical achievement by two guys with disabilities (and it is that!). It has drawn together a statewide community of enthusiasts that now use the Canal Trail on a regular basis for fitness, social interaction, advocacy and general well-being. The Trail provides a beautiful, safe and history rich environment that allows people of all abilities to get outdoors and challenge themselves to new physical achievement (if they wish), or just get to know the history of the New York State, the Canal and the impact it had on the growth of our nation.

Why do we want to talk about it?

The Journey and the Canal Trail have served to tie together individuals and organizations across the state that have similar challenges and shared successes. Without the common strand of the Journey, these connections may never have been made.

We have three goals for our presentation at the World Canals Conference:

- Share stories and highlights of the Journey through words, pictures and video
- Show the extraordinarily unique benefits that the Trail provides for all users
- Collaborate with others interested in starting their own similar efforts

The Journey has positively and permanently changed the lives of both participants and observers. It is important that we share that impact.

John Robinson was named one of ten national White House Champions of Change for Disability Employment in 2014 and honored with the Excelsior College President's Award for Advocacy in 2010. Since 2011, he's served as managing partner, CEO and Founder of Our Ability, which provides inclusive workforce and employment consulting, mentoring, workshops, keynotes and seminars on disability and diversity. Our Ability's clients have included Cargill, Inc., Microsoft, Bank of America, Aflac, SEFCU and Price Chopper. John additionally founded Our Ability Connect, the only online platform where employers can directly connect with qualified candidates with disabilities by searching a digital profile

service, posting employment opportunities and sponsoring virtual job fairs. As Executive Director of the New York Business Leadership Network, he builds coalitions among New York State businesses interested in both hiring and building supplier diversity of businesses owned by individuals with disabilities. John was the subject of “Get Off Your Knees: The John Robinson Story,” a public television documentary and “Get Off Your Knees: A Story of Faith, Courage, and Determination,” an autobiography published in 2009.

“I left corporate America after 20 years to give back to our community of individuals with disabilities and provide new opportunities for employment.”

John Robinson, C.E.O.
OurAbility, Inc., 19 Timber Lane, Glenmont, NY 12077
www.ourability.ocm

Reimagining Canal Waterfronts

The international waterway E-70: its role in understanding landscapes and stimulating urban transformations in Poland. Prof. Lucyna Nyka, Faculty of Architecture, Gdańsk University of Technology, POLAND

The presentation gives insights into the characteristics of the 800 km long water way that connects the Vistula Lagoon with the Vistula River and the Oder River in Poland. Today the route belongs to the European System of Inland Waterways, namely the E-70 international waterway that links Rotterdam, Antwerp, Berlin, Gdańsk, going through Vistula Lagoon to Kaliningrad and further on into the system of the Nemunas waterway along the Pregel and the Deyma rivers to the Lithuanian Klaipėda. On the basis of cartographic materials, historical and cultural studies the presentation reveals how this historic waterway emerged and how it became in recent years an important stimuli for revitalization of cities and regions. Moreover, the presentation shows that after centuries of being used for transportation of goods and decades of negligence, this waterway plays today an important role in connecting cultures and re-defining our approach to landscapes.

The idea of creating a water route connecting the Vistula River with Oder River appeared in the middle of the 18th century. In a turbulent political situation of Poland the connection was intended to overcome the dominancy of the city of Gdańsk that traded with Hamburg, Lübeck and other Hanseatic League cities located on coasts of the Baltic Sea. The arduous process of constructing the Bydgoski Canal in the late 18th century resulted in creating a convenient water connection that enabled the transportation of goods from the territories of Poland to the west of Europe. The canal is only 24.7 km long but it has been a necessary link in connecting the Vistula river, through the Brda, Noteć and Warta rivers with the Oder river. Supported by a rich network watergates, sluices, weirs and pump stations is a unique example of the 18th century hydroengineering thought.

In the last decade the whole water route became an important stimuli for revitalization of cities and regions. It is used both for touristic and cultural practices. In frames of several projects numerous ports, marinas and convenient jetties for mooring houseboats and yachts boats were built or renovated. Major

waterfronts were refurbished and became a center of urban life. What is more, the main water route, once a linear connection was developed and enriched with two important water loops that spread into regions and bring new life to local communities: Wielkopolska Loop located in the west of Poland and Zulawska Loop located in the Vistula River Delta. Entering these loops reveals that both regions however so distant, share a large part of their identity and landscape characteristics. Both were influenced by the culture of Dutch settlers that migrated to Poland from The Netherlands in the 17th century, both were transformed into habitable land out of marshlands and bogs. Confirming the similarities and enhancing the unique characteristics of both territories supports the process of their vibrant renewal.

Lucyna Nyka (Prof. D.Sc., Ph.D.) is a full Professor at the Faculty of Architecture, Gdańsk University of Technology and a Dean of the Faculty of Architecture. Her research interests focus on the contemporary architecture and its role in urban landscapes, with particular indication on issues concerning water. She is an author of the EU-founded IP "Bridging the City – Water in Architecture, Urban Spaces and Planning" and co-author of several others. Recent book (2013): "Architecture And Water – Crossing Boundaries". She is an editor of several books, e.g. L. Nyka (Ed.): 'Water for urban strategies'. Weimar: Verlag der Bauhaus-Univerität Weimar 2007, and author and co-author of many scientific papers, e.g. Nyka L.: Experiencing Historic Waterways and Water Landscapes of the Vistula River Delta, in: F. Vallerani, F. Visentin (Eds.) Waterways as Cultural Landscapes, Taylor & Francis Books 2017 (in print), Nyka L.: Polder And City: Sustaining Water Landscapes on an Urban Edge, in: SGEM 2016 Wien, and many others.

lnyka@pg.gda.pl

A New Route to Canal Restoration: Floating Communities and Flourishing Heritage.

Patrick Moss, Moss Naylor Young Limited, Frome, UK

In The World Heritage City of Bath, a pioneering approach to canal regeneration may herald a new era of expanding available waterspace, enabling thriving live-aboard communities.

Bath has two navigable waterways within its hinterland, the River Avon and the Kennet and Avon Canal. The latter was revitalized 25 years ago to provide a holiday and leisure resource, but is increasingly now the home to many who choose to live within easy reach of the city, where there was once a third waterway, the Coal Canal, which fueled the growth of Regency Bath.

There has long been an aspiration to reopen the Coal Canal, recreating a waterway rich in wildlife and heritage that would allow public access by boat and on foot to some of the most remote and beautiful parts of Bath's hinterland. Whilst such a scheme is inherently attractive, those promoting it have needed to find benefits that appeal to the authorities that would fund it, thus with the rise of live-aboard boaters on the Kennet and Avon Canal, such an opportunity has arisen.

Bath's waterways are part of England's glorious canal network, which has grown ever more popular in recent decades. Recently, an increasing number of boaters have registered as having no home mooring whilst also living aboard. A proportion of boaters with no home mooring also stay within one area, which can cause friction with those who see the waterways as a leisure resource, as they feel the canals are being taken over by informal floating homes.

Many boats with no home mooring are in areas where no such moorings are available and partly as a result of this, local councils have begun to notice the vulnerability of such homes for people who live there.

Working with Bath Council on their water space strategy, the author saw that the number of boats staying within reach of the city was beginning to exceed the space available for them, and that conventional marinas were both unpopular and prohibitively expensive to build.

Noting that all ten miles of the coal canal is a short drive or bus ride from Bath and building on previous work elsewhere that promoted canal regeneration on the basis of demand for mooring, the author has begun to work with the council, the canal society, and the national waterways trust to promote not just new moorings for residential boaters, but the reinstatement of a heritage-rich waterway from the center of the world heritage site to the heart of the now silent Somerset Coalfield, turning the "problem" caused by congestion into an opportunity to revitalize an historic landscape.

The process is only just starting but by restoring the Coal Canal, Bath Council and the Canal Society will not only be providing places of profound peace, community and nature in what have often become soulless and industrial landscapes, but also affordable and sustainable homes for those on a lower income or who would like to downshift and reduce their carbon footprint.

Patrick Moss is director of his own consultancy firm, Moss Naylor Young Limited, based in Somerset, England. Patrick set up Moss Naylor Young six years ago after a career in private practice. MNY specializes in Waterways Heritage and Regeneration. Patrick, who lives on a boat himself and is a lifelong waterway enthusiast, was inspired to look at the role of liveaboard boaters in promoting waterways regeneration by his recent work for the local council in his home city of Bath, Somerset and working on other canal regeneration projects in the English Midlands. In addition to his consultancy work, Patrick is a project monitor for the Heritage Lottery Fund, Chairman of the Somersetshire Coal Canal Society and acts for the Commercial Boat Operators Association.

Patrick@mossnayloryoung.com
www.mossnayloryoung.com www.coalcanal.org

Western Reclamation Canals – Transformation from Agriculture to Urban. Jim Duncan, Principal Engineering Analyst, Salt River Project, Phoenix, AZ, USA

Metro Phoenix boasts a 131-mile system of canals created by the United States Bureau of Reclamation in 1903. Among the first federal systems to deliver water to the arid West, it grew from the remnants of canals built by ancient Hohokam Indians and 19th century settlers, and transformed the Salt River Valley into one of the nation's most productive agricultural centers. Today, the Salt River Valley Water Users Association canal system – managed by Salt River Project (SRP) – is more vital than ever.

The canals still perform their original work of providing irrigation to farms. Yet urbanization has expanded their purpose. In addition to supplying most of the drinking water for the region's growing cities, the canals and their trails have become corridors of connectivity and culture. In the past 20 years, more than 75 miles of canal banks have been improved with multi-use trails, $12 million in permanent

public art projects have been built, and special events celebrating the canals have attracted 80,000 attendees a weekend to interact with local, national and international artists.

This evolution coincides with the past half century's shift from an agrarian to an urban economy. Now home to 4.9 million residents, the Phoenix area is the second fastest growing region in the country. Rapid urbanization has fueled demands to enhance the canal banks as recreational and urban trail corridors for walking, jogging, bicycling and horseback riding. Agreements with local governments in the 1960s set the stage for these changes. Yet they did not happen overnight. For many years, liability concerns and the practicalities of canal operation and maintenance hindered the construction of trail and recreational enhancements.

Since the late 1980s, technological advances in canal maintenance combined with agreement among stakeholders on liability, land rights and design criteria led to rapid expansion of multi- use opportunities along the canals. Today, federal regulations mandate public access to the canals. Partnerships between SRP and area cities are transforming the 131-mile canal system into a highly utilized urban trail system, connecting community destinations and regional parks, significant visitor attractions and special event venues that attract thousands while still maintaining a fully operational water delivery and irrigation system.

Phoenix, the largest city in the metro area, has partnered with SRP to create 25 miles of improved multi-use canal trails and an iconic destination, Arizona Falls, which transformed a 1902 hydro generation facility into a popular public destination along the Arizona Canal. The Phoenix Public Art Program, known for integrating art into infrastructure, led development of the project, and has been involved in a number of other canal bank enhancements.

Scottsdale has taken a different approach as the only Valley city with a canal through its downtown. Since 2012, Scottsdale Public Art has created a unique special event, Canal Convergence. This annual event brings local, national and internationally recognized artists to the Arizona Canal to create temporary installations in and around the canal that help celebrate, interpret and educate. Just five years old this event in late February has attracts over 80,000 attendees.

As manager of the canal system and associated dams, reservoirs and watershed, SRP sees the expanding use of the canal corridors as an opportunity to broaden public awareness about the canals' vital role in delivering the region's water. Linked to the canals, the trails and public art underscore the importance of protecting the canals and the water they carry from mountain watersheds to agricultural fields and household taps.

Jim Duncan is the Principal Engineering Analyst within the Water Engineering Department of Salt River Project (SRP), he has worked with SRP for 34 years. Mr. Duncan oversees SRP's Canal Multiple Use program which directs the development of all recreational use canal bank projects through partnerships with local municipalities. These projects include multi-use trails, public art installations and special events. Mr. Duncan has worked in all aspects of operating and maintaining a canal system that still performs its original charge of delivering water for agriculture while having the added responsibilities of urban irrigation and being the major drinking water source for metro-Phoenix.

Jim Duncan, Principal Engineering Analyst
SRP, Mail Station PAB246, P.O. Box 52025, Phoenix, AZ. 85072-2025
jim.duncan@srpnet.com

Canalside, Buffalo: Leveraging Historic Canals for Economic Revitalization. Tim Hughes, C&S Companies, Buffalo, NY, USA

C&S was the prime design firm for the $20 million Buffalo Inner Harbor Canal- side Phase 3A. This project is a critical component of Buffalo's overall Inner Harbor Canalside build-out, which envisions 1.1 million square feet of commercial, cultural and residential space. The Canalside project transformed a blighted and unused area of prime waterfront into a tourist and resident destination. Phase 3A created a new public amenity near the waterfront, including waterways and public spaces with historically aligned canals and tow- paths, canal-era bridges, and public places that support wide-ranging, year-round activities.

Originally, the site contained the western terminus of the Erie Canal, inter-linked networks of other canals, numerous canal-related buildings and an infrastructure of roadways and bridges. In 1940, the Memorial Auditorium, known as the "Aud," opened on the site, serving as a sports and entertainment venue until 1996. The Aud then stood empty until 2008 when it was demolished to make way for Canalside.

Canalside transformed a destitute property in the heart of the city's waterfront into a focal point for outdoor activity and recreation spanning all four seasons. Prior to this investment there were fewer than 100 activities annually in this location. The site is now home to more than a thousand events that draw hundreds of thousands of visitors each year. This investment laid the foundation for current and future development, with numerous parcels available for private investment.

Canalside connects existing and new assets, including a naval museum, boardwalk, and sports arena. The water features can be enjoyed in summer months for boating and wading and in the winter become the second largest outdoor skating surface in New York.

Numerous challenges included a very aggressive seven-month design schedule, difficult soil conditions, many levels of agency involvement, nearby critical infrastructure, and considerable historical research requirements. Considerable research was required to establish the historic alignment of the canals, and additional "footprint" conditions of the era (including walls, streets, slips and towpaths), which had changed significantly over the decades. New Swartz and Whipple Truss bridges replicate canal era structures and were developed with modern design considerations while evoking historical conditions.

One significant challenge was the presence of the Hamburg Drain, a primary combined city sewer overflow (CSO) that aligns directly with the new canals. It was critical to maintain uninterrupted operation of this infrastructure. The site also had centuries of construction and demolition that left extensive, undocumented, sub- surface artifacts. Soil conditions were poor and not suitable as structural fill. Deep foundations and integral structural systems, consisting of piles and grade beams, support the major structural elements, provide for build-out, and preserve features that could not be disturbed. The

site is also beneath and partially within the right of way for an elevated highway bridge carrying Interstate 190.

The project has been honored and recognized, in combination with the East Canals project, with the 2014 Historic Restoration/Preservation Project of the Year award from the Western New York Chapter of the American Public Works Association.

Tim Hughes, Office Principal
C&S Companies, 141 Elm St, Suite 100, Buffalo, NY
thughes@cscos.com

Inspiring Connections Along the D&L Trail. Elissa Garofalo, Executive Director, Delaware & Lehigh National Heritage Corridor, Easton, PA, USA

The Delaware & Lehigh National Heritage Corridor (D&L) facilitates long-term stewardship of the historic transportation system that includes the Lehigh and Delaware Canals (a National Historic Landmark) and remnants of the Lehigh Valley Railroad. Now centered on the D&L Trail, it serves as the platform to tell the story of anthracite coal as it traveled from mine to market.

An overview of the D&L's mission will be provided and demonstrated by its tagline "*connect, revitalize, preserve, celebrate and sustain"* the nationally significant five county Corridor. The D&L works to CONNECT the trail, partners and heritage stories along the 165 mile route that brought anthracite coal and other natural resources to market during America's 19th century Industrial Revolution. We endeavor to use our rich heritage as a tool to help REVITALIZE communities along the Trail. We help PRESERVE the landscape through a robust Conservation Landscape and interpret sites and stories. A half marathon along the route CELEBRATES the path with proceeds helping to SUSTAIN the organization.

Today, the D&L Trail is a multi-use trail spanning 165 miles from the mountains of northeast Pennsylvania, along rivers and through the Lehigh Valley and Bucks County to the Port of Philadelphia following the historic transportation system of anthracite canals. Today, the D&L Trail is now 92% complete and located conveniently in the backyard of 53 communities as it winds through towns, on main streets and through parks.

Efforts to completely connect the D&L Trail involve a complex network that includes federal, state and local government, non-profits, private property owners, foundations, local business and volunteers. The D&L Corridor organization does not own the trail but serves is the convener that facilitates efforts to forge toward the trail's completion. The organization is diverse enough to connect people to the broader landscape and its unique experiences in nature and the environment, community and economic impact, health and recreation, history, preservation, and education. This rare union makes us a reliable resource, able connect residents and visitors to experiences that make our region one of Pennsylvania's most vibrant.

Elissa Garofalo's leadership at the Delaware & Lehigh National Heritage Corridor in Easton, PA brought about a merger and a new model for non-profit management. During her tenure, 92% of the 165-mile D&L Trail has been connected; the "Get Your Tail on the Trail" wellness initiative received national

recognition; the “Tales of the Towpath” educational curriculum has expanded to 86 elementary schools with related field trips; and the Lehigh Valley Greenways Conservation Landscape has become a model program in Pennsylvania.

Elissa pioneered efforts to revitalize Jim Thorpe, PA which led to its naming as one the *Great Places of America* by the APA. She attended the Strategic Perspectives in Nonprofit Management Executive Education program at Harvard Business School. A Penn State graduate she was one of the Lehigh Valley’s 25 Most Influential Women in 2016. Her greatest successes are her children, Maggie and Jay, who are two good kids who have become really good adults.

Elissa Garofalo, Executive Director
Delaware & Lehigh National Heritage Corridor, 2750 Hugh Moore Park Road, Easton PA 18042
elissa@delawareandlehigh.org

Waterfront Edge Design Guidelines (WEDG): LEED for the Waterfront. Darryl A. Zuk, McLaren Engineering Group, West Nyack, NY

Waterfront planning and design that results in more access, better ecology, and resiliency amidst the increasing threats posed by climate change must be done right. But what is “done right”? With input from waterfront communities, design experts, and government agencies, the Waterfront Alliance, a non-profit organization working to restore and revitalize New York and New Jersey’s waterways, created the Waterfront Edge Design Guidelines (WEDG) program to answer that question in the New York metropolitan region. The goal of this voluntary ratings system is to promote waterfronts that are resilient, environmentally healthy, accessible, and equitable for all. WEDG is doing for the waterfront what LEED has done for buildings; the program formalizes a set of best practices and a voluntary ratings system for the waterfront. Over the next year, in collaboration with McLaren Engineering Group (McLaren) and many other stakeholders, the Waterfront Alliance will work toward expanding WEDG into a more broadly applicable “LEED for the waterfront” initiative.

McLaren has worked extensively along the New York Harbor and surrounding shorelines for decades, and has worked with WEDG since its release in January 2015. WEDG guidelines have become a tenant of McLaren’s design standards along New York City coastlines. The implementation of WEDG shall be demonstrated through case studies in Brooklyn, where the guidelines were used to shape and certify the various designs. The revitalized Domino Sugar site will reconnect South Williamsburg to its waterfront, while incorporating elements of the historic factory and addressing the unique conditions along the East River. The design focuses on enhancing public access to the waterfront and creating resilient strategies in response to climate change conditions. Owners, design professionals, community planners, and governmental agencies will benefit from the content, case studies, and recommendations presented in this paper.

McLaren is also currently working on an exciting privately financed project that would transform the waterfronts in Downtown Albany and Rensselaer. The Capital District Gondola is an aerial gondola system that will transport commuters, visitors, and tourists more than one-mile between the Rensselaer Rail Station, Albany’s Capital Complex, and the Empire State Plaza. Along the route, the gondola will

cross the Hudson River, offering spectacular views of Albany, Rensselaer, and the valley. Gondolas are increasingly being used in urban settings around the world to solve transportation connectivity challenges and provide a fast, safe and environmentally healthy mobility option.

Daryl A. Zuk, Project Manager
McLaren Engineering Group
Direct: 212-324-6319
Office: 212 324-6400
dzuk@mgmclaren.com

The Economic Power of Water

New York's Erie Canal: A 19th Century Canal System Contributing to a 21st Century Economy. Mary Burgoon & Jean Loewenstein, CHA Consulting, Inc., Syracuse, NY, USA

Since 1825, the Erie Canal has had a special place in history as an engineering marvel that opened trade and transportation to interior parts of the country by connecting the Great Lakes to the Atlantic Seaboard. While most of the focus on the Canal System today is for its recreational and tourism uses, the economic impact is significant. In fact, the Canal System users have a total economic impact of approximately $6.2 billion annually, making the Canal System very relevant in today's world and New York's economy.

Many communities, businesses, industries and farming operations still rely on the Canal for its abundant, reliable and inexpensive supply of water. Factories that once relied on the canals have been replaced by modern businesses doing important global research and development that require large quantities of water for their laboratories and operations. We will discuss recent research that illustrates the categories or sectors of use along the Canal System that have a significant positive effect on local and regional economies in addition to generating considerable tax revenues for local, State and federal governments. These sectors include:

- Industries – Canal water is used in manufacturing, processing, cooling and cleaning equipment
- Research and Development – Canal water is used in research and processing in a laboratory setting
- Agricultural – Canal water is used for irrigating crops
- Hydroelectric Facilities – Canal water is used for energy production (generating power for 54,000 homes per year)
- Quarries and Mining – Canal water is used in washing materials, dust control and mine dewatering
- Public Water Supply – Canal water is used for municipal water systems (221,000 New Yorkers)
- Waste to Energy Facilities – Canal water is used to generate steam to create energy
- Golf Courses – Canal water is used to irrigate grounds
- Commercial Shipping – The Canal continues to be used for the transport of goods and materials

Our conclusion is the New York State Canal System is more than a transportation network and tourism resource – it is an essential supplier of water to a variety of industries and businesses in New York State and a driver of economic activity and development as cost effective access to water can be a key consideration in site selection for certain businesses. Accordingly, the Canal System is vital to supporting existing businesses and attracting new commerce to New York State.

Mary Burgoon has more than 25 years of experience in community planning, land use planning and waterfront design and development. As a Principal Planner at CHA, Mary has lead teams of planners, engineers and economic development specialists in projects that assist municipalities and public agencies in preparing a direction for their future while mapping out a course for growth and economic development. Mary's work as a principal planner involved public participation, development of goals and policies, and research and documentation of environmental and physical features, financial structures, housing, and parks and recreation.

Mary earned a master's degree in landscape architecture and planning from the New York State University College of Forestry and Environmental Science. She has also worked as a Director of Parks and Recreation and taught at SUNY Cortland.

Mary Burgoon
136 Peridot Drive, Syracuse, NY 13219
Burgoonmary15@yahoo.com

Jean Loewenstein is a Principal Planner with more than 25 years of experience as a Land Use Planner. Her experience includes municipal and regional planning, land use and zoning, environmental impact statements, and grant writing for public and private sector clients. She has worked on all aspects of the State Environmental Quality Review Act process from lead agency coordination through Environmental Impact Statements and the Statement of Findings. In her work related to Comprehensive Plans, she has assisted clients in the development of the appropriate regulatory framework for zoning, site plan and subdivision regulations necessary to implement these plans. Jean graduated with a BS degree in Resources Management from the State University of New York College of Environmental Science and Forestry.

Jean Loewenstein, AICP
CHA Consulting, Inc., 441 South Salina Street, Syracuse, NY 13202
jloewenstein @chacompanies.com

Canal Power: A Case Study in Connecting the Public to Small Hydropower Along Canals. Julie Smith-Galvin on behalf of Ted Rose, CEO, Gravity Renewables, Boulder, Colorado, USA

Canals and the small hydropower facilities that share their waters emerged together and now face similar and related challenges. Both helped grow a young nation at a critical time. Both drew upon public and private interests to create important economic, social and political activity. Both have had their utility eroded over time by newer and more flexible technologies. Today, the value of these canals

and hydropower facilities is a direct result of connecting the public to their past, present and future worth, by:

- Preserving and appreciating historical context and usability;
- Recognizing inherent environmental attributes;
- Maintaining existing operations/uses;
- Creating recreational and educational opportunities; and
- Building community interest and pride.

At the dawn of the 19th century, entrepreneurs in Lowell, Massachusetts created an ambitious complex of canals to bring water to power the city's factories. The development became the heart of the American industrial revolution. While power canals fueled Massachusetts' growth, New York embarked on a bold plan to use the Erie Canal to connect the eastern seaboard and the expanding western territories.

But the power generation capabilities of this navigation canal system were never far from people's mind. As Noble E. Whitford wrote in his comprehensive engineering review of the Canal in 1921:

> At each of the locks on a canal there exists a head of water and this circumstance makes it possible to install hydraulic power-plants at virtually all canal locks. Often it is necessary to pass water around a lock to supply the needs of the lower levels and in such instance power goes to waste unless there is present a plant to develop it.

In late 2016, Gravity Renewables acquired two plants borne of that insight: the Seneca Falls and Waterloo hydroelectric facilities located adjacent to the Cayuga-Seneca Barge Canal. These plants are rich in history, but facing an uncertain future. Gravity is striving to revitalize these facilities by embracing history and undertaking needed upgrades that will ensure the continued availability of clean energy for the local region.

Using Seneca Falls and Waterloo facilities as a case study, the presentation will not only explore the interconnection between canals and hydropower, but will also outline the company's efforts to leverage public engagement as a critical component of building long-term value for these historical assets.

Ted Rose serves as the Chief Executive Officer and Director on the Board of Directors at Gravity Renewables, Inc. Ted joined Gravity Renewables, LLC, a small hydro consulting firm that was the predecessor to Gravity Renewables, Inc., as Managing Partner in 2010.

For almost a decade, Ted has been an industry leader in the development of renewable energy purchasing in the United States. He has worked with companies including Google and Nike as well as schools including Kent State University and Ohio Northern University, as well as municipalities across the country. He also has served on working groups for the National Hydropower Association as well as the Steering Committee in 2013 and 2014 for HydroVision.

Previously, Ted Rose served as the Vice-President of Business Development for NexGen Energy. He led the company's solar development and renewable energy credit trading. Earlier, Ted served as Vice President for Renewable Choice Energy, the award-winning carbon offset and renewable energy credit

provider. Ted graduated magna cum laude from Harvard College. He lives with his wife and two sons in Boulder, CO.

NOTE: Ted Rose was unable to present in-person. His presentation was delivered by:

Julie Smith-Galvin, JSG communications
julie.smithgalvin@jsgcommunications.com

Leveraging Assets on Canada's Canal System. Darlene Upton, Executive Director of Ontario and Waterways, Parks Canada, Ottawa, ON, CAN

This presentation focuses on the economic impact of canals to support sustainable operations and have a positive and lasting impact in the many communities they pass through. Unique in 2017 is the celebration of Canada's 150th Anniversary of Confederation. To celebrate, the Government of Canada is offering free admission for all visitors to national parks, national historic sites, and national marine conservation areas operated by Parks Canada across the country. As part of this celebration, lockage fees are free this year, providing all boaters with access to Parks Canada's historic and beautiful waterways like never before.

This presentation will highlight how the activities at Canada's Historic Canals are contributing to their sustainability and that of local communities in several key areas 1) Canada 150 celebrations and how communities have leveraged free lockage, 2) Partnering on special events, 3) New commercial operations and partnerships, 4) Hydro production, 5) Infrastructure investments, and 6) Indigenous reconciliation. Specific examples will be provided with a discussion on successes and lessons learned. This year of celebration has been key for not just highlighting a variety of initiatives but also for building the momentum for cultivating new partnerships and supporting a vibrant future for heritage canals and their local communities in 2017 and for the next 150 years.

Darlene Upton has been with Parks Canada for 21 years. Darlene's role as Executive Director, Ontario and Waterways includes leadership on regional relationships for the 5 national parks, 1 national urban park, 31 historic sites and 2 marine conservation areas in Ontario, in addition to the historic waterways in Quebec and Ontario.

Darlene is passionate about making Parks Canada sites relevant and accessible through innovative partnerships that allow visitors unique, local, and authentic experiences. She is the recipient of Boating Ontario's Gord Blake Visionary Award for leadership in the marine industry largely due to this passion. Darlene draws much inspiration for her work from her love of travelling, the arts and music.

Darlene Upton, Executive Director, Ontario and Waterways
Parks Canada, 1800 Walkley Road, Ottawa, Ontario. K1H 8K3
Darlene.Upton@pc.gc.ca

Waterway Tourism

Sustainable tourism as an answer to economic development of a neglected region and a way of preserving natural heritage of a unique waterway system. Julia Wleklińska, Academy of Fine Arts, Gdańsk, Poland

The presented project showcases how sustainable tourism offers an answer to economic development of a neglected region while preserving ecological and cultural heritage of a unique waterway system.

Elbląg Canal (originally Oberländischer Kanal) was opened in 1860. It was used for transporting goods from inner land to hanseatic city of Elbląg. In order to overcome far-sized difference in terrain level (about 100m) its designer – Prussian engineer Georg Jacob Steenke introduced inclined planes based on those used in Pennsylvania's Morris Canal, which are unique engineering structures in the world. Since 1945 the canal remains under Polish jurisdiction and have been continually used since its opening. Despite the tumultuous history of the region it is practically preserved in its original form.

Due to rail and road transport development Elbląg Canal has shared the fate of other such canals transforming from a trading route into a tourist attraction. Since the end of World War II, the economy of the region has mostly been based on failing collective agriculture which, with practically non-existent industry, resulted in impoverishment of local communities. Due to scarce regional budget the canal has been insufficiently maintained and gradually started to succumb to a state of dereliction and neglect. For decades the canal has been used by sailors mostly as transit way from Gdańsk to the lakes of the West Mazurian Lake District (Zachodnie Pojezierze Mazurskie). Additionally, since the early 20th century organised passenger cruises operate along the canal, however, due to low water level in the whole system of Elbląg Canal they have been limited to the inclined planes area only.

The aim of the revitalization project is to integrate the waterway with terrains along the system of Elbląg Canal by replacing the existing model of tourism with sustainable one that would allow for the optimal use of the amenities offered by the region. The project consists of 3 phases:

1. mapping of the local tourist attractions, natural and cultural heritage sites
2. development of strategies for their revitalisation
3. designing exemplary tourist attraction including electrically powered boats for smaller groups of tourists which would allow them to take on board, e.g. bicycles.

The new form of tourism should encourage tourists to explore the terrains along the canal - the abundance of wild flora and regional historic heritage, especially architectural artifacts (some dating back to 14th century). Another key point of the program is helping preserve the natural ecosystem of canal water as well as of the terrains along the canal. Ecological vessels and small havens located in selected places with access to bicycle and footpaths would provide tourists comfort, ease of translocation and the opportunity to derive from the opulence of attractions offered by the region and, simultaneously engage local residents offering them employment and improving their wellbeing.

Julia Wleklińska is a graduate of Interior Design at the Academy of Fine Arts in Gdańsk, Poland specializing in Naval Architecture Design. She is currently a PhD student of Design at her alma mater. Julia's research interests concern preservation of natural heritage of historic waterways via introduction

of sustainable infrastructure and eco-conscious solutions in water transport. Julia works as interior design as well as yacht design professional. However, having been academically and professionally involved with design, she also took MA in English Linguistics at the University of Gdańsk.

Julia Wleklinska
Academy of Fine Arts Gdansk, Partyzantów 39/6 80-254, Gdansk, Poland
julia.wleklinska@gmail.com

Promoting Tourism through New York State's Canal System. Ross Levi, Executive Director, NYS Division of Tourism – I Love NY

Empire State Development Corporation, 633 Third Avenue, New York, NY 10017
Ross.Levi@esd.ny.gov

Canal Heritage & Restoration

50 years of restoring waterways. Roger Squires, Ph.D., Inland Waterways Association (IWA) and Waterway Recovery Group, London, England, UK

The WATERWAY RECOVERY GROUP [Navvies] in the UK celebrated its 50th anniversary in 2016. It is amazing how far that volunteer organisation has developed and grown in stature over those 50 years. Technical expertise has evolved and 'success has built on success'. Some local canals were reopened very quickly - others are still 'restoration projects' under active development.

The waterway restoration movement in the UK evolved in two strands. One comprising the local canal societies, each looking after their own local canal. These rely on local enthusiasts who want to reopen and safeguard their local waterway. The other strand is a national umbrella organisation, WRG, which forms part of the UK Inland Waterways Association, and is based on a regional network of travelling working groups. This network is supplemented with a small number of national groups with specialist expertise. [e.g. tree surgeons] These groups have a combined co-ordination mechanism, with a central council, all of whom are volunteers, and are linked through a national magazine, NAVVIES.

Local Canal Societies raise their own funding for restoration work, including supplies of all materials and equipment. Where these local groups have major projects, often with a tight time schedule, they can call on the services of WRG to supply the extra skills and labour, especially if they need to top up their local efforts or complete a major task within a set time window. Throughout the year, WRG nationally organise a range of weeklong work camps, at sites throughout the country, which are run on the basis that the volunteers just pay for their food, which is purchased and cooked collectively, they sleep in local village halls in sleeping bags, and are offered transport to and from the sites of the work camps in the WGG vans. In this way students and the unwaged can take part on an equal footing with others who are committed to undertaking such community based work.

Over the past 50 years the Waterway Recovery Group have restored and reopened many miles of derelict UK canals. They have developed a body of expertise and enabled many individuals to learn new skills, quite apart from enjoying working with likeminded people on projects that all feel are worthwhile.

Roger Squires trained as a geographer at London University. He specialised in Economic Geography. His doctorial thesis examined the origins and growth of the canal restoration movement, using volunteer labour and skills, supported by public donations , to restore and reopen derelict canals. He was Commodore of the London based St Pancras Cruising Club for ten years and subsequently elected as its Vice President. He was the Deputy National Chairman of the Inland Waterways Association and Chairman of its National Navigation Committee between 2000 and 2010. He continues to sit on various waterway committees, facilitating the optimum use of waterways. He is a long standing Director of the American Canal Society and was a founder member of Inland Waterways International. In this way he continues to personally promote the value of inland waterways worldwide.

Roger Squires
Inland Waterways Association (IWA), London, England, UK
rogersquires@btinternet.com

NOTE: Session Chair Russell Thomson stepped-in and offered a presentation on recent heritage and restoration work on Scotland's Caledonian Canal when another speaker was unable to attend.

Russell Thomson, Waterway Area Manager – Caledonian Canal
Scottish Canals, Muirtown Wharf, Inverness, IV3 5LE, Scotland, UK
Russell.Thomson@scottishcanals.co.uk

Design, construction, repair and operation of canal structures (Lockport, NY). Donald Nims, PE, Bergmann Associates, Rochester, NY and Dave Kinyon, Lockport Locks Heritage District Committee, Lockport, NY, USA

At the location destined to become the City of Lockport, the Niagara Escarpment, presented engineers with the challenge of ascending what amounted to a 75-foot-high rock cliff. No single lock had ever been built that could accommodate a lift of this magnitude. The solution was to divide the lift into manageable segments. Five essentially identical manually operated locks arranged end-to-end, forming a staircase, or "flight," to accomplish the task. To provide simultaneous eastbound and westbound travel a twin set of flights were constructed. Upon completion in 1825, the original double set of five locks was considered to be an engineering triumph.

The Erie Canal was subsequently enlarged from 1836 through 1862 to accommodate increased traffic and larger vessels (also known as the Evershed Era). Reconstruction of the Flight of Five locks was begun in 1838 and the north set of locks were completed in 1842 while the south set of locks were completed in 1849. By 1910 the southern half of the Flight of Five was replaced by a set of two mechanically-operated locks, which are still in service today. The remaining northern half of the Flight of Five and the modern flight of two locks were operated concurrently for a period of time until the Flight of Five's wooden gates and other operating components were removed. Since then it has served a less noble, yet important function as a spillway that collects sediment and debris from becoming a navigational hazard downstream.

Located in the heart of Lockport, the Flight of Five was central to the founding of Lockport and played a critical role in the development of this canal-side community. Until this project, the Flight of Five received little maintenance since the Erie Canal was enlarged in 1910. Since then sediment and debris have collected inside the chambers, lock walls have shifted, stone masonry bridges and masonry block walls have cracked and deteriorated, and handrails have fallen into disrepair. It is a symbol of Lockport and Erie Canal history that was in need of restoration. The good news is that these historic structures are in a condition that they can feasibly be rehabilitated.

The overall project scope is to make repairs that would restore the Flight of Five to working order as depicted by the Evershed drawings. The City's goal is to create a scene that is as historically authentic as feasible. The wooden gates and balance beams are the most prominent features that must be restored.

The cost to design and construct the entire project is estimated at approximately $9.75 million (in 2008 dollars). Due to the availability of funding ($1.8 million for construction) the first phase to rehabilitate Locks 69 and 70 was constructed between October 2013 and October 2014. Subsequent future phases will be constructed as additional funding becomes available.

Most significantly the rehabilitation of the Flight of Five has led to a resurgence in commercial development. Since the completion of Phase I of the Flight of Five Rehabilitation, there has been over $3 million in private and public sector investment and the creation of 20 new jobs in the Locks Heritage District.

Donald Nims, P.E.
Bergmann Associates, 280 East Broad Street, Suite 200, Rochester, New York 14604
dnims@bergmannpc.com

David Kinyon, Chairman
Lockport Locks Heritage District Committee, Lockport, NY
drkinyon@roadrunner.com

Canal College: Using the rich heritage of Scotland's canals to inspire future generations. Ross Martin, Chair, Scottish Waterways Trust, Falkirk, Scotland, UK

Canal College, represents an innovative use of the rich heritage of Scotland's canals to inspire future generations, offering disadvantaged young people the skills they need to create a brighter future for themselves.

Canal College changes the lives of 16-25 year olds unable to move into employment, further education or training.

Volunteers work on a range of practical projects, learning about natural, built and cultural heritage. They accumulate environmental & heritage skills & gaining awards & certificates.

The free, hands-on practical, outdoors experience gives people furthest from the job market a new & engaging approach to learning, getting them on the path to work, improving confidence & breaking down major, debilitating barriers.

In two years 162 participants moved on to a positive destination - paid employment, accredited training, volunteering & further education & contributed an astounding 14,712 hours work on improvements.

Canal College evidences that young people want to connect to the built, natural & cultural heritage of the canals, inspiring them to create a brighter future for themselves; a new generation of canal champions to care for our waterways in the future.

Since 2012, Scotland's only waterways charity Scottish Waterways Trust has inspired people of all ages and abilities to make life enriching, and often life transforming, changes to their lives by learning about, and caring for, Scotland's canals.

Using the canals, we help tackle some of the country's most pressing issues such as youth unemployment, obesity, social isolation and ill-health with engaging innovative projects and public events.

Our projects and events are free to participants and managed by a small team of 10 including expert canal officers with significant experience of delivering community outreach, nature conservation, curriculum-linked education projects and activities tailored to people with more complex needs.

Our mission is to create brighter futures for people, communities and wildlife on and beyond Scotland's canals.

Ross Martin, Chair, Scottish Waterways Trust, New Port Downie, Lime Road, Falkirk FK1 4RS, Scotland, U.K.
ross.martinorg@me.com
www.facebook.com/scottishwaterwaystrust
www.twitter.com/scotlandscanals
https://www.linkedin.com/company/scottish-waterways-trust
https://www.youtube.com/user/scotwaterwaystrust2

Leveraging historic, cultural & natural assets to deliver a restored working waterway in Northern Ireland. Brenda Turnbull Chief Officer, Lagan Navigation Trust

LNTs complex work to reopen the 44km derelict Lagan Navigation in Northern Ireland through extensive partnership leverage & community engagement.

LNT has a unique approach to derelict waterways restoration. We are a driving force for co- design & co-production levering social, environmental, economic & regeneration benefits into waterways & their communities.

We are Northern Ireland only waterways restoration charity & align our work to government objectives for community focused delivery of projects which receive their funding.

In three years we have generated c800 days of community volunteering & input, raised significant funds for, mapping, surveying, engineering design & environmental assessments, we have developed in partnership £14M of projects, we've grown a new social enterprise business, The Waterways College to support our activities. The Navigation attracts 2m visitors annually to our towpaths & contributes to the local economies along the 44kn route.

Broader partnership means attracting new users & investors to inland waterways - LNT does this.

Established by government LNTs remit is to re-open, in partnership, the derelict 44km Lagan Navigation. We are the Navigations custodian.

LNT responds to emerging government policy and strategy and works closely with local government to influence delivery of same. Our underpinning ambition is to see a working waterway which drives social, economic, environmental and physical regeneration of the Lagan Valley through which the Navigation travels. 30% of the population of Northern Ireland live, work and attend educational establishment in our area of influence.

Our work is predicated on ensuring that future generation have a voice in the future of waterways in Northern Ireland.

Brenda Turnbull, Chief Officer
Lagan Navigation Trust, Navigation House, 148 Hillsborough Road, Lisburn, BT27 5QY, Co Antrim, Northern Ireland
brenda@lagannavigationtrust.org
www.lagannaviagtiontrust.org
www.twitter.com/laganavogator
https://www.linkedin.com/brendaturnnbull

Celebrating & Interpreting Canals Through Public Art & Events

NOTE: Session Chair Rob Cassetti stepped-in when one of the scheduled speakers was unable to attend and delivered a presentation on the 2017 pilot voyage and the proposed 2018 tour by the Corning Museum of Glass GlassBarge along New York's Canal System and connecting waterways.

Rob Cassetti, Senior Director, Creative Services & Marketing
Corning Museum of Glass, Corning, NY, USA
cassettirk@cmog.org
www.cmog.org/glassmaking/demos/hot-glass-demos/glassbarge

Make No Small Plans: Transforming Scottish Canals through Art & Creative Engineering.

Richard Millar, Director of Infrastructure, Scottish Canals, Glasgow, Scotland, UK

Since they were first carved through the heart and highlands of the nation more than 250 years ago, Scotland's canals have been home to a unique fusion of art and engineering. During their 19th century heyday as the transport thoroughfares that stoked the fires of the Industrial Revolution, visionary

engineers such as Thomas Telford – the Colossus of Roads – ensured they were arteries of artistry as well as commerce. From the art deco flourishes on the iconic bascule bridges of the Forth & Clyde Canal to the sweeping curves of the Crinan Canal's iconic basins, beauty was carved – often literally – into the soul of Scotland's inland waterways.

The glory days of Scotland's canals continued for more than a century before the birth of rail travel sounded their death knell. Trains gradually replaced barges as the chosen mode of transport for both passengers and goods, with the clip-clop of heavy horses on the towpaths giving way to the whistle of steam and rhythmic thrum of the new mode of transport. By the 1960s, the canals had fallen into decline and had been transformed from bustling arteries into unloved backwaters. They were seen as an outmoded form of transport, a barrier to development and a danger to local communities. The artistry inherent in their design was lost beneath waves of weeds, graffiti, and the slow, uncaring decay of time.

It would take almost 50 years – and the largest waterway regeneration project ever undertaken in Britain – to bring Scotland's canals back to life and restore their . From the creation of The Falkirk Wheel, the world's only rotating boat lift and a working sculpture, to The Kelpies – the world's largest equine sculptures – and the thousands of artistic interpretations and flourishes that now grace their water and banks, Scottish Canals and its partners have revived the creative soul first sparked some two centuries before.

With hundred-foot-high steel horses; engineering icons that let boats soar 35-metres through the air; and canal gateways designed by Hollywood icons, the renaissance of Scotland's canals is once again seeing engineering, architecture and artistry come together to create something truly special. These colossal projects have captured the imagination of people all over the world and, once again, celebrated Scotland's canals as arteries of artistry and engineering.

Richard Millar is Director of Infrastructure at Scottish Canals. His current remit covers the asset management, engineering and operation of the Scottish Canals, maintaining their heritage whilst also securing their relevance to the 21st Century.

Since joining the organization in 1999, Richard has worked on a number of high-profile projects, including the Millennium Link – an £83.5 million scheme which saw Scotland's canals returned to a navigable state for the first time since the 1960s – the regeneration of the Lowland Canals as a visitor destination; the development and operation of The Falkirk Wheel, the world's only rotating boat lift; and the creation of Pinkston Watersports – Scotland's first urban watersports centre, situated in the heart of North Glasgow.

Most recently, he played a pivotal role in the creation of The Helix. The £43 million project has transformed 350 hectares of underused land between Grangemouth and Falkirk into a new visitor attraction, parkland and marine hub with the Forth & Clyde Canal at its heart. The Helix is also home to The Kelpies – the world's largest pair of equine sculptures. More than 2.5 million people have visited the attraction since its launch in April 2014.

Richard Millar, Director of Infrastructure
Scottish Canals, Canal House, Applecross Street, Glasgow G4 9SP, Scotland, UK
Richard.Millar@scottishcanals.co.uk

Lowell's Canals: A Vision for a City. Peter Aucella, Assistant Superintendent, Lowell National Historical Park and James Ostis, President, Lowell Heritage Partnership, Lowell, MA, USA

Through many generations, Lowell's vision for future development has been grounded in the potential of its canals. Located 30 miles northwest of Boston, Lowell was founded in 1822 as a seminal planned industrial city and grew to become one of the most significant textile producing centers in the country. Lowell's 19th century success was based in innovation, technological advancement, and city planning designed to benefit both industry and the worker. A canal system of exceptionally grand scale and technological complexity was engineered to serve as both a transportation corridor and power source for the burgeoning industrial city.

The historically intact 5.6 mile canal system later provided a competitive advantage in the 1970s when community leaders reimagined the post-industrial city as a state and national park unit. Like many industrial cities, Lowell experienced a long, slow, and devastating economic decline through much of the 20th century as industry moved out in search of better operating conditions. The plan to establish Lowell National Historical Park, as a living monument to our nation's industrial past, came at a time when a visitor of Lowell could stand anywhere in downtown Lowell, turn 360 degrees, and see nothing but blight and decay. Community and political advocates came together to envision the adaptive reuse of historic structures, development of canal- side recreational amenities, and cultivation of cultural programs. The redevelopment potential of the canals was at the core of this bold redevelopment strategy. Since the establishment of Lowell National Historical Park in 1978, public and private partners have injected over $1 billion into heritage preservation and development projects, making Lowell an international model of urban revitalization.

Today, the canals and canal-side recreational amenities continue to weave through Lowell's industrial urban core to the mighty Merrimack River and connect the city's most densely populated and socio-economically diverse communities to the downtown and national park.

Over the past year, a new vision for the city's waterfronts has emerged. The Lowell Heritage Partnership, a non- profit organization dedicated to caring for architecture, nature, and culture in Lowell, led an extensive visioning process to reimagine vibrant use of the remarkable and underused waterfronts for residents and tourists. The extensive community planning process confirmed the potential for waterfront areas throughout the city. The resulting Lowell Waterways Vitality Initiative Action Plan, offers a variety of new placemaking ideas to make the city's historic waterway more accessible, active, and vibrant. This plan is supported by the City of Lowell and key stakeholders in the community and private sectors.

Cities are dynamic places. While plans for growth and redevelopment shift to meet the needs of current generations, Lowell's canals have persistently inspired bold visions for the city's future. The shared community vision for the 21st century redevelopment and reuse of the historic canals will influence a new generation of projects along the historic canals.

Peter Aucella has held positions at the U. S. Department of Housing and Urban Development, the Massachusetts Bureau of Transportation Planning and Development and was the Community Development Coordinator for two mayors of the City of Malden, Massachusetts. He served as Director of Economic Development on the staff of former United States Senator Paul Tsongas, and later as Manager of the Senator's Massachusetts Office. In Lowell, he has served as Director for the City's Division of Planning and Development, Executive Director of a federal agency known as the Lowell Historic Preservation Commission. He is currently Assistant Superintendent of Lowell National Historical Park. He works with the City of Lowell and private developers to rehabilitate and reuse historic mill and commercial buildings, and supervises the development of canal walkways and the Park's vintage trolley system. Mr. Aucella has over 30 years of experience developing canal-side recreational amenities.

Peter Aucella, Assistant Superintendent, Lowell National Historical Park, 67 Kirk Street, Lowell, MA, 01852
peter_aucella@nps.gov

James Ostis is a Ph.D. candidate in public policy at the University of Massachusetts Boston's McCormack Graduate School and serves as the president of the Lowell Heritage Partnership. The Lowell Heritage Partnership is an alliance of community activists who are committed to preserving, protecting, and celebrating Lowell's heritage in the forms of architecture, nature, and culture. The LHP serves as an informal "friends of the Park" group for Lowell National Historical Park. The Lowell Heritage Partnership recently completed a planning process to reimagine Lowell's waterfronts as inspiring the "Lowell Waterways Vitality Initiative." Mr. Ostis has also served on the boards of a number of community organizations including as the co-chair of the Lowell Cultural Council from 2014-2017.

James Ostis, President, Lowell Heritage Partnership, Lowell, MA
jamesostis@gmail.com

The role light art festivals can play in extending a season. Felix Guttmann, Chairman, Amsterdam Light Festival, Amsterdam, NL

Amsterdam is one of the world's most popular tourist destinations. It is world renowned for its heritage, the canals and the attractiveness of its public space. Yet it faced a strong seasonality in its visitor numbers. Our analysis was that we could seduce visitors to come off season by organizing a major event which would build on the strength of the city and the attractiveness of the effects of light and water. We aimed to create an event that would appeal at least equally to the inhabitants of the city. Therefor we chose to create an art exhibition in public space. Light Art being a young art form in the middle of a revolutionary transition it fitted our goals perfectly.

Amsterdam Light Festival now is an annual light art festival in Amsterdam, which has been organized for the 5th time. Artists, architects and (light) designers from all over the world bring their light artworks and installations alive during the festival every winter.

The artworks are placed alongside two routes. Each route has its own theme, artworks and visitor experience. Water Colors, the boat route, displays big monumental objects and offers visitors the

chance to experience the art from a water perspective. Illuminade, the walking route, shows interactive and innovative installations from upcoming artists.

From the visitor perspective the combination of light and water is quite mesmerizing. The setting in the beautiful historic city of Amsterdam offers an ideal backdrop. And the fact that one can appreciate the festival from the comfort of a boat appeals to many visitors.

We are a producing festival: we invite the artists to submit their ideas in a Call for Concepts - after a fierce competition the jury selects approx. 35 works, which we then commission. We fully pay for the production including a fee for the artist; we offer artistic and technical support and expertise, so it is a great opportunity for artists to become part of the international light art community.

In our fifth edition around 1 million people visited Amsterdam Light Festival. The mix of visitors is approximately 25% locals, 30% foreign visitors and 45% consist of people from The Netherlands.

In ways of economic impact, research shows that the festival has had a significant effect on hotel & restaurant occupancy during the relevant period, and seasonality has almost completely disappeared.

Our organization is now open to share our findings with other cities and canal administrations. We have set up festivals in various other places, with comparable success.

Felix Guttmann is a serial entrepreneur with a broad interest. One of his ventures is Canal Company, which he started in the early eighties and which has become one of the leading sightseeing companies in Amsterdam. Felix is founder and chairman of Amsterdam Light Festival Foundation. Other activities have included teaching MBA-students, various other start-ups and several board roles in NGO's.

Felix Guttmann
Rapenburgerstraat 123, 1011 VL Amsterdam, NL
felix@amsterdamlightfestival.com

The Journey and Impact of Water Music NY. David Alan Miller, Music Director, Albany Symphony Orchestra, Albany, NY, USA

The Albany Symphony will discuss the origin, planning, implementation, and results of Water Music NY, a special Erie Canal Bicentennial Celebration culminating in a July, 2017 musical journey the orchestra took from Albany to Buffalo. From January through July, 2017, the Symphony partnered with seven emerging American composers, working in seven canal communities – Albany, Schenectady, Amsterdam, Little Falls, Baldwinsville, Brockport, and Lockport – to create collaborative compositions pairing seven local arts groups with the Symphony, inspired by the history and culture of each site. The pieces were performed from July 2 – July 8, 2017 in each community during day-long festivals of art, music, food, wine, and family activities. David Alan Miller, Music Director of the Albany Symphony, will discuss the conception of the project, the Symphony's partnership with the NYS Canal Corporation, and the project's exploration of the vital artistic and cultural communities along the canal, celebrating the canal's heritage and looking forward to its future.

David Alan Miller, Music Director, Albany Symphony, Grammy®-winning conductor David Alan Miller has established a reputation as one of the leading American conductors of his generation. Music

Director of the Albany Symphony since 1992, Mr. Miller has proven himself a creative and compelling orchestra builder. Through exploration of unusual repertoire, educational programming, community outreach and recording initiatives, he has reaffirmed the Albany Symphony's reputation as the nation's leading champion of American symphonic music and one of its most innovative orchestras. A native of Los Angeles, Mr. Miller holds a bachelor's degree from the University of California, Berkeley and a master's degree in orchestral conducting from the Juilliard School. From 1988 until 1992, he was Associate Conductor of the Los Angeles Philharmonic. From 1982 to 1988, he was Music Director of the New York Youth Symphony, earning considerable acclaim for his work with that ensemble.

Contact:
Sophie Moss, Grants and Special Projects Manager
Albany Symphony, 19 Clinton Ave., Albany, NY 12207
sophiem@albanysymphony.com

Marketing Canals to Audiences Old and New. Debbie Stack & Jim Aroune, WCNY Public Media, Syracuse, NY

Promoting historic and contemporary waterways to a public inundated by messaging from numerous sources can be challenging, frustrating, confusing, and expensive. Even traditionally waterway-friendly audiences, such as boaters, historians, and heritage tourism travelers, expect information that is readily accessible and often, as succinct as possible. In this presentation, we'll draw upon our firsthand media and marketing expertise to share strategies for marketing canals across the wide-range of media platforms available. Whether print, radio, television, social media, or web, theses platforms represent opportunities to educate, engage, and encourage use of our vital waterways to a variety of audiences. We'll take a look at these audiences and what they are looking for and suggest ways to target effective messaging to them. We'll also outline some of the costs – human, time, equipment and of course, financial – and ways, including partnerships and coalitions, to manage those costs.

Jim Aroune is Vice President of Content Production and Delivery at WCNY, Central New York's Public Broadcasting organization. He leads the development of robust local and national content campaigns; including seasonal series, nationally distributed documentaries, daily and weekly news and public affairs programs on television and radio, weekly series and educational programming. Jim is award-winning television executive editor, anchor, and producer with extensive experience in short and long-form writing and reporting on New York's canals. He is co-executive producer of WCNY's new PBS documentary, *Erie: The Canal that Made America*. He resides in a home adjacent to the Erie Canal in Fairport.

jim.aroune@wcny.org

Debbie Stack is WCNY's Director of Education and former educator and public relations coordinator at Syracuse's Erie Canal Museum. She is the co-author of *Cruising America's Waterways: The Erie Canal,* which earned a national Benjamin Franklin Award; editor of *Always Know your Pal: Children on the Erie Canal*; producer of the 26 episode PBS series, *Cruising America's Waterways;* and co-producer of

WCNY's *Dream Destinations: New York's Contemporary Canals* documentary. Debbie is co-executive producer of WCNY's new PBS documentary, *Erie: The Canal that Made America*.

WCNY Public Media, 415 W. Fayette St., Syracuse, NY 13204
Debbie.Stack@wcny.org

Canal Engineering

Welland Canal Improvements (Ontario, Canada). William R. Miles, P.E., Bergmann Associates, Rochester, NY, USA

To improve the efficiency and safety of lockages through the 8 locks on the Welland Canal in Ontario, Canada, the St. Lawrence Seaway Management Corporation (SLSMC) has undertaken a 5-year improvements program for the aging canal system, built in the 1950's and 1960's to connect Lake Erie to Lake Ontario primarily for commercial traffic on the Seaway. There are eight (8) locks and five (5) reaches in the Welland Canal System used by Seaway vessels up to 750 feet in length and 40,000 DWT.

In early 2013 the SLSMC began a 5-year program to replace 1.88 km of marine open quay tie-up wall structures within the Welland Canal in St. Catharines, Ontario. The $100M+ (CAD) project was designed in mid-2013 by the Bergmann Associates led consultant team and preliminary construction began in the fall of that year with pre navigation season work. Over the next four (4) navigation closure periods (Jan. 1- March 20) one reach of roughly 500 m of wall was replaced with more modern steel and concrete structures using prefabricated sections and creating more resilient structures. The last of the wall replacements was constructed in early 2017, and the renewed docking system is now in operation.

Concurrent with the reconstruction of the tie-up walls in the St. Catharine region of the canal, a new hand-free mooring (HFM) system was designed and installed within 9 of the lock chambers on the Canal also by the Bergmann Associates' Consulting Team. The HFM system installed is a prototype manufactured and supplied by Cavotec Moor Master Limited, Kaiapoi, New Zealand. The purpose of the magnetic suction-type system is to make tying up inside the lock chambers easier for the vessel and safer for the deck line-handlers, since no lines would be necessary. In order to install the system in a lock chamber, slots at 3 locations and roughly 15'-9" wide by 5'-8" deep by 65' to 72' high in dimension, and rails were installed vertically in each side of the slots. In the 2015 closure period the HFM system was installed in Locks 1, 2 and 7. In the 2016 closure periods the HFM systems were installed in the western lock chambers of the flight Locks 4, 5 and 6; followed in 2017 by installation in the eastern lock chambers. Each lock installation cost in the neighborhood of $2.SM (CAD).

The presentation will provide some of the basic design details, analysis methods, system information, and lessons learned for both the tie-up walls and hands-free mooring system projects. Photographs of existing facility demolitions, new construction and finished projects will be provided throughout the presentation as well.

William R. (Bill) Miles, PE is the USA Waterways Principal for Bergmann Associates, a 400 person consulting firm headquartered in Rochester, NY and with 10 offices in the eastern half of the US. He is also the technical manager for the firm's nationally recognized Navigation Structures Business.

He has over 40 years of experience as a Project Manager and Sr. Engineer for lock and dam, flood control and waterways projects around the country. Recently he has been a Project Principal for the Welland Canal Tie-up Wall Replacements, the Kentucky River Authority Locks Rehabilitation, the Illinois DNR Stratton Lock Extension, the City of Lockport's Flight of Five Restoration, and the Chickamauga Lock Replacement for the Nashville District, among numerous other projects. He is a member of PIANC, ASCE, SAME, ASDSO and IWI and has presented numerous project presentations to waterways conferences. Mr. Miles is a graduate of Syracuse University with a BS in Civil Engineering and has worked at Bergmann for 27 years.

Bergmann Associates, 280 East Broad Street Suite 200, Rochester, NY 14604
bmiles@bergmannpc.com

The Stratton Lock Expansion Project (Fox River, Illinois, USA). Joshua M. Repp, P.E., Project Manager, Bergmann Associates, Buffalo, NY, USA

The William G. Stratton Lock, formerly known as McHenry Lock, provides lockages for recreational boating traffic on the Fox River and has been in service since 1960. The Lock serves as the passageway between the Fox Chain of Lakes in northern Illinois, and the Fox River. An average of 15,000 boats pass through the aging locks annually. The lock originally measured approximately 18x60 feet and, due to its relatively small size, users often experienced high wait times.

An engineering study was conducted in 2012 to evaluate options to increase the capacity of the lock, including an alternative to expand the length of the lock or to construct a separate lock adjacent to the existing lock. A detailed comparison of each alternative was made, considering primary factors such as cost, construction schedule, flexibility and ease of operation, ingress and egress times for boaters, and ability to facilitate potential future renovations and maintenance needs. Expansion of the existing lock chamber in the downstream direction was selected, roughly doubling the length of the lock to 18x120 feet.

Design for the lock expansion included rehabilitation of the existing lock chamber, modifications to the existing lower gate monolith, installation of a new gate monolith, reconfiguration of filling/emptying systems, extension of lock walls, safety improvements, and new lock mechanical and electrical systems. The existing horizontally framed steel miter gates were to be repaired and the lower lock gate relocated to the new lower gate monolith. The design was completed in 2013 and the lock expansion project was constructed in the winter of 2014 at a cost of nearly $4 million dollars. The rehabilitated lock has been in service now for several years and, given its increased capacity, has greatly reduced wait times and enhanced the boating experience for recreational boating users on the Fox River.

The presentation will outline the alternatives considered during the study phase, discuss features of the lock expansion design, and discuss challenges encountered during construction. Photos and video of the pre and post construction conditions will be included.

A link showing the lock construction from above:

https://www.youtube.com/watch?v=bjAQWDL2TMs

Joshua Repp is a Project Manager and Structural Engineer with Bergmann Associates in Buffalo, NY. He received his BS and ME in Civil Engineering from the State University at Buffalo and has worked on heavy civil projects for most of his career. Josh joined the Civil Works group at Bergmann Associates in 2004, where he has been involved with a number of large and small waterways projects. His experience includes the evaluation, design and rehabilitation of virtually all structural aspects of bridges, locks, and dams. Josh led the structural design for the Stratton Lock Project at Bergmann.

Joshua M. Repp, P.E., Project Manager
Bergmann Associates
40 LaRiviere Drive, Suite 150, Buffalo, New York 14202
jrepp@bergmannpc.com
www.bergmannpc.com

Innovative below Water Inspection of Canal Facilities using the latest most appropriate Technology. Eric Thorkildsen, P.E. Vice President, Greenman-Pedersen, Inc. (GPI)

Inspection of canal facilities has traditionally involved human divers, which is labor and equipment intensive. These results in increased risk and costs with these associated inspections to the canal owners. Current technology exists to provide superior supplemental options to help canal owners make future decisions involving preservation, repair or replacement.

Greenman-Pedersen, Inc. (GPI) has been involved with the inspection of the New York State Canal System, which consists of 525 miles of canal system composed of the Erie, Oswego, Cayuga-Seneca, and Champlain Canal Systems for the past six years. During this period, there has been push to provide more accurate, quantifiable, yet efficient results. GPI teamed with the NYS Canal Authority to come up with a "best tool" approach depending on the situation. The result has been a combination of technologies and strategies that will be presented. Current tools include trained inspectors, divers, remotely operated vehicles (ROV), underwater acoustical imaging, LiDAR, and aerial drones.

The result has been a *risked based* approach that has placed conventional methods aside while creating challenges. For example, currently in the United States every public bridge is inspected every 24 months. However, some of these bridges are more risky than others. The same can be said for canal facilities. The risks associated with a lock approach wall can be very different from a guard gate or lock cambers. Should all of these structures be inspected with the same frequency and intent? These concepts have been successfully vetted with the current teaming of GPI and the Canal Authority and will be discussed in this presentation.

Eric Thorkildsen has 29+ years of experience in both the public and private sectors specializing in transportation and marine structures. He is a registered professional engineer in multiple states. Expertise includes bridge, dam and marine design/inspection, underwater inspection and seismic analyses.

Mr. Thorkildsen is the 'Engineer of Record' for GPI's construction subsidiary Underwater Engineering Services, Inc., which specializes in marine construction.

Mr. Thorkildsen's Marine Engineering Experience grew out of a five-year relationship with the Port Authority of New York/New Jersey working on their bridges. He managed a multi-year contract for marine engineering work. A dam rehabilitation for Rensselaer County provided experience not only in structural rehabilitation and inspection of dams, but permit development for the New York Dept. of Environmental Conservation.

The permit approval required interaction with the NY State Historic Preservation Office and the NY State Fisheries. Mr. Thorkildsen performed both the above water and underwater inspection of the Rensselaer County Dam. He is a certified diver.

GPI/Greenman-Pedersen,Inc, 80 Wolf Road, Suite 300, Albany, NY 12205
ethorkildsen@gpinet.com

Waterway Cleanup – Canals and Brownfields

Combined Navigational and Environmental Dredging (Howards Bay, Duluth, MN).

Eric Dievendorf, P.E., Arcadis, Syracuse, NY, USA

Howards Bay is a major shipyard and grain terminal serving the ports of Duluth, Minnesota and Superior, Wisconsin. The bay is located off the St. Louis River, which feeds into the western end of Lake Superior. It has been the home of a series of shipyards, grain terminals, commercial fishing operations, and other industrial operations serving the area for over 100 years. The United States Army Corps of Engineers (USACE) is responsible for maintaining a federal navigational channel through the bay.

Remediation of the sediments within Howards Bay is a key step toward the eventual delisting the St. Louis River Area of Concern (SLRAOC). This urban, industrial waterway is impacted by dredging and dredged material disposal restrictions due to exceedances of sediment quality guidelines, especially for lead, tributyltin (TBT), polycyclic aromatic hydrocarbons (PAHs), and mercury.

Federal channel maintenance dredging in Howards Bay and potential remedial action are being addressed through an integrated navigational and cleanup dredging program developed under the Great Lakes Legacy Act (GLLA). Joint planning and design of the navigational and environmental dredging, with the goal of realizing the technical objectives while providing cost and schedule efficiency, is underway. This work is being performed by a partnership group that includes the Wisconsin Department of Natural Resources (WDNR), the United States Environmental Protection Agency Great Lakes National Program Office (GLNPO), USACE, the City of Superior, and Fraser Shipyards, Inc. (Fraser).

This presentation will summarize the activities of the team in developing potential conceptual remedies and a final remedial design for the project; the design methods to address the varied geography of the site, which includes shallow near-shore areas, the deep federal channel with steep side slopes, and features such as slips and docking areas; the manner of concurrently designing and later integrating the environmental and navigational aspects of the design, including communications methods; key cost factors and cost-reduction opportunities explored and achieved by the partnership; and lessons learned.

This project will aid in sustaining critical shipping and support operations in Howards Bay, provide environmental benefits, and contribute to the goal of delisting the SLRAOC. The project is progressing

successfully thanks to a public-private partnership group that focuses on common objectives and seeks to work toward these objectives as a team. Through this presentation, we hope to encourage other such partnerships to achieve environmental and navigational dredging goals in a unified, efficient manner.

Eric Dievendorf has worked as an environmental engineer with Arcadis for over 13 years. He started with the company after receiving his Bachelor and Master of Science degrees in chemical engineering from Syracuse University. His primary areas of focus are design and construction of sediment and wetland remediation projects. He has successfully implemented projects across the United States and is a licensed professional engineer in four states. Eric is a life-long Syracusan and has spent many hours walking along the historic Erie Canal.

Eric Dievendorf, P.E., Senior Project Engineer
Arcadis, One Lincoln Center, 110 W Fayette Street, Suite 300, Syracuse, NY 13202
eric.dievendorf@arcadis.com

Environmental Remediation of Erie Canal Facilities – Use of Inland Waterways. Todd Cridge, Lauren Putnam & Mark Gravelding, Arcadis, Syracuse, NY, USA

The Erie Canal, part of the New York State Canal System (formerly known as the New York State Barge Canal), was built in the 19th century to create a navigable water route from the Atlantic Ocean to interior urban centers and the Great Lakes. Industries associated with urban centers developed along this new conduit of industry and commerce, often leaving behind environmental impacts. However, as other methods of transportation (train, automobile) developed, marine traffic on the Erie Canal has diminished, and former marine and urban centers along the Erie Canal are initiating redevelopment to attract new users while retaining the current users. Initial redevelopment steps and facilities improvements can often include environmental remediation due to the residual impacts from historical and current industrial and commercial operations.

During preparation for such remedial efforts, it is beneficial to work with the property owner(s) and local government agencies to understand the long-term needs and goals for the redevelopment of specific areas of the Erie Canal system to attract new users to the waterway while sustaining existing commercial and recreational waterway use. Two example former industrial manufactured gas plant (MGP) environmental sites within the Erie Canal waterway system include an industrial harbor connected to the Erie Canal by a NYS Canal Corporation-owned lock, and a downstream section of the Mohawk River within the Erie Canal waterway adjacent to and including an active riverfront park.

During the investigation and design stages for the remediation of the harbor, consideration was given to sustaining waterway operations by re-establishing within the harbor the minimum navigational depth for the Erie Canal waterway system. In concert with routine maintenance dredging in the harbor, an in-situ capping remedy, which was completed in 2013, was designed to maintain existing environmental impacts in place and minimize potential human and biotic exposure. Additionally, design consideration was given to future potential harbor uses and the waterfront redevelopment plan under development by the city in which the harbor is located.

Downstream, a former industrial MGP site was remediated on the banks of the Mohawk River adjacent to the Erie Canal. The upland portion of the site was remediated in 2006, and restored to support the development of a riverfront park to attract community members to enjoy the beauty and use of the Erie Canal. A bulkhead and docking facility allows recreational boaters, through travellers and tourists to stop and enjoy the commerce and sites of the local community, and alternately allows community members to venture up and downstream to enjoy the commerce and sites along the inland waterway. Environmental remediation investigations are ongoing in the waterway of the Erie Canal, and focus remains centered on improving the environmental quality of the river adjacent to the park while maintaining the attractiveness and usefulness of the inland waterway and improving on potential utility as a recreational resource.

Todd Cridge has a Bachelor of Arts in Environmental Studies from Middlebury College and a Bachelor of Science in Civil Engineering from Syracuse University, and works as an environmental engineer with Arcadis. He has 14 years of experience providing engineering and project management to large industrial clients, and specializes in engineering analysis and design related to environmental and sediment remediation.

todd.cridge@arcadis.com

Lauren Putnam has a Bachelor of Science in Environmental Engineering from Cornell University, and works as an environmental engineer with Arcadis. She has 9 years of experience providing engineering and project support services to large industrial clients, and specializes in engineering analysis and design related to environmental remediation. Her significant experience includes preparation of engineers cost estimates, remedial design, and feasibility assessments, construction management, design of sediment investigation plans, post-construction monitoring and maintenance, and project management duties. As a child, Ms. Putnam spent summers enjoying the inland waterways of New York, including the Erie Canal. It is her passion to improve these areas to allow greater access to and beautification of the waterway system.

lauren.putnam@aracdis.com

Mark Gravelding has a Bachelor of Science and Masters of Science from the College of Environmental Science and Forestry in Syracuse, NY. He has 28 years of experience providing engineering services, specializing in contaminated sediment investigation, evaluation, and remedial design. Mr. Gravelding's experience includes the development of environmental strategies to address contaminated waterways where he has designed remediation systems to address sediments containing organic and inorganic contaminants. Relevant elements of his remedial design and implementation experience include shoreline containment systems, sediment removal/dredging, and cap design as well as bank, floodplain and wetland remediation and restoration. Mr. Graveling has worked on developing remedial designs for more than 50 sediment sites throughout the US.

mark.gravelding@arcadis.com

Arcadis, 100 West Fayette Street, Suite 300,
Syracuse, NY, 13202

Transforming Utica's Inner Harbor: Integrating the Past to Shape the Future. Paul Romano, Project Manager, OBG, Utica, NY and Lisa C. Nagle, Principal, Elan Planning, Design & Landscape Architecture, PLLC, Saratoga Springs, NY, USA

In 1909 the City of Utica leaders advocated for a branch of the Mohawk River be turned into an 'Inner Harbor' at the base of the City's CBD. A well-known local civil engineer conceived of the concept and presented it to the NYS Barge Canal Terminal Commission. Embracing the idea, the Terminal Commission studied canals in Europe including systems in Great Britain, France, Belgium, Holland, and Germany. The result was a 1911 report recommending construction of the harbor at an estimated cost of $695,000. According to the Commission's report, the Utica Harbor would be "similar to those which have been so successfully operated by various cities of Europe" and "no other city on the line of the barge canal has so favorable an opportunity for such an enterprise."

Today there is no public access and the lands around the canal, while being used as a NYS Canal Corporation's maintenance center, are severely underutilized. In 2008, New York State created legislation that requires the NYS Canal Corporation to transfer 33 acres at the Inner Harbor to the Utica Harbor Point Development Corporation (UHPDC.) As a result of the enacted legislation, the City of Utica created a master plan aimed at redeveloping the City's Inner Harbor. The total project area encompasses approximately 148 acres.

Today the publicly vetted master plan and is widely supported including by a variety of state agencies having received over $8M in grant dollars since 2013. The objective is to integrate the historical aspects of the inner harbor into an economically sustainable, new mixed-use waterside development that will become a major destination along the canal in and the Mohawk Valley. When complete the Inner Harbor will redevelop a former waterfront industrial site into an economically integrated mix of retail/commercial, residential, and community facility uses with high-quality design, including:

- A Harbor Promenade with pedestrian amenities such as benches, period lighting, interpretive signage, trash receptacles
- Marina and Marina Services
- Division of Canals Machine Shop (1933) Building Adaptive Reuse as a year-round commercial destination with ethnic restaurants, local beer, wine and spirits, local crafts, outdoor seating, farm emporium, boating supplies
- Restored Utica Canal Terminal Warehouse (1911-1918) Building as a Marina and Barge Canal History Center
- Performance Amphitheater area
- Pedestrian walkways with connections to the Erie Canal Trail
- Multi-story, Anchor Mixed-use Buildings (commercial, office, residential)
- Physically connect to downtown, historic Bagg's Square, the Utica Marsh, and to active and passive recreation areas on National Grid property located west of the harbor.

This session will review the history of the inner harbor and discuss how it has shaped the master redevelopment plan and the steps the city has taken towards implementation. The Mayor of the City of

Utica will share his vision and enthusiasm while city staff and the consultant team will provide the nuts and bolts of 'getting it done.'

Paul Romano is a Project Manager at O'Brien & Gere Engineers and has more than 28 years of professional civil and environmental engineering experience. He has managed numerous projects for municipalities, state and federal agencies, and economic development corporations in the New York State. He has been responsible for the management and design of environmental and municipal infrastructure projects, including inflow and infiltration sewer studies, sewer system upgrades and overflow controls, green infrastructure and stormwater retrofits, and asset data collection, assessment, and management. He has also provided capital project and master planning assistance to municipalities, including the development and implementation of funding strategies, preparation of grant applications, and grant administration.

Mr. Romano also serves on the consultant team providing master planning and design for the Utica Harbor development project.

Paul Romano, Project Manager
OBG, 101 First Street, 4th Floor, Utica, NY 13501
Paul.Romano@obg.com

Lisa Nagle has practiced in strategic planning, visioning, and economic development for communities throughout the northeast for over 25 years. As a 'Community Strategist' Ms. Nagle has led and developed numerous projects in close partnership with community leaders, volunteer committees, the private sector, and the general public. Ms. Nagle helped create several consensus based plans that were adopted and are being directly implemented. She has proven experience in the areas of community revitalization, strategic planning, project management, grant writing, and consensus-building.

Lisa C. Nagle, Principal
Elan Planning, Design & Landscape Architecture, PLLC. 18 Division St., Suite 304, Saratoga Springs, NY 12866
lnagle@elanpd.com

Waterway Cleanup – A Focus on Onondaga Lake

Culture and Biology of Onondaga Lake: Past, Present and Future – Early history and current/future significance to native peoples (Haudenosaunee). Phil Arnold, Ph.D., Director Ska-Nonh Peace Center, Syracuse, NY, USA

Onondaga Lake is one of the most important places in the accounts of the founding of the Haudenosaunee, or "People of the Longhouse."[1] More than 1000 years ago it was here that the Peacemaker, Hiawantha and the Tadadaho came together, through the help of Jigonsaseh, a woman, to establish what has been translated into English as "The Great Law of Peace." This is an ancient

[1] The Haudenosaunee are most often, and mistakenly, referred to as the "Iroquois," or "Six Nations Iroquois."

ceremonial process and social protocol, which helps orient human beings into respectful relationships with all beings, human and otherwise, who inhabit the natural world.

The Longhouse is organized in to matrilineal clans who select their representatives in offices of Clanmother, Chief, and Faithkeeper. The Haudenosaunee are a confederation of six different nations. The original Five Nations are, from West to East, the Seneca, Cayuga, Onondaga, Oneida, and Mohawk. The Confederacy Wampum Belt, or Hiawantha Belt depicts this relationship between the Five Nations. Onondaga is represented by the Tree of Peace in the middle, which is planted at Onondaga Lake and the geographical Center, or heart, of the Haudenosaunee.

As such, Onondaga Lake is a sacred place for the Haudenosaunee. The Onondaga Nation, who are the Central Fire of the Haudenosaunee Confederacy remain among the last Federally recognized sovereign Indigenous peoples in the U.S., if not the World, who still govern themselves by their ancient ceremonial Longhouse practices—and not by the US Bureau of Indian Affairs. The "Great Law of Peace" has been continuously active from time immemorial until today. This tradition is reflected in the living community of the Onondaga Nation.

The influences of the Great Law of Peace is formally acknowledged by the United States (US Senate Resolution 78: 1987) as having inspired the Founding Fathers in the development of Western Democracy; instrumental in developing the United Nations; and contributing to the Women's Movement. In spite of its profoundly significant cultural importance, however, comparatively few people know about the Great Law of Peace. Over the last several decades, legislation, educational materials, cultural initiatives and museums have gradually been increasing and reorienting US citizens to their obligations to Indigenous peoples. The Center's focus, therefore, will be to educate primarily non-Haudenosaunee people from all walks of life to understand the continuing importance of the Great Law of Peace. It will instruct its visitors to appreciate how indigenous values came to influence our modern way of life and identity as "Americans."

Philip P. Arnold is Associate Professor and Chair of Religion Department at Syracuse University as well as core faculty in Native American and Indigenous Studies. He is the Director of the Skä·noñh—Great Law of Peace Center (www.skanonhcenter.org/). His books are *Eating Landscape: Aztec and European Occupation of Tlalocan* (1999); *Sacred Landscapes and Cultural Politics: Planting a Tree* (2001); *The Gift of Sports: Indigenous Ceremonial Dimensions of the Games We Love* (2012) and *Urgency of Indigenous Religions* (University of New Mexico Press, forthcoming). He is a founding member of Neighbors of the Onondaga Nation (NOON), (www.peacecouncil.net/NOON/index.html) and established the Doctrine of Discovery Study Group (www.doctrineofdiscovery.org) He is the President of the Indigenous Values Initiative (www.indigenousvalues.org), a non-profit organization to support the educational work of the Skä·noñh—Great Law of Peace Center.

Culture and Biology of Onondaga Lake: Past, Present and Future – Introduction and Vital History. Ed Michalenko, Ph.D., Director Onondaga Environmental Institute, Syracuse, NY, USA

Onondaga Lake is a small urban lake with an extensive history of municipal and industrial pollution. Once classified as a hyper-eutrophic waterbody and one of the most polluted bodies of water in the world, Onondaga Lake has undergone tremendous epilimnetic water quality improvement over the last 25 years. A brief introduction to the watershed and lake morphology will be provided along with a historical perspective of water quality changes and environmental conditions from the time of European settlement through today. Onondaga Lake attracted European settlers due to the nearby presence of salt springs. Salt and its transport to market was a major reason for constructing and successful financing of the Erie Canal. The establishment of the salt industry led to growth and prosperity of the surrounding community, which in turn, created an increasing need to manage municipal waste. Several Onondaga Lake tributaries began repositories for sanitary and storm waters via a combined sewer system prior to the advancement of sewage treatment. As the City of Syracuse grew in population and the Industrial Revolution unfolded, the salt industry slowly receded, but the Lake and region attracted other large scale industries. The chlor-alkai industry, and in particular, the production of soda-ash via the Solvay Process, had profound effects on the waters, sediments and surrounding lands of Onondaga Lake. Overtime, the Lake was contaminated with a variety of inorganic and organic compounds including mercury, cadmium, other metals, chloro-benzenes, poly-aromatic hydrocarbons (PAHs) and poly-chlorinated biphenyls (PCBs) amongst others.

In 1988, the Atlantic States Legal Foundation (ASLF) brought a citizens lawsuit against Onondaga County for violations of the clean water act (CWA). The New York State Department of Environmental Conservation (NYSDEDC) joined the federal suit aimed at improving sewage treatment at the Metropolitan Syracuse Wastewater Treatment Facility (METRO) and mitigating the effects of Combined Sewer Overflows (CSOs) throughout the system. In 1990, US Congress, led by Senator Daniel Patrick Moynihan and Congressman James T. Walsh, created the Onondaga Lake Management Conference (OLMC) and charged it with development of a comprehensive restoration, conservation and management plan for Onondaga Lake, and in 1993, the OLMC issued *"A Plan for Action*". In 1994, Onondaga Lake was listed as a Superfund hazardous waste site on the United States National Priorities List (NPL) under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The citizen's lawsuit was settled in federal court and recorded as the Amended Consent Judgment (ACJ) on January 20, 1998. In April of 1998, the OLMC resolved that the ACJ superceded and in September of 1999 incorporated the ACJ into the 1993 *"A Plan for Action*" . In August 1999, the Onondaga Lake Partnership (OLP) was created through an amendment to the Water Resources Development Act (WRDA), sponsored by Congressman James T. Walsh. The OLP replaced the OLMC in planning, designing and constructing projects consistent with the Onondaga Lake Management Plan and ACJ. Since 2000, a number of projects have been implemented by the OLP resulting in water quality improvements to the upper waters of Onondaga Lake.

Edward M. Michalenko, Ph.D. serves as President of the Onondaga Environmental Institute (OEI). OEI is a not-for-profit corporation dedicated to environmental education, research, planning and restoration in Central New York. Ed's professional career is focused on the fate and effects of chemicals in the environment, including the Solvay wastebeds, which form the western shore of Onondaga Lake. Dr. Michalenko has dedicated over 30 years to researching and monitoring the Onondaga Lake watershed. As the Town of DeWitt Supervisor, Ed has been a strong advocate for neighborhood improvements, flood control, parks and greenspace, sustainability and the environment. Dr. Michalenko has co-authored five books and over 40 technical publications on environmental fate and effects of chemicals for the USEPA, National Library of Medicine, and the Agency for Toxic Substance and Disease Registry, and hundreds of records for the Hazardous Substance Database.

Culture and Biology of Onondaga Lake: Past, Present and Future – Biota past, present and future and responses to habitat restoration. Dr. Neil Ringler, Director Onondaga Lake Science Center, SUNY ESF, Syracuse, NY, USA

Historical accounts dating to the 1600's document a cold-water fishery in Onondaga Lake. By the late 1800's industrial and municipal degradation of the lake and tributaries resulted in declines in American Eel (*Anguilla rostrata)* and the loss of Atlantic Salmon (*Salmo salar*) and Whitefish *(Coregonus sp.).* Surveys from 1927 through 1994 showed increases in numbers of species; fishing was actually banned in the lake in 1970. Continued sampling with multiple gear types through 2016 has recorded a cumulative total of 66 kinds of fish; some increases reflect completion of the canal system and deliberate or inadvertent introductions. In addition, migration of Walleye and Lake Sturgeon (*Accipenser fulvescens*) from nearby lakes is well documented. Yet, many fishes in the Lake do not spawn there or in the tributaries.

Mercury levels in Walleye and Bass are dropping in response to dredging and capping activities, and our studies are preparing for an active fishery once these levels decline below statewide thresholds. There is some evidence that the Syracuse refuge community in from many nations already takes fish in the lake outlet. An intensive littoral zone restoration, new habitat structure and changes in water treatment facilities have resulted in great opportunities for enhance fish growth and reproduction.

These potential changes will be studied in detail beginning in 2017. In addition to fish communities, aquatic plants and invertebrate communities are being studied intensively. Aquatic plants have expanded from 5 to 23 species since 1986 (closure of chlor-alkali plant), now covering 85% of the littoral zone. Aquatic invertebrates are more sparse and less diverse than in surrounding waters, but new substrate in more than 400 acres of the lake, coupled with rock and woody habitat devices, show promise in enhancing the invertebrate (fish food) base. A student-based sampling and analysis program, in concert with state, county and private enterprise, is anticipated to play a major role in the future understanding and utilization of the Onondaga Lake watershed.

Neil H. Ringler has studied the Onondaga Lake ecosystem since 1986. His educational background in biological science was gained at California State University, Long Beach, Oregon State University and the University of Michigan. He served as Dean and then Vice Provost for Research at SUNY ESF 2005-2012.

He is currently Vice Provost and Executive Director of the newly formed ESF Onondaga Lake Science Center (OLSC) in Syracuse, NY. As SUNY Distinguished Teaching Professor, he provides classroom instruction in vertebrate and aquatic insect courses, and has guided about 80 masters and doctoral candidates since joining ESF in 1975. His studies and those of his students include Atlantic and Pacific Salmon in Great Lakes tributaries, behavior of sticklebacks in British Columbia lakes, ecological relationships in Adirondack lakes, spawning behavior, stream ecology, and restoration responses by fish, aquatic invertebrates and aquatic plants.

Canal and Canalside Recreation

Empire State Trail – A Transformation along New York's Canal System. Andy Beers, Director, Empire State Trail, Albany, NY, USA

In January, 2017, Governor Cuomo announced creation of the Empire State Trail, a 750-mile bicycle and walking trail that will span New York State, from Buffalo to Albany, and from New York City through the Hudson and Champlain Valleys to Canada. Some portions of the trail already exist; over the next three years an additional 350 miles will be constructed or improved, with the entire route completed by the end of 2020. This session will provide an overview of the trail's benefits, costs, and challenges – providing information relevant to the development of canalway trails and similar bicycle/pedestrian paths across the U.S. and the world.

New York State celebrates boldness and diversity – cultural, physical, social, geographic – and welcomes experiences that weave these qualities together. The Empire State Trail connects us to New York's natural beauty, diverse history, and iconic landscapes. The Trail promotes healthy lifestyles and provides a place for friends, families, and tourists to experience New York's urban centers, village main streets, and rural communities.

New York State has appropriated $200 million to fund trail construction. Design is underway on more than 40 trail construction projects. When completed by the end of 2020, the Empire State Trail will be the longest multi-use state trail in the nation.

Completion of the original Erie Canal in 1825 was the genesis of New York proclaiming itself the "Empire State". The trail will follow New York's iconic canal routes, the 400-mile Erie Canal and 60-mile Champlain Canal. Some trail sections are adjacent to active Barge Canal routes, passing alongside canal locks. Other segments are sited on towpaths of the historic original canal. In the Hudson Valley, much of the route will be "rail-trails" built on abandoned rail lines, providing additional opportunity to interpret NY's industrial and transportation history.

Typical trail construction will feature a 10-foot to 12-foot wide asphalt or stonedust surface, welcoming walkers, hikers, runners, and bicyclists of all abilities. The trail will be accessible to users with mobility challenges and older visitors.

Wayfinding signage utilizing a distinctive logo will be installed along the entire 750-mile route. A mobile website will be created to direct trail users to nearby local attractions and businesses, such as restaurants and lodging, bike repair shops, farm stands, historic sites, and downtown business districts.

Andy Beers was named Director of the Empire State Trail in May, 2018. Prior to that he served for ten years as the Executive Deputy Commissioner for the NYS Office of Parks, Recreation and Historic Preservation, which operates 215 state parks, historic sites, and greenway trails. Andy also worked for seventeen years for the New York Office of The Nature Conservancy. In 1983 he received a M.S in Natural Resource Policy from Cornell University.

Andy Beers, Director, Empire State Trail
Hudson River Valley Greenway. 625 Broadway, 4th Floor, Albany, NY 12207
andy.beers@hudsongreenway.ny.gov

Let's Adapt! Partnering in Inclusive Canalway Transformation.

Anita O'Brien, M.A., CTRS, Executive Director, Rochester Accessible Adventures and Peter J. Abele, Owner, Erie Canal Boat Company, Fairport, NY, USA

The Erie Canal National Heritage Corridor provides hundreds of acres abundant in opportunities for exploration and adventure on both water and land. However, most of the access to these historic and scenic areas has been limited to residents and tourists who use standard equipment (eg, kayaks and cycles) and who do not require any additional support in order to participate. Frequently overlooked in our tourism outreach efforts are individuals with disabilities and/or decreased mobility. Rochester Accessible Adventures (RAA), a nonprofit organization, is implementing the solution: Creating unique partnerships with businesses along the Erie Canal Corridor in New York in order to ensure that individuals with a variety of disabilities are able to access these opportunities and truly explore the history of the Canalway for generations to come.

The Need is Great

Individuals with disabilities comprise about 20% of the US population, about 56 million people. And along the Erie Canalway, this segment of the population is largely an untapped source for increasing tourism and frequent-user statistics. Other countries with similar statistics (eg, UK 19%; EU 17.6%) may also share this reality. Many municipalities and businesses remain unprepared to address the very real challenge of community accessibility. Without access to the opportunities our Canalways offer, individuals with disabilities and their families/friends are less likely to choose to participate in those recreation and tourism events. If we want to encouragegenerations of investment and participation along our Canalway systems, we must ensure we address the barriers which are preventing access to these opportunities.

The Answer is Clear

Rochester Accessible Adventures implements a Model of Inclusion Training to address this need for true inclusion along our Canalways. Our Adaptive Paddling and Cycling Center (APACC) model was implemented in partnership with Erie Canal Boat Company in Fairport, NY, a for-profit paddling and cycling rental company situated within yards of both the Erie Canal waterway and pedestrian/cycle pathway. RAA and ECBC launched The APACC in July 2016 with a two-day open house event to invite families to try adaptive and standard paddling and cycling equipment. 110 people learned how they, as

families with a member with a disability, could access the water or trailway *together*, *whenever Erie Canal Boat Company is open for business.* In its first year of the APACC partnership, ECBC reported 65 rentals that were the direct result of the factthat it now operates with true inclusion best practices.

The Future is Bright for an Inclusive Canalway Transformation

True inclusion in recreation -- where businesses and municipalities operate inclusively whenever their doors are open -- is the direct link to bringing families with a member with a disability to our Canalway systems on an annual basis to learn about the rich history and explore the historical sites and natural beauty. In 2017, RAA and Erie Canal Boat Company will replicate our model and train more businesses along the Erie Canalway National Heritage Corridor to operate with true inclusion and address the barriers to participation by families with a member with a disability. We will also incorporate education about local history along the Canalway so that guests leave with much more than just the physical benefits of their ride or paddle. Our presentation will share real-time solutions for ensuring that inclusive access to the history and beauty of our Canal systems is a reality for generations to come.

Anita O'Brien is a Certified Therapeutic Recreation Specialist (CTRS) with 20 years of experience in providing adaptive and inclusive recreation opportunities for individuals with disabilities. She has lived in Rochester NY for 17 years, working with two area community-based recreation programs to develop and implement recreation and adaptive sports programs to enhance the lives of individuals with a variety of disabilities, including diagnoses of spinal cord injury, intellectual and developmental disability, traumatic brain injury, multiple sclerosis, spina bifida, Parkinson's disease, and more. In 2015 Anita formed the nonprofit organization Rochester Accessible Adventures (RAA) in direct response to the community's need for true systemic change which results in sustainable inclusive recreation and adaptive sport opportunities. Rochester Accessible Adventures implements a Model of Inclusion to train businesses to operate inclusively, supports adaptive and inclusive team sports such as wheelchair basketball and sled hockey, and operates as a regional resource center for individuals with disabilities, families, and professionals who provide services to individuals with a variety of disabilities and medical conditions.

Anita O'Brien, Executive Director
Rochester Accessible Adventures, 2165 Brighton Henrietta Town Line Rd, Rochester NY 14623
aobrien@rochesteraccessibleadventures.org
www.rochesteraccessibleadventures.org

Peter Abele returned to the Rochester area after several years in Virginia and rediscovered Fairport and the Erie Canal Waterway. With the help of organizations like the Fairport Partnership and the Village of Fairport IDA, he identified and purchased a small kayak and canoe business along the canal 12 years ago. As a member of the Fairport Perinton Merchants Association for over 10 years and board member for 8, Peter has participated in various community events and nonprofit programs. He is a strong proponent of the canal as a tourist destination and cultural asset and has worked with New York Canal Authority and communities leaders to promote canal activities and businesses. Teaming up with Anita O'Brien 8 years ago, the Erie Canal Boat Company installed a Hoyer lift and began offering paddling clinics and weekly cycling program to individual of all abilities. Solidifying that partnership with Rochester Accessible

Adventures in 2015, Peter and Anita have developed the Adaptive Paddling and Cycling Center (APACC), the first regional location for inclusive recreational activities along the Erie Canal Waterway.

Peter Abele
Erie Canal Boat Company, 7 High Gate Trail #5, Fairport, NY 14450
eriecanalboatcompany@gmail.com
www.eriecanalboatcompany.com

Blueways – Reimagining the inland waterways, removing barriers to participation and responding to changing consumer demand. Sharon Lavin, Head of Marketing and Communications, Waterways Ireland

Blueways are a new initiative to encourage increased uptake of recreational activity on and around the waterways. They were developed in response to changing consumer demand and maximise the potential of existing assets and infrastructure on the inland waterways of Ireland.

Since autumn 2014, Waterways Ireland has been developing a new initiative to encourage increased uptake of recreational activity on and around the waterways. Blueways are much more than trails, they are a centre piece or spine on which a range of craft, heritage, activity, accommodation, cultural and dining experiences can be mapped.

They offer broad appeal across a wide range of users, with Paddling, Walking and Cycling at its centre. Outdoor and adventure tourism is a key growth sector worldwide and the development of this sector provides opportunities for growth, particularly in rural areas, by allowing businesses to leverage this important tourism infrastructure in their own areas.

Through working together in partnership, rural communities and businesses can really benefit from the opportunities presented in our built and natural heritage.

Blueways stimulate tourism thereby bringing prosperity to rural areas which are not traditional tourist hotspots but use Blueways as an economic driver for the region.

The overall scale of the current Waterways Ireland "Blueway" offering is limited, however, in its short existence, the Blueways concept has been extremely successful. They have demonstrated their success through the generation of new businesses along the Blueway corridors.

The Irish government recently launched the "Action plan for rural development" where they cited the Blueways model as a key element in the delivery of this plan. They have achieved wide support from Local Authorities, the National sporting authority of Ireland, Sport Ireland among other key stakeholders. A significant number of other organisations are seeking to become part of a national Blueways brand, looking towards Blueways as an example of Best practice.

Sharon Lavin, a Marketing professional with over 20 years Marketing and Communications experience. Sharon currently leads the Marketing and Communications team for Waterways Ireland for the past 2 years. She has has extensive experience in marketing and promotion with a strong background in the private sector. Her role within Waterways Ireland is to promote the vibrancy and myriad of activities

available on the inland waterways of Ireland and deliver increased recreational use and users to our waterways.

Sharon Lavin, Head of Marketing and Communications
Waterways Ireland, Somerview House, Old Dublin Road, Carrick-on-Shannon, Co Leitrim
sharon.lavin@waterwaysireland.org

Canal Vessels – Old Boats, New Stories

Utilization of the Rhein-Main-Danube Canal System for Green Energy and Products - A Case Study on the Straubing Harbor in Bavaria, Germany

. Dr. Klaus Doelle, Associate Professor, Department of Paper and bioprocess Engineering, SUNY-ESF, Syracuse, NY, USA

Waterways are more and more attractive to industry for the transportation of raw materials, especially energy crops and their residues from agriculture, forestry and food production operations. Linked to this is a growing demand for these materials linked to economic, ecological and social sustainability. The concept of utilizing the Rhein-Main-Danube canal system as a revitalization and transport medium is explored based on a case study of the Straubing Harbor in Bavaria located on the river Danube. The study focuses on the demand of the (green) chemical industry upstream and downstream and a regional bio economic strategy to bridge the gap between bioenergy and petro- based chemicals.

Biomass in general and as a product from municipal and wastewater treatment operations have a high percentage of organic content and therefore, can be used for renewable energy production. Currently, over 50 percent of all biosolids in New York State are disposed in landfills without making any use of the potential for energy production. Integrating a biogas plant into the chain of biosolids treatment prior to its landfill disposal is a possible solution to the problem. This work presents an economic feasibility study of future biogas plants located in the Oswego and Amsterdam area in New York State. In order to do this, detailed revenue and costs models referring to biogas and/or value added product production were developed. The analysis demonstrated the profitability and positive environmental effect of energy production on medium and large scales. A special aim of the study is to analyze different transportation modes and compare their efficiency to the example of biosolids transportation, especially possible options of a New York State Canal System revitalization. Currently, the Canal System is barely used for commercial transportation, however, waterborne transportation is considered very efficient and environmentally friendly. Comparable transportation cost analysis suggests viability of barge transportation under special conditions.

Dr. **Klaus Doelle** has over 26 years combined professional experience in the commercial sector of, chemical process development, paper manufacturing, materials, design, manufacturing, energy production, waste water treatment and patent management. He has over 9 year's academic experience at Brandenburg University of Applied Sciences, Germany and the State University of New York, College of Environmental Science and Forestry (SUNY-ESF) Department of Paper and Bioprocess Engineering (PBE) and Division of Environmental Science (ES).

His research is focused in the areas of pulp & paper and related environmental topics, design, constructed wetlands, subsurface bioreactors, fossil energy, bioenergy, hydropower, water and waste water treatment, paper recycling, paper development, filler materials, energy savings, renewable energy & processes, engineering, machine & process design. Results of his research efforts have been published in over 550 publications, including 140 papers, articles, invited papers, presentations and discussion panels. In addition, his past research efforts have led to 66 granted patents, more than 250 filed patent inventions, and in addition over 50 invention disclosures.

Klaus Doelle, Associate Professor, Department of Paper and bioprocess Engineering, Environmental Science, Director TRINITY Institute,
SUNY-ESF, 416 Walters Hall, One Forestry Drive, Syracuse, NY 13210
kdoelle@esf.edu

Examining our Legacy: The Interconnected Relationship of Waterways and Forests. Erick Tichonuk, Co-Executive Director, Lake Champlain Maritime Museum, Vergennes, VT

As we celebrate 200 years of canal history in New York State the economic implications are very are clear. Increased access to natural resources meant economic prosperity, but also significant impacts on the landscape. During the 2017 Legacy tour the canal schooner *Lois McClure* has been planting the tree species from which she is built, white pine and white oak; two original northern forests species impacted by human activity such as boat construction. This talk explores the relationship between waterways and forests, and how the Lake Champlain Maritime Museum chose to interpret it. The story exemplifies why canals are agents of transformation.

Erick Tichonuk, Co-Executive Director
Lake Champlain Maritime Museum, 4472 Basin Harbor Rd., Vergennes, VT 05491
erickt@lcmm.org
www.lcmm.org

Protecting and promoting Irelands floating heritage- a collaborative approach to heritage management. Cormac McCarthy, Environment & Heritage Officer, Waterways Ireland

A key outcome of the Waterways Ireland Heritage Plan 2016-2020 was the urgent need for further documentation, conservation and advocacy for traditional heritage boats. Waterways Ireland deemed this a priority action which was flagged for delivery in Year 1 of the Plan. An innovative, collaborative project was initiated, involving relevant NGOs to document this important aspect of our Cultural Heritage. Furthermore the project brief ensured that a holistic model for traditional boat surveys was created which looked at not only traditional boats but also the language and terminology around traditional boats (which can significantly vary from navigation to navigation), an inventory of traditional boat builders, methods to showcase the boats on both GIS and open source mapping (ensuring as wide an audience as possible could benefit from the survey) and bespoke drawings of not only a

representation of the boats (to scale) but also design highlights from the boats. This ensured a resource for education and awareness raising of traditional boats was secured.

A wide range of boats were recorded highlighting the range of activities and livelihoods supported by the use of boats, including industrial (gravel, dredging), trade (turf, kegs of stout), artisanal fisheries and livelihoods (snap fishing from cots, reed cutting, transport of people and small goods), passenger transport, angling (both individual and commercial), leisure cruising, recreational and competitive rowing and canoeing not to mention seven World War II Amphibious Vehicles! Furthermore, traditional heritage boats are symbols of cultural identity. This variety raises interesting questions for the qualitative definition and protection of traditional boats. It also lends itself to creating added value for the waterway tourism product, floating heritage is very much a living heritage that is capable of being experienced first-hand by tourists (both domestic and international) and the Heritage Boat Association are to be lauded for their work in exposing people to heritage boats. The ethnographic research into language associated with traditional boats and boat building and the ground theory research through informal interviews of boat owners and boat builders greatly adds to the qualitative information collected as part of this scheme.

This project was considered an unprecedented National success as it is the first ever systematic audit of traditional heritage boats of Ireland's inland waterways. It was also the recipient of the Guardian Award at the 2016 World Canals Conference. This baseline assessment will be used to develop Irelands first classification system for traditional heritage boats that will hopefully inform future support schemes for traditional boats and advocate for their greater protection. It helped forge stronger relationships with our NGO stakeholders through involving them from the earliest stages of project inception right through the collaborative project management process – empowering them and illustrating our commitment to partnering on heritage projects of shared purpose. This initiative is continuing into 2017 with a similar survey of the Shannon Navigation and Shannon Erne Waterway.

Cormac McCarthy is heritage professional with over 16 years experience. His role in Waterways Ireland includes the conservation and management of waterways related heritage (natural, built and cultural) and he is heavily involved in community groups whose focus is the collection and preservation of Irelands unique Intangible Heritage (including oral history, folk traditions and placenames). He coordinated the development of the first Waterways Ireland Heritage Plan 2016-2020 and is charged with its implementation. The overarching aim of this Plan is to 'identify and protect the unique waterways heritage and promote its sustainable use for the enjoyment of this and future generations'.

Cormac McCarthy, Environment & Heritage Officer
Waterways Ireland, Dock Road, Drewsborough, Scarriff, Co. Clare, Ireland V94 H7N1
cormac.mccarthy@waterwaysireland.org