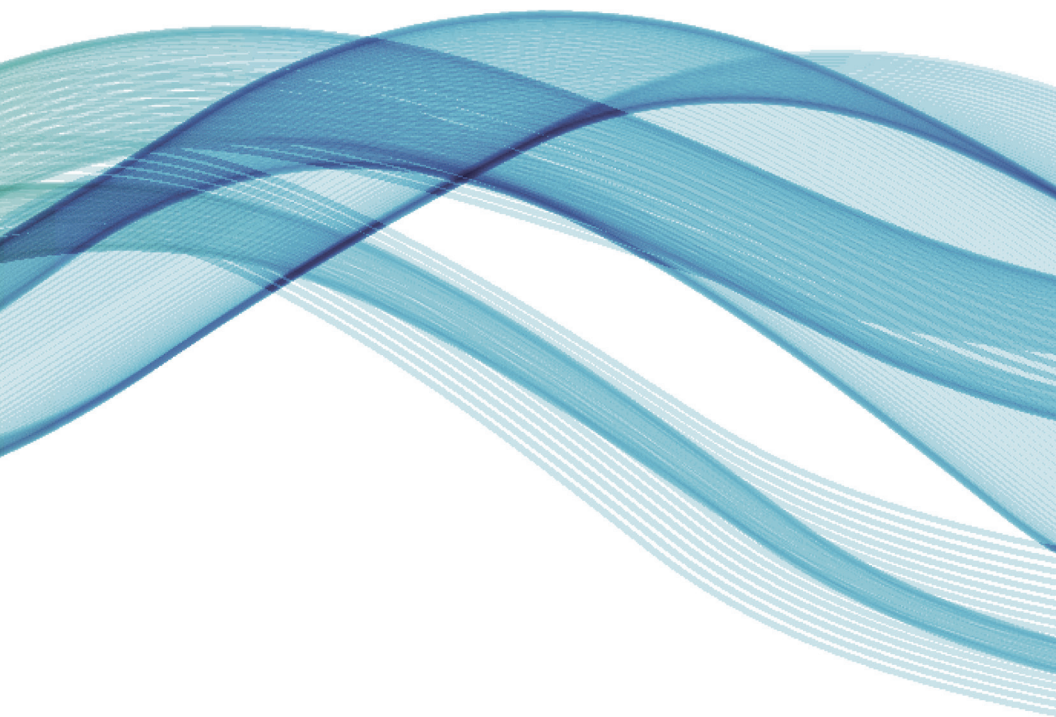


STORMWATER SYMPOSIUM | 2022

Infrastructure. Resilience. Equity.



THE VILLANOVA URBAN STORMWATER PARTNERSHIP (VUSP) acknowledges that many of our research efforts are conducted on the traditional and ancestral home of the Lenni-Lenape Native Americans.

**We encourage you to visit [lenni-nation.org](https://lenni-lenape.org)
for additional information on the Lenni-Lenape people.**



THE VILLANOVA URBAN STORMWATER PARTNERSHIP (VUSP), with the mission to advance the evolving field of sustainable stormwater management and to foster the development of public and private partnerships through research, is part of the Villanova Center for Resilient Water Systems (VCRWS), which conducts interdisciplinary research—environmental, geotechnical, water resources—to engage with society to create resilient solutions to global water challenges.

SYMPOSIUM AGENDA

WEDNESDAY, OCTOBER 12

7:30 REGISTRATION & REFRESHMENTS

8:30 VILLANOVA WELCOME

Villanova Room

The Rev. Peter M. Donohue, OSA, PhD,
President of Villanova University

Robert G. Traver, PhD, Director of VUSP

INTRODUCTION TO EJSCREEN: U.S. EPA's TOOL TO IDENTIFY AND ADDRESS ENVIRONMENTAL JUSTICE CONCERNS ACROSS THE COUNTRY

Angus Welch, U.S. EPA Region 3

9:30 BREAK

Vendor Lounge

9:50 TECHNICAL SESSIONS

Infiltration Performance

Villanova Room

Stormwater Case Studies

Radnor-St. David's Room

Construction Challenges

Cinema

10:45 BREAK

Vendor Lounge

11:05 TECHNICAL SESSIONS

VUSP—Villanova Campus Sites: Findings Update

Villanova Room

VUSP—Delaware River Watershed Initiative: Monitoring and Assessment Research in Suburban Watersheds

Cinema

12:00 LUNCH

Dougherty Hall

SYMPOSIUM AGENDA

WEDNESDAY CONTINUED

1:15 TECHNICAL SESSIONS

Infiltration Challenges

Villanova Room

Stormwater Control Measure Master Planning I

Radnor-St. David's Room

Smart Systems

Cinema

2:10 BREAK

Vendor Lounge

2:30 DIVERSITY, EQUITY AND INCLUSION PANEL

Equitable Engineering in Practice and Within Our Community

Villanova Room

3:15 POSTER SESSION BREAK

Radnor-St. David's Room

3:50 PANEL

Post Construction Stormwater Management Manual Update

Villanova Room

5:00 NETWORKING RECEPTION & RAFFLE

Vendor Lounge

SYMPOSIUM AGENDA

THURSDAY, OCTOBER 13

8:00 REGISTRATION & REFRESHMENTS

8:30 TECHNICAL SESSIONS

Changing Climate

Villanova Room

I-95 Girard Avenue Interchange Stormwater Project— Lessons Learned From Collaborative Research

Cinema

9:25 BREAK

Vendor Lounge

9:40 VU WELCOME

Villanova Room

**Bridget Wadzuk, PhD, Associate Director, VCRWS,
and Daylor Chair of Civil Engineering**

PHILADELPHIA WATER DEPARTMENT GREEN CITIES CLEAN WATERS UPDATE

**Randy Hayman, Water Commissioner,
Philadelphia Water Department**

10:20 BREAK

Vendor Lounge

10:40 TECHNICAL SESSIONS

Philadelphia Water Department Operations and Performance of Green Stormwater Infrastructure

Villanova Room

Focus on the Floodplain

Cinema

SYMPOSIUM AGENDA

THURSDAY CONTINUED

11:45 LUNCH

Dougherty Hall

1:00 TECHNICAL SESSIONS

VUSP—Research Findings from an Integrated Approach to GSI Analysis

Villanova Room

Permeable Pavement

Radnor-St. David's Room

Stormwater Control Measure Master Planning II

Cinema

2:15 BREAK

Vendor Lounge

2:35 TECHNICAL SESSIONS

Equity and Triple Bottom Line

Villanova Room

Addressing Water Quality

Radnor-St. David's Room

Resilience

Cinema

3:30 VUSP PANEL IMPLICATIONS FOR DESIGN BASED ON RESEARCH

Villanova Room

4:30 CLOSING REMARKS & RAFFLE

Villanova Room

KEYNOTE SPEAKERS



ANGUS WELCH is the Acting Environmental Justice Coordinator in U.S. EPA Region 3. His position is located in Region 3's Office of Communities, Tribes, and Environmental Assessment. His role involves technical analyses and coordination for Region 3's Environmental Justice Program. Welch develops metrics, maps, and reports that clarify environmental impacts in Mid-Atlantic Region communities. He also provides environmental justice trainings for government, community, academic, and

business audiences. These trainings cover fundamental concepts as well as analytical tools, such as EJScreen, to identify and address environmental justice concerns. Welch has worked in Region 3 since early 2020. His prior professional experience occurred primarily in the private sector, including positions as a director of data management and as a management consultant. Welch holds a bachelor's degree in Geosciences from Skidmore College and a master's degree in Applied Geosciences from the University of Pennsylvania. His master's degree thesis focused on modeling runoff control performance of green stormwater infrastructure in West Philadelphia. The project helped to quantify runoff discharge volumes to the local combined sewer system.



RANDY E. HAYMAN, ESQ., is the Commissioner and CEO of the Philadelphia Water Department. Hayman received his bachelor's from the University of Michigan and a law degree from Georgetown University. Before assuming his post in Philadelphia, Hayman was a partner at the environmental law firm Beveridge & Diamond, headquartered in Washington, D.C. He served as general counsel for 15 years at two major water utilities, the District of Columbia Water and Sewer Authority and the Metropolitan

St. Louis Sewer District. Outside of the water industry, Hayman's varied career includes working as an Assistant Attorney General in Missouri. As Water Commissioner, Hayman is responsible for managing all units and a staff of approximately 2,000 at the Water Department, which provides integrated water, wastewater, and stormwater services for the City of Philadelphia as well as some suburban wholesale clients. His professional and community efforts have been recognized by the *Washington* and *St. Louis Business Journal* with their prestigious Minority Business Leader Awards, and the *Washington Business Journal* presented him with the

Greater Washington Legal Champions Award, recognizing him one of the top general counsels in the nation's capital. Global Philadelphia recently presented him with its Sustainable Development Award for his commitment to improving the environment.

DIVERSITY, EQUITY AND INCLUSION PANEL

EQUITABLE ENGINEERING IN PRACTICE AND WITHIN OUR COMMUNITY

While the field of engineering has become more diverse in recent years, it is still 84% male and 78% white (ASCE, 2020). This panel will discuss how we can continue to cultivate a diverse workforce of engineers. Additionally, stormwater engineers are grappling with projections such as a 26.4% increase in U.S. flood risk by 2050 due to climate change with a disproportionately high impact on Black communities (Wing et al, 2022). How can engineers better serve these communities?

Moderator

Mark Orebiyi, E.I.T., ENV SP, Project Engineer
Clark Water Group

Panelists

Jerome Shabazz, Founder,
Overbrook Environmental Education Center

Saleem Chapman, Chief Resilience Officer,
City of Philadelphia

Shiny Mathew, PE, ENV SP, Section Head,
Eastern PA Water Resources, JMT

DIVERSITY, EQUITY AND INCLUSION PANEL



MARK OREBIYI, E.I.T., ENV SP
Moderator

Mark Orebiyi graduated from Villanova University in 2017 with a degree in Civil and Environmental Engineering in addition to graduating from Eastern University with a degree in Applied Mathematics the same year. Prior to graduating, he had three internships with large and small civil design firms located in Pennsylvania and Virginia. He pursued his MS in Civil Engineering from Villanova and graduated

in 2019. During that time, he served as the National Society of Black Engineers (NSBE) Region 2 Pre-Collegiate Initiative Chair and the Graduate Assistant for the VESTED Academy and NovaEDGE. He worked with the Center for Resilient Water Systems and Villanova Engineering Service Learning to develop his thesis during the Master's program. Currently, he works with Clark Construction as a Project Engineer for the Clark Water Group.

Panelists:



SHINY MATHEW, PE, ENV SP, has more than 15 years of engineering design and project management experience. Her focus has been on water resources engineering, including hydrology and hydraulics, stormwater management, green stormwater infrastructure, erosion and sediment control, drainage design and permitting. Over the last decade, she has been implementing sustainable projects throughout the region and has designed a number of projects for private developers and public

clients including PennDOT, SEPTA, PHL, and the City of Philadelphia Streets and Water Department. Her diverse background allows her to manage complex multidisciplinary infrastructure projects throughout the region. Currently, she works at JMT as the Section Head for Eastern PA Water Resources and serves as a Deputy Practice Leader supporting projects and staff throughout the Mid-Atlantic region.



SALEEM CHAPMAN is the City of Philadelphia's Chief Resilience Officer and Director of the Philadelphia Office of Sustainability. Chapman is responsible for the implementation of and reporting on Greenworks: A Vision for a Sustainable Philadelphia. He also oversees the city's climate preparedness and resilience strategy as well as the application of a racial equity lens to sustainability. Before joining the City of Philadelphia, Chapman amassed a vast array of experience in the sustainability field, including professional work in urban policy analysis, environmental justice, and sustainable economic development. Chapman holds a bachelor's in Biomedical Engineering from Drexel University, as well as a bachelor's in Integrated Social Science and a master's in Public Administration, both from Penn State University.



JEROME SHABAZZ is the founder and Executive Director of the Overbrook Environmental Education Center, and JASTECH Development Services Inc., a not-for-profit organization developed in 1997 to promote environmental justice, encourage sustainable community development and promote improved environmental health in urban communities. Under his direction, the Overbrook Center developed a national reputation for its "Brownfields to Greenfields" remediation and green workforce development programs. Prior to working in the nonprofit sector, Shabazz worked for 25 years in water and gas utilities, managing workforce and safety training at Philadelphia Gas Works' LNG Processing Division, and at the Philadelphia Water Department. Shabazz is a member of the Environmental Protection Agency's National Environmental Justice Advisory Board (NEJAC); PA Department of Environmental Protection's Citizen Advisory Council (CAC); DEP's Environmental Justice Advisory Board (EJAB); and the City of Philadelphia's Environmental Justice Advisory Council (EJAC). He is the 2020 Henry Meigs Environmental Leadership Award recipient and earned his master of science degree in Environmental Protection & Safety Management from St. Joseph's University.

PANEL

POST CONSTRUCTION STORMWATER MANAGEMENT MANUAL UPDATE

Wednesday, October 12 | 3:50 p.m. | *Villanova Room*

In 2017, the panel members took on the process of completing the update of the 2006 Pennsylvania Stormwater BMP Manual. After five years of work, the panel members have completed a draft of a brand-new manual based on the latest research and science in the field of stormwater management. The manual includes performance-based Stormwater Control Measure (SCM) design guidance, hydrologic procedures for managing extreme precipitation in a changing climate, changes in how volume and water quality are analyzed and managed, a focus on improving the resiliency of infiltration facilities, and increased incentives for the preservation of natural landscapes. Join us for a preview of this new manual before it is published for public comment.

Sean Furjanic, Environmental Program Manager,
NPDES Permitting Division, PaDEP

Robert Traver, Professor and VUSP Director, Villanova University

Amanda Hess, Research Professor, Villanova University

Mark Bowen, Senior Project Manager, NTM

VUSP PANEL: IMPLICATIONS FOR DESIGN BASED ON RESEARCH

Thursday, October 13 | 3:30 p.m. | *Villanova Room*

The Villanova faculty members of the VUSP will discuss recommendations for Green Stormwater Infrastructure design, including advances in our understanding of media dynamics, linking GSI together as a system, the implications of GSI choice within a community, and the adaptation needed under changing climate.

Moderator

Robert Traver, Professor, Villanova University

Panelists

Bridget Wadzuk, Professor and Daylor Chair, Villanova University

John Komlos, Teaching Professor, Villanova University

Kristin Sample-Lord, Associate Professor, Villanova University

Virginia Smith, Associate Professor, Villanova University

Kelly Good, Assistant Professor, Villanova University

SPECIAL SESSIONS

VUSP—VILLANOVA CAMPUS SITES: FINDINGS UPDATE

Wednesday, October 12 | 11:05 a.m. | *Villanova Room*

There are six sites on Villanova's campus that were monitored with funding by the EPA and PADEP over recent time. This panel will summarize key findings from multiple rain gardens, infiltration trenches, and a constructed stormwater wetland.

Achira Amur, PhD Candidate, Villanova University

John Komlos, Teaching Professor, Villanova University

Matthew McGauley, PhD Candidate, Villanova University

Mahmid Rahman, MS Student, Villanova University

Kristin Sample-Lord, Associate Professor, Villanova University

Virginia Smith, Associate Professor, Villanova University

Bridget Wadzuk, Professor, Villanova University

VUSP—DELAWARE RIVER WATERSHED INITIATIVE: MONITORING AND ASSESSMENT RESEARCH IN SUBURBAN WATERSHEDS

Wednesday, October 12 | 11:05 a.m. | *Cinema*

This session explores monitoring and assessment research related to the Delaware River Watershed Initiative (DRWI), which is funded by the William Penn Foundation. Topics include stormwater performance monitoring, implementing low-cost, real-time stormwater controls, and exploring the effect of COVID-19 restrictions on stream water quality.

Sara Baghalian, Postdoctoral Fellow, Villanova University

Michael Burns, PhD Student, Villanova University

Marzieh Shiva Khosravi, PhD Student, Villanova University

Lesmes Alejandro Mora Jerez, PhD Candidate, Villanova University

I-95 GIRARD AVENUE INTERCHANGE STORMWATER PROJECT: LESSONS LEARNED FROM COLLABORATIVE RESEARCH

Thursday, October 13 | 8:30 a.m. | *Cinema*

Villanova and Temple University are working collaboratively with PennDOT through AECOM to conduct research "that supports a resilient PennDOT Stormwater Strategy that reduces overall costs through reduction of risk, enhanced performance, extended lifecycle, and reduced targeted maintenance costs of stormwater management practices." The speakers will present an overview of the project, and discuss what has been learned and the benefits gained from this collaboration.

Edwina Lam, P.E., Water Resources Practice Leader, AECOM

Christian Lynn, PLA, ASLA, Landscape Architecture Practice Lead, AECOM

Laura Toran, PhD, Temple University

Robert Traver, Professor and VUSP Director, Villanova University

PHILADELPHIA WATER DEPARTMENT OPERATIONS AND PERFORMANCE OF GSI

Thursday, October 13 | 10:40 a.m. | *Villanova Room*

Moderator

Gerald Bright, Philadelphia Water Department

Aaron Kirkland, An Overview of Philadelphia Water Department's Green Stormwater Operations Unit (GSO)

James Bluebaugh, Expecting the Unexpected: Anticipation, Preparation, Response and Oversight of GSI in an Urban Environment

Matthew Rozanski, Building Operational Resilience for a Stormwater Maintenance Grounds Program

William Nichols, Construction Phase Performance Testing of Lined GSI

SPECIAL SESSIONS CONTINUED

VUSP—RESEARCH FINDINGS FROM AN INTEGRATED APPROACH TO GSI ANALYSIS

Thursday, October 13 | 1:00 p.m. | Villanova Room

Villanova researchers will be presenting findings and recommendations from the water resources, geotechnical, and robotics perspectives on the monitoring and analysis of several PennDOT stormwater management practices constructed as part of the I-95 Girard Project.

Moderators

Edwina Lam, Water Resources Practice Leader, AECOM
Robert Traver, Professor, Villanova University

Presenters

Garrett Clayton, Professor, Villanova University
Amanda Hess, Research Professor, Villanova University
Kristin Sample-Lord, Associate Professor, Villanova University
Virginia Smith, Associate Professor, Villanova University
Bridget Wadzuk, Professor, Villanova University
Gerald Zaremba, Research Professor, Villanova University

ABOUT US

The mission of the **Villanova Urban Stormwater Partnership (VUSP)** is to advance the evolving field of sustainable stormwater management and to foster the development of public and private partnerships through research. The VUSP is part of the Villanova Center for Resilient Water Systems (VCRWS), which engages with society to create resilient solutions to global water challenges through interdisciplinary engineering research.

HOW TO BECOME A MEMBER

Partnerships only accelerate progress, and we at VUSP are focused on providing our members with research updates, timely content, and purposeful community.

BENEFITS OF MEMBERSHIP

- Discounted Symposium admission and booth charges
- Newsletter with all partner logos, and a section highlighting our Partners for the stormwater community
- PDH form with every VUSP/VCRWS Presentation
- Library of past presentations and journals publication links
- Library of theses/dissertations
- Annual discussion of research lessons learned and needs with Partners
- Annual Partners tour of our research sites
- Networking opportunities with our soon-to-graduate student researchers
- Staying up to date with our cutting-edge research



Scan the QR code for abstracts, resources, and more information about the Stormwater Symposium.



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Villanova Center for
Resilient Water Systems

HELPFUL INFORMATION

- To connect to Wi-Fi, use the VUGuest network and enter your information on the Villanova Guest Wi-Fi Self Registration Portal page.
- Lactation Space: Bryn Mawr Room
- Prayer Room: Haverford Room
- Professional Development Hours (PDH) are available. Please visit the VUSP table in the back of the Villanova Room to receive your form.

PARTNERS

AECOM	Jacobs	OptiRTC
Biohabitats	Johnson, Mirmiran & Thompson	Philadelphia Water Department
Century Engineering	Langan	Princeton Hydro
Contech Engineered Solutions	Michael Baker International	Sci-Tek Consultants
Gannett Fleming	NTM Engineering	T&M Associates
Grist		Verdantas

Thank you to Brian Jacko, VCRWS alumnus, for the Stormwater Symposium logo design.

EXHIBITORS

Contech Engineered Solutions	NDS
Ferguson Waterworks	NTM Engineering
In-Situ	Oldcastle APG
Johnson, Mirmiran & Thompson	StormTank (Brentwood)
Lane Enterprises	StormTrap

THANKS TO OUR SPONSORS

Wednesday Lunch
Ernst Seeds

Thursday Lunch
MBP

Breaks
Ferguson Waterworks

Reception
Pennoni

Poster Session
ADS

Lanyard
American Academy of Water Resource Engineers

SCHOLARSHIPS

Solving stormwater issues in urban environments requires more than engineers alone. For the first time, the VUSP and Sponsors are providing scholarships for community leaders, STEM teachers, and prospective graduate students to help inspire and educate the diverse group of people who are helping to combat stormwater issues.

NDS

NTM

Johnson, Mirmiran & Thompson

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