Chattanooga Development Symposium 2019

August 6, 2019

Note: Abstracts are in no certain order & subject to change without notice.

Please watch ascechatt.com for any programming or general updates.

Symposium Keynote

Abstract: This keynote will high-light past & present development in the greater Chattanooga area and the intricacies involved with developing in the scenic city along with some TDOT related elements. Presenters will quantify past & current development status and success and discuss how development in the City will move forward.

Presenter Bios:

1. **Joe Deering,** Region 2 Director, Tennessee Department of Transportation

Joe Deering, P.E., R.L.S. is the Director/Assistant Chief Engineer of Region 2, located in Chattanooga. His responsibilities include directing department operations throughout the 24-county region. Major areas of operational responsibilities are highway maintenance and repair, construction engineering, right-of-way, traffic and highway marking, bridge repair and inspection, state aid program and administration, materials and tests, design, highway beautification, environmental planning, and office administration, including personnel matters.

2. **City of Chattanooga Mayor Andy Berke**

After graduating with honors from Stanford University in 1990, Andy worked as a legislative assistant in the office of Tennessee Congressman Bart Gordon. Seeing Congressman Gordon's attentiveness to his constituents' needs, Andy decided public service was where he could best serve his community.
Andy graduated with honors from the University of Chicago Law School in 1994. Following law school, he worked as a law clerk in the United States Court of Appeals in Denver, Colorado. During this time he also taught at Kansas University Law School as an adjunct professor.

Elected to the State Senate in 2007 & re-elected in 2008, Andy became the Vice-Chairman of the Senate Democratic Caucus. He served on the Senate Education and Transportation Committees and was appointed by Governor Phil Bredesen to the State Workforce Development Board.

Immediately following his election to Mayor of Chattanooga in March 2013, Mayor Berke streamlined government with a top to bottom reorganization that eliminated three departments and saved taxpayer dollars in the process. Since the reorganization, the Berke Administration has relentlessly focused on making Chattanooga streets safer, families stronger, growing middle class jobs, and using taxpayer dollars efficiently.

During the Mayor's tenure, Chattanooga has seen a number of improvements in quality of life ranging from a decrease in both property and violent crime to a drop in unemployment of more than 2% and over 6,157 new jobs have come to the Chattanooga region. Foreclosure rates have decreased while Chattanooga had the third highest wage growth in the country for a mid-sized city in 2014 and more than 117 homeless veterans have been housed in the Chattanooga area.

Under Mayor Berke's leadership, following a robust public engagement process, Chattanooga established an Innovation District -- 140 acres in the heart of downtown that houses a catalytic mix of start-up businesses, incubators, and accelerators alongside investors and public amenities.
For his many works, Mayor Berke was named Municipal Leader of the Year by American City and County magazine.

TDEC Legislative Updates, Permitting Case Studies and Tips

Abstract: Legislative updates / case studies related to permitting / what does the average engineer, developer, architect, environmental consultant need to know to do the job better?

Presenter Bio:
Karina Bynum works for the Division of Water Resources at TDEC (Tennessee Department of Environment and Conservation). Under TDEC's watershed approach, her work includes developing performance criteria for stormwater, optimizing wastewater operations for nutrient removal, developing TMDL monitoring plans, and consulting on stream and wetland restoration projects. Karina holds Bachelor's and Master's degree in civil and environmental engineering from Tennessee Technological University and a Ph.D. from the Czech Technical University in Prague on adaptive watershed restoration. Karina is a registered engineer in the state of Tennessee.

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Riparian Buffers – Making Requirements Work for You

Abstract: Riparian Buffers are required along streams for new developments located within the Hamilton County Water Quality Program area. Often, the temporary riparian buffer required by TDEC's Construction General Permit is different from the permanent riparian buffer necessary to meet MS4 (Stormwater) permit requirements. This presentation will outline specific requirements for permanent riparian buffers and highlight their function and purpose. Examples and guidance will be provided on how to incorporate riparian buffers into the overall design of a development, including creating amenities and providing spaces that are welcoming to the public.

Presenter Bio: Crystal Bishop has 15 years of experience in government service as a stormwater professional. She has a B.S. degree in Wildlife and Fisheries Science from Tennessee Technological University, a M.S. degree in Biology with a Concentration in Ecology from Middle Tennessee St. University, and is a CPMSM professional. She has worked for the stormwater programs for the City of Chattanooga, the City of Franklin and is currently the Stormwater Manager for Hamilton County. Ms. Bishop serves on the Board of Directors for the Southeast Stormwater Association and the Tennessee Stormwater Association. She is the Tennessee Co-Chair for the Kentucky-Tennessee WEA Watershed Committee and serves on several other committees. She enjoys connecting and collaborating with people to form effective partnerships, and in her spare time, you can find her spending time outdoors or rooting for the Tennessee Vols!

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Buffer Delineation, As-built Survey and Certification Requirements and Fees

Abstract: For construction projects in the City of Chattanooga:

- Pre-construction meeting requirements & notification
- Delineating water quality & landscape buffers in the field - surveyed & marked
- Stay-on Volume/ Green Infrastructure survey requirements and other considerations
- Requirements from surveyors & their critical role in the process
- As-built and Certification requirements, and associated review fees

Presenter Bio: Jeremy Swilley, CPESC, CPMSM, HMT, QHP-IT is the Construction Program Supervisor for the City of Chattanooga's Land Development Office. He has over 20 years experience in construction, inspection and water quality work in both the private and public sectors. He has also been a Hazardous Materials Specialist for over 20 years, and has worked a myriad of emergency response calls as both an independent contractor and as a regulator. He currently spends most of his time answering questions and helping contractors and his inspectors maintain compliance with their permits.

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Form-Based Code: 3 year checkup

Abstract: Learn about the number of Form-Based Code projects, variances and approval percentages over the last 3 years. Hear about how edits are selected and participate in an open discussion about what has been easy and challenging for designers.

Presenter Bio: Emily Dixon works for the City of Chattanooga Land Development Office as a Development Review Planner. Using the Form Based Code she reviews plans, makes suggestions to reduce variances and prepares variance cases to go before the Form Based Committee. Emily holds a degree from the University of Georgia in Athens.

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Smart Cities Division: Year 1 Progress Report

Abstract: The City of Chattanooga's Smart City Division leverages technologies, collaborations, and innovation to provide constituents with three primary tenets; accessibility, safety, and resilience with the end goal of ensuring people, services, employment, and recreation are readily connected. Acting as both cross-sectoral and strategic, it is anticipated that the Smart City Division will be increasingly called to action for smart city-related thought leadership, planning, research, and implementation services on the local, regional, and national levels.

Presenter Bio: Kevin Comstock has over 35 years of experience in the transportation industry and currently serves as the Smart City Director for the City of Chattanooga, TN. He has held various positions in the private sector and in local and state government performing the design and construction of numerous Transportation and Telecommunications projects across the country. His specialties include project management, strategic planning and collaborative team-building.

Kevin began his collegiate career at the University of Louisville and continued graduating summa cum laude from Middle Tennessee State University with a BS in Professional Studies and a concentration in Organizational Leadership.

Kevin is a Subject Matter Expert and served as a US Dept. of Energy, Vehicle Technology Office Reviewer for new and innovative DOE project and programs. He is engaged in many collaborative projects with Oak Ridge National Lab, and the National Renewable Energy Lab and with several academic institutions in the Region. Kevin also served as the 2017 President for Tennessee Section of the Institute of Transportation Engineers (ITE).

He and his wife of nearly 43 years spend much of their time with their two sons and five grandchildren.

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Overview of the Endangered Species Act and Section 7 Compliance

Abstract: The conservation planning assistance related to the Endangered Species Act (ESA) will be discussed. The informal and formal consultation process as well as the most common issues related to ESA compliance will also be reviewed.

Presenter: Dustin Boles

Presenter Bio: Dustin serves as a Fish and Wildlife Biologist in the TN Field Office of US Fish & Wildlife Service. He works as a member of the Federal Activities/Conservation Planning Assistance team providing ESA technical assistance to project proponents. Prior to joining the Service, he served as a Natural Resource Specialist with the U.S. Army Corps of Engineers.

Low Carbon Concrete - Practical steps to reduce embodied carbon in concrete mixtures

Abstract: Learn about embodied carbon in concrete mixtures and see how concrete compares to other common building materials in terms of embodied carbon.

Presenter Bio:
Alan Sparkman has served as the Executive Director of the Tennessee Concrete Association since 1998. He regularly teaches concrete industry professional courses across the US and served as an Assistant
Professor at Middle Tennessee State University for the Concrete Industry Management program for the
2010-2011 academic year. He developed and teaches a class on Concrete Construction Sustainability for the "Concrete" MBA program at MTSU.

He has been deeply involved with pervious concrete for over a decade and regularly places pervious concrete both for TCA demonstration projects and commercial projects where he is asked to assist and train contractors learning about the correct placement of pervious concrete. Alan holds the NRMCA
Pervious Concrete Craftsman certification and is a co-author on several research publications relating to pervious concrete, as well as other concrete topics. He works closely with universities in Tennessee to design and direct research relating directly to current concrete issues, and TCA publishes this research in Tennessee Concrete magazine on an ongoing basis.

Alan maintains an active teaching and training schedule and has taught parts of the NRMCA Concrete
Sales Professional program for California, Tennessee, Georgia, Kentucky, Indiana, Texas and New
Jersey, as well as for the National Ready Mixed Concrete Association. In addition, he is an approved examiner for the ACI Flatwork Finisher program and is certified to teach the NCCER Wheels of
Learning Concrete Craft Training.

As a firm believer in lifelong learning, he completed his Masters of Business Administration degree in
May of 2004 from Jones International University. In November of 2006, Alan became a LEED
Accredited Professional through the U.S Green Building Council and in January of 2007 Alan earned his Certified Association Executive (CAE) designation, a certification earned by less than 5% of all association professionals. He currently holds 15 technical and professional certifications related to concrete, construction and association management.

Alan was honored to receive one of the prestigious Kodak American Greenways Awards in 2004 for his efforts in making the Count on Concrete bike ride across America a success. He was honored with the 2010 Tennessee Sustainability Award by the Tennessee Environmental Council, and has twice been honored with the TCA President's Award (2008 & 2013). In April of 2016, Alan received the
Concrete Sustainability Award from the American Concrete Institute "for significant mentorship of the concrete community in the field of sustainability and exemplary outreach to those in the public, private and social sectors improving recognition, understanding and appreciation for the sustainable benefits of concrete as a building material." Also in 2016, Alan was recognized as the 2015 Association
Executive of the Year by the Tennessee Society of Association Executives.

TCA has been named by the National Ready Mixed Concrete Association as the State Association of the Year three times under Alan's leadership, with the most recent award coming for 2015.

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Concrete Questions and Answers

Abstract: Rapid fire session where participants ask any question they want about concrete and the presenter provides a fact-based answer. (Presenter reserves the right to say: I don't know!).

Presenter Bio:

Alan Sparkman has served as the Executive Director of the Tennessee Concrete Association since 1998. He regularly teaches concrete industry professional courses across the US and served as an Assistant
Professor at Middle Tennessee State University for the Concrete Industry Management program for the
2010-2011 academic year. He developed and teaches a class on Concrete Construction Sustainability for the "Concrete" MBA program at MTSU.

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Case Study - Historical research relevant to Civil Engineering Today

Abstract: Learn ways to research sites (for free) utilizing library resources, Sanborn maps, civil war maps, title research and City directories. Hear about the riveting tale of the Stone Fort and the methods used to uncover a historical engineering marvel!

Presenter Bio: Emily Dixon works for the City of Chattanooga Land Development Office as a Development Review Planner. Using the Form Based Code she reviews plans, makes suggestions to reduce variances and prepares variance cases to go before the Form Based Committee. Emily holds a degree from the University of Georgia in Athens.

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Environmental Justice: Overview and Opportunities in Tennessee

Note: This presentation counts as 1 PDH Ethics

Abstract: This presentation will provide a brief overview of Title VI of the Civil Rights Act of 1964, the concept of environmental justice, the Tennessee Department of Environment and Conservation's (TDEC) approach to pursuing equity in administration of its programs and services, environmental justice in action at TDEC, and how environmental justice may come into play during development projects. The presentation will also highlight tools available for understanding environmental justice concerns.

Presenter Bio:

Kendra Abkowitz currently serves as Assistant Commissioner for Policy & Sustainable Practices for the Tennessee Department of Environment and Conservation (TDEC). Kendra leads the department's efforts to conduct short and long term environmental policy research and analysis; provide technical guidance to business, industry, and other public entities to promote environmental stewardship and resilience; implement departmental strategic planning initiatives; administer voluntary sustainability and resilience programs; and perform Title VI and Environmental Justice functions in an effort to better conserve Tennessee's natural resources. She regularly engages with federal and state agencies on new initiatives, proposed rulemakings and other environmental policies that may impact TDEC's programs and collaborates with state and local leaders, non-governmental organizations and the academic and business community to exchange views on matters relevant to environmental policy and sustainability. Kendra was significantly involved in the development of TDEC's comments submitted to the U.S. Environmental Protection Agency on the proposed Clean Power Plan, worked on development of Tennessee's strategy for improving the energy efficiency of state-owned facilities, facilitated the process for developing an approach to permitting voluntary wastewater reclamation and reuse within the state, and has been a primary contributor to development of policies and programs designed to reduce food waste in Tennessee. Previously, she served as Policy Analyst, Senior Policy Analyst and Director for the Office of Policy & Planning.

Prior to working at TDEC, Kendra served as a Sustainability Professional at Vanderbilt University, where she designed, implemented, and managed numerous sustainability programs designed to reduce environmental impacts resulting from operations within the University and Medical Center and at campus special events. Kendra holds a PhD in Environmental Management and Policy and a Bachelor's Degree in Economics and Sociology from Vanderbilt University and a Master's Degree in Sociology from the University of Chicago. She is currently pursuing an MBA at Middle Tennessee State University.

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Geophysics and Our Aging Infrastructure

Abstract: Assessment of our country's aging, if not crumbling, infrastructure is becoming increasingly important. The ASCE's Report Card for America's Infrastructure (2017) received a "D+" grade. Everything from bridges, pavements, and dams to land development requires a better understanding of what is located beneath the surface. That said, geophysics is able to play a considerable role in providing a very cost effective and non-destructive means for subsurface evaluations to assist in making our infrastructure more updated and ultimately safer. This presentation will highlight a variety of applications using several case studies from several different projects located throughout the southeast.

Presenter Bio: Kevin Hon has over 15 years of experience in shallow subsurface geophysics after earning his BS in Geology at Wright State University and his MS in Geology at New Mexico State University. Mr. Hon has spent the majority of his career in geotechnical consulting with a particular emphasis on engineering and environmental applications. However, four of those years were actually working for a manufacturer of geophysical systems. He currently serves as the geophysical services group leader and technical lead for geophysical applications within S&ME.

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Nondestructive Testing Methods in Civil Engineering Applications

Abstract: Nondestructive Testing (NDT) are useful tools for civil infrastructure developers. This presentation explores various types of civil engineering nondestructive testing methods and presents some case studies that demonstrate cost savings and risk reduction.

Presenter: Ariel Soriano graduated from the University of Minnesota with a B.S. in Civil Engineering and has more than 25 years of experience that includes: Forensic, Geosynthetic, Geotechnical, Hydraulic, Materials, Pavement, & Structural Engineering; Statistical QA/QC; and LEAN & Six Sigma-Based Manufacturing.

Ariel worked as a Staff/Project Pavement and Materials Engineer for the South Dakota DOT Office of Research evaluating, testing and assessing construction materials, and existing pavement and engineered structures; developing specifications for new and rehabilitation projects; and managing multi-discipline construction projects. He has worked as a Senior/Principal Engineer for a geosynthetics manufacturer and for a regional/national/international engineering consultants as a Senior Geotechnical, Pavement, & Materials Engineer.

Beginning in 2006, as an Engineering Manager for the City of Chattanooga, Ariel provided civil, forensic, geotechnical, hydraulic, materials, pavement, and structural engineering oversight; and supervised project planning, specifications development, and contracts for City construction projects.

Ariel then spent 6 years as VP-SCP Technology for Spray-Lock Concrete Protection, a Chattanooga-based manufacturer. He returned to the City in late 2018 as Senior Engineer in the Land Development Office.

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Earth Retaining Structure Design Requirements within the City of Chattanooga

Abstract: Session will provide brief overview of adopted code, specs and design methods for earth retaining structures in the City of Chattanooga. The session will also cover material selection, analytical methods and normal construction constraints.

Presenter: Ariel Soriano graduated from the University of Minnesota with a B.S. in Civil Engineering and has more than 25 years of experience that includes: Forensic, Geosynthetic, Geotechnical, Hydraulic, Materials, Pavement, & Structural Engineering; Statistical QA/QC; and LEAN & Six Sigma-Based Manufacturing.

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Tennessee Stream Mitigation Guidelines and Aquatic Resource Alteration Permit Updates

Abstract: Compensatory Mitigation for impacts to aquatic resources should be developed in a scientifically defensible manner approved by the applicable regulatory agencies, which demonstrates sufficient increase in resource values and function to compensate for permitted impacts. TDEC Division of Water Resources has updated the Stream Mitigation Guidelines for the State of Tennessee. This presentation will provide an overview of the 2019 Stream Mitigation Guidelines for the State of Tennessee, recent TDEC ARAP Rules Revisions and other related topics.

Presenter Bio: Vena Jones is a Professional Geologist with the Division of Water Resources. She has worked in the water resource protection industry for nearly 20 years. Vena has a BS in Geology and Hydrology from the University of Arizona and an MS in Geology from Vanderbilt University. Vena was the project lead for the 2019 Stream Mitigation Guidelines, TN Stream Quantification Tool, and TN Debit Tool. She regularly consults on stream and wetland restoration projects.

Most recently, Vena has taken a position as the natural resources lead for the State Revolving Fund loan program where she will be focusing on community based resilience, green infrastructure and adaptive management in the face of a changing environment.

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Quantitative Data Management of the City of Chattanooga's Wet Weather Consent Decree Program

Abstract: Management of any program involves what can be extremely challenging tasks in scope, schedule, and budget. While those are the foundation of a good management program, the solution may be the most difficult to get your arms around and handle. All the standard management metrics may be met but at the end of the day, if you're not on track with the solution, you're just not on track.

The City of Chattanooga has entered into a Consent Decree (CD) with the EPA in an effort to significantly reduce system inflow and infiltration (I&I) and to ultimately eliminate sanitary sewer overflows (SSOs) throughout the system. Jacobs has contracted with the City to be their program manager to implement the CD program. Thus far, Phase I, which consists of approximately 85 projects and tasks is nearly completed, leading into Phase II which will add an additional 50 projects starting in the second half of 2019. With the massive amount effort invested in the program, it's imperative we regularly track and highlight our progress to effectively meet the program goals and the CD requirements. With this objective, we have focused on quantitative data management and have developed methods and analytics to efficiently guide the capital planning for cost effective, affordable, and technically innovative and feasible solutions.

The program has performed multiple rehabilitation projects to reduce system I&I. In order to quantitatively assess the effectiveness of the completed projects, we have developed metrics utilizing the flow data collected pre and post project. This data is then associated with rainfall and other environmental data during the same periods; pre and post peak hourly wet weather flows are identified and then grouped based on rain amount. A comparison of the average pre and post flows is then made for each project. The data is collected, analyzed and updated quarterly to continuously incorporate new data and increase the analysis accuracy. By looking at the I/I reduction trend, the City is able to quantify the overall project performance of the rehabilitation efforts and better forecast future development.

Another metric of evaluating the rehabilitation effort is through SSO reduction. Jacobs utilizes the SSO data and rainfall data to perform various SSO analysis. We categorize the wet weather SSOs within the project area by year and by pre and post construction period to quantitatively evaluate the project effort in reducing SSOs. Jacobs has also performed similar analysis on an overall CD program basis by correlating the SSOs with rainfall and analyze the SSO trend by cause, duration and volume. These analyses also the support the management of the CD Capacity Assurance Program.

Moreover, after each major storm event, Jacobs collects various data and performs a storm event analysis. The analysis compares the facility flow/level data with rainfall, chronic overflow locations, and SSO data to evaluate the operations of the Wastewater Treatment Plant, Pump Stations and the Combined Sewer Overflow Treatment Facilities during the

storm event. Jacobs usually presents the analysis to the City to discuss operation scenarios, identify operational gaps, and recognize future projects.

Through data management and data analysis, Jacobs has normalized project results for comparison, helped the City better manage the program solutions and focus on problem areas throughout the system. We also use our data to extrapolate correlations to advise the City on the optimal technical and financial approach to SSO abatement. Our ultimate goal is to assist the City to develop a clear picture of the path forward and allow us to better manage the CD program and utilize the City funds in the best manner possible.

Presenter Bio: Shihua Xie currently works as an environmental engineer in the Jacobs Chattanooga, TN office, and assists the program management of the Consent Decree Program. Shihua holds a B.S. in environmental engineering from Georgia Institute of Technology. She brings experience in CAD, water quality and wastewater treatment. She works on flow monitoring and data management of the city sewer system, performs program solution analysis, and helps with various program financial management tasks including budget reconciliation, SRF disbursement and invoicing.

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Introducing a Centralized Guidance Resource for Stormwater Best Management Practices Performance Evaluations

Abstract:

The Interstate Technology and Regulatory Council (ITRC), a subcommittee of the Environmental Council of States (ECOS), recently published a web-based and centralized resource for information on post-construction stormwater BMP effectiveness (water quality treatment). Comprehensive guidance is provided on how to use and implement that information. The guidance document, a BMP screening tool, and four short “explainer videos” are available at https://stormwater-1.itrcweb.org/. This presentation explains the framework and objectives of the guidance document to assist stakeholders with BMP lifecycle processes including:

- Screening,
- Selection,
- Installation,
- Operation,
- Monitoring, and
- Maintenance.

National verification programs and public domain data repositories are featured to provide reliable, vetted data sources to the user for evaluating their BMP needs. The document provides applicable lifecycle considerations including contracting and generalized qualitative costs. Installation factors are detailed from construction challenges to inspection checklists, quality control factors and record drawings. It goes on to address long-term technology- and performance-based operational strategies, including aspects such as routine and non-routine maintenance. Data and information from existing publicly available BMP performance programs has been incorporated into an online BMP Screening Tool.

Using site-specific pollutant treatment requirements and installation considerations, the Tool can assist the user by narrowing BMP options to a list that is appropriate for a given set of site conditions. Also, the Tool provides users with summarized information on the treatment efficiencies, installation requirements and maintenance issues regarding the identified BMPs with links that connect the user with detailed data and fast links to information from across the nation.

It is intended that a live online Q&A Panel will be implemented in mid-2019 and on a regular basis thereafter to assist users with this BMP resource.

Presenter:

Mark B. Miller serves as Research Scientist for AquaShieldTM, Inc., a manufacturer of stormwater treatment systems headquartered in Chattanooga, Tennessee. He is responsible for product development, regulatory affairs as well as directing lab and field testing programs. Mark is a member of the Chattanooga Stormwater Regulations Board and is a former Technical Committee Chairman for the Stormwater Equipment Manufacturers Association. Mark holds an M.S. in Geology from Centenary College in Shreveport, Louisiana and a B.A. in Geology from the University of Tennessee, Knoxville.

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TVA Public Land Use (Land Plans and Land Rules)

Abstract: Section 26a permitting (When is a permit needed, what is a complete application, and how to avoid a violation or encroachment.)

Presenter (1): Ben Bean has worked with the Tennessee Valley Authority for the last 17 years in public land management, regulatory permitting, and natural resource stewardship projects and partnerships. Currently Ben is serving as Sr. Policy Specialist for Stewardship Projects and TVA's Natural Resource Policy. Prior to this Ben served as the Program Manager for 5 reservoir watersheds in the western region of the Tennessee Valley, including Nickajack and Chickamauga reservoirs. This position is now occupied by John Falco who is here today with Ben. Ben's career has been dedicated to natural resource conservation and environmental policy and management. He looks forward to explaining the work TVA does to support the unified development of the Tennessee River for multiple uses and public benefits through Section 26a permitting.

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Presenter (2): John Falco is the Program Manager in Land Use and Permitting's Western Region. John has a Bachelor's degree in Environmental Studies from Maryville College, Tennessee. He came to TVA in 2010 and has worked as a watershed representative doing permits and land disposal actions. John was the Land Use and Permitting Program Manager for the Knoxville, Tennessee Region before accepting a transfer to the Guntersville field office.

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U.S. Army Corps of Engineers Permitting

Abstract: Scope of Analysis 2. The need for a USACE federal permit for filling wetlands or work and structures in navigable waters triggers the need for compliance with other federal laws, including the Endangered Species Act, the National Historic Preservation Act, and the National Environmental Policy Act. This presentation will focus on what portions of an overall project are evaluated as part of the U.S. Army Corps of Engineers permit evaluation.

Presenter: Aric Payne

Presenter Bio: Aric has served as a Biologist with the U.S. Army Corps of Engineers Regulatory Division for the last 2 years, in the Chattanooga Field Office. He is responsible for verifying DA permit applications, jurisdictional determinations, and coordinating and managing mitigation banks. Prior to Regulatory, Aric served as an Aquatic Biologist with USACE in Huntington, West Virginia for 3 years, and an Aquatic Biologist with the Kentucky Division of Water for 5 years, where he was responsible for assessing aquatic environments via biological surveys of macroinvertebrates and fish.

Clean Water Act Updates and U.S. Army Corps of Engineers Permitting Overview

Abstract: The U.S. Army Corps of Engineers Regulatory Program is committed to protecting the Nation's aquatic resources and navigation capacity, while allowing reasonable development through fair and balanced decisions. This presentation will provide an overview of the definition of “waters of the U.S.,” permitting, and compensatory mitigation.

Presenter: Casey Ehorn

Presenter Bio: Mr. Casey Ehorn is Acting Chief of Regulatory Division, Nashville District, which consists of 30 talented and dedicated regulators working in the States of Tennessee, Kentucky, Alabama, Mississippi, and Virginia. Prior to working in Nashville, Casey worked for the U.S. Army Corps of Engineers in Seattle, Washington, and Birmingham, Alabama. Mr. Ehorn has completed two USACE Headquarters details, and is a graduate of the Army Engineer Research and Development Center University program. Mr. Ehorn is a graduate of University of Montana, and earned his Masters Degree at the Evergreen State College in Olympia, Washington.

Designing Stormwater Controls for the Future Landowner

Abstract: This presentation will focus on the design of on-site stormwater BMPs with the future landowner in mind. Comparisons will be made between stormwater BMP designs that are created to minimize front-end cost versus those that focus on long-term feasibility and owner needs. Attendees will learn about local government BMP maintenance programs, why property owner-led maintenance is so popular, and how these issues are creating unintended and difficult consequences for stakeholders. Site designers will learn how local government site design policy is changing to encourage BMP selection and designs that can alleviate these problems.

Presenter Bio: Mary Halley has 20 years of experience working as a consultant for local governments on stormwater issues. Her work spans cities and counties in 11 states and five EPA regions. She focuses primarily on stormwater management regulations, policies, support tools and funding, related to NPDES-MS4 permit compliance and comprehensive stormwater management business planning. In recent years, much of Mary's efforts have targeted the successful integration of green infrastructure into local government stormwater management programs.

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Best Practices for Relocating Rare Plant Species

Abstract: The results of relocation (sometimes referred to as translocation) studies, successful or unsuccessful, are rarely reported or published (Budelsky and Galatowitsch, 2000; Falk et al., 1996; Mangold, 2012; Drayton and Primack, 2012). Without a species-specific model on which we can base our project plans, what is the most efficient and cost-effective way to conduct a relocation? There are widely used methods to ensure relocation success. We urge practitioners (1) develop specific, measurable, and attainable objectives, (2) to conduct plant relocations as experiments set-up for long-term mitigation, and (3) to publish the results.

Presenter Bio: Clea (Klagstad) Cartwright, MS, is an Environmental Consultant and GIS mapping specialist with just under ten years of experience in the field. Clea independently coordinated, managed, and performed work for projects ranging from $5,000 to $1,000,000 through careful time management, attention to detail, and communication. She regularly consulted with a team of approximately 20-30 professionals and sub-consultants. More recently, Clea managed key proponents of environmental projects on multi-billion dollar budgets in various western states, including Presidential Permit preparation, fieldwork and field crew management, GIS mapping, and implementation of quality assurance controls.

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What's New in Subdivision Reviews

Abstract: Review of the updated major subdivision checklist for surveyors and engineers and well as an update on review process changes.

Presenter Bio: Lisa Thompson is the recently selected Subdivision Coordinator for the Chattanooga-Hamilton County Regional Planning Agency. Prior to joining the RPA staff, Lisa was the Client Support Specialist with Simplify Compliance in Brentwood, TN. She received her Bachelor's degree from the University of Tennessee and recently completed her Masters of Science in Sustainability from Lipscomb University where she studied environmental policy development. Lisa has over 12 years experience in planning and public administration while working for the State of Tennessee Local Planning Assistance Office, the South Central Development District, and multiple local city and county planning offices. When not working you can find her spending time with her husband, Boyd, and dog, Justice, or exploring a national park.

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Quantitative Estimation of Surface Water Quality Parameters Using Remote Sensing Technology in Southeast Tennessee

Abstract: Satellite remote sensing technology has been providing an opportunity for synoptic and multitemporal viewing of water quality for more than 25 years. The optical properties (i.e. reflectance) of water depend on the concentration and characteristics of suspended sediments, phytoplankton, and dissolved organic matters. Sensors aboard satellites can measure the amount of solar radiation at various wavelengths reflected by surface water, which can be correlated to water quality parameters (e.g. suspended sediments and chlorophyll-a). This constitutes an alternative means of estimating water quality, which offers three significant advantages over ground sampling. First, the near-continuous spatial coverage of satellite imagery allows for synoptic estimates over large areas. Second, the global coverage of satellites allows for the estimation of water quality in remote and inaccessible areas. Third, the relatively long record of archived imagery (e.g. Landsat since the early 1970s) allows estimation of historical water quality, when no ground measurements can possibly be performed.

Currently, no remote sensing based algorithm is available to study surface water quality at watershed scales in Southeast Tennessee. This study aims to investigate the potential of remote sensing technology to study surface water quality in the watersheds of Southeast Tennessee using satellite observations coupled with field measurements. The City of Chattanooga, TN, has grown substantially during the last several decades and has become the center of a series of urbanized sub-watersheds. The environmental impacts, especially the quality of surface waters due to this growth, have become a major concern for the sustainable developments of the greater Chattanooga areas. The successful development of the proposed water quality estimation algorithm would provide a powerful tool to study the impacts of land use and land cover change on the surface water quality in the watersheds of Southeast Tennessee.

This is an ongoing research, which is currently developing a series of numerical models to estimate turbidity, chlorophyll-a, conductivity, pH, and Dissolved Oxygen (DO) in the Tennessee River using Landsat 8 OLI imagery and concurrently obtained in situ measurements of corresponding water quality data. This talk presents the preliminary results of this research.

Presenter Bio: A.K.M. Azad Hossain, Ph.D. received his M.S. and Ph.D. degrees from the University of Mississippi (UM) (2004 & 2008) in Geological Engineering and B.Sc. and M.Sc. degrees from the University of Dhaka, Bangladesh (1995 & 1998) in Geology.

He worked in the National Center for Computational Hydroscience and Engineering at UM as a Post- Doctoral Research Associate and a Research Scientist for about seven years (Aug 2008-June 2015). He also worked in the Department of Geology and Geological Engineering at UM as an Adjunct Assistant Professor for more than five years (Dec 2010 – June 2015) and as a Visiting Assistant Professor for more than a year (June 2015-July 2016). Since August 2016, he is working as an Assistant Professor at the Department of Biology, Geology, and Environmental Science at the University of Tennessee at Chattanooga (UTC).

Dr Azad's research interests focus on the applications of GIS, Remote Sensing, and Spatial Analysis techniques in different areas of earth and environmental science. Specifically, he is interested in quantitative estimation of different geophysical variables in terrestrial and aquatic environments using remotely sensed data acquired in optical and microwave portions of the electromagnetic spectrum.

He teaches a variety of courses including Geographic Information Systems (GIS), Remote Sensing, Spatial Analysis, Radar Remote Sensing, Physical Geology, Historical Geology, Environmental Geology, Oceanography, and Engineering Analysis.

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Five Fundamentals for Cost Effective Erosion Control

Abstract: Successful restoration of disturbed sites requires a comprehensive and holistic approach. Those overseeing erosion and sediment control and resulting stormwater quality efforts must integrate several considerations supported by proper planning and execution. Measures taken and the degree of success realized during active construction can have major and enduring impacts on future water quality. This presentation will introduce five fundamentals essential to the success of any erosion and sediment control project.

The first fundamental employs creative methods to develop suitable growing media, typically from less than desirable substrates. "Soil deficient" sites associated with land disturbances offer considerable challenges, particularly when topsoil sources are scarce. Creating strategies to improve growing conditions can only be accomplished by first understanding the make-up of soils through comprehensive testing for agronomic potential, followed by incorporation of prescriptive amendments to remedy excesses and deficiencies of key soil constituents.

The second fundamental requires an assessment of suitable plant species for achieving sustainable growth and effective erosion control – while meeting the collective expectations of owners, their consultants, the installer and relevant regulatory agencies. Soil properties, climate, moisture regimes, slope aspect, maintenance, future land use and a host of other considerations contribute to proper species selection.

Once soil and agronomic considerations have been addressed, the third fundamental is to analyze site conditions to assess necessary erosion and sediment control measures. Site conditions, such as slope lengths, gradients and aspects and channel flow hydraulics must examined and proper controls selected. Quantifiable performance

attributes such as erosion control effectiveness, functional longevity and ability to facilitate growth establishment as well as cost effectiveness must be factored into determination of suitable techniques.

The fourth fundamental entails proper installation practices critical to the success of the project. Detailed specifications, drawings and guidelines must be developed and combined with qualified onsite supervision to assure proper installation. Finally, once reclamation measures have been installed, all active sites should be routinely inspected and maintained after each significant precipitation or other potentially damaging event – the fifth and final fundamental.

The Five Fundamentals are neither novel nor revolutionary advancements or methodologies for successful land rehabilitation, but rather the assimilation of time proven design considerations combined with proper execution and implementation in the field. This presentation will provide overviews highlighting essential components of each of the five fundamentals. Then, case studies where these fundamentals have been successfully integrated on erosion and sediment control projects will be presented.

Presenter Bio: Marc S. Theisen, M.S., CPESC, CPSWQ, CESSWI is Vice President of Business Development and Technical Services for Profile Products, LLC. He is responsible for developing new business in emerging market segments while overseeing activities of technical services to support business development through education, training and day to day technical assistance for clients, consultants and contractors. Theisen has extensive global experience in erosion and sediment control working on energy, mining, waste containment and infrastructure projects over six continents. He also oversees the development and technical marketing of a comprehensive family of erosion control, sediment control, agronomic amendment and storm water treatment technologies.

Marc is a founding member of the Erosion Control Technology Council (ECTC) and a member of the ASTM D18 and D35 Committees on Erosion Control, Sediment Control and Geosynthetics. He is an active and longtime member and past Technical Vice President of the International Erosion Control Association (IECA) and contributor to EnviroCert International. In 2007 Marc was recognized by Land Development Today magazine as a Stormwater All-Star – one of the most influential people in stormwater management and in 2015 as a “Mover and Shaker” by Storm Water Solutions magazine.

He holds five patents and has authored numerous papers that have assisted in creating industry standards and growth. In 2018 he earned EnviroCert International’s “Distinguished Service Award” and was honored with the IECA “2018 Technical Paper of the Year.”

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Update on the Chattanooga Airport

Abstract: Update on the recent growth at the Chattanooga Airport. Presentation will include passenger growth, an overview of a recent 20-year MasterPlan study and plans to build a parking deck and expand the terminal. Also discussed will be proposals for air service growth.

Presenter Bio: Blake Poole is a Native of Charlotte, NC and 1978 Graduate of Furman University. He has worked over 28 years for Delta Air Lines. The last 18 years were spent as a state and local lobbyist before retiring in 2008.

Later in 2008, he joined the Tennessee Department of Economic and Community Development as Special Assistant to Commissioner Matt Kisber, working solely on the Volkswagen production facility in Chattanooga.

Blake is Member of the Chattanooga Chamber of Commerce's Volkswagen Team. He handled all state and local issues related to Volkswagen, as well as coordinated issues between Tennessee, Georgia and Alabama.

In 2011, with the change of Administrations in Tennessee, he became a Business Development Consultant with the State of Tennessee and handled business recruitment and existing industry expansions in a 10-county region in Southeast Tennessee.

In December of 2015, he joined the Chattanooga Airport Authority as Vice President of Air Service and Economic Development and works with all the airlines to bring more flights into Chattanooga.

Blake lives in Calhoun, Georgia with his wife Sabrina Bell Poole and has 4 children and 6 grandchildren.

Blake Poole
Vice President – Air Service & Economic Development, Chattanooga Airport Authority

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Understanding Landscape Installation: Get your project off on the right foot!

Abstract: Understanding Landscape Installation: Get your project off on the right foot!

Presenter Bio:

Lyn Rutherford
City of Chattanooga
Water Quality Specialist 2, Green Infrastructure & Vegetation Specialist

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TDOT Responds to the Flood Triggering Landslides of 2019

Abstract: Over ninety-five emergency landslides will be mitigated in middle and east Tennessee as a result of the 2019 February flooding event. The event created and continues to create tremendous strain on the Department's customers, staff, and construction equipment resources; all this while programmed transportation improvements must continue to be rolled out. Seeking inspiration, the author used guidance based on papers developed for previous highway geology \ transportation geotechnical engineering conferences, such as a paper that discussed the flood events of 1973 in Tennessee.

This paper and presentation will discuss landslide types that typically occur in the Tennessee geological terrain, an overview of the different types of stabilization methods typically employed, and discuss the collaborative effort that occurred between the different stakeholders. Measures being taken to better manage TDOT's geotechnical assets following flooding events will also be addressed.

Presenter Bio: Robert Jowers is the manager of the TDOT Geotechnical Engineering Section. He leads a staff of thirty-four that provides project development support to roadway designers and structural designers, and also geohazards support. Robert is a licensed engineer, and attained his bachelor's of science degree in Civil Engineering from the University of Tennessee.

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Mountain Creek Stream Bank Restoration – A Collaborative Success Story

Abstract: Mountain Creek flows through the community of Red Bank, TN near Chattanooga and discharges to the Tennessee River. One section of the creek that was experiencing extreme erosion from flooding directly abuts Red Bank Elementary School. If left unaddressed, the bank erosion would eventually jeopardize the structural stability and safety of the School's access road and outdoor classroom.

TenneSEA (Student Environmental Alliance – now called Water Ways), a Chattanooga organization that collaborates with communities to teach children about their connection to nature, reached out to local Red Bank Elementary alumni who are involved in floodplain management, stormwater and the erosion prevention and sediment control (EPSC) industry. A collaborative team of local businesses (including Propex), non-profit organizations, school, and government agencies donated their time and resources to tackle the project.

Students at Red Bank Elementary also played a part by participating in the "Stream Team". The program teaches students about the natural world around them by using real-world problems while determining sustainable solutions. Students learned about watersheds, flooding, EPSC, water quality and were included in the engineering design.

To restore the stream bank and provide a sustainable solution, a combination of engineered earth armoring solutions were used. The system was designed to resist extreme hydraulic stresses, protect the stream bank and slope above the steam bank from larger flood events while promoting vegetation in lieu of hard armor. This vegetative solution will help promote water quality in an already impaired watershed.

The stream bank was stabilized in early 2018, protecting the school's access road, and most importantly providing a safe outdoor classroom for the students.

Presenter Bio:

Jeff holds a B.S. degree in Civil Engineering from Tennessee Technological University, is a licensed professional engineer and holds numerous state and national erosion prevention and sediment control and stormwater certifications. Jeff is also the TN state representative for the Certified Professional in Erosion and Sediment Control certification and is an approved instructor. Jeff spent 24 years in consulting engineering specializing in the field of stormwater and erosion prevention and sediment control including engineering design, management, regulatory permitting, construction engineering inspection, SWPPP development and environmental compliance. Jeff currently works for Propex as a Market Development Manager to help lead market development for erosion control and geosynthetic solutions.

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Engineering a Permanent Road Foundation

Abstract: Unbound aggregate materials are the largest transportation infrastructure asset for most state and local Departments of Transportation (DOTs). This asset is used in road bases and subbases as well as for surfacing of unpaved roads. Unbound aggregate layers also are the most vulnerable transportation infrastructure, as these layers are subject to premature failure due to deterioration, contamination and adverse hydraulic conditions.

These “out of sight, out of mind,” underappreciated and often under-engineered layers are the subject of this PDH article. The loss of support of unbound aggregate results in full-depth reconstruction, a total loss of the aggregate assets, and road downtime with traffic congestion and construction-related traffic accidents.

Readers will be shown improved best-management design practices and how to preserve unbound aggregate assets to enhance the performance of these layers. Use of the correct aggregate and a separation/stabilization geotextile can construct a Permanent Road Foundation (PRF) so full-depth reclamation and total reconstruction may be avoided. The quality of aggregate enabled by the selection of the proper geotextile will maximize the cost effectiveness of these now-permanent road layers.

Demonstration is provided for how the structural and hydraulic benefits of nonwoven geotextiles make them the most cost-effective geosynthetic to be used in the establishment of a PRF. Comparison will be made between unbound aggregate PRF and other types of road support layers. The PRF will significantly lower the Life Cycle Cost (LCC) of the road. Overall Life Cycle Assessment (LCA) considerations also will be discussed.

Learning Objectives

- Why roads fail prematurely and how to assess the damage of unbound aggregate layers within their jurisdiction.
- The detrimental effects of road base layers becoming contaminated with subgrade soils.
- How to create a cost-effective Permanent Road Foundation (PRF) using a separation/stabilization geotextile.

• Why a PRF is the most durable and cost-effective road support layer compared to alternative strategies.

• How critical friction, durability and hydraulic properties uniquely position nonwoven geotextiles as the preferred geosynthetic to enable a PRF.

• How the preservation of unbound aggregate layers can dramatically lower the Life Cycle Cost (LCC) of transportation infrastructure.

Presenter Bio: David Andrews is a registered professional engineer in Georgia and Tennessee with more than 23 years of experience in product development, marketing and technical sales. He earned a Bachelor of Civil Engineering from Auburn University and a Masters of Arts in Teaching in Mathematics Education from The University of Georgia. David lives in Lawrenceville, GA with his wife, Milagros (Mily), and sons Ivan (21) and Addison (16). He enjoys renovation remodeling projects, cooking, social dancing and traveling. In 2017 he and his wife paced 2nd in Atlanta's Peruvian Marinera Championship.

David B. Andrews, P.E, Propex Geosolutions
Transportation Market Segment Manager

Brownfield Cleanup at the Former Glover Tract – Riverwalk Trail

Abstract: Case Study: Brownfield Cleanup at the Former Glover Tract – Riverwalk Trail

Presenter Bio: Matt Aplin
Presenter Bio: Mark Harrison, PE, PG,
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Riparian Rights-Who owns the rivers in Tennessee

Abstract: Session will discuss riparian rights – Who owns the rivers in Tennessee? Presentation will also cover the basics of working on TVA owned shoreline and usage issues for surveyors, engineers and attorneys.

Presenter Bio: Mr. Savage is currently manager of the Survey Products group at the Tennessee Valley Authority (TVA) in Chattanooga, Tennessee. Prior to his service at TVA he was in private survey practice for 10 years

specializing in dispute resolution and expert witness services. He has surveyed several disputed state boundaries to resolve jurisdictional conflicts. Mr. Savage is an adjunct professor at Cleveland State Community College where he teaches courses in boundary law, geodesy, GIS, and surveying fundamentals. He has researched and retraced the historical surveys of Henry David Thoreau and has published several articles on the subject. Mr. Savage teaches exam review and continuing education seminars at various state and local conferences across the country. He has served as director of production for Cook and Spencer Consultants in Chattanooga. Mr. Savage was senior designer at Psi Consulting Engineers where he worked on structural and environmental design. And, he was a survey supervisor at Whitfield Engineering in Dalton, Georgia. Mr. Savage received his B.S. degree, with high honors, in civil engineering technology from the University of Tennessee at Martin.

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GIS Web Tools for Project Management – TDOT I-124/US 27 Project

Abstract: This will be a demonstration of a live GIS web application built to assist design engineers, construction engineering inspectors, surveyors, project managers, contractors, and the Tennessee Department of Transportation (TDOT) in the overall management of a 2.4-mile, $140 million transportation project through the center of Chattanooga, Tennessee.

Presenter Bio:

Dixon Brackett is the President/Chief Manager of Earthworx, LLC. She is a professional geologist, professional surveyor, and a certified manager in building information modeling. She has 39 years of experience as an engineering geologist, over 20 years' experience in geographical information systems (GIS), and 33 years' experience in surveying technology. Ms. Brackett and Earthworx, LLC were chosen from over 100,000 companies world-wide as recipients of the Special Achievements in GIS award from ESRI.

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Other Ways Design Professionals Impact the World

Abstract: Engineers may be involved in many aspects of the community outside of their regular work. There are several wonderful organizations that are good fits to utilize engineering skills to impact the world. Look for information or representatives from a few of those organizations & opportunities at the symposium.

- ACE Mentor Program:

The ACE Mentor Program mission is to engage, excite and enlighten high school students to pursue careers in architecture, engineering, and construction through mentoring and to support their continued advancement in the industry.

- WaterWays:

Waterways (formerly the Caribbean and Tennessee Student Environmental Alliance) works with kids and their communities to protect and restore water where they live, work, and play.

WaterWays is devoted to clean water, both in the Caribbean Basin (dba CaribbeanSEA) and in the Tennessee Valley. We run camps and educational programs in both areas to empower kids and communities to protect and restore their water where they live, work, and play.

Unlike environmental organizations that attempt to effect change from without, WaterWays works to make a difference from within. Staff and volunteers the train local educators and students to design, implement, and monitor projects that conserve the local marine ecosystems. Through these efforts, the next generation of leaders will protect the environment which provides economic stability.

WaterWays has seen much success since our founding in 2004! Part of that has been to include work in the Tennessee Valley, through our subsidiary, Tenne-SEA Clean Water Project (now rebranded as Water Ways) and our outdoor gear re-sale shop, The Gear Closet. Through collaboration with the electric utilities, government entities, resorts, and community groups, thousands of students and teachers are more attuned to conservation of their local resources.

The main office of WaterWays is in Chattanooga, Tennessee. We also have an office in St. Lucia from which our Caribbean SEA Program Director works.

YOU can help us further our mission . . . to put students in charge of protecting their environment. Our goal is to help achieve clean water for all.

https://www.caribbean-sea.org/about-us/

- TN SAVE:

Following large-scale disasters (tornadoes, floods, earthquakes, etc.), there is a need to assess buildings for safe occupancy and continued use. Critical facilities (emergency operations centers, hospitals, shelters, etc.) are key to community recovery and must be inspected for safety quickly following a disaster. Likewise individuals and business owners will want to return to home, school, or work and need to know if buildings are safe. State and Local Jurisdictions may not have the resources to inspect a large quantity of buildings in a short period of time, so it is essential to prepare ahead of time to have knowledgeable and trained individuals available on short notice. In Tennessee, these individuals are known as SAVE Inspectors.

The Tennessee Structural Assessment and Visual Evaluation (TNSAVE) Coalition is a group of professional organizations whose objective is to help the Tennessee Emergency Management Agency (TEMA) develop and maintain a post-disaster building inspector program. TNSAVE serves TEMA and the State of Tennessee to identify and recruit, train and organize, and mobilize building inspectors following a disaster.

TNSAVE Coalition is designed for individuals who have experience and training in building design and construction to assess buildings and vertical structures for safety and/or occupancy following disasters in the state of Tennessee.

TNSAVE Members include architects, professional engineers, and other qualified individuals who will assist the Tennessee Emergency Management Agency (TEMA) following a disaster.

http://www.tnsave.org/home

Representative: Caitlin Moffitt, ACE Mentor Program

Representative: Mary Beth Sutton, Water Ways (formerly TenneSEA)

Representative: Mack McCarley, TNSAVE

POSTER PRESENTATION: Reasons for Rarity: Exploring Plant Abundance in a Changing World

Abstract: In the midst of the sixth mass extinction, rare species are becoming extinct at disproportionately higher rates than common species. In this context, it is important to understand the drivers of rarity to facilitate more concerted efforts towards rare species conservation. Through our research, we aim to elucidate such mechanisms through single-species and congeneric studies in order to inform how global change will shape future plant species distributions.

Presenter Bio (1): Savanna Wooten is a graduate student at UT Chattanooga with research focused on conserving the federally threatened White Fringeless Orchid, in addition to other plant rarity studies. Her research interests include plant ecology, plant physiology, and global change.

Presenter Bio (2): Jared Odell is a graduate student at UT Chattanooga working on a project funded by the National Science Foundation (NSF) assessing the drivers of plant species rarity specifically focused on the rare endemic Ruth's Golden Aster. His additional research interests include global change biology, rare species conservation, and plant ecology.

POSTER PRESENTATION: Toxicology of Emerging Nano Pollutants

Authors: Snehal Ujjina and Jejal Bathi

Abstract: Recent increase in use of nanomaterial has led to their potential increased release to environment and hence potential toxic risk to eco-system. Researchers are exploring toxicity of such emerging pollutants with primary focus on the environmental implications, including exploration of toxicity to organisms from wide-ranging parts of the ecosystem food webs. Our poster summarizes potential toxicity and current understanding of engineered nanoparticles to ecosystem.

Presenter Bio: Snehal is a high school student in his junior year at Boyd-Buchanan School, Chattanooga. With the passion in the public health from environmental stressors, Snehal is exploring the topics in the area of emerging environmental contaminants and their impacts on the public health.

POSTER PRESENTATION: Nanomaterial: Characterization and Treatment in Urban Stormwater Runoff

Authors: Patrick Craig, Steven Sawyer and Jejal Bathi

Abstract: Our on-going research is looking at the adsorption capacity of different engineered and natural bioretention media and their performance for treatment of emerging engineered nanomaterial contaminants in surface waters. DLS technology combined with spectroscopic techniques are used to detect these particles in a range of 1-100 nanometers; along with many different parameters to illustrate the media's adsorption efficiency. Our poster will present an overview of ENMs and their potential treatment using adsorption approaches.

Presenter Bio (1): Patrick Craig is an undergrad Civil Engineering researcher at the University of Tennessee at Chattanooga. Patrick is passionate about water resources engineering and natural system. He is interested in pursuing career in designing green infrastructure and low impact development.

Presenter Bio (2): Steven Sawyer is a 3rd year undergrad Civil Engineering student at University of Tennessee at Chattanooga. He is a student ambassador for the college of engineering. Steven is researching environmental engineering over the past two years and he hope to have a career researching and designing new solutions to emerging environmental issues.

POSTER PRESENTATION: Decision Supporting Hydrodynamic Modeling of Tennessee River Decision

Authors: Shuvashish Roy and Jejal Bathi

Abstract: River simulation models can be instrumental in the decision-making process for scared water resources management. EPA's Environmental Fluid Dynamics Code (EFDC) is one of such models that can simulate hydrodynamic and water quality to support decision making. In this poster, we present the development of a user-friendly grid generator for EFDC and its application to the Tennessee (TN) River in the urban stretch of Chattanooga, below Chickamauga Reservoir**.**

Presenter Bio: Shuvashis Roy is a master's student in Civil Engineering at the University of Tennessee at Chattanooga and expected to graduate with his master's degree in December 2019. He received bachelor's degree in Civil Engineering with major in Environmental Engineering. Shuvashish is exploring the use of 3D hydrodynamic fate and transport modeling of nanomaterials in surface water.

POSTER PRESENTATION: Characterization of Nano Contamination: Challenges and Findings

Authors: Syed Tareq and Jejal Bathi

Abstract: Nano contamination (particulate contaminants of <100 nm) in surface waters is a growing concern worldwide. Due to their ultrafine invisible nature, it is very difficult and highly technical to detect them in the aquatic environment. We have conducted a systematic review of the procedures and techniques that researchers are currently using and developed a methodology of characterization of the nano contaminates in surface waters. We are currently applying the newly developed characterization techniques to quantify the nano contamination in surface waters from different urban source areas.

Presenter Bio: Syed Tareq is a graduate student in Civil Engineering at UTC and expected to graduate with his Master's degree in December 2019. Syed has a great passion to work in the field of environment, especially mitigation of urban pollution. As part of his thesis project, Syed is quantifying contributing source specific nano pollution in urban environment.

POSTER PRESENTATION: Three Dimensional Mesh Representation of Urban Environment Using OpenStreetMap Data

Abstract: Computational simulations involving numerical solutions to partial differential equations for physical problems involve three phases; preprocessing, processing, and postprocessing. In the preprocessing phase, meshes are created. Meshes (or grids) are discretized finite elements which represent the physical geometry for which numerical simulations is intended. Meshes constitute essential component of simulations involving numerical analysis and their generation techniques can vary. Few attempts have sought to represent the urban environments in form of computation meshes that can be used for simulation involving urban spaces such as computational fluid dynamics modeling (CFD). In this research, a robust watertight mesh generation program for cityscape computational fluid dynamics (CFD) simulation was created. The program, created using MATLAB, depend only on geospatial database (OpenStreetMap) for the required data and incorporates Triangle, a popular two-dimensional Delaunay triangulation software to generate unstructured grids that make up the hybrid tetrahedral volume mesh of the cityscape. The program extracts coordinate and heights of buildings within selected domain from OpenStreetMap database and processes the data to generate the required meshes.

Presenter Bio: Babatunde Atolagbe is second year master's candidate of Civil Engineering at the University of Tennessee at Chattanooga with anticipated graduation in December 2019. He holds a bachelor's degree in Civil Engineering from the University of Ilorin, Nigeria and has a few work experiences in the construction and consultancy engineering. His current researches are focused on infrastructure materials, civil infrastructure systems and smart cities and he utilizes both experimental and computer modeling to solve civil engineering problems.

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