2021 TNGIC Spring Virtual Conference Presentations

APRIL 20th

Tennessee's Forest Products Industry: Growing Trees & the Economy – Rachel Greene, TN Division of Forestry

Timeslot: 9:35-9:55 CT /10:35-10:55 ET

The forest products industry has a substantial impact on Tennessee's economy. Yet, relatively few policymakers and members of the public know what modern forestry looks like and how it impacts communities across the state. This lack of awareness about the forest products industry is part of a larger communication gap in regard to active forest management and the benefits of forests to communities. Active forest management, which includes timber harvesting, increases disturbance and diversifies forests so they can be more resilient on the Tennessean landscape. As 83% of forests in Tennessee are privately owned, the mechanisms for disturbance and active forest management must meet the many objectives that landowners might have: recreation, income, aesthetics, wildlife, and a sense of place. Diverse, competitive, and sustainable forest products markets is a compelling tool to convince private landowners to keep their forestland intact and forested. Furthermore, many mills and areas of timber harvest are located in counties that currently experience economic distress. The forest products industry and the accompanying active forest management enable forest regeneration and age diversification as well as provide opportunities for employment and forestland retention. In this way, Tennessee's forest products industry is growing rural economies and trees for the next generation.

Rachel Greene joined Tennessee Division of Forestry in 2020 as the Forest Data and Analysis Unit Leader. She previously worked in academia researching plant and fire ecology, wildlife responses to forest management, and how the South's forested landscape may change over the next 40 years. Rachel combines a systems-thinking, collaborative approach with data visualizations to tell compelling stories about why forests and forest management are important.

MEGA:BITESS - Michael Camponovo, Dr. Becky Trout Fryxell and Corey Day, University of Tennessee

Timeslot: 9:55-10:15 CT / 10:55-11:15 ET

Medical Entomology & Geospatial Analyses: Bringing Innovation To Teacher Education & Surveillance Studies - The MEGA:BITESS Academy is designed to stimulate innovative classroom teaching and learning, facilitate a workforce interested in entomology and geospatial sciences, and foster a community aware of La Crosse encephalitis. We train educators to develop STEM projects for their

middle- and high-school students by examining environmental factors related to the mosquito oviposition (egg laying). This work also increases awareness of La Crosse virus, an arbovirus that effects children and can cause neurological problems to memory and skills. Learn more about the program at https://www.megabitess.org/ and view our data hub at https://megabitess-tga.hub.arcgis.com/. MEGA:BITESS is funded through a USDA PD-STEP grant.

Michael is the GIS Outreach Coordinator and a GIS Instructor for UTK Geography. Under his direction the department's community and stakeholder engagement has expanded in a variety of formats, including direct instruction to students in K-12 classrooms. Michael works with K-12 educators to promote geospatial technology and provide educator-focused professional development. He coordinates efforts with partners to provide career and mentoring resources.

Becky is a medical and veterinary entomologist in the Department of Entomology and Plant Pathology at the University of Tennessee. Becky uses her formal training in her research and teaching program at UT. Her research program focuses on managing vectors and their pathogens to improve human and animal health and welfare. This project directly aligns with her interests in mosquitoes and La Crosse virus, as she has worked with both state and county health departments to improve Aedes mosquito and virus surveillance.

Corey is a PhD student in medical and veterinary entomology at the University of Tennessee.

What's new with Esri Products and Services – Bob Rike, Sunny Fleming, Andrew Sharer and Matthew Viverito, ESRI

Timeslot: 10:15-10:35 CT / 11:15-11:35 ET

Overview of new of some of the new products and services introduced by Esri to support our users. A digital resource leave behind will be part of the presentation..

Robert (Bob) Rike is an Account Executive on the Esri State and Local Government Team based out of Charlotte North Carolina. He has been with Esri for 15 years and currently supports State Agencies in Alabama, Georgia, Tennessee and Virginia with their implementation of GIS systems and geospatial solutions. Prior to joining Esri Bob worked as the Assistant Coordinator for the Virginia Geographic Information Network (VGIN). He has also worked in the electric utility industry and local government supporting GIS implementations. Bob earned a Bachelor of Landscape Architecture from Virginia Tech.

ArcGIS Hub Basic for Tennessee State Parks: Internal- and External-facing Use Cases – Rachel Schultz and Andrew McDonagh, TDEC TN State Parks

Timeslot: 10:45-11:05 CT / 11:45-12:05 ET

Tennessee State Parks leverages ArcGIS Hub Basic to organize and distribute shared GIS resources both internally and externally. Smart Parks Open Data is a public-facing site connected to the Tennessee State Parks website, serving external customers with maps and data. The internal-facing Smart Parks Command Hub serves as a one-stop shop for rangers and other park staff to access GIS data and tools, organized by division or working group.

Rachel Schultz is a geospatial analyst, developer, and cartographer local to the greater Nashville area and an alumna of MTSU's graduate program in GIS. In her current role as GIS Lead with the Tennessee Department of Environment and Conservation, Rachel engineers solutions to spatial problems related to natural and cultural resource conservation, recreational facilities management, State Parks marketing, and more. In her spare time, Rachel is a voracious reader and enjoys camping in Tennessee State Parks with her husband, Jonathan, and dog, Clementine.

Andrew McDonagh is a GIS Specialist who received his MS in GIS from the University of Redlands, CA in 2017, and BS in Parks, Recreation and Tourism from the University of Vermont in 2013. Some of his most enjoyable mapping experiences have been in the last few years working with federal and state governments doing GIS for parks planning, creating solutions in the office, and GIS wilderness and trails inventorying in the field. Andrew loves where his mapping work virtually "takes" him daily, and how he can learn about the world through maps, travel, and photography.

Related Tables: Improving Your Data with Relative Ease – Jeff Kirchberg, City of Maryville

Timeslot: 11:05-11:25 CT / 12:05-12:25 ET

In this presentation, we will be introducing users to related tables and how to integrate them into your workflow. Related tables can provide depth to spatial data without creating infinite attributes or loss of historic data. A brief demonstration will be provided on how to create these in both ArcMap and Pro, and some use-cases that have provided great value to stakeholders.

Jeff Kirchberg is the GIS Programmer for the Water and Sewer Department for the City of Maryville where he performs database development, new software implementation such as IT Pipes, Survey123, and Field Maps, and education and training of end users. He is passionate about the further education of both office and field workers and developing systems to allow better data driven decisions. Jeff is especially interested in developing new ways for data managers to design systems, educate users, and manage data in an effort to fully realize the goals of an organization.

Update on High School GIS Duel Enrollment in Tennessee - Kurt Butefish, Tennessee Geographic Alliance and Michael Camponovo, University of Tennessee

Timeslot: 8:40-8:50 CT / 9:40-9:50 ET

A brief update on the availablity of duel enrollment community college courses in high school for Career and Technical Education (CTE) students in Tennessee. Progress in the CTE course ""Introduction to GIS"" will also be discussed.

Kurt Butefish is the Executive Director of the nonprofit Tennessee Geographic Alliance. The mission of the TGA is to advance geographic literacy in the state through K-12 teacher professional development, creation and dissemination of geography related classroom materials and programs, and advocacy for geography and geospatial technologies in the K-12 educational arena. Butefish is a member of the TNGIC Education Committee.

Modernizing the National Spatial Reference System – Brian Shaw, NOAA

Timeslot: 9:40-10:00 CT / 10:40-11:00 ET

The National Oceanic and Atmospheric Administration's (NOAA) National Geodetic Survey (NGS) has been providing the positioning infrastructure for the nation since 1807 when Thomas Jefferson created the Survey of the Coast. Society continues to learn more about how dynamic our world is, through improvements in technology with satellite based positioning, and other new systems of measurement that did not exist when today's National Spatial Reference System (NSRS) was developed. The world is in constant change and there is a need to track changes in our environment with faster and more accurate observations. This can be accomplished with a modernized NSRS that will provide a precise, consistent and accurate positioning infrastructure that is readily and easily accessible primarily through Global Navigation Satellite System (GNSS) observations. The NSRS will provide the spatial infrastructure for the future of self driving cars, building information models, and improving flood plain mapping for the safety of life and property. The NSRS will be easier and more cost effective to maintain providing the ability to account for dynamic changes in positioning such as plate tectonics; subsurface ground fluid withdrawal induced subsidence -- in some places inches per year of vertical change; and other geophysical phenomena. This presentation will provide an update of how the future NSRS will improve and what can be done to prepare for this paradigm shift in positioning.

Brian Shaw is a Geodesist at NOAA's National Geodetic Survey serving as the Rocky Mountain Regional Advisor. He began his career at NGS in 2002 after earning a BS in Computer Science with minors in Mathematics, Geography and History from Radford University in Virginia. In 2005 he earned an MS in

Geographic Information Systems from the University of Redlands elevating him to the NGS geospatial go-to person. Brian emphasizes how GIS depends on geodesy as a frame of reference for location and is the foundation of positioning. Educating geodetic and geospatial professionals about the importance of datums and how they are critical to consistent coordinates, especially when aligning and comparing disparate data for making important decisions.

3D Printing, Lidar, and GIS as Art – Mike Wilson, Austin Peay State University GIS Center

Timeslot: 10:20-10:40 CT / 11:20-11:40 ET

With the onset of COVID-19, numerous makers, hobbyists, schools, and Universities came together to create Personal Protective Equipment (PPE). In the case of Tennessee, numerous public and private institutions came together to help our state. In the case of the TN project, over 18,000 face shields were printed and delivered to TEMA. The Austin Peay State University GIS Center played a significant roll in the TN effort. As the COVID-19 pandemic has progressed, supplies of PPE have become more readily available. For the APSU GIS Center, we have several new 3D printers that do not fit easily into our core mission of GIS services and training.

A recent trend in 3D printing, provided an interesting opportunity to explore the linkages between GIS, Lidar, 3D printing, and art. In this presentation, I will discuss the use of lidar data, GIS, and a 3D printer to create 3D printed lidar tiles. These tiles are a 3D representation of the captured terrain data. Although the tiles have an analytical potential, they also represent an artistic representation of GIS and lidar data.

Mr. Mike Wilson received a BS in Geology from Kutztown University and an MS in Geosciences from Murray State University. After several years working in private industry, Mike was appointed the APSU GIS Center Director in 2005. During Mike's tenure, the Center has worked on numerous local, state, and federal projects and grants. Some of the notable work includes:

- Damage Assessments after the 2010 Middle TN flooding and numerous other destructive storms and events

- Mapping and drone work for several manhunts and missing person searches

- ADA Sidewalk mapping for Montgomery County

- Wetland Mapping on Fort Campbell

- PPE production for the State of Tennessee

In the past 20 years, the Mike and the Center have mentored and trained numerous APSU graduates. These graduates are working in both public and private industry and are key contributors to our community and the 21st century workforce.

Skytec – Andy Carroll, Skytec LLC

Timeslot: 10:50-11:10 CT / 11:50-12:10 ET

As extreme weather events and natural disasters become more frequent and severe, there is a growing need for governments, companies, and nonprofits to have a clear understanding of what is happening on the ground. High-resolution satellite, manned, and unmanned imagery resources are growing increasingly crucial for efforts to evaluate the magnitude of disasters and assist hard-hit areas. Skytec will share work with the Engineering Manager for the Chattanooga Department of Transportation and discuss using satellite imagery to create a mapping application and tornado impact index to help communities recover from severe tornadoes that swept through the Tennessee Valley in April of 2020.

Andy Carroll is the CTO for Skytec, LLC

Tennessee in 3D: Exploring 3D Building Generation and Implementation – Ryan Pittenger and Paul Dudley, STS-GIS

Timeslot: 11:10-11:20 CT / 12:10-12:20 ET

The State of Tennessee's statewide LiDAR initiative has created opportunities for 3D data creation and modeling throughout the state. The State's Strategic Technologies Solutions - GIS Services group has created a workflow using ESRI's ArcGIS Pro to produce 3D buildings with the plan to serve this data to the public. This presentation will cover the technical aspects of the workflow as well as dive into how you can put this data to use for planning and modeling.

Ryan Pittenger is a graduate of Southern Illinois University Carbondale and started his career in GIS in 2011. He has been a GIS Analyst with the State of Tennessee STS-GIS Services for the past 8 years. He currently supports the 911 agencies of West Tennessee with GIS services and mapping products.

Paul Dudley works as a GIS Analyst with the State of Tennessee STS-GIS Services group helping support various data programs. He is a graduate of University of TN Knoxville's Geography Department and has 11 years of experience in the private and public sectors.

3D Modeling and Digital Twin Development - Krysia Chris Sapeta, Sanborn Map Company

Timeslot: 8:50-9:30 CT / 9:50-10:30 ET

Although physicists have studied the possibility of a 2D universe, I'm perfectly happy living in our 3D and it is natural progression for GIS to evolve from 2D to 3D, essentially creating a digital twin. This presentation will discuss the following

- 3D Modeling and the Level of Details for Models

- Enhancing 3D models to develop a Digital Twin

- Applications of 3D Models and Digital Twins

Ms. Krysia Sapeta has over 30 years of experience working in the geospatial industry. Her background includes a strong technical foundation and 18 years as a full life-cycle program manager.

Ms. Sapeta entered the geospatial mapping industry while surveying as part of obtaining her Bachelor of Science, Geology. She continues to enhance her technology expertise through continuing education, and shares her knowledge with the geospatial community through presentations, workshops and publications.

Her management and technical abilities are affirmed by multiple certifications and she is recognized for her experience in all aspects of Geospatial/GIS mapping. These include: Certified Photogrammetrist, Project Management Professional, State of Virginia Surveyor Photogrammetrist , and GIS Professional.

Configuring Esri Field Maps for High Accuracy Data Collection and MSL Elevations – Cliff Hoeffner, Duncan-Parnell

Timeslot: 9:40-10:00 CT / 10:40-11:00 ET

This presentation will cover configuring Field Maps to store GPS metadata, configuring an Arcade script to display elevations in the field as Mean Sea Level in Feet, and how elevations are stored when reviewing your collected data.

Cliff Hoeffner is a Geomatics rep for Duncan-Parnell and is responsible for Trimble Mapping and GIS sales, support & rentals for the state of Tennessee.

Esri's Utility Network: Lessons Learned, What to Expect – Wendy Peloquin, GISinc

Timeslot: 10:00-10:20 CT / 11:00-11:20 ET

The Utility Network is a world where telecom and utility networks unite. Let us talk about the water distribution utility network, data management, and analysis and what it means to your organization. GISinc has been leading the charge with the early adopter crowd and will share experiences and insights as you consider how to prepare to embrace the UN.

Wendy Peloquin, GISP is an Account Executive at GISinc with over 13 years of industry experience. She earned a B.S. in Geography and a Certificate in GIS from UGA and a Masters degree in GIS Administration from the UWF. Wendy is an active member of URISA International's Board of Directors.

Utilizing Google Earth Engine to map coastal landscape degradation: a case study of seagrass in Mosquito Lagoon, Florida, from 2000 to 2020 – Clancy Oliver and Hannah V. Herrero, University of Tennessee

Timeslot: 10:20-10:40 CT / 11:20-11:40 ET

Seagrass is a foundation species, providing extensive structure and support in ecological communities. Seagrass meadows are also important beyond the coastal ecosystems they reside in, as they store carbon within the ocean and they support economies by providing valuable resources for fishing and recreation. So far in the 21st century, extensive algal blooms in many regions have accelerated coastland degradation and resulted in a severe loss in seagrass meadows. Human activity has largely been destructive to seagrass meadows, and is the primary cause of the increased severity of algal blooms. Remote sensing efforts provide the opportunity for extensive analysis and mapping of these phenomena. This project maps and analyzes the landscape change of seagrass meadows in the coastal waters of the Mosquito Lagoon MPA (Marine Protected Area) from the year 2000 to 2020. Landsat 5 and Landsat 8 multispectral data, with a spatial resolution of 30 m, is used with a machine-learning Random Forest classification to develop the mapping. The resulting maps visualize the severe loss of seagrass meadows across the study area in the beginning of the 21st century. This project provides valuable analysis for guiding the future of the surrounding community of Mosquito Lagoon, and it may provide insights for using Landsat data to map seagrass meadows or other vegetation land cover change.

I am working towards finishing my undergraduate degree by summer 2021 at the University of Tennessee, Knoxville (UTK). My degree has two majors. Since the beginning of my undergraduate journey, I have had a major in materials science & engineering, which has been interesting to learn

about and has provided me with deeper knowledge and understanding of math, chemistry, and physics. After discovering my interest in geospatial science & geography, I added a second major in geography with a geospatial science & technology concentration, which has given me invaluable perspective and knowledge about people, the cities & environment they interact with, and how to analyze data from them. I am completing both majors, but I have realized that geospatial science & geography seems like a better fit for me to pursue for future work. I am helping Dr. Hannah Herrero of the UTK Geography Department with a research project using satellite imagery to map coastal landscape degradation. In my free time, I enjoy hiking and spending time on the lake. I also love good board games with friends.