PROGRAM 2024

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Contents

PLANNING COMMITTEE 3
SPONSORS 4
THE PENN STATER 5
EXHIBITORS 8
ESRI HANDS-ON LEARNING LAB 10
GENERAL SESSIONS 11
WORKSHOPS & TECHNICAL SESSIONS 14
Simple Schedule 14
Wednesday, April 10, 2024 15
Morning Pre-Conference Workshops 15
Lunch Break 16
Afternoon Pre-Conference Workshops 16
Thursday, April 11, 2024 18
Augmented/Virtual Reality, AI, and Digital Twins 18
Engaging the Public & GIS Foundations 21
GIS Programming & Development 25
Geoscience and Environmental Applications 26
Public Safety, 911, and Crime Mapping 30
Water/Wastewater/Stormwater Utilities 32
Mappy Hour' Poster & Map Session 36
Friday, April 12, 2024 43
Engaging the Public 43
GIS Foundations 44
Public Safety, 911, and Crime Mapping & GIS Management 45
Geoscience and Environmental Applications 48
Water/Wastewater/Stormwater Utilities 51
Presenter Index by Last Name 53

PLANNING COMMITTEE

Co-Coordinators: Bobak Karimi & Nathan Piekielek

2024 Conference Planning Committee Members

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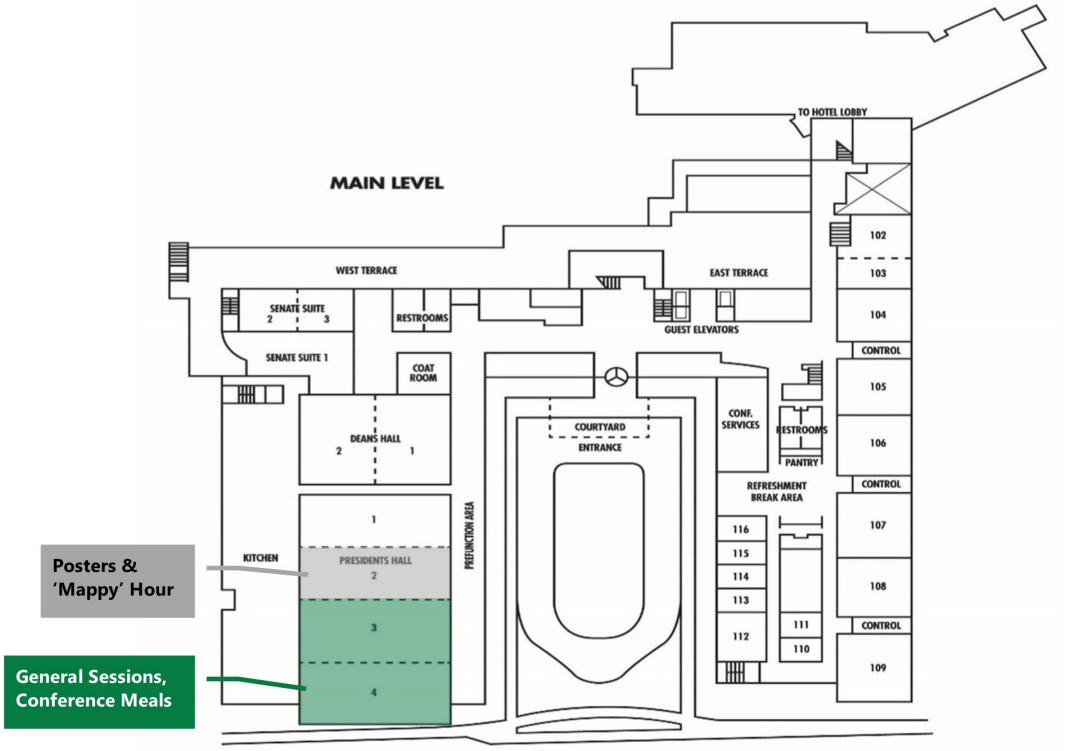
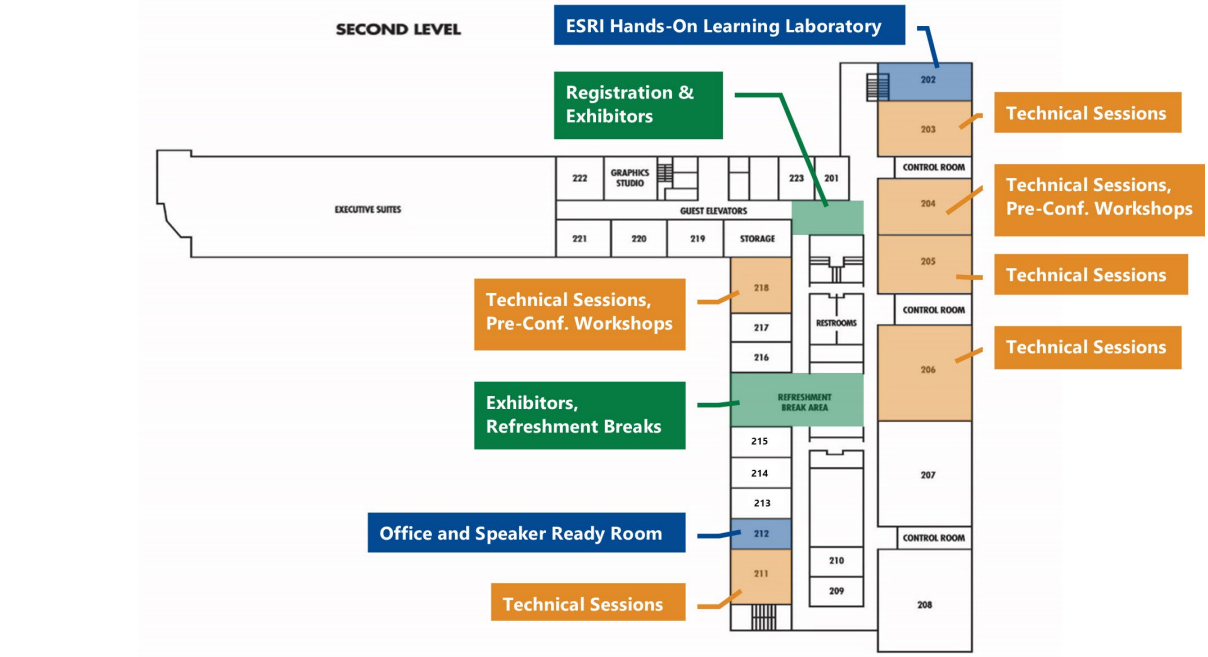
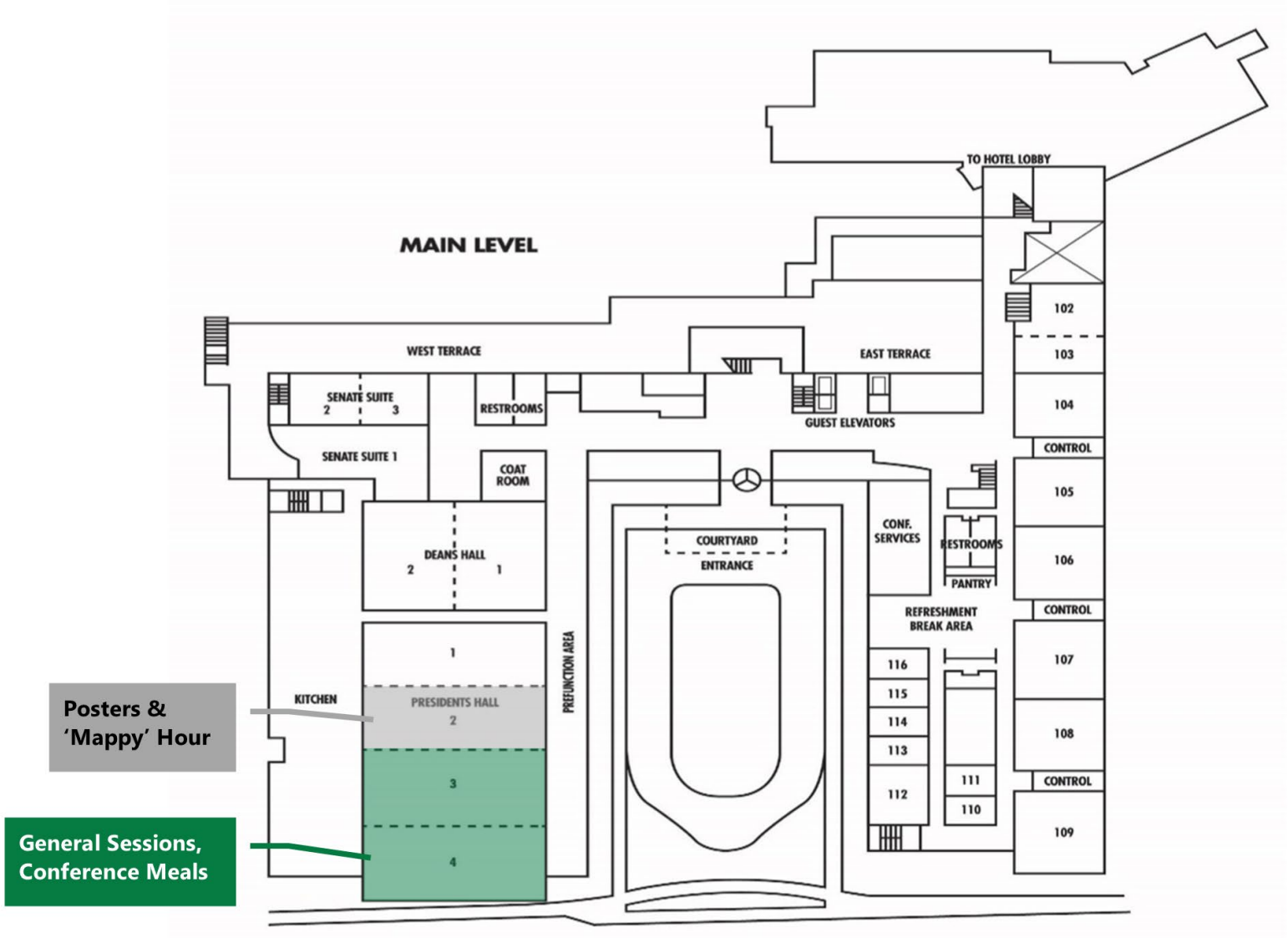
THE PENN STATER



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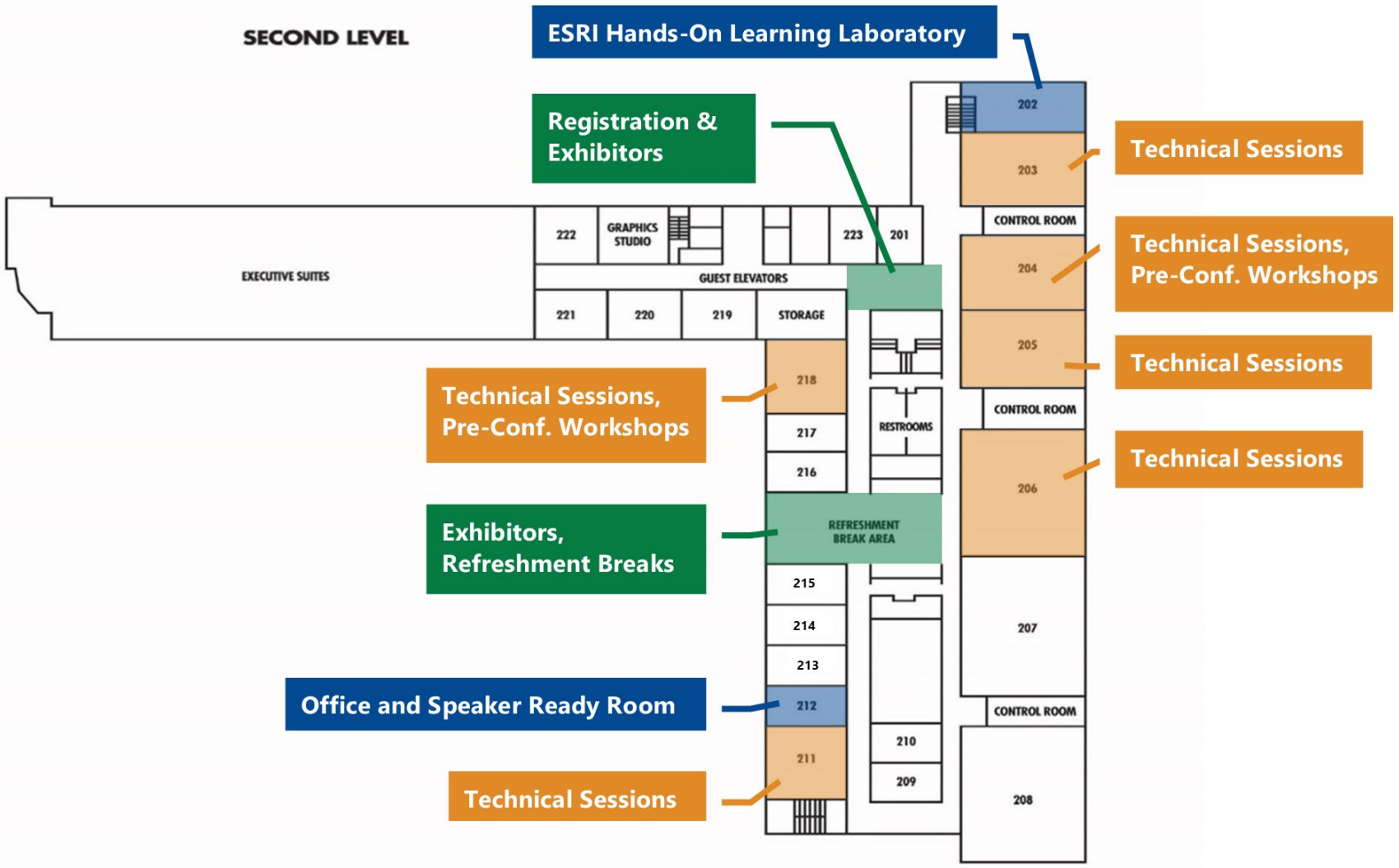
Posters & 'Mappy' Hour
General Sessions, Conference Meals


SECOND LEVEL
ESRI Hands-On Learning Laboratory
Registration & Exhibitors
Technical Sessions
Technical Sessions, Pre-Conf. Workshops
Technical Sessions
Technical Sessions
Technical Sessions, Pre-Conf. Workshops
Exhibitors, Refreshment Breaks
Office and Speaker Ready Room
Technical Sessions
EXECUTIVE SUITES
GRAPHICS STUDIO
GUEST ELEVATORS
STORAGE
RESTROOMS
REFRESHMENT BREAK AREA
CONTROL ROOM
CONTROL ROOM
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201
202
203
204
205
206
207
208
209
210
211
212
213
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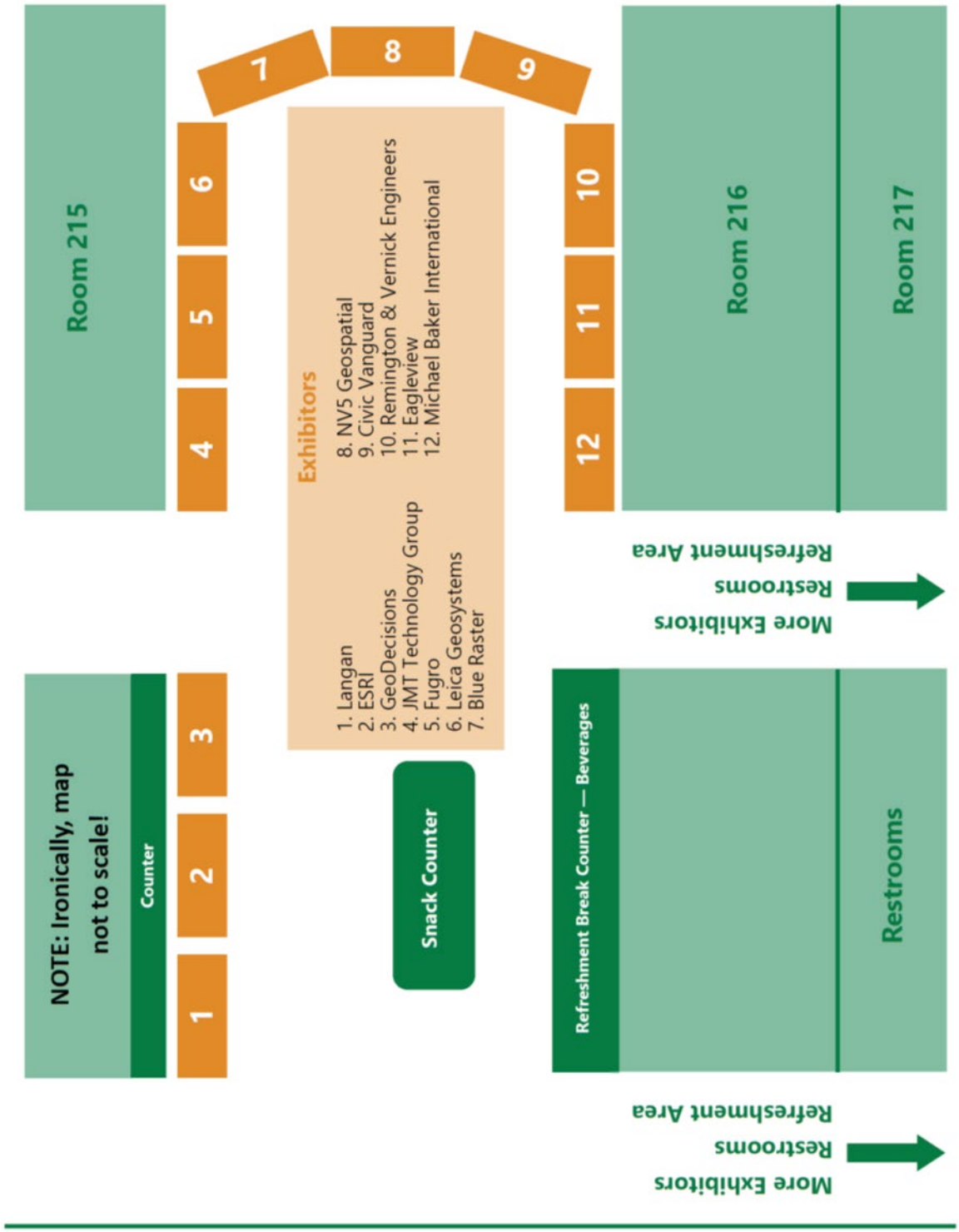
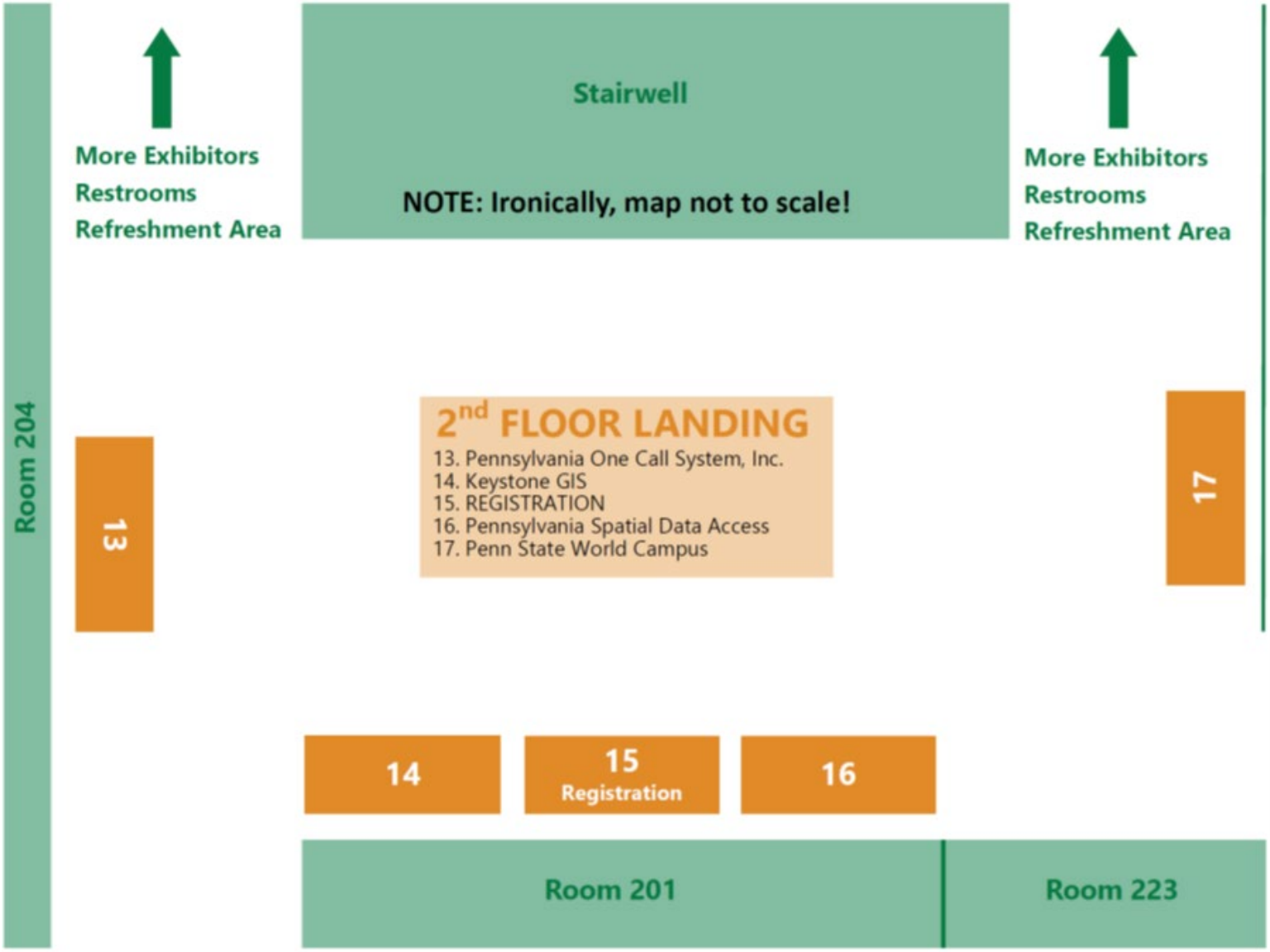
223

EXHIBITORS

Exhibitors are located on the 2nd floor of the conference center in two locations. See maps.




Room 204
More Exhibitors
Restrooms
Refreshment Area
Stairwell
NOTE: Ironically, map not to scale!
More Exhibitors
Restrooms
Refreshment Area
2nd FLOOR LANDING
13. Pennsylvania One Call System, Inc.
14. Keystone GIS
15. REGISTRATION
16. Pennsylvania Spatial Data Access
17. Penn State World Campus
13
17
14
15
Registration
16
Room 201
Room 223

ESRI HANDS-ON LEARNING LAB

Room: 202

Time: April 10 10:00 – 17:00
April 11 10:00 – 17:00
April 12 10:00 – 12:00

The Hands-On Learning Lab (HOLL) is a dedicated space to take free lessons on a variety of GIS and ArcGIS topics. Each self-paced lesson takes about 1 hour to complete and includes conceptual information and step-by-step software exercises. Laptops and ArcGIS software needed to complete each lesson are provided. Esri instructors are available to assist with lesson selection and answer any questions you may have. The list of the available learnings are as follows:

- Getting Started with ArcGIS Pro
- Getting Started with GIS
- Exploring ArcGIS
- Getting Started with ArcGIS Online
- Adding Location-Based Data to a Map
- Automating Workflows Using Python
- Creating Web Apps Using ArcGIS Experience Builder
- Discovering Patterns Using ArcGIS Insights
- Exploring ArcGIS Field Maps
- Exploring ArcGIS Living Atlas of the World
- Getting Started with Arcade
- Getting Started with ArcGIS Notebooks
- Getting Started with ArcGIS Survey123
- Getting Started with ArcGIS Business Analyst
- Improving Newborn Health Using ArcGIS Online
- Integrating CAD and BIM Data with ArcGIS
- Managing Parcels and Land Records Using the Parcel Fabric
- Mapping Clusters with ArcGIS Pro
- Monitoring Activity Using ArcGIS Dashboards
- Performing Image Classification Using Deep Learning
- Processing Imagery with Raster Functions
- Solving Transportation Problems Using ArcGIS Network Analyst
- Spatial Modeling and Analysis Using ArcGIS Spatial Analyst
- Telling Stories with ArcGIS StoryMaps

GENERAL SESSIONS

ROOM: Presidents Hall 3 & 4

Cartographic Design for Outdoor Recreation: Making a Purple Lizard Map

Michael Hermann

Founder of Purple Lizard Maps

Date: Thursday April 11th, 2024

Time: 8:45 – 10:15

Topic: In this keynote session, Purple Lizard founder Michael Hermann will talk about recreational cartography and how the team at Purple Lizard Maps create beautiful topographic maps designed to unlock broad landscapes for people to explore. From initial data compilation to final design, Purple Lizard Maps sets out to create the most detailed maps of recreational assets, cultural assets and access to public land specific to the needs of outdoor enthusiasts. His maps are unique in blending the art of old-world cartography with modern digital data and design tools, and the end result is among the best maps ever produced for outdoor adventures.

Speaker Biography: Michael Hermann founded Purple Lizard Maps in 1997 with a mission to become a leader in recreational map design. Michael received his B.A. in Geography from Penn State with a focus on digital cartography and launched his career as a Digital Cartographic Specialist with Trails Illustrated/National Geographic Maps in Colorado. Today, Michael is among the leading cartographers in the industry and Purple Lizard Maps is an award-winning recreational map publisher.

Michael served as the lead cartographer with the Canadian-American Center at the University of Maine where he led the design of the Historical Atlas of Maine. That atlas received the Globe Book Award for Public Understanding of Geography and Best Atlas of 2016 from CaGIS. Michael is a past president of NACIS (North American Cartography and Information Society) and past president of the Osher Map Library and Smith Center for Cartographic Education at the University of Southern Maine.

Are we Geographers? GIS Professionals? Or are we *Spatial Data Scientists?*

Nick Giner

Product Manager – Analytics and Data Science

Date: Thursday April 11th, 2024

Time: 12:30 – 14:15

Abstract: We are currently in the midst of a data science revolution—big data, AI, and machine learning are all the rage. As geographers and GIS professionals, it's sometimes challenging to understand where we fit in to all of this. However, we may not realize that many of the skills and techniques we employ daily are actually being applied to real-world data science problems. When we combine this with the geographic lens through which we view the world, this makes us true spatial data scientists who are equipped to solve some of the world's most complex problems and challenges. In this keynote, Nick will cover the main building blocks of spatial data

science, examples of the types of problems that it can help us solve, and how our unique perspective and diverse skillsets make us valuable contributors in this modern age of data science.

Speaker Biography: Nick Giner is a Product Manager for Esri's Analytics and Data Science capability area, covering ArcGIS Notebooks, Python and R integrations, and GeoAI. Prior to joining Esri in 2014, Nick completed Bachelor's and PhD degrees in Geography from Penn State University and Clark University, respectively. In his spare time, he likes to play guitar, golf, cook, and do yardwork.

Enlightening Technology: The Use of Light Detection and Ranging (LiDAR) Data to Advance Our Understanding of Forest Wildlife Habitat Needs and to Inform Conservation Planning

Dr. Jeffrey Larkin

Professor at Indiana University of Pennsylvania (IUP)

Date: Friday April 12th, 2024

Time: 8:30 – 10:00

Topic: It is well known that forest wildlife select habitat based on vegetation structure and species composition. Moreover, structurally complex forest landscapes are understood to host more diverse wildlife communities and to better meet the needs of individual species throughout their annual cycles. Pennsylvania's forests, like those in most eastern states, are structurally simplified due to past and ongoing land use decisions, invasive pests and diseases, a legacy of deer over-browsing, and shifting forest product markets. As a result, many species of forest wildlife in Pennsylvania have been experiencing persistent population declines. In recent decades, several agencies, conservation groups, academic institutions, and funders have formed strong partnerships based on the shared vision of improving the structural complexity and resilience of public and private forests in Pennsylvania. These efforts involve long-term planning and implementing forest stewardship activities that aim to balance stand age classes, diversify structure, and recover wildlife populations. The effectiveness of landscape-scale conservation is enhanced by quality data that can be used to rigorously assess baseline forest conditions and elucidate fine-scale habitat associations of focal wildlife. Obtaining such information, however, is challenging, especially across large spatial extents and in a way that allows for comparability between baseline and future conditions to assess outcomes and to guide science-informed program modifications. This presentation with showcase how conservation scientists with disparate, yet complimentary areas of expertise are combining the knowledge of forest management, avian ecology, bioacoustics, and remote-sensed data sources like LiDAR to collaboratively overcome these many challenges. Using a wide array of tools in a growing "conservation science toolbox", researchers and practitioners can leverage the use of a variety of advanced technologies to inform forest wildlife conservation.

Speaker Biography: Dr. Larkin is a Distinguished Professor of Wildlife Ecology and Conservation at Indiana University of Pennsylvania and the Forest Birds Habitat Advisor for the American Bird Conservancy. He also serves as the science advisor for NRCS's Working Lands for Wildlife-Eastern Deciduous Forest program. He received his B.A. in Biology from Ithaca College (NY) and his M.S. Forestry and Ph.D. Wildlife Ecology and Conservation from the University of Kentucky. His research often combines his expertise in forestry, wildlife ecology, and conservation

implementation. During his time at IUP, Dr. Larkin and his students have assisted state and federal agencies and other conservation groups with understanding the ecology and associated management implications for numerous wildlife species. He has authored or co-authored more than 135 scientific publications. In 2016, he was awarded the USDA-Abraham Lincoln Award for his contributions to private forest conservation in partnership with NRCS's Working Land for Wildlife and in 2019 was recognized by the Northeast Association of Fish and Wildlife Agencies for his efforts to help bridge wildlife science and implementation of forest management.

From Niche Tool to Everyday Hero: The Evolving Landscape of the GIS Professional

Thomas P. Fisher, AICP, GISP

Enterprise Geospatial Technologies Administrator for Cuyahoga County, OH

Date: Friday April 12th, 2024

Time: 12:15 – 14:00

Topic: Tom Fisher has a front-row seat to the fascinating journey of GIS technology. With 29 years in the field and 23 volunteering with URISA, the organization for GIS professionals, he's witnessed a remarkable transformation. Once confined to limited functionality and cryptic command lines, GIS has blossomed into a powerful, user-friendly tool embraced by diverse professions. Standard point-and-click interfaces, combined with AI-powered scripting and programming, have democratized access to its potential. But in this "flattened" landscape, where does the future lie for the GIS professional? Moving beyond credentialing (GISP), Mr. Fisher offers his insights on the trajectory of this dynamic field in the next five to ten years.

Speaker Biography: om is a GIS leader with over 29 years of experience in the private and public sectors of information technology, geographic information systems, and planning. As the Enterprise Geospatial Technologies Administrator at Cuyahoga County, he leads innovative, long-term strategic planning in support of various entities' IT functions related to application development. Tom also spearheads relationship building initiatives with private and public-sector clients, and manages a team of GIS/IT applications professionals.

He holds two Bachelor of Science degrees, one in Cartography/GIS and the other in Network Communications Management. He is a Certified Planner (AICP) and GIS Professional (GISP), and an active member of several professional associations and organizations. Tom has received multiple awards and honors for his contributions to the GIS field, and has published several articles on geospatial data sharing and cooperation. His mission is to leverage GIS as an analysis and decision support tool, and to facilitate data sharing and collaboration among stakeholders.

WORKSHOPS & TECHNICAL SESSIONS

Simple Schedule

Wednesday, April 10th	
8:00 - 17:00	Registration
8:30 - 12:00	Intro to Python for ArcGIS
	GIS Career Development Workshop
12:00 - 13:30	Lunch
13:30 - 17:00	Advanced Python for ArcGIS
	AGOL 123
10:00 - 17:00	Esri Hands-On Learning Lab (HOLL)
Thursday, April 11th	
8:00 - 17:00	Registration
8:45 - 10:15	Breakfast - General Session
10:30 - 12:15	Breakout Sessions
12:30 - 14:15	Lunch - General Session
14:30 - 16:15	Breakout Sessions
10:00 - 17:00	Esri Hands-On Learning Lab (HOLL)
17:00 - 19:00	"Mappy Hour" Poster & Map Session
Friday, April 12th	
8:30 - 10:00	Breakfast - General Session
10:00 - 12:00	Esri Hands-On Learning Lab (HOLL)
10:15 - 12:00	Breakout Sessions
12:15 - 2:00	Lunch - General Session

Wednesday, April 10, 2024

REGISTRATION IS OPEN FROM 8:00 – 17:00 ON THE 2ND FLOOR OF THE CONFERENCE CENTER

Morning Pre-Conference Workshops

Introduction to Python for ArcGIS

James Whitacre

Time: 8:30
Length: 3.5 hours
Room: 204
Description: Programming tools are now a standard feature within GIS software packages and allow GIS users to automate, speed up, and become more precise in their data management and analytic work. This workshop is designed for GIS users who have little to no experience with computer programming and will cover core Python programming language concepts specifically for use in ArcGIS. The workshop will focus on guiding participants through hands-on exercises designed to provide the essential skills to programmatically manipulate data as part of an ArcGIS workflow. This workshop is designed to be preparation for the following workshop on Advanced Python for ArcGIS, but may be taken independently.

GIS Career Development Workshop

Sara Baughmann

Time: 8:30
Length: 3.5 hours
Room: 218
Description: In this workshop we will offer resume and portfolio reviews (to be submitted 2 weeks in advance), a Panel Discussion with some GIS experts in various fields, and presentations featuring career advice from GIS Professionals, including:

- Tony Spicci with the GISCI on earning your GISP Certification and why it is beneficial to your career in GIS.
- Al Guiseppe from the Pennsylvania Bureau of Geological Survey on aspects of resumes and how they can influence your job search.
- Eric Jespersen from the PA Geospatial Coordinating Board on ways that students and early career professionals can expand their experience through contribution and public service.

If you are interested in finding out what you can do to further your career in GIS, this workshop is for you. In the afternoon, we will offer mock interviews that participants can sign-up for.

Lunch Break

Lunch is provided for workshop participants.

Afternoon Pre-Conference Workshops

Advanced Python for ArcGIS

James Whitacre

Time: 1:30
Length: 3.5 hours
Room: 204
Description: Building on the introduction to Python for ArcGIS, this workshop will expand on those skills to further use Python in ArcGIS. The workshop will focus on the ArcPy Python site package to expand geoprocessing capabilities with Python. Participants will learn to build geoprocessing scripts using ArcGIS Notebooks covering different ArcGIS tasks and workflows. The workshop will also cover how to create custom script tools in ArcGIS toolboxes for reuse and sharing. Participants will also learn skills for error handling.

AGOL 123

Joe Livoti

Time: 1:30
Length: 3.5 hours
Room: 218
Description: Embark on a light-hearted exploration into the world of ArcGIS Online with our workshop, "AGOL 123"! Whether you're a seasoned ArcGIS Online professional or just dipping your toes into the AGOL waters, this ~3-hour session promises an enjoyable journey. We'll unravel the mysteries of AGOL, covering the basics and venturing into the collaborative features of ArcGIS Online. The workshop is designed to be interactive, encouraging participation without the pressure of heavy technical jargon. Join us as we guide you through creating maps, sharing insights, and fostering collaboration. This workshop is your chance to explore without the stress, with activities and discussions tailored to keep the mood light and enjoyable. No need for a compass or advanced GIS knowledge – just bring your curiosity and a smile. Let's navigate the world of ArcGIS Online together in a light-hearted and friendly setting!

Tour of Two Penn State Centers

Nathan Piekelek

Time: 8:30
Length: 3.5 hours
Room: Donald W. Hamer Center for Maps & Geospatial Information and the Center for Immersive Experiences
Description: Join us for tours of two Penn State Centers that provide geospatial related services – the Donald W. Hamer Center for Maps & Geospatial Information and the Center for Immersive Experiences . Both are housed on the ground floor of the Pattee Library in the center of Penn State's University Park campus. Center staff will give an overview of the resources and services

provided, respond to questions, and provide opportunities to interact with digital resources and equipment.

Tour registrants will convene at 2:00 pm on the ground floor of the West Pattee Library, in the Penn State Libraries Collaboration Commons (outside of the Center for Immersive Experiences). Following a short welcome, the group will be divided in half with each group starting their tour in one or the other center. At approximately 3:15 pm the groups will switch centers. There will be no formal close to the tour, and participants will be responsible for their own transportation to and from the tour.

Participants will be responsible for their own transportation to and from the tour. FREE public bus service is available from The Penn Stater to the Penn State Library. The last departure for campus to make it on time is at 1:33 pm.

Thursday, April 11, 2024

REGISTRATION IS OPEN FROM 8:00 – 17:00 ON THE 2ND FLOOR OF THE CONFERENCE CENTER

Augmented/Virtual Reality, AI, and Digital Twins

ROOM: 203

GIS is a Game Changer But is Your GIS Game Ready

Steve Kocsis

Time: 10:30

Length: 20 minutes

Abstract: If you are publishing GIS data online is it ready for the big show? Game engines are becoming more (geo)spatially sophisticated and aware. How are game engines able to use GIS and what does that mean for us as GIS providers? The future of UI is heavily steeped in location. Isn't it fitting that geospatial data is all about location? Join Cambria County for a peek at GIS, the game changer, in the game space and how unreal it can be.

Become a Real-Life Superhero with Virtual and Augmented Reality Tools

Maria Martin

Time: 10:50

Length: 20 minutes

Abstract: The use of virtual and augmented reality tools (AR, MR - mixed reality or XR - extended reality) in GIS and engineering is ever-expanding and evolving to make it easier to implement in AEC, building construction, 3D scanning and reality capture, and GIS data collection. Designs, as-builts, and models can be brought to the project site and visualized in the field in a 1:1 scale providing interactive analysis not capable from viewing these same datasets conventionally.

JMT has begun to explore these tools including iTwins.js, vGIS and GeoBIM and how they can better serve AEC projects. For instance, vGIS is a leading AR/MR solution and 2023 ESRI Partner Conference Award recipient for innovation. It aggregates and transforms spatial data (BIM, GIS, and LIDAR) onto a view frame of your mobile device. Through integration with high resolution GPS, this data is accurately juxtaposed onto your screen simply by pointing your device at the project area.

Allow JMT to take you on an AR/VR tour as we explore the benefits and possibilities that these AR tools can offer to the GIS and AEC industry. We will discuss various use cases like utility conflict detection, as-built development/confirmation, clash detection and project documentation providing key learnings and best practice tips along the way.

Digital Transformation in the Geospatial Technology World

Eric Abrams

Time: 11:30

Length: 20 minutes

Abstract: Artificial intelligence (AI) is accelerating digital transformation at unprecedented speeds, poised to impact everything we do and help solve complex challenges. The Geospatial Technology industry is already adapting and seeing changes in project requirements creating a world of GeoAI. While this rapid transformation may seem unsettling, numerous opportunities exist to leverage technology for critical infrastructure. While appreciating the power that AI offers, it's important to distinguish geospatial technology and AI individually and the growth of the GeoAI industry. GIS is a powerful tool that enables visualization, data analysis, designing data structures and providing decision making frameworks. On the other hand, AI provides a platform for big data analysis and high-end computing processing that support fast deployment of AI models, reducing the time and effort required for manual feature extraction. Combining the two to form GeoAI enhances the accuracy, efficiency, and speed in computation of various applications, and geo-visualization. GeoAI as a digital transformation technology, along with, Generative AI, Digital Twins, Big Data, IoT, Metaverse, Machine Learning, Immersive Technologies like AR/VR, Automation & Robotics, Blockchain, Cloud, and SaaS have revolutionized the way our industry operates. Together, these technologies enable robust digital ecosystems capable of driving efficiency, scalability, and innovation across sectors.

From 2D Maps to Digital Twins

Srini Dharmapuri

Time: 11:30

Length: 20 minutes

Abstract: Sanborn has been involved in mapping for over a century and has invested in various geospatial technologies. Sanborn can collect aerial vertical, oblique imagery, aerial and mobile Lidar, UAS-based imagery, and Lidar. The availability of various geospatial data has enabled the creation of Digital Twins. A Digital Twin is a realistic representation of a physical object, product, entity, or city. Digital Twin typically requires connection to the real world through Wi-Fi, Video, data, etc. The 'Internet of Things allows for more robust Twin models. The Digital Twin combines multiple assets and attributes in one model/system. The Digital Twin has many uses. One can test/model the effects on the real world by testing on digital rather than the physical. It is faster and more efficient than physical prototyping. It improves overall operational efficiency. In this presentation, a detailed discussion on Digital Twins will be presented along with examples.

AI and UAS and GIS, Oh MY!

Justin Fraser

Time: 11:50

Length: 20 minutes

Abstract: AI is at the forefront of technology and is expected to touch just about every industry in the future. To address the large demands in growth, Langan is diving headfirst into how we can integrate AI with our already existing technology infrastructure to come up with solutions that directly impact the AEC Industry. In this presentation, attendees will explore Langan implemented case studies on how we are using AI, Drones, and GIS to detect and analyze traffic

patterns on various sites to help improve operations and decision making. Join us for this one of a kind presentation on AI, UAS, and GIS!

Bring your GIS Inside: Stafford County, VA Indoors for ArcGIS

Dave Capaz & Eric Derr

Time: 15:10
Length: 20 minutes
Abstract: Stafford County, Virginia deploys indoor GIS for administration buildings as a platform for public access routing, tracking and security with enhancements planned for facilities and emergency services departments.

GeoDecisions created ArcGIS Indoors application for the Stafford County Administration Building which provided the ability for users to find and route to locations in the building. GeoDecisions also created a web scene allowing for viewing the administration building in 3D. The rooms in the application contain deep links to Stafford County's Matterport application. Clicking on the links launches a virtual layout of the room in a separate tab. Enhancements are planned for various departments including Facilities and Emergency Services.

Advancing Tree Inventory Methodology using Automation

Savannah Carter

Time: 15:30
Length: 20 minutes
Abstract: The purpose of the project was to locate, identify, and calculate the Diameter Breast Height (DBH) for every tree within a 525 square mile proposed development in Sarasota, FL. The tree locations and identifications were used to aid developers in proper land clearing practices within the AOI to maintain Southwestern Florida's natural feel.

To achieve this task, Dewberry co-acquired lidar and RGB imagery. Lidar data was acquired at approximately 200 ppsm using a Riegl VQ-1560 II-S sensor mounted in a Cessna Caravan aircraft. The project was flown with overlapping, perpendicular lines to ensure sufficient penetration through the tree canopy. 14 lines were acquired in ~1 hour of flight time.

The co-acquired RGB imagery was collected using a 150 megapixel integrated camera and met a ground sample distance of 5.0 cm.

Using a semi-automated approach, the RGB imagery was fused with the lidar and leveraged in the location and classification of each tree. Additionally, to verify the tree species, stereo imagery was compiled to provide 3d views. The automated DBH estimations were made based on a power function equation that relates tree height and DBH based on a species specific scaling parameter. The species specific scaling parameter was determined by calculating the average difference between the field collected DBH value with the predicted DBH value for the scaling parameter. Standard deviation and range between predicted and actual DBH were also considered.

Remote Sensing Techniques for Digital Twins

Courtney Malott

Time: 15:50

Length: 20 minutes

Abstract: This presentation aims to provide a comprehensive examination of three prominent remote sensing techniques — lidar, nadir imagery, and oblique imagery—in the context of creating textured and non textured digital twins. As the demand for accurate and detailed digital representations of our environments grow, understanding the strengths and limitations of these techniques becomes crucial for informed decision-making in urban planning, infrastructure development, and asset management.

With an overview of each remote sensing technique, outlining the underlying principles and acquisition methods. Lidar, known for its precision in capturing elevation data, will be contrasted with nadir imagery, which provides top-down views, and oblique imagery that captures multiple perspectives. Measuring the pros and cons of each combination.

Engaging the Public & GIS Foundations

ROOM: 218

End with the Map: Web Mapping in a Mobile-First World

Jamie Christensen

Time: 10:30

Length: 20 minutes

Abstract: In the rapidly evolving landscape of GIS, the traditional map-centric approach often overshadows the potential for more intuitive, user-friendly interfaces. This presentation proposes a paradigm shift: starting with a simple, Google-style search and culminating with a map, inverting the conventional GIS workflow. This method aligns with the contemporary mobile-first mentality, catering to users accustomed to direct, straightforward access to information. It challenges us to rethink our workflows, considering how we can adapt to changing user expectations and technological advancements. By embracing this new perspective, GIS professionals can broaden their reach, making spatial data more approachable and meaningful to the public. With Pennsylvania case studies, we'll explore how ending with a map, rather than starting with one, can transform the way we interact with and understand geographic information, making GIS more inclusive and relevant in our increasingly mobile-centric world.

Engaging the public from a GIS Analyst's desk

Katherine Weber

Time: 10:50

Length: 20 minutes

Abstract: As a GIS Analyst it's all too easy to read a proposal and just zero in on the GIS specific tasks, losing sight of the project's real-life goals. In a recent a Safe Streets for All (SS4A) project, I found myself focused on the nitty gritty of the safety analysis itself before conversations with

the rest of the project team opened my eyes to how my work output can help engage the public and ultimately improve the community.

This specific project involved developing a comprehensive safety action plan for the WinFred Metropolitan Planning Organization (MPO). The action plan identifies the most significant roadway safety concerns in the community and proposes projects and strategies to address roadway safety issues using the eight-steps as set forth by the United States Department of Transportation (USDOT). Public engagement and collaboration is one of the essential eight steps.

In this talk I'll highlight lessons learned from a GIS analyst's view: How a bilingual survey I created with Survey123 was designed with equity and accessibility in mind. How I created and embedded a corresponding web map that is accessible and bilingual. How the selection of the location of pop-up events, designed to engage residents where they are, was aided by using GIS in finding accessible, heavily trafficked public locations that reach a wide range of residents across age, gender, race, ethnicity, and abilities. And ultimately, lessons learned on the value of the lived experience of the residents and the local planning organization over the utilitarian output of GIS software and tools.

Finding Synergies through Community-based Learning: Students, Faculty and Community Members

Susan Lucas

Time: 11:10

Length: 20 minutes

Abstract: Neighborhoods in small and medium sized legacy cities often struggle to deal with a vast array of problems, including vacant land. Top-down approaches to managing vacant land, including aggressive enforcement campaigns against tax delinquent property owners, and more recently, the creation of land banks, have largely failed to help local communities. Vacant land management strategies implemented at the neighborhood level offer more hope, specifically if local organizations and residents feel vested in implementing those strategies. For many communities, a first step in managing vacant land is answering a simple question, how much vacant land is there in a community? A lack of access to data, maps and software, combined with a lack of expertise often make answering basic questions like this problematic. These challenges can sometimes be overcome through partnerships with other communities, non-profit organisations and local academic institutions.

In summer 2022, students from Youngstown State University and the University of Pittsburgh began partnering with residents and community activists from the Borough of Swissvale, Pennsylvania to map and describe vacant lots using a citizen- and sustainability- centered approach. The project was managed by a steering committee composed of Swissvale residents, local council members, students and the two faculty members leading the project. In this presentation we examine how data use, mapping making, and the use of GIS were shaped by the organizational structure of the project, pedagogical concerns and constraints, accessibility of data and GIS software and community interest in the project. As the project progressed a clear tension emerged between technical facets of map-making and GIS use and how the deliverables, survey instruments, maps and graphs and data, were perceived and valued.

Bridging the Gap: Hopeworks' GIS Program Empowers Young Adults and Transforms Communities

Luis Olivieri

Time: 11:30

Length: 20 minutes

Abstract: Not everyone is meant to follow the same path, and that extends to education. While some thrive in a traditional education environment, individuals would benefit from programs that train outside of the world of academia. Hopeworks is a social enterprise that uses technology, healing, and entrepreneurship to transform lives; young adults entering Hopeworks are typically earning an average of $400 per year and after going through the training program, they have the opportunity to make a livable and comfortable wage, earning over $42,000 annually.

As part of their offerings, Hopeworks created a Geographic Information Systems (GIS) business that provides critical mapping and data management services to improve organizational efficiency, deploy valuable resources, and enable data-driven decisions. GIS is one of Hopeworks' growing social enterprises that provides around 40 internships — overall providing life-changing opportunity where young adults can grow their skills to build strong futures and break the cycle of poverty. They are able to provide the opportunity to learn basic concepts of GIS through training and real-world experience through partnerships with New Jersey American Water, Comcast, Merchantville Pennsauken Water Commission, and others. In addition, the young adults learn the skills and strengths they need for any career path. When Hopeworks young adults apply for a job, all this puts them ahead of other candidates and makes them more appealing to potential employers. The GIS program is a service recognized at the regional and national level for the quality of work their team provides and has received numerous accolations for their outstanding work, including the Esri Special Achievement in GIS (SAG) award. In programs like this and others, Hopeworks is able to make an impact on communities to improve their current situation, helping them make better-informed decisions, all while making a social impact and helping young professionals build their futures.

Navigating the Geospatial Horizon: OA GIS Strategic Plan to Unleash Statewide Lidar & Imagery

Scottie Wall & Joseph Petroski

Time: 11:50

Length: 20 minutes

Abstract: The OA GIS seeks to improve the quality of life in Pennsylvania, making it a better place to live and work, through the cultivation of statewide geographic information resources. This goal is achieved through the development, maintenance, distribution, and effective use of comprehensive statewide geographic data and geospatial technology. The resources provided by the OA GIS empower governments, universities, businesses, and individuals to address issues affecting Pennsylvania's physical, economic, and social well-being.

Lidar and imagery data are indispensable geospatial service offerings. Lidar provides precise 3D mapping, elevation models, and vegetation analysis. It's vital for urban planning, autonomous vehicles, and natural disaster assessment. Imagery data offers visual context, aids environmental monitoring, and supports emergency response. Whether it's assessing

infrastructure, enabling precision agriculture, or creating virtual environments, these data sources empower us to understand and address complex challenges across the commonwealth and power our decision-making tools.

One goal of our strategic plan aims to streamline geospatial service procurements, creating a cost-effective, centrally managed program that benefits all stakeholders. Since stakeholders across sectors have conveyed the importance of Lidar and Imagery data to their work, OA GIS solicited survey information about current and future uses of remote sensing data. The information collected will help us plan for better management of the Commonwealth's existing imagery and lidar data and future acquisitions of new data. The presentation is our opportunity to share the results of the surveys back to our unique stakeholder groups to thank them for their contribution and continue the conversation.

A New State Plane Coordinate System is Coming in 2025 ... and It Is Not Like What You're Used To.

Scott Drzyzga

Time: 14:30

Length: 20 minutes

Abstract: The National Geodetic Survey is preparing America for changes to our horizontal and vertical datums in 2025. In short, the North American Datum of 1983 (NAD83) will be superseded by the North American Terrestrial Reference Frame of 2022 (NATRF2022). With these changes come changes to the State Plane Coordinate System (SPCS), including the Coordinate System of Pennsylvania. The new SPCS takes advantage of map projection concepts that are seldom presented in GIS textbooks. The purpose of this presentation is twofold: 1) to present the forthcoming changes from a Pennsylvania perspective; and 2) to discuss the implications for teaching students - and GIS pros continuing their education - about geodesy, map projections, and coordinate systems.

Geodesy for the Geographer - Vertical Datums in Floodplain Mapping

Jeff Jalbrzikowski

Time: 14:50

Length: 40 minutes

Abstract: Join Jeff for a discussion of the various types of vertical datums of the National Spatial Reference System (NSRS). A session targeted for the floodplain manager, but great for anyone who works with 3D data analysis. We will review terminology, some technical history of the superseded vertical datum NGVD29, how NAVD88 is different, and the forthcoming new datum NAPGD2022. Vertical datum transformations (aka conversions), and tools available from NGS to do that, will be explained.

Automate Your Business Process with Workflow Manager

Mark Bowen

Time: 15:30

Length: 40 minutes

Abstract: ArcGIS Workflow Manager provides an easy to use, scalable workflow management system for ArcGIS Online and ArcGIS Enterprise. It helps optimize GIS and non-GIS tasks with tools to manage the people, processes, and products. Its powerful automation tools transform

processes like digital submissions, parcel editing workflows, and inspection workflows. Workflow Manager's service-drive architecture orchestrates seamless end-to-end workflows within and outside of GIS. This session will cover the product's capabilities and demonstrations of building a workflow process to increase organizational efficiency.

GIS Programming & Development

ROOM: 204

Using Web Scraping and ArcGIS Online Notebook Scheduled Tasks to Update Feature Services

James Whitacre

Time: 10:50

Length: 40 minutes

Abstract: Ever found a constantly-changing website containing location information, but it is not a table or an easily consumable format to convert to features? This technical presentation will highlight an example of using Python in an ArcGIS Notebook to web-scrape changing event information from a website and update the data on an ArcGIS Online feature service. We will go over how to use the ArcGIS API for Python, and the Requests, Beautiful Soup, and Pandas Python libraries to extract information from websites and transform them into meaningful location data. We will also go over some tips and tricks for how to inspect websites to target specific elements for web scraping. GIS users who want to build on their Python, HTML, and spatial data science skills will not want to miss this presentation!

An Introduction to Pandas, Geopandas and more with Python

Christopher Jursa, GISP

Time: 11:30

Length: 40 minutes

Abstract: Geospatial potential is available in tabular formats provided by clients and stakeholders for GIS-related projects. These tabular formats commonly include comma separated values and spreadsheets. While not immediately be geospatial in nature, the tabular data can be upgraded to geospatial data with libraries such as Pandas and Geopandas. Subsequently, this geospatial data can be converted back to a tabular format for non-GIS users. This lecture will conquer the learning curve of beginning Python with Pandas and Geopandas for basic data conversions.

ArcGIS Online 123: The Ins and Outs of AGOL or “Why aren’t You Using it Yet?”

Joseph Livoti

Time: 14:30

Length: 40 minutes

Abstract: A Are you a dinosaur? You must be if you're still using ArcMap or if you haven't started harnessing the power of AGOL! This presentation will give an overview of how a municipality or small organization can utilize the power of AGOL. Use cases include a completely online based GIS platform for permitting and inspections. We'll touch upon some of the super cool tools like

Dashboards, Story Maps, Survey123 (my favorite) and with the deprecation of web app builder, we'll briefly explore the world of ArcGIS Experience Builder. Get ready to open a whole new world of online adventures with ArcGIS Online!

ArcGIS Enterprise: Cloud Implementation Best Practices

Jacqueline Nova

Time: 15:30

Length: 40 minutes

Abstract: A cloud-first ArcGIS System enables an innovative GIS System and reduces infrastructure costs – but moving to the cloud can be daunting. What workflows will change? How does a cloud environment differ from an on-premises deployment? In this session, we will share some best practices for deploying ArcGIS in the Cloud and examine the benefits of a cloud-native environment against the realities of users and their workflows. We will discuss cloud deployment options, cloud providers, and the new possibilities cloud deployments offer organizations.

Geoscience and Environmental Applications

ROOM: 206

Orthorectifying Historic Aerial Photographs of Pennsylvania

Nathan Piekielek

Time: 10:30

Length: 20 minutes

Abstract: This presentation reports on progress towards processing and orthorectifying historic aerial photography of Pennsylvania with a goal of producing seamless 1-meter spatial resolution orthomosaics of at least 10-meter horizontal positional accuracy. To date, ten collections comprised of 1,753 individual photographs covering 2,150 square miles with years ranging from 1949 to 2001 have been completed. Not all collections met project goals. Challenges and lessons learned will be discussed as well as next steps for the project.

Exploring High-Resolution Land Use/Land Cover Data

Steven Guinn

Time: 10:50

Length: 20 minutes

Abstract: The use of spatial data has been a crucial development to the conservation movement and provides organizations with a fundamental understanding of the landscape. With funding from the Chesapeake Bay Program (CBP) in partnership with the U.S. Geological Survey (USGS) and University of Vermont (UVM), Chesapeake Conservancy produced 1-meter resolution land use/land cover data to provide cutting-edge technology to conservation groups to empower data-driven conservation and restoration. Unique for not just their spatial resolution, but also their categorical resolution, these data offer over 50 classes of land use/land cover that can be rolled up into 18 general land use classes. Made openly and freely available, these data have been used by a variety of organizations to support watershed planning and modeling, public outreach, and legislation reformation. This session will explore the creation and use of these

data and how it can help drive decision-making for conservation throughout the Chesapeake Bay Watershed in Pennsylvania.

Utilizing Remote Sensing to Identify Best Management Practices (BMPs) in Watershed Restoration

Brian Gish

Time: 11:10

Length: 20 minutes

Abstract: Best management practices (BMPs) are at the core of restoring ecological communities and reducing nutrient and sediment loads in broken waterways. To determine the best applications of these tools, documenting existing BMPs, assessing their current impacts, and identifying opportunities for greater implementation are key. This presents a challenge: how do we build BMP inventories while balancing efficiency and accuracy? Methods such as field surveys and transects are often employed, but are labor- and resource-intensive, must be completed in inflexible time windows, and are susceptible to human errors and biases. Aggregated datasets at the county, regional, or state level can be used, saving time and resources, but do so at the expense of geographic specificity. Even when detailed, spatially-specific data exists, it is often inaccessible due to cost, confidentiality, and/or propriety. Thankfully, remote sensing offers an alternative approach that can increase efficiency, accuracy, availability, and scalability. The Chesapeake Bay Foundation (CBF) explored a variety of such methodologies in developing of two Section 319 watershed implementation plans: Marsh Creek (44.5 mi^2, HUC-12, Centre County) and the Upper Conestoga River (61.1 mi^2, HUC-12, Lancaster, Berks, and Chester counties). CBF was able to establish the location and extent of multiple BMPs (cover crops, tillage, riparian buffers, etc.), assess relevant conditions (bank loss, loading, etc.), and track changes over time. All data used was free and publicly available, with subsequent analysis having been completed using ArcGIS and Google Earth Engine software packages. The results have demonstrated high degrees of spatial and temporal accuracy, ease in scalability, and efficiency in terms of cost, labor, and time. Ultimately, the inventories CBF derived from remote sensing will be used in hydrological modeling, development of community-driven strategies, and tracking BMP implementation going forward.

The USGS 3D National Topography Model – Updates for Pennsylvania

Eliza Gross

Time: 14:30

Length: 20 minutes

Abstract: The United States Geological Survey (USGS) National Geospatial Program is in the process of establishing the 3D National Topography Model (3DNTM), which is a new initiative that will update and integrate USGS elevation and hydrography data into a 3D model to deliver high-quality foundational data and support improved geospatial analysis. The 3DNTM includes the 3D Hydrography Program (3DHP) and the next generation of the 3D Elevation Program (3DEP). Data resulting from the 3DHP and 3DEP are expected to meet the most demanding scientific requirements and enable data-driven decisions across user communities. This presentation will go over these programs and how they pertain to current and upcoming geospatial data acquisitions in Pennsylvania.

More than surface-level: Approaches and challenges to generating elevation-derived data for a diverse scientific community

Ellen Fehrs

Time: 14:50

Length: 20 minutes

Abstract: One of the Pennsylvania Geological Survey's greatest challenges in the production of elevation-derived hydrography has been creating a product that can be applied effectively across multiple disciplines and in distinct landscapes. This product, the Pennsylvania Hydrography Dataset (PAHD), is created using a variety of technical methods, including geomorphon production and least-cost analysis. These methods target the digitization of channel structures based on surface elevation, but do not address greater concerns involved with the representation of subsurface features. This is particularly relevant in Pennsylvania, where karst topography and subsurface flow result in substantial uncertainty when it comes to modeled data. Applications that rely on traditional hydrologic and hydraulic modeling may not be as impacted by these "uncertain" hydrography data, but there are a number of scientific pursuits that are only interested in "known" surficial features or field-validated subsurface features. The distrust of modeled data by disciplines reliant on field validation techniques has resulted in backlash against the concept of elevation products that have undergone any editing—including hydro-enforcement and -conditioning. The PAHD workflow and schema aim to provide a product that meets the needs of data users who require a fully articulated modeled network versus those who need only channelized surficial features.

Using Probability Density Function Analysis to Quantify Landslide Occurrence in Allegheny County, Pennsylvania

Al Guiseppe

Time: 15:10

Length: 20 minutes

Abstract: The Pennsylvania Geological Survey is establishing a quantitative assessment of landslide occurrence in Allegheny County, Pennsylvania. This assessment utilized a dataset encompassing around 600 landslides compiled by the survey. Various raster datasets, including slope, elevation, topographic position, slope aspect, vegetation canopy height, soil water storage, regolith thickness, proximity to mapped formation contacts, and fold axes, were employed to unveil statistical relationships with landslide occurrences.

For each raster dataset, values were extracted from both known landslide locations and randomly generated control points. The resulting ratios of landslide occurrence functions to control location functions formed a set of landslide correlation indices. Ratios significantly exceeding 1 signified a higher likelihood of landslide occurrence, while those below 1 indicated a lower likelihood. Analyzing these ratios across different raster datasets revealed the most influential conditions contributing to landslide risk. Steep land surface slopes emerged as the primary predictor, but elevation, topographic position, vegetation, soil characteristics, and geologic structure also played substantial roles. Overburden thickness and hillslope direction demonstrated minimal impact on landslide occurrence.

The aggregation of these indices produced a comprehensive landslide susceptibility map. This approach marks a critical initial step in formulating a methodology for the quantitative

assessment of landslide susceptibility. Our objective is to generate highly detailed landslide risk maps, providing valuable insights for municipal planners and engineers to make informed decisions. This effort contributes to an enhanced understanding of landslide susceptibility in the region. The potential impact of this research is significant, with the capacity to markedly improve landslide risk assessment and management strategies across Pennsylvania.

Shooting Range Remediation: Using Kriging to Delineate the Extent of Lead Contamination in Soil from an Uneven Sample Pattern

Miranda Waldman

Time: 15:30

Length: 20 minutes

Abstract: Shooting ranges are a source of large lead accumulations, contributing to rising lead levels in soil. This study examines measured lead levels in soil samples taken from a shooting range in Pennsylvania, with the goal of producing a continuous surface identifying areas exceeding the Pennsylvania Department of Environmental Protection limit of 450 parts per million per the Statewide Health Standard for Medium Specific Concentrations of Inorganic Regulated Substances: Soil-to-Groundwater Values. Several data challenges impacted the spatial interpolation of the measured lead levels, including an uneven sampling pattern used to obtain the soil samples and an extremely skewed distribution. Previous research has shown that kriging can be successfully employed to interpolate lead in soil, even with uneven sampling schemes. This research compared several kriging methods to delineate the extent of lead contamination with the goal of minimizing estimation error. In addition, several study area delineations were compared to address the uneven sampling scheme.

ODNR Orphan Well Identification Project - A Case Study in Comprehensive GIS Data Management and Analysis

Chris Langley

Time: 15:50

Length: 20 minutes

Abstract: Beginning in 2021, CEC received a contract with Ohio Department of Natural Resources (ODNR) to identify, map, and catalog the location of orphan gas wells within the state. Utilizing an experimental concept, CEC deployed UAV aircraft carrying mounted magnetometer units to conduct aerial surveys of selected properties searching for metal signatures of obscured or buried oil and gas wells. Being a large and complex project, CEC's GIS team was tasked with both processing and managing all the data collected including property right of entry, magnetic anomaly detection, and results mapping/reporting. Additionally, CEC needed to develop tools allowing us to easily share our results and data with the ODNR. To accomplish these tasks, CEC developed detailed workflows that spanned across many GIS disciplines including raster analysis, database design, web application/dashboard development, and form creation/reporting utilizing Survey123. This presentation will detail how CEC was able to combine these individual workflows into a single data management system and the lessons learned along the way.

Public Safety, 911, and Crime Mapping

ROOM: 211

An Enterprise Approach to NG911

Drew Fioranelli

Time: 10:30

Length: 40 minutes

Abstract: Effective data management is paramount in ensuring the precision and reliability of information for Next Generation 9-1-1 (NG911). This presentation advocates for the utilization of ArcGIS Enterprise to optimize workflows, enhance automation, and facilitate seamless enablement within the NG911 framework. Delving into the specifics, we will delineate how ArcGIS Enterprise serves as a robust platform to maintain accurate in addressing data for NG911. Furthermore, we will explore the platform's capabilities in providing enablement solutions to addressing authorities, streamlining the process of tracking, and submitting change request forms. An enterprise-centric approach data management will elevate the efficiency and accuracy of NG911 data management, impacting the overall effectiveness of emergency response systems.

Leveraging GIS in Emergency Situations within the Conservation & Environment Delivery Center (CEDC)

Kevin Eaton

Time: 11:10

Length: 20 minutes

Abstract: This presentation will demonstrate several applications that were stood up to help manage and assist Commonwealth staff and agency partners make critical decisions during emergency situations. Examples will be shown from the PA Department of Environmental Protection, and PA Department of Agriculture. Also a behind the scenes look will be provided of the newest CEDC GIS Framework based interactive mapping application - the Geographic Environmental Emergency Response (GEER) app.

Address of Success – Using a Web-Based Tools to Maintain Addresses for NG911

Devin Waggoner

Time: 11:30

Length: 20 minutes

Abstract: Montgomery County, Pennsylvania is migrating to Next Generation 911 services and asked JMT Technology Group (JMT) to help prepare their data to meet NENA/PEMA standards. As a final step in the process, JMT provided the county with a web-based toolkit to support their addressing protocol and best practices guidelines positioning them for long-term success to maintain compliance.

Because soft/hard copy guidance can be cumbersome and seldom used, JMT integrated a web-based address toolkit in an Esri Experience Builder which allows users to confirm if a proposed address or street name is unique when checked against the county's authoritative layers and

sends them for county review. Also, the tool performs critical quality control checks and tracks the quality of the address points through a dashboard.

This direct workflow and communication between the municipalities and the county ensures all parties are reviewing the same information.

Streamlining the City of Philadelphia, Streets Department's Hauling Permit Review and Route Validation Process

Sean Lain

Time: 11:50

Length: 20 minutes

Abstract: The City of Philadelphia, Streets Department is responsible for reviewing and approving hauling permits for freight that is transported within the City's limits over the roadways. The Streets Department staff then reviewed the provided route to determine if it violated any low clearances or weight restrictions by using a combination of institutional knowledge and internal data sources. Since the City reviews thousands of permits an annual basis, they sought a solution that would help reduce the frequency of communications with applicants when clarification regarding provided routes was required.

To help improve this process, JMT and the Streets Department worked together to enhance their existing comprehensive bridge geodatabase containing all navigable bridges within the City. JMT then created an intuitive and interactive GIS-based route validation application. The application provides hauling permit applicants with the ability to construct the route to be traversed while providing validation and warning messages when inappropriate streets are selected. This validation helps increase the speed and accuracy of the permitting review process by standardizing the method of creating each route. This validation helps mitigate the possibility of freight being hauled on a route that has prohibitive restrictions. The route validation application provides administrative functionality so that Streets Department staff can review, modify, and approve routes. The application will fully integrate with the existing Hauling Permit and access the bridge geodatabase and the existing street centerline GIS data maintained by the City.

This presentation will provide an overview of how the route validation application is helping the City improve the hauling permit review process. In addition, the presentation will include an overview of the bridge geodatabase and the Esri-based map interface that serves as the main component of the application.

Increasing Access To Prep Services In Pennsylvania

Elizabeth Skender

Time: 14:30

Length: 20 minutes

Abstract: When used as directed, pre-exposure prophylaxis (PrEP) lowers the risk of contracting the human immunodeficiency virus (HIV). Improving access to PrEP is a successful strategy for reducing HIV exposure among at-risk populations, including queer-identifying people, Black and transgender women, and drug users. However, only a quarter of Pennsylvania's 1.2 million

people recommended for PrEP have a prescription. In Pennsylvania, only pharmacists, in conjunction with a physician, can provide PrEP, which limits access.

Using ArcGISPro3.1, data on pharmacy location, and current PrEP provider locations in Pennsylvania, this study examines if allowing pharmacists to prescribe PrEP would increase accessibility and, if accessibility improves, where and to what degree. Accessibility is measured by generating 15-minute, 30-minute, and 60-minute drive time trade areas for pharmacies that currently provide PrEP. The 60-minute drive time polygons are considered PrEP deserts. The analysis is then re-run, adding in all pharmacies. The assumption underlying this analysis is that if pharmacies were allowed to provide PrEP without a physician, then any pharmacy could give the medication.

Preliminary analysis of current PrEP accessibility shows that areas with 60-minute drive times to current providers are in central, rural areas of Pennsylvania. Shorter 30-minute drive times are standard in the collar counties of Philadelphia, the Lehigh Valley, Cambria, and Somerset counties near Pittsburgh and counties in northwest Pennsylvania. In some counties, 60+ minute drive times are the norm. Statewide, drive times are limited to sixty minutes, benefiting previously underserved areas in the Allegheny mountains. Northeast mountain counties see decreased drive times to thirty minutes or less, except Luzerne, Monroe, and Carbon, remaining within sixty minutes. Laurel Highlands witnessed improved accessibility, with driving times reduced to thirty minutes or less, except for Greene County.

Drones + GIS = 💗

Steve Kocsis & William Chittester

Time: 15:30

Length: 40 minutes

Abstract: Drones are an excellent tool for GIS. You can use them to create new, updated basemaps and 3D models. Did you know that you can use drone video in GIS? Did you know that you can connect live drone feeds with applications that give field personnel the eye in the sky? Imagine if you could add GIS data to those live feeds. Oh, wait, what? You can already do that with tools that don't cost extra for that $olution? Join Will and Steve as they demonstrate Drones and GIS working together in live, real-time situational awareness tools.

Water/Wastewater/Stormwater Utilities

ROOM: 205

Rainy Day Fund: Why American Cities and Towns Need High Accuracy Planimetric Mapping

Lucia Woo

Time: 10:30

Length: 40 minutes

Abstract: Do you know how much of your property, campus, or office complex is covered by asphalt or concrete? Discover the crucial role of high-resolution aerial photogrammetry in assessing such impervious surfaces, vital for effective stormwater management. This

presentation delves into how municipalities leverage the 2D planimetric mapping of man-made and natural features derived from aerial orthoimagery to support sustainable funding strategies. One leading example is stormwater utility fee programs, which charge businesses and residences a fee proportional to the impervious surface existing on their properties. Accuracy is the name of the game, and high-res orthos with high horizontal (x,y) accuracy is the tool of choice by municipalities to avoid billing disputes and lawsuits. Join us to gain insights into the evolving landscape of stormwater management and the pivotal role that aerial photogrammetry plays in reducing risks to our homes, wildlife habitats, drinking water supplies, and human lives.

Water You Waiting For? Discover the Power of Esri's Utility Network

Zach Lawlor

Time: 11:10

Length: 40 minutes

Abstract: Water utilities face a range of challenges, from aging infrastructure to increasing demand and climate change. To address these challenges, many utilities are turning to advanced technologies like the Esri Utility Network. This presentation will explore the power of the Esri Utility Network for water utilities, including its real-time data, advanced analytics, and improved asset management capabilities. Through case studies of Langan implementations, attendees will learn how water utilities have successfully implemented the Esri Utility Network to improve their operations and service delivery. Don't wait to discover the power of the Esri Utility Network for your water utility - join us for this informative and engaging presentation!

To the Utility Network and Beyond!

Erin McCormick

Time: 11:50

Length: 20 minutes

Abstract: The ArcGIS Utility Network (UN) is a transformational technology change, a modernization effort replacing earlier widely adopted Esri network technology and data models, embedding logic and functionality that will further empower organizations. At the same time, the UN represents a significant deviation from more traditional data schemas and requires a thoughtful and deliberate approach to help ensure organizational and technological readiness. As support for Arc Desktop is getting ready to be retired have you planned for how you will transition to ArcPro for your Utility data?

This presentation will highlight the ArcGIS Utility Network adoption pathway and address considerations for existing utilization patterns, required server infrastructure, integrations with Asset Management and other business systems. This transition is not a one size fits all approach and this presentation will help assist your decision process for the approach that best fits your needs and if the UN is the right fit for your organization. Additionally, this presentation will include an overview of what's next for Water Utilities addressing vertical assets and into the future with digital twins.

GIS Mapping & Field Survey Services for Falls Township Utility Infrastructure

Christopher Gross & Ethan Snyder

Time: 14:30

Length: 20 minutes

Abstract: RVE undertook the provision of field survey location services and GIS mapping for the utility infrastructure across various zones in Falls Township. The primary focus was the sanitary sewer, water system and stormwater utility infrastructure assets. This project was divided into two phases. The initial phase covered Zones 3 and 5, while Phase II expanded to Zones 1, 2, 4 & 6.

Falls Township aimed to upgrade its GIS mapping with survey-grade GPS data and Esri ArcGIS software. RVE led the effort, focusing on field location, collection, and mapping of utility data for sanitary, stormwater, and potable water systems.

A significant collaboration was with the Township of Falls Authority (TOFA). TOFA's invaluable contribution was pivotal to the project's success, offering GIS field information specific to the sanitary system manholes. This data incorporated details on rims, inverts, and precise locations of all sanitary sewer manholes within the township boundaries. RVE seamlessly integrated this data into its collection to offer a comprehensive dataset.

RVE collaborated with Jones Engineering Associates (JEA), leveraging their combined expertise to address the challenges faced during the Phase I pilot project. These challenges ranged from traffic control measures, acquiring property access permissions, addressing structural location/access issues, to handling the GIS mapping of various pipe layers.
A detailed roadmap was set, with specific tasks ranging from initial land surveying services, capturing USGS research data, employing GPS control points, to sanitary sewer and stormwater system land surveying services. Each task was executed, using advanced tools such as the Trimble Geo7x GPS unit. RVE's dedicated efforts culminated in the creation of an integrated GIS Utility Infrastructure Mapping Database for Township. This database showcased the intricate details of existing utility systems, spatially aligned to a base map.

SUE & GIS – Building your Asset Management Vision

Mark Maguire

Time: 14:50

Length: 20 minutes

Abstract: Subsurface Utility Engineering (SUE) is the practice of using geophysical technologies to designate and locate underground utilities, such as water pipes, electrical conduits, and gas features. SUE plays a huge role in the development of GIS-based asset management systems, as facilities grapple with the maintenance of their aging infrastructure. But the process from getting from a positive “hit” in the field via ground penetrating radar (GPR) to a feature logged in GIS involves many facets. This presentation will provide an overview of SUE and GIS integration, while covering key factors such as accuracy, attribution, and quality control through recent case studies. We will also discuss applications for connecting the “underground to the indoors” with the rise of 3D GIS and accessible scanning technologies for full-circle asset management.

Gis-Driven Hydraulic Model Expansion: A Case Study From Pittsburgh Water And Sewer Authority

Ross Volkwein, Wade Trim, and Ana Bennett

Time: 15:10

Length: 20 minutes

Abstract: This presentation outlines the application of GIS tools in expanding hydraulic modeling within the City of Pittsburgh. These tools were pivotal in team planning, coordinating a complex program scope, managing deliverables, and transforming data for long-term enterprise-wide use. Our approach and coordination with PWSA led to improvements in data accuracy and project efficiency. A diverse array of GIS tools was utilized, including ArcGIS Pro, ArcGIS Online, Hub Sites, Field Maps, StoryMaps, Dashboards, Python, and Model Builder.

A thorough suitability analysis was done to identify appropriate sewersheds for detailed H&H model expansion. The project team developed multiple alternatives for expansion using mapbooks, web applications, and StoryMaps. Tracing tools identified potential sites for flow monitoring equipment installation. Field Maps was instrumental in conducting site investigations and tracking the approval and installation process.

A specialized workflow was created for surveyors. This involved using Field Maps in conjunction with a high-accuracy GNSS, enabling multiple crews to track their progress and data in real time using a Dashboard. ArcGIS Pro reports were used to create user-friendly deliverables for PWSA field crews, assisting in locating and opening stuck manholes.

Data was integrated with DEMs and asset management data. Harmonizing this diverse data set posed a challenge, addressed by developing a Model Builder tool and custom Python geoprocessing scripts. These tools rigorously compared all datasets to select the most current and relevant data for the model.

The final output was tailored for PCSWMM (PC Storm Water Management Model) compatibility. This output marked a substantial improvement in data quality for the model. It enhanced the accuracy and reliability of the H&H models and facilitated the development of submodels before survey completion for the entire project.

Mappy Hour' Poster & Map Session

ROOM: Presidents Hall 1

Bar accepts drink tickets and cash.

Investigating Geologic and Soil Influences on Watershed Scour and Fill near Washington, D.C.

Sophia Boquist

Time: 17:00

Length: 2 hours

Abstract: This project aims to examine the influence of soil composition and underlying geology on historical scour and fill patterns in watersheds surrounding the Washington, D.C. area. Scour/fill rasters of two watersheds, Difficult Run and Northwest Anacostia, are created from manipulation of digital line graphs (DLGs) derived from U.S. Geological Survey topographic maps. Once DLGs are clipped to size and rasterized, the distribution of values is adjusted to remove null ranges and the final product is overlaid onto a LiDAR image of the area. This produces a visual of scour and fill within the watershed. Regional bedrock geology and soil composition data are then compared to this scour and fill. Features displayed on topographic maps, such as landslides and road cuts, may also be digitized for further comparison to geologic and scour/fill data. Because the area's geology is primarily crystalline metamorphic rocks which do not erode easily, scour and fill is most likely influenced by human activity (road building, construction) rather than geologic composition (USGS 1999).

Don't forget your hall pass: Exploring the use of ArcGIS Indoors for a District Wide K-12 Environment

Justin Fraser

Time: 17:00

Length: 2 hours

Abstract: In the rapidly evolving landscape of K-12 education, the integration of technology plays a pivotal role in shaping innovative and effective learning environments. This presentation explores the transformative potential of Indoor Geographic Information Systems (GIS) in the backdrop of K-12 schools. Unlike traditional GIS that primarily focuses on outdoor spatial data, Indoors GIS utilizes ArcGIS Indoors applications to bring the power of geospatial analysis and mapping to the interior spaces of educational institutions.

The session will delve into the myriad of ways in which Indoors GIS can be harnessed to optimize the utilization of indoor spaces within K-12 schools. From enhancing facility management and safety protocols to facilitating interactive and immersive learning experiences, this presentation aims to showcase the diverse applications of Indoors GIS in the Campus Space.

The presentation aims to inspire educators, administrators, and policymakers to embrace the potential of Indoors GIS as a tool for fostering innovation, safety, and efficiency within K-12 educational settings by showcasing Langan implemented case studies. By the end of the session, participants will gain insights into practical strategies for leveraging geospatial technology to create dynamic and future-ready learning environments through routing, space management, and asset management alike.

Social Determinants of Health in Historically Redlined Areas of Pittsburgh, PA

Sydney Greenway

Time: 17:00

Length: 2 hours

Abstract: Social determinants of health (SDOH) are external factors outside of an individual's control that influence their long-term health. These factors, which include employment status, education level, and level of social support, also encompass access to physical resources such as green spaces, libraries and schools, grocery stores, and healthcare facilities. In the United States, research increasingly links the Homeowner's Loan Corporation's (HOLC) "residential security maps" of the 1930s-60s with continued inequality and uneven patterns of disinvestment, poverty, and poor health outcomes across ma many U.S. cities. However, less research has examined how the HOLC neighborhood rankings might affect variations in access to critical physical resources across individual cities. This research seeks to address this deficiency by examining if there is a correlation between the HOLC's neighborhood rankings for Pittsburgh neighborhoods and access to physical assets, which is used as a proxy for one's socially determined health. This research was conducted using ArcGIS Pro 3.2.0. Data on physical resources was mapped using the data set "Allegheny County Assets" from the WPRDC. The variables included in the analysis are locations of doctors' offices, supermarkets, parks, and libraries, given their recognized effects on health and well-being. ArcGIS software was used to overlay this data on the HOLC rankings for Pittsburgh city neighborhoods and to quantify correlations between HOLC letter grade and modern asset locations. The "count within" tool

was used to quantify how many assets were in areas receiving each HOLC grade. The results of the analysis do not show a clear association between HOLC grade and the presence of neighborhood assets. Notably, both libraries and parks are evenly distributed to areas receiving all HOLC grades. However, the distribution of supermarkets is uneven, with higher concentrations in neighborhoods ranked A by the HOLC.

The Darién Gap

Theresa Haug & E-Kat Hampton

Time: 17:00

Length: 2 hours

Abstract: The Darién Gap is a 26,000-square-km (10,000-square-mi) area of dangerous wilderness including swamps, mountains, and rainforest that straddles the Colombia-Panama border. In 1923, the United States set out to unite the American countries by building the 30,000 km (19,000 mile) Pan-American Highway, which stretches from Alaska to Argentina. Road construction stopped abruptly in 1975 leaving a 100 km (60-mi) stretch of missing highway between Central and South America. The area around the missing stretch is called the Darién Gap.

Since 2010, more than 1 million migrants have transited the Darién Gap with hopes of finding asylum in North America. In 2023, the numbers became staggering; over half a million people transited, with one in four being children. Migrants have been fleeing many counties, including China, Cuba, Haiti, Nepal, and Venezuela. Many fly to nearby places in Ecuador and Brazil, because they have comparatively lax visa regulations, and find ways to Turbo or Necloclí, Colombia. Those without proper documentation hire coyotes (migrant smugglers) to guide them through the rugged jungle terrain. Migrants travelling a popular southern route will follow rivers up to the pass at Palo de las Letras and exit the jungle in Panama at Paya. Migrants travelling a popular but deadly northern route will follow the aptly named Rio Muerto up to the mountain pass at Frontera and exit the jungle in Panama at Bajo Chiquito. Our map shows several popular routes, which we reconstructed from bits and details in news reports.

The global community must examine the root causes prompting so many people to flee their home countries and examine whether current policies can withstand the resolve of those determined enough to successfully cross the Darién Gap. An entire region will need to come together to work towards political and social stability.

Airbase Planning Application with the Assistance of Artificial Intelligence and the Analytical Hierarchy Process

Fred Holwerda

Time: 17:00

Length: 2 hours

Abstract: The present method of airbase planning is a cognitively intense task that is defined by a multicriteria decision making process. The task of airbase planning is generally assigned to combat engineers who must rapidly plan and coordinate with other planners from various military occupational specialties. The task can be delayed when specific planners are occupied with their own tasking methods, especially in contingency situations or crisis events. This research explores the use of a geospatial information system, the analytical hierarchy process,

and geospatial artificial intelligence to expedite the planning steps for airbase development and reduce the overall cognitive burden on combat engineers in the field.

How Pittsburgh's Geography affects Socioeconomic Status

Emma Mihok

Time: 17:00

Length: 2 hours

Abstract: Defined as a combination measure of income, amount and kind of education, occupation type, place of residence, and ethnicity or race, socioeconomic status (SES) is a key indicator of equality. Research has shown that the distribution of SES across US cities has been and is highly uneven. Traditionally these differences in SES have been explained by a variety of historically contingent processes like institutionalized racial discrimination, unfair mortgage lending practices, migration, differences in education levels and access to jobs, characteristics of the job market, family structure and race. Less researched are the impacts of a city's site and situation on the distribution of socioeconomic status. A city's situation is its location relative to other places and its connectivity. Connectivity can be disrupted not only by steep slopes and rivers but also by the built environment. The city of Pittsburgh, located at the confluence of three rivers, surrounded by steep hills and ravines provides a perfect opportunity to study not just the effects of social, economic, and demographic forces on the distribution of SES but also the effects of the city's site and situation. Using income, race, educational attainment, and occupation census data this research examines spatial variations in SES across Pittsburgh's 90 neighborhoods. Then the distribution of SES is compared to changes in elevation, and proximity to Pittsburgh's three rivers. The results show that SES varies considerably across Pittsburgh's neighborhoods. The analysis of slope and river proximity shows mixed results. Low SES neighborhoods tend to be concentrated together on multiple sides of Pittsburgh's rivers. There appears to be little correlation between SES and elevation and slope steepness. However, elements of the built environment, specifically the limited access busways that cross Pittsburgh and limited access highways serve to isolate both neighborhoods with low and high SES.

An ArcGIS Tool to Extract Strike/Dip from Terrain Data

Hope Mullins

Time: 17:00

Length: 2 hours

Abstract: Understanding the strike and dip of geologic structures is crucial for geologists as it provides valuable insights into the orientation and three-dimensional arrangement of rock layers or faults. This knowledge aids in accurate mapping of geological formations, facilitating resource exploration, such as mineral deposits or oil reserves. Moreover, it helps in interpreting the geological history and deformation processes, aiding in geological hazard assessment and infrastructure planning, ensuring sustainable development and safety in areas prone to geological risks. For the Nanticoke Creek region, many outcrops where such data would normally be collected using traditional field tools (i.e., Brunton Compass) are scarce. What outcrops do exist are inaccessible at the base of stream channels, have had their positions altered due to mining practices, or are inaccessible at the peak of steep slopes. To overcome this challenge, we created a tool to extract the Strike/Dip of geologic features based on terrain data – in this case a high-resolution (1m/pixel) digital elevation model (DEM) sourced from Light Detection and Ranging (LiDAR). This tool allows the user to select points along an expected geologic structure, and using 3D point information conducts a three-point problem to determine

the strike/dip using right hand rule (RHR) and azimuth notation. By implementing this tool, we can "access" previously inaccessible locations for important geologic structural data.

Identifying Unseen Contamination with Integrated Bioinformatics and GIS Analysis of Heavy Metal Responsive Marker Genes in Arabidopsis thaliana GEO Datasets

Bruno Nkapbela

Time: 17:00

Length: 2 hours

Abstract: There are naturally low concentrations of heavy metals found in soil, but human industrial activity has caused a sharp growth in their concentration in the environment, resulting in toxic effects on animals and plants (Socha et al., 2015). Heavy metals are absorbed by the plant from the soil solution and transported to above-ground edible parts. The metals afterwards enters the animal or human body through the food chain, becoming a health threat (Khan et al.,2013). Epidemiological studies on pregnant women and neonates living in e-waste recycling communities have shown elevated Pb, Cd, and Cr concentrations in their blood (Kim et al. 2020), meaning that current methods of recycling are causing harm to the public through unseen contamination. Heavy metal analysis can be accomplished with various techniques, such as atomic absorption spectrometry (Bannon and Chisolm Jr, 2001), inductively coupled plasma mass spectrometry (Liu et al., 1999) ,and X-ray fluorescence spectrometry (Eksperiandova et al., 2002). Although the techniques mentioned here have been demonstrated to be effective, they are limited in their applications due to their high technological sophistication, time expenditure, sample destruction methods, and costly preparation procedures. To better track heavy metal contaminations in soil and water, integrated Bioinformatics analysis uses marker genes to track heavy metal pollution in soil and water by detecting their expression in plants growing in those environments. The experimental design proposes a combination of GIS and integrated bioinformatics analysis to identify unseen sources of contamination in the Pennsylvania agricultural supply chain using only virtual tools, and experimentally validated by simple quantitative PCR at a fraction of the normal time and cost necessary for contamination assessment.

Streaming Base Maps

Caron Pawlicki

Time: 17:00

Length: 2 hours

Abstract: The Pennsylvania Geological Survey (PaGS) prepares geologic maps for areas within Pennsylvania. On a map, the layer that provides locational details is the base map. Most base maps show roads and towns, but for geologists studying the rocks, it is also important to see landforms and hydrography. These features are impacted by and can have an impact on surficial and bedrock geologic units.

PaGS began producing digital maps in 2004 using digital raster graphics (DRGs) for the base layer. These georeferenced images of 7.5-minute topographic quadrangle maps were published by the U.S. Geological Survey (USGS). By the end of the decade, we started overlaying lidar-derived hillshade images on the DRGs, giving them a 3D effect. In 2018, we transitioned to combining vector base map files published by the USGS with the hillshade images. We

manipulated the raster and vector base layers for optimum appearance by adjusting properties such as transparency, symbology, and label placement. These base map manipulations, especially those of vector files, were time consuming.

Now Esri provides streaming base maps in ArcPro, and PaGS can adopt a more automated workflow. We are exploring these maps and their visualization options to identify those that are most complementary to the geologic data being presented. In this poster session, we show part of a 1:24,000-scale bedrock geologic map with various streaming base maps. Please take our Survey 123 and vote for your favorite!

Feasibility Study Using Saline Tracers And Electrical Surveying To Track Disappearing Stream Waters In Luzerne County, Pa

Morgan Romanowski

Time: 17:00

Length: 2 hours

Abstract: The Nanticoke Creek, located in Luzerne County, PA has been heavily altered by past coal mining operations. Waters of the creek flow into the subsurface through fractures in the bedrock, and interact with mine pools, resurfacing downstream at the Askam Borehole as Abandoned Mine Drainage (AMD). However, the exact location of these fractures and the prominent flow pathways, to and through the mine pools, are unknown - thus complicating stream restoration efforts. Without knowing these flow pathways, stream restoration would require concrete to be poured along the entire streambed. Mapping subsurface flow pathways for the stream waters can aid in reducing the cost and efficiency of stream restoration by focusing materials and efforts on targeted areas. We used a saline tracer and electrical resistivity surveying to determine the fracture locations and flow pathways of the stream waters entering the abandoned mine pools. A Syscal Kid Switch 24 with a total of 24 electrodes spaced at 5-m intervals parallel to the Nanticoke Creek bed were used in this study. Using a dipole-dipole electrical configuration a survey depth of 20-m was achieved. The streambed is usually dry, except for the upper reaches; thus, surveys were conducted following high precipitation events to ensure that water was flowing the length of the stream bed in question. Data was acquired both before and after the addition of a saline tracer to the water. The pre-salt conductivity values were subtracted from the post-salt, and processed into a single tomographic image that highlights the fracture flow pathways. Stream restoration efforts can now more efficiently focus time and material on plugging the fractures that intersect the surface, or have higher flow-rates (based on fracture size). Additionally, we may be able to use fracture frequency and spacing to predict fractures along other similarly affected streams in the area by conducting a multi-scale fracture analysis.

Assessing Surface Runoff Pathways: A Comparison of LIDAR and UAS Structure from Motion Digital Elevation Models in the Context of Excess Agricultural Nutrient Application from Manure and Synthetic Fertilizer

Fin Turnage-Barney

Time: 17:00

Length: 2 hours

Abstract: Agricultural sources of nutrients, predominantly from manure and synthetic fertilizer applications, pose a significant threat to water quality, as pollutants mobilized by surface runoff can contaminate receiving water bodies. Understanding the pathways of surface runoff during rain events is crucial for informing and designing effective management practices. Currently, LIDAR (Light Detection and Ranging) data are predominantly utilized to delineate these pathways in Geographic Information Systems (GIS). However, due to its infrequent acquisition, there is a growing interest in exploring the potential of Structure from Motion (SfM) techniques using Unmanned Aerial Systems (UAS) imagery, which provide near real-time data. This study compares the effectiveness of LIDAR and UAS-SfM Digital Elevation Models (DEMs) in identifying surface runoff pathways through which excess nutrients are mobilized. While LIDAR data offer high-resolution elevation information, its infrequent acquisition limits its applicability for assessing temporal changes in these pathways. On the other hand, UAS-SfM DEMs provide timely and high-resolution data, enabling more frequent monitoring and identification of runoff pathways during rain events. By comparing these two techniques, this study aims to highlight the advantages and limitations of each method in accurately identifying and monitoring surface runoff pathways, ultimately aiding in the development of effective management strategies to mitigate water pollution from excess nutrient application.

Pennsylvania Bird Atlas Map

James Whitacre

Time: 17:00

Length: 2 hours

Abstract: This year, 2024, marks the start of the 3rd Pennsylvania Bird Atlas, which occurs every 20 years. With advances in GIS technologies, like ArcGIS Experience Builder, Survey123, and other applications, the 3rd Bird Atlas will nearly be fully digital! Part of that digital transformation is the new Pennsylvania Bird Atlas Map created by the Pennsylvania Game Commission to better engage bird enthusiasts across the Commonwealth and to manage the hundreds of atlas volunteers who will be tracking their avian observations throughout the Bird Atlas. This map highlights the Atlas Blocks in Pennsylvania, some general information about the block, and what species were observed in past atlases.

Friday, April 12, 2024

REGISTRATION IS OPEN FROM 8:00 – 12:00 ON THE 2ND FLOOR OF THE CONFERENCE CENTER

Engaging the Public

ROOM: 204

Maps are for the Birds: Engaging Volunteers for the 3rd Pennsylvania Bird Atlas

James Whitacre

Time: 10:15

Length: 40 minutes

Abstract: This year, 2024, marks the start of the 3rd Pennsylvania Bird Atlas, which occurs every 20 years. With advances in GIS technologies, like ArcGIS Experience Builder, Survey123, and other applications, the 3rd Bird Atlas will nearly be fully digital! Part of that digital transformation is the new Pennsylvania Bird Atlas Map created by the Pennsylvania Game Commission to better engage bird enthusiasts across the Commonwealth and to manage the hundreds of atlas volunteers who will be tracking their avian observations throughout the Bird Atlas. This presentation will walk through the technical considerations for how the Pennsylvania Bird Atlas Map was created using ArcGIS Online, Experience Builder and Survey123.

As We Sit Around the Table Let Us Feast From the Silver Platter

Steve Kocsis

Time: 11:15

Length: 40 minutes

Abstract: We're sitting at the table but we're all eating from our own bagged lunches. We are grateful to have access to or create data for our own purposes. However, as we continue to feed our systems I can't help thinking about our role in GIS. Every byte brings to mind several songs with lyrics like "We're all here cause we're not all there". Well, what in the world am I talking about? How about a look at the PA GIS Community as a whole? We've had many years of discussion "around the table" saying how important GIS is; how great is the work that we do, wouldn't it be nice if PA had statewide (pick a layer), how can we fund.... and here we are; yet we're not all there.

A recent sense of forward progress has been PEMA NG911 GIS and through the Geo Board talking about common layers and Basemap2030, or 3DPA. Great discussions about the same old stuff. One thing that is missing from making 3DPA/Basemap2030 a reality is a unified focus--something that helps identify how datasets are related and dependent. What is something that demonstrates the need for Lidar, Imagery, 3D Meshes, Oblique Imagery, Drones, Building Information, Property Records, Emergency Services, Transportation and Logistics, Conservation and Watershed Management, Economic Development, Community Engagement, etc.? Here's a hint; Hazard Mitigation Plans (HMPs). Preparing GIS data and analysis for HMPs is THE focused purpose that hits on all of these topics and truly is a silver platter that can deliver 3DPA by 2030. Join Cambria County in discovering the intrinsic creation of 3DPA via the data necessary for

Hazard Mitigation Planning. If we are all here at the table, let us all be there to share the feast together!

GIS Foundations

ROOM: 218

Pathways and Mileposts to PA Basemap 2030

Eric Jespersen

Time: 10:15

Length: 20 minutes

Abstract: Exploring the advancement towards Pennsylvania's authoritative base map, this presentation delves into the progress made over the past three decades. Spatial accuracy has reached a serviceable level, and key partnerships are recognized. The focus is now on generating mechanisms and opportunities for seamless integration of diverse datasets, aiming to address ongoing maintenance and data currency challenges. The presentation unveils a 5-year timeline outlining the integration of framework data layers into a unified base map. Attendees will gain insights into potential engagement opportunities, contributing ideas to enhance PA BaseMap 2030 and make it a shared reality.

The Yellow Brick Road of Spatial Data Infrastructures… Boundaries, Roads and Address Points Oh My!

Samantha Dixon

Time: 10:35

Length: 20 minutes

Abstract: With growing requirements for more comprehensive/cross-boundary data access, most States are implementing state-wide Spatial Data Infrastructures (SDIs) to meet this need. On its own, implementation of an SDI can seem quite arduous but combined with the growing attention to data governance can make the thought of such an implementation seem downright scary. From the required collaboration to the workflows to the change management and everywhere in between there are evil monkeys, poppies, and wicked witches along the way. Getting agreement amongst provisioners on data standards, data formats, data requirements, etc. is easier said than done. Even once these items are agreed upon, there is still the data governance required to ensure that the data is accurate, complete, aligned, and maintained (current). Further resources to establish, as well as maintain, these implementations are often limited and/or take valuable staff's time away from their real "day jobs".

In this presentation, we will share the impact of bad data and the success of several entities in thwarting many of the "wicked witches" challenges through automation in support of all aspects of the Spatial Data Infrastructure process. We will highlight a growing number of use cases such as the US Census, Michigan, Georgia, Arizona, and Los Angeles County. Put on your ruby red slippers and join us to learn how your organization too can follow the yellow brick road to Spatial Data Infrastructure success.

Boundary Quality Project - PA Test Case

Eric Jespersen

Time: 10:55

Length: 20 minutes

Abstract: The Boundary Quality Project (census.gov) is meant to assess, analyze, and improve the spatial quality of legal and administrative boundary files. Ensuring quality boundaries is a critical component of the geographic preparations for decennial censuses and the Census Bureau's ongoing geographic partnership programs.

With a stated goal of 100% relative common representations for civic boundaries among federal, state, and local governments by 2028, the GeoBoard's Civic Boundary Working Group pursues opportunities to achieve that goal. The US Census Bureau, PennDOT Bureau of Planning and Research, the Local GeoHistory Project, and Clearfield County collaborated late last year in a test project in Pennsylvania. Learn about the methods, results, and the possibilities and plans for expanding the project over the next few years.

Land Surveying Fundamentals for GIS Professionals

Don Groesser

Time: 11:15

Length: 40 minutes

Abstract: An overview of the profession of land surveying focused on the common areas of interest for GIS Professionals, including datums, boundaries, surfaces, and remote sensing. The relationship between mapping and the features as located on-the-ground are paramount to the profession of land surveying and has often created angst between surveyors and the GIS community. There will be a focus on the current PA laws regarding the definition of land surveying and the related licensing laws, with hope to encourage collaboration between our professions with a shared goal of protecting the general welfare of the public and the contribution of our skills to society.

Public Safety, 911, and Crime Mapping & GIS Management

ROOM: 211

Using FME to Manage Parcel CAMA Workflows

Christian Przbylek

Time: 10:15

Length: 20 minutes

Abstract: In December 2023, the Pennsylvania 9-1-1 Advisory Board voted to adopt and publish an update to the Commonwealth of Pennsylvania's Statewide NG911 GIS Strategic Plan. This update was crafted by the Pennsylvania Emergency Management Agency (PEMA) 911 office, in close collaboration with its county GIS and 911 partners. The PEMA NG911 GIS Working Group and the County GIS Pros Association made important contributions to the plan that will help

ensure NG911 GIS data supports the current and future needs of Pennsylvania's 9-1-1 community.

With the initial statewide migration to NG911 service nearing completion, this updated plan signals a shift in the Commonwealth's geospatial approach to NG911. Compared to the last version of this plan, the updated version shifts focus from a pre-migration to post-migration posture and envisions an end state for NG911 GIS where accurate geospatial call routing is maintained and where Public Safety Answering Point's (PSAPs/9-1-1 call centers) can more easily and efficiently adopt emerging mapping technologies that utilize geospatial data to enhance location intelligence and further improve 911 service.

The updated plan identifies six strategic goals and associated tactical action steps to realize each goal, and additional metrics to measure success. These goals include:

1. Promoting addressing in alignment with NG911 standards
2. Operationalizing 3D mapping technologies and vertical elevation data
3. Maintaining NG911-ready GIS data and keeping pace with evolving NG911 GIS data standards
4. Supporting county NG911 GIS professional recruitment and retention efforts
5. Ensuring GIS data supports interstate interoperability (for NG911 call transfers)
6. Encouraging adoption of the NENA NG911 GIS Data Model Standard across PSAP mapping platforms

In this presentation, Kyle Bodtorf and Christian Przybylek will discuss how PEMA, working closely with our county GIS and 911 partners, are operationalizing this plan to achieve these goals and reach the envisioned end state. Learn what's in store for the future of GIS and NG911 in the months and years ahead.

Using FME to Manage Parcel CAMA Workflows

Justin Smith

Time: 10:35

Length: 20 minutes

Abstract: Cumberland County GIS has deployed FME Server over the past year. Faced with the challenge of automating intricate data workflows, the GIS Department sought a tool to streamline data manipulation processes between disparate networks without the need for extensive coding.

We will overview the creation of a desktop model designed for seamlessly joining parcel linework with Computer-Assisted Mass Appraisal (CAMA) attributes and calculating property tax estimates. Then observe how FME Server enables publishing web services for on demand data processing. FME brings our GIS Department a significant advancement in managing complex datasets.

Integrating Parcel Fabric at Chester County

Christopher Gabris

Time: 10:55

Length: 20 minutes

Abstract: The ArcGIS Parcel Fabric structures parcel managing and editing workflows in a multi-user environment. Hosted as a service, the Parcel Fabric can be shared across all platforms in your Enterprise, including desktop, web, and mobile workflows and applications.

Chester County started their effort of migrating to ArcGIS Pro in 2022. They also spent significant time and effort in evaluating the decision of integrating Parcel Fabric. The Parcel Fabric includes workflows for COGO and topology, and Attribute Rules can be authored to automatically populate data to provide quality assurance and restrict invalid data entry. In the Parcel Fabric, Chester County is managing workflows for multiple parcel types including tax parcels, subdivisions, roads, site address points, and historic features. Parcel editing workflows, configured as ArcGIS Pro Tasks, make routine operations streamlined.

Chester County employs a robust ArcGIS Enterprise consisting of a Dev, Test, and Production environments and over 200,000 parcels in the Parcel Fabric.

Pennsylvania Municipal Geospatial Professional's (PMGP)

Joseph Livoti

Time: 11:15

Length: 20 minutes

Abstract: The proposed Pennsylvania Municipal Geospatial Group aims to address the growing need for collaboration, knowledge sharing, and support in the geospatial field within the state. Distinguishing itself from county-level groups, the initiative offers a statewide reach, focusing specifically on municipalities, towns, boroughs, and their affiliated organizations. Leveraging Keystone GIS's operational support and credibility, the initiative plans to establish a board of directors, working groups, and regular meetings to foster collaboration, capacity building, advocacy, innovation, and resource sharing among members. The proposed action plan outlines key objectives, initial steps for organization, legal structure, membership drive, communication and outreach, collaboration framework, financial planning, timeline, and progress documentation, providing a comprehensive roadmap for the group's formation and development.

Keystone GIS board member Joe Livoti, who is spearheading this initiative with its unique approach and Keystone GIS affiliation, presents a promising opportunity to create a dynamic ecosystem for geospatial development and cooperation across the state. By focusing on specific objectives, leveraging existing resources, and adopting a well-defined structure, the initiative is poised to make a significant impact on the geospatial landscape in Pennsylvania, addressing the needs of municipalities and contributing to the broader geospatial community.

Pennsylvania Municipal Geospatial Professional's (PMGP) Q&A

Joseph Livoti

Time: 11:30
Length: 20 minutes
Abstract: Q&A session for the PMGP.

Geoscience and Environmental Applications

ROOM: 206

Economic Change and Climate Disaster Comparison in the Asia Pacific

Faiza Ahmed

Time: 10:15
Length: 20 minutes
Abstract: In a globalized economy, many factors can impact economic indicators. Supply chains, war, politics, but most importantly, economic geography is expanding to see how climate change can impact a nation's economy. For this study, 3 main economic indicators (GDP, unemployment rate and debt ratio) are compared to each other and in response to natural disasters. Using IMF and EM-DAT Disaster Database, six countries of the southeast Asian region were examined: Indonesia, Philippines, Singapore, Malaysia, Thailand, and Vietnam. Their changes in GDP were compared in response to disaster events over a 30-year period (1992-2022). Panel data which is also known as longitudinal or cross-sectional time-series data was prepared using these open data sets. Panel Data Model (plm) library of functions in the R Studio were used to run financial model estimation to compare disaster intensities (deaths per population) to GDP. Hausman Test on the data set determined that a fixed effect model estimation is required due to unobserved heterogeneity, thereby rejecting the study's null hypothesis that natural disasters and GDP or economic indicators are independent. Further use of geographic weighted regression modelling using 'spgwr' functionalities of R are also considered.

Homewood's Street Trees in Context

Julian Kröger

Time: 10:35
Length: 20 minutes
Abstract: Impermeable surfaces contribute to and worsen the urban heat island effect, reduce water percolation rates, and reduce air quality. Street trees and urban tree canopies are vital tools for counteracting each of these environmental issues. Research indicates that the distribution of street trees varies greatly across individual urban places, with the lowest tree inventories and the poorest quality trees in low-income neighbourhoods and communities of color. As a result, low-income neighborhoods and communities of color often have worse air quality and higher surface temperatures than predominately white, affluent neighborhoods. This research examines the distribution of street trees and variations in air quality across the city of Pittsburgh by taking advantage of publicly available data on multipoint tree surveys and temporal air pollution values (PM 2.5 concentration), with further plans to use raster temperature data from NASA's AppEEARS data center to measure the urban heat island effect.

The results of this study show that significant environmental inequalities exist across Pittsburgh neighborhoods. The number of street trees and tree canopy density is highest in white, affluent neighborhoods and lowest in predominately non-white, low-income neighborhoods. With an R-squared of 0.016, the correlation between PM 2.5 concentration and tree canopy, though intuitive, was not statistically significant. This may have been due to the small sample of air quality data available. The final empirical result of this study testing the heat mitigating capacity of street trees will be completed shortly. This project was largely completed through an internship with Operation Better Block, a long-standing community development organization in Homewood which runs several green initiative programs, including the installation of PurpleAir monitors to continue the tracking of air quality data in the neighborhood.

Gravity Investigation to Map Minepools

Bobby Karimi

Time: 10:55

Length: 20 minutes

Abstract: The goal of this research was to determine what gravity-surveying approaches, if any, can aid in determining where there are existing mine pools in the Nanticoke region and which ones have collapsed. To aid in ensuring site selection over top of expected mine pools, we used georeferenced, historical mine maps for the region. The Earth Conservancy granted us access for one of their Nanticoke properties - a reclaimed mine land now used for all- terrain vehicle (ATV) recreation. At the site, we established a gravity base station using Wilkes University's own base station as a reference, then collected 3 to 6 readings (for averaging) every 5 meters using a Lacoste & Romberge Model G Gravimeter. We tested different approaches, including microgravity vertical gradient (MVG) and standard microgravity surveying methods, and further tested different spacing of readings to determine the best quality-efficiency balance. MVG proved difficult to obtain given the necessary height differential and the impact of wind on the stability of the gravimeter, so we were forced into using a standard survey approach. Additionally, the results from 5 meter spacing was determined to be the best for further data analysis, though 10 m could be argued for the purpose of greater efficiency. All data was corrected for instrument drift & tide, and the bouguer anomaly was calculated using a density determined from site samples and known lithologies. Geostatistical interpretation was used to generate a 2D surface map of continuous data in the study area, as well as to determine a polynomial best-fit surface for area. Subtracting the latter from the bouguer surface, we were able to highlight localized anomalies, which mimic the expected size and distribution of mine pools near the surface. Deeper mine pools were not obvious in the results. Further research is necessary to peel back the anomalies due to the upper mine pools from lower ones to see if deeper reaches can be mapped using our approach.

Site Selection for Bats? A New Era of Conservation

Shannon Hennessy

Time: 11:15

Length: 20 minutes

Abstract: Pennsylvania is home to a diverse range of wildlife, including 12 Federally endangered species. Among them are the Indiana bat and Northern Long Eared bat, which rely on forested areas to survive. Pennsylvania is also home to 13 million people who require complex infrastructure and utilities to support them. This presents a unique challenge for utility

companies: how can they keep the state powered without disturbing some of its most precious residents?

Introducing site selection for bats! Learn how Langan applied site selection and remote sensing techniques on a large scale to identify potential endangered bat habitats. With this GIS analysis, utility companies can compare critical habitats and use-patterns to their networks, allowing them to conduct maintenance such as tree trimming without impacting sensitive species.

The number of threatened species grows regularly, but using GIS we can work to create a symbiotic relationship between human infrastructure and the natural world. This presentation is meant to inspire GIS professionals to explore creative ways to use technology to protect the environment while providing value to clients. Join us to learn more!

Nation-Side Geospatial Assessment of Carbon Sequestration Potential in Colombia

Catalina Moreno-lopez

Time: 11:35

Length: 20 minutes

Abstract: The IPCC's Sixth Climate Assessment Reports stress the importance of carbon sequestration (CS) in reaching net zero CO2 emissions by 2050 to meet the 1.5 º C target of the Paris Agreement. Aligned with this objective, the Colombian government, a medium oil-producing developing countries, has an ambitious climate change strategy for 2050, with CS as a mechanism to reach carbon neutrality. Therefore, we conduct a nationwide geospatial assessment of carbon sequestration potential in Colombia in three main stages: identifying feasible areas, then characterizing them in terms of storage potential using the volumetric approach equation (CO2 screen tool) and a storage cost model (using the NETL, 2017 model).

First, we evaluate the feasible areas for CS in Colombia using open-source geographical systems. Specifically, for nationwide assessment of deep-saline aquifers by screening 14 continental sedimentary basins, by overlapping with data layers relating to surface exclusion areas and leakage risk minimization. Our findings reveal over 160,000 km² distributed across six basins that are feasible locations for Carbon sequestration. Then, we characterize those areas in terms of storage potential with a gridded geospatial map that illustrates a theoretical total capacity exceeding 1.1 Tera tonnes CO2 in P50 (0.11- 1.9 Tera tonnes), and an effective capacity of 65,000 million tonnes (Mt) of CO2 (16,000-183,000 M tonnes) predominantly concentrated in Colombia's eastern region, specifically the Llanos basin with efficient storage of 29,000 Mt in P50.

This comprehensive analysis yields valuable insights into the feasibility of carbon sequestration in saline aquifers for Colombia. Our study is important for guiding future investments and policy decisions related to CS and carbon management strategies in Colombia. Furthermore, these outcomes serve as a potential template for other developing nations where carbon sequestration may play a pivotal role in global climate.

Water/Wastewater/Stormwater Utilities

ROOM: 205

Hydrating the Urban Desert: Integrating new surface hydrography with urban stormwater systems

Andrew Brenner

Time: 10:35

Length: 20 minutes

Abstract: The national push to leverage high resolution lidar-derived elevation models (USGS's 3D Hydrography Program) to update hydrographic network maps has increased interest in more accurate representation of subsurface flow in urban landscapes. In most natural landscapes, surface flow is the primary hydrologic driver and can be accurately determined through analysis of terrain models using flow direction, flow accumulation, and direct channel detection analyses. In dense urban landscapes the primary hydrologic driver is often subsurface stormwater networks which cannot be mapped with optical remote sensing. NV5 will present a conceptual framework that has three alternatives:

Level 1 – No Integration: This product is the standard USGS 3DHP network. This approach requires no knowledge of the stormwater system and no integration with it.

Level 2 – Superficial Integration: In this option, all flow lines entering the urban areas are routed to major stormwater lines and discharge into the receiving water bodies through known outfalls.

Level 3 – Comprehensive Integration: This level of analysis provides the most precise hydrographic representation in urban environments allowing for individual inlet-to-outlet tracking, catchments and flow accumulation to inform stormwater requirements such as pipe diameter, and identification of point source pollution initiation at network outlets.

GIS & GPS Data Collection Services for Warminster Municipal Authority Stormwater System

Christopher Gross & Ethan Snyder

Time: 10:55

Length: 20 minutes

Abstract: The objective of the project was to offer comprehensive GIS and GPS data collection survey services for the Warminster Municipal Authority (WMA). The aim was to map, document, and standardize the stormwater system assets in accordance with State guidelines. This endeavor stemmed from the Environmental Protection Agency's nationwide update that necessitated an overhaul of stormwater regulations by the PADEP. The mandate addressed groundwater pollution challenges, compelling municipalities to provide detailed maps of all municipally owned or operated outfalls that directly discharge into surface water bodies. Furthermore, municipalities were advised to keep their GIS systems up-to-date, ensuring the efficient tracking of their utility systems.

In response, RVE successfully incorporated and digitized existing GIS files, including various maps and data sets provided by the WMA. All data was georeferenced to guarantee spatial accuracy, aligning with DEP's digital submission standards. Attribute tables were updated and populated from the given datasets, ensuring compliance with DEP directives. By cross-

referencing existing digital data with on-site data collected through GPS, the team assured the utmost positional accuracy. In addition, RVE also trained WMA staff on the GPS equipment and standards needed to keep his information up to date. Leveraging the capabilities of cutting-edge Autodesk AutoCAD and Esri ArcGIS software applications, a color-coded Stormwater System Map was drafted. As part of the mandate, the Stormwater Pollution Prevention Plan was consistently updated, adhering to MS4 regulations. To achieve comprehensive coverage and accuracy, data from various county and state resources was integrated seamlessly. Upon completion, the project yielded an integrated and exhaustive map of WMA stormwater assets, inclusive of Bucks County data. This map was complemented with a digital GIS format submission that met DEP's MS4 compliance standards.

Utilizing GIS to Meet Permit Requirements for a Phase II MS4 Permit in Washington County, Maryland

Joshua Trott

Time: 11:15

Length: 40 minutes

Abstract: Washington County, MD, is a Phase II Municipal Separate Storm Sewer System (MS4) permit holder. Stormwater runoff throughout Washington County is untreated and discharges directly into streams, rivers, and lakes. This exposes waterways to the potential risks of pollution. Under this permit, Washington County has several requirements that must be met yearly. These requirements ensure no pollutants are going into the local waterways and ultimately the Chesapeake Bay. GIS has become a key component of the county achieving these goals. This includes the use of Survey123, ArcGIS Pro, and ArcGIS Online. Survey123 is heavily used in inspections such as dry weather outfalls, Illicit Discharge Detection and Elimination (IDDE), trash clean ups, and stormwater pollution prevention plans (SWPPPs). ArcGIS Pro is heavily used in tracking BMP inspections and impervious acreage throughout the county. ArcGIS Online (AGOL) combines these and makes it easy to share data across departments and agencies. With the continued progression of ArcGIS, future goals of Washington County Stormwater include modeling, python scripting, and data management.

Presenter Index by Last Name

A

Abrams, Eric....19
Ahmed, Faiza....48

B

Bennett, Ana....35
Boquist, Sophia....36
Bowen, Mark....24
Brenner, Andrew....51

C

Capaz, Dave....20
Carter, Savannah....20
Chittester, William....32
Christensen, Jamie....21

D

Derr, Eric....20
Dharmapuri, Srini....19
Dixon, Samantha....44
Drzyzga, Scott....24

E

Eaton, Kevin....30

F

Fehrs, Ellen....28
Fioranelli, Drew....30
Fisher, Thomas....13
Fraser, Justin....19, 37

G

Gabris, Christopher....47
Giner, Nick....11
Gish, Brian....27
Greenway, Sydney....37
Groesser, Don....45
Gross, Christopher....34, 51
Gross, Eliza....27
Guinn, Steven....26
Guiseppe, Al....15, 28

H

Hampton, E-Kat....38
Haug, Theresa....38
Hennessy, Shannon....49
Hermann, Michael....11
Holwerda, Fred....38

J

Jalbrzikowski, Jeff....24
Jespersen, Eric....15, 44, 45
Jursa, Christopher....25

K

Karimi, Bobby....49
Kocsis, Steve....18, 32, 43
Kröger, Julian....48

L

Lain, Sean....31
Langley, Chris....29
Larkin, Jeffrey....12

Lawlor, Zach 33
Livoti, Joseph 25, 47, 48
Lucas, Susan 22

M

Maguire, Mark 34
Malott, Courtney 21
Martin, Maria 18
McCormick, Erin 33
Mihok, Emma 39
Moreno-lopez, Catalina 50
Mullins, Hope 39

N

Nkapbela, Bruno 40
Nova, Jacqueline 26

O

Olivieri, Luis 23

P

Pawlicki, Caron 40
Petroski, Joseph 23
Piekielek, Nathan 26
Przybylek, Christian 45

R

Romanowski, Morgan 41

S

Skender, Elizabeth 31
Smith, Justin 46
Snyder, Ethan 34, 51

T

Trim, Wade 35
Trott, Joshua 52
Turnage-Barney, Fin 42

V

Volkwein, Ross 35

W

Waggoner, Devin 30
Waldman, Miranda 29
Wall, Scottie 23
Weber, Katherine 21
Whitacre, James 15, 16, 25, 42, 43
Woo, Lucia 32