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Empowering Colleges: Expanding the Geospatial Workforce

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GeoTech Center Information

The GeoTech Center is virtual, comprised of a Director, four Associate Directors, and eight Assistant Directors from institutions across the nation. The central office is located at Jefferson Community and Technical College (JCTC) in Louisville, KY.

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GeoTech Center Virtual GIS Day

The GeoTech Center successfully hosted a Virtual GIS Day on November 18, 2020. Multiple tracks ranging from cartography techniques, to GIS lessons, to GIS applications, to a Spanish speaking track were offered. Included below are the description of each of the talks. To listen to recordings of each of the talks (as well as to gather a variety of resources and lesson plans), please visit: https://geotech-virtual-gis-day-kctcs.hub.arcgis.com/

Good Maps, Bad Maps, You Know I Had My Share: Joseph Kerski discussed how to cultivate the practice of being critical of data, especially spatial data, in our modern data-rich geospatial world. In an age when anyone can make a map with a dozen layers in it in less than a minute, it is important to understand where those layers came from, who created them, how often it is curated, and other metadata. During this lively presentation, we will examine some authoritative, though imperfect, maps and layers, along with others that are frankly bad for many reasons, many will be fun, all will be intriguing.

GIS en la web: Herramientas para crear tu propia cartografía interactive: En este taller se explican las herramientas básicas de la aplicación Datawrapper, una página para la creación de mapas, gráficos y tablas. Utilizar herramientas para ingresar, manipular y mostrar datos geográficos de forma rápida y fácil es una tendencia que ha venido creciendo en muchos ámbitos profesionales. Profesionales y estudiantes están realizando su propia cartografía ya sea para complementar un artículo o mostrar los resultados de una investigación. El taller va dirigido a toda persona interesada en obtener conocimientos en cartografía web.

Mapping Conflict: The Armed Conflict Location & Event Data Project (ACLED) is a disaggregated conflict data collection, analysis, and crisis mapping project. ACLED provides real-time data on the dates, actors, types of violence, locations, and fatalities of all reported political violence and protest events across nearly 150 countries around the world. The ACLED team conducts analysis to describe, explore and test conflict scenarios, and makes both data and analysis open to free use by the public.

Teachers can use the ACLED dashboard to examine the spatial and temporal attributes of conflicts. This presentation will illustrate its use in a freshman level college course. Students will learn how to use the dashboard and complete geographical research to compare and contrast conflicts in different countries. The presentation will also show how to expand your analysis by downloading the data from the website and then uploading it into ArcGIS Online.

Mammoth Cave in Six Maps: Rickard Toomey, Cave Resource Management Specialist at Mammoth Caves National Park spoke about how caves are mapped and the history of mapping caves at Mammoth Caves National Park.

Mapeo Humanitario: Comience con el mapeo humanitario en OpenStreetMap (OSM) uniéndose al Monroe Community College Mapping Club mientras demuestran cómo usar OSM para mapear y producir datos espaciales y productos cartográficos para ayudar en el conocimiento de la situación y la toma de decisiones cuando se enfrentan a desastres naturales, público emergencias de salud y eventos de más largo plazo como disturbios políticos.

Get Your Game on with ArcGIS Story Maps: Learn how to use Esri's StoryMaps within the classroom. This session included a preview of the newest StoryMaps and how they can be integrated into almost any grand level or lesson.

Humanitarian Mapping: Get started with humanitarian mapping in OpenStreetMap (OSM) by joining the Monroe Community College Mapping Club as they demonstrate how to use OSM to map and produce spatial data and cartographic products to aid

Geospatial Science and Technology Educator Certification Pilot Program Graduates

The National Geospatial Technology Center of Excellence (GeoTech Center) is pleased to announce that the following 21 individuals received their Geospatial Science and Technology Educator Certification (GSTEdC) on September 11, 2020. The educators listed below represent the first group of educators to receive their GSTEdC.

- Ina Ahern, Plymouth Reg. High School, NH
- Karen Babyak, Frazier High School, PA
- Jerry Bartz, Brookhaven College, TX
- John Beltran, Central New Mexico Community College, NM
- Judith Bock, Elmhurst University, IL
- Lisa Cady, University of Arkansas – Fort Smith, AR
- Russell Columbus, Monroe High School, MI
- Phil Crossley, Western Colorado Univ, CO
- Ryan Kelly, Bluegrass Comm College, KY
- Rob Langston, Brandon School Division, Manitoba, Canada

- Brandi LeRoy, Bangor High School, ME
- Matt Mann, Douglas MacArthur High School, TX
- Bill Montgomery, New Jersey City College, NJ
- Katrina Patton, Southeast Comm College, NE
- Evan Sellers, Academy for the Arts, Science, and Technology, SC
- Jason Smolinski, Fairfax High School, VA
- Peter Stetson, Educational Mapping Service, RI
- Kyle Tredinnick, Omaha Public Schools, NE
- Peter Trentacoste, Pope High School, GA
- Tara Vansell, Lindenwood University, MO
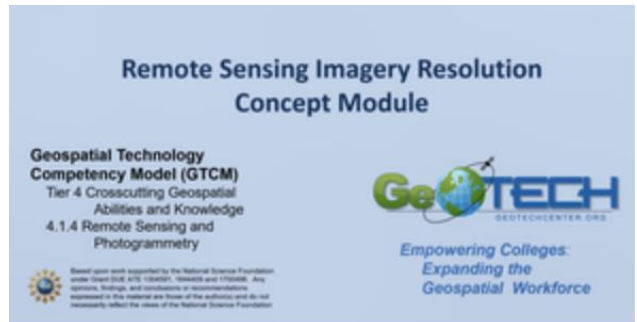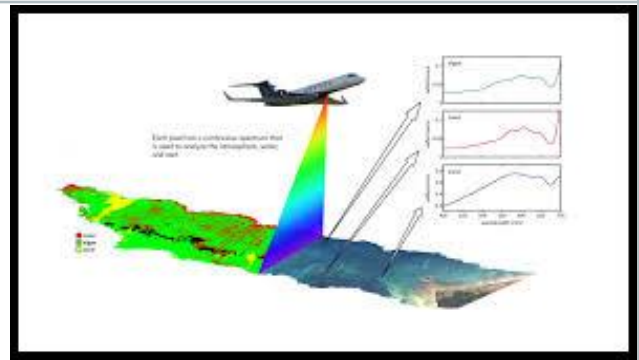- Matt Winbigler, Cloquet Middle School, MN

Geospatial Science and Technology Educator Certification is a project funded by the National Science Foundation and administered by the GeoTech Center. The certification requires that educators proceed through a "pathway" of activities: a geospatial technology competency self-assessment to determine areas of strength and weakness, an eight unit self-paced massively open online course (MOOC) that consists of lectures, discussions, assignments, and quizzes, ten concept modules and its associated quiz, and a capstone project that consists of the creation of an original geospatial technology exercise, instructor resource guide, and story map. Upon successful completion of the pathway, educators receive their GSTEdC.

In the summer of 2018, Charlie Fitzpatrick, K-12 Manager of the Education Team at the Environmental Systems Research Institute – Esri, the global market leader in GST software, confirmed that a number of states were beginning to require secondary teachers provide "evidence" of their GST competence in order to teach GST courses. For secondary and post-secondary educators, showing evidence of expertise through inclusion of a credential or certification on their resume provides additional benefits beyond a prerequisite to teach a course. A certification in GST provides the added value of offering proof to students, parents, and administrators of the skillset of the instructor. It contributes to job security and affords an opportunity for professional development and growth. It also places educators in a better position to acquire grants, have abstracts accepted to present papers at professional conferences, and furnishes evidence of expertise when collaborating with other institutions for curriculum development and articulation agreements. And if an educator's certification program is based on the skills and competencies needed by the workforce, the added benefit is that those critical competencies will become part of the curriculum taught in more classes and programs. As a consequence, industry will recognize the competencies the students from these programs have been exposed to, providing a bridge between secondary, post-secondary GST instruction, and the workforce.

The GeoTech is presently developing an NSF grant proposal to create a full GST educator certification program. If funded, geospatial educators will have a new and exciting opportunity to get certified in geospatial science and technology education.

Future GSTEdC cohort opportunities are presently being planned. If you are interested in learning more about the GSTEdC program, please contact Nicole Ernst at nlernst@hacc.edu.

Concept Modules (and Demo Videos)

Processing Drone Images with Ground Control Points
EPISODE 3

CONCEPT

Remote Sensing Imagery Resolution Concept Module

Geospatial Technology Competency Model (GTCM)
Tier 4 Crosscutting Geospatial Abilities and Knowledge
4.1.4 Remote Sensing and Photogrammetry

Empowering Colleges: Expanding the Geospatial Workforce

With most programs moving to online instruction, the GeoTech Center wants you to know about resources that can be used as part of your courses. Students can freely access Concept Modules that review basic concepts from the GeoTech Center website and YouTube Channel. The modules are short (less than 20 minutes) and focus on concepts that students need to know yet are complex enough to need a refresher. Topics include:

1. Map Projections
2. Datums
3. Statistics (part 1 and 2)
4. Color
5. Metadata
6. Programming (part 1 and 2)
7. Scale
8. Topology
9. US Census
10. Attribute Relationships
11. Data Management
12. Remote Sensing Resolution
13. Remote Sensing Overview
14. Data Visualization (MAUP)

Demo videos are short demonstration videos designed to show students and educators how to perform a particular task in a step-by-step

manner. The topics covered by the demonstration videos include managing geospatial data in ArcGIS Pro, collecting field data using real-time kinematic GPS, and implementing high accuracy workflows in drone data processing. To suggest topics for future demonstration videos, please contact the GeoTech Center team.

See the full list and links to these modules and Demonstration Videos on the GeoTech Center website at:

http://www.geotechcenter.org/concept-modules-and-demonstration-videos8203.html

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in situational awareness and decision-making when faced with natural disasters, public health emergencies, and longer term events such as political unrest.

Using GIS to Solve Health Equity and Public Health Problems: Kristen Kurland, Carnegie Mellon University, Heinz College: Health and equity issues are complex and collaborations from multiple disciplines are needed to address them. GIS is a tool that allows advanced analysis and decision-making using data from many perspectives. This talk provided insights to geospatial projects and policy solutions related to health problems facing the world today.

Experiencias de alumnos universitarios en el uso de los Sistemas de Información Geográfica como herramienta de apoyo para entender y modelar el territorio: Con la ponencia se busca compartir con los asistentes algunas experiencias en el uso de los Sistemas de Información Geográfica que los alumnos de la Fundación Universitaria Tecnológico Comfenalco y de la Escuela Naval de Cadetes "Almirante Padilla", han tenido, utilizando estas herramientas para la gestión de datos georreferenciado y la toma de decisiones en el campo ambiental, territorial, académico y de investigación. Y como algunos egresados del programa de ingeniería ambiental lo siguen aplicando estas herramientas en su crecimiento profesional y laboral.

Defining the "I" in GIS: Over the past several years there have been developments made in the communication of results in the geospatial industry that are more graphical and simpler to understand. As part of this development a dynamic method of looking at information will be explored and goes beyond a static representation of information. Some of these dynamic tools have been used during COVID – 19 pandemic and the recent U.S. Presidential election. This program will show some of the dynamic tools that can be used in the geospatial environment which require no programming.

Humanitarian Mapping: Get started with humanitarian mapping in OpenStreetMap (OSM) by joining the Monroe Community College Mapping Club as they demonstrate how to use OSM to map and produce spatial data and cartographic products to aid in situational awareness and decision-making when faced with natural disasters, public health emergencies, and longer-term events such as political unrest.

Flying Cars or TEOTWAWKI? Either way, the Future is Geospatial: As us geonerds know, geography is everywhere, and geography is where it's at! But, the more I work around the world, the more I realize that we are only aware of a sliver of the possibilities. Geospatial concepts are worming their way into our future in ways that are surprising to discover. In this talk, I'll discuss nascent and future trends where geospatial knowledge, know-how, and conceptual understanding are, or will be, critically important. I'll invite you to share your thoughts and reflections. Let's have some fun and talk about how geography is truly becoming a keystone discipline for our collective futures.

YouthMappers: de la teoría a la realidad: Join Vivian Arriaga and Jasson Mora Mussio as they discuss YouthMappers, an organization whose mission is to cultivate a generation of young leaders to create resilient communities and to define their world by mapping it.

Introduction to Mapbox Studio: Mapbox is a live location data platform powering maps and navigation experiences for mobile, web, gaming, and automotive. The Mapbox Education program works with instructors and students across disciplines to connect the classroom to the latest that the Mapbox platform has to offer: Design beautiful maps in Mapbox Studio, develop interactive web maps with Mapbox GL JS and use Mapbox APIs and kits to build location-based games and mobile apps. During this session, you work learn to work with Mapbox Studio. Throughout the tutorial, you will learn to upload custom data to Mapbox Studio, add it to a template style, use filters to style your data, and publish and share your map designs!

GIS and Powerful New Avenues for the Classroom (and Beyond): Anita Palmer, GISetc.
In this presentation you will get a look at two new resources for K12 learning...but wait! If you are in higher ed, don't go anywhere, this could be for you too.

Creating a COVID-19 ArcGIS Dashboard: GIS data dashboards have been used to visualize and analyze complex spatial data regarding the COVID-19 pandemic. This session will explore how and why GIS dashboards are critical for decision- makers and informing citizens to understand the pandemic at a local and national level spatially. Participants will learn how to create a GIS data dashboard of COVID-19 cases, deaths, and recoveries for each country using the live feed data from Johns Hopkins University and U.S. Census data.

Combating Food Insecurity & Food Waste Through Service Learning Partnerships: This presentation highlighted a GIS service-learning partnership between Palomar College, the Alliance for Regional Solutions, and the San Diego Food System Alliance, that has been ongoing since 2013. The Alliances have worked with Palomar GIS students to map and analyze various datasets in order to address the problems of food insecurity and food waste in San Diego County.

Rethinking Cartography: Design Hints & Discussion for Better Data Visualization: This workshop provided some hints and tips that help you and your students create maps that really tell a story - not just any story, but your data's story customized for a specific audience.

GeoGames: Want to engage your geography learners? Love trivia? Join us to learn about some fun Geography- based games for the classroom, Scouting events, community nights, and more!

Integrating Geotechnologies in European Education: This presentation was made on behalf of the European Association of Geographers (EUROGEO), a non-profit scientific association established by the European Commission more than 40 years ago and based in Belgium. EUROGEO has been strongly advocating for the widespread use of GIS tools and technologies in different sectors of education, in schools, with youngsters, adult education, universities and colleges across Europe. The presentation will review the progress made and share the outcomes of some of the projects undertaken, the lessons learned for GIS education and current and future developments.

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Chula Vista Police Department Drone Program

Mission: The mission of the Chula Vista Police Department's UAS Program is it to provide airborne support to police operations in a safe, responsible, and transparent manner to preserve the peace, reduce response times and increase the quality of life in Chula Vista.

Overview: Small remotely operated Unmanned Aerial Systems (UAS), also commonly referred to as drones, are an efficient and effective way of providing law enforcement critical information to respond to Calls For Service, emergency situations or to conduct criminal investigations. Some examples include; providing an overhead view of an area or incident for ground personnel, safely clearing the interior of buildings, providing detailed documentation of crime and accident scenes, and searching for lost or missing persons.

Drones as First Responder (DFR): Beginning on October 22, 2018, with strong support from the community, the Chula Vista Police Department began deploying drones from the rooftop of the Police Department Headquarters to 911 calls and other reports of emergency incidents such as crimes in progress, fires, traffic accidents, and reports of dangerous subjects. This unique concept of operations (CONOPS) for drones developed out of a partnership between CVPD and Cape. CVPD and Cape are part of the San Diego IPP Team, selected as one of only 10 teams among hundreds of applicants as part of the FAA's Integration Pilot Project (IPP). The IPP is a federal initiative designed to help integrate drones into the National Air Space (NAS). CVPD's CONOPS is called Drone as First Responder (DFR) and it is a transformational method of policing that has demonstrated the ability to increase officer and community safety and reduce overall police response times. DFR provides the ability to see what is going on at an incident before emergency personnel arrive on scene. In addition to the overhead perspective that traditional air support has always provided, DFR allows a trained incident commander to "virtually" arrive on scene first, sometimes minutes before officers are in harm's way. The drone has a powerful on-board camera that streams HD video back to the department's real-time crime center where the Teleoperator, who is a trained critical incident manager, not only controls the drone remotely, but communicates with the units in the field giving them information and tactical intelligence about what they are responding to. The system also streams the video feed to the cell phones of the first responders, supervisors, and command staff so they too can see exactly what the drone is seeing.

In addition, CVPD is the first and only police department in the nation to test and successfully use Live911 (Live911.com). This revolutionary software developed in partnership with HigherGround allows the Teleoperator, and soon officers in the field, the ability to listen live to incoming 911 calls in real time. The audio of a call between a citizen and a dispatcher contains critical information. The Teleoperator is able to launch based upon what he or she hears during the ongoing 911 call, and is often able to have the drone arrive on scene before the officers on the ground even realize the incident is occurring. This Live911 system supports the already robust and efficient CVPD police dispatching system, providing only an added layer of efficiency to serve the community.

The DFR Program continues to expand its capabilities with the ultimate goal of providing the ability to respond to any location in the city within minutes. In May of 2019, Chula Vista Police was authorized to fly Beyond Visual Line of Sight (BVLOS waiver). This allowed the drones to fly up to 3 miles in any direction from the launch site (within city limits). Moving from a 1-mile flight radius to 3 miles increased the area of service exponentially.

In August of 2019, Chula Vista partnered with Paradise Valley Hospital and Rush Properties to add an additional launch site. The site is about 2 miles south of the police department and provides the ability to cover the entire west portion of the City. This area is roughly 30% of the geographic area of the City but, due to its density and commercial activity, is responsible for about 70% of the priority calls for service. CVPD has plans to expand DFR to the east in the near future and ideally cover the vast majority of the geographic area of Chula Vista.

Southwestern College: In November 2020, an MOU was signed between the Chula Vista Police Department and Southwestern College to add the rooftop of the Math, Science, and Engineering building of Southwestern College as a launch site. It is expected that students of the Drone Technology and Applications Program at the College will serve as interns (in the capacity of visual observers) providing these students with additional training. In the process to reach the partnership, Southwestern College leadership (including the College President's Executive team and the Executive team of the Associated Student Organization) along with the Director of the Drone Technology and Applications program were consulted.

In the first year of DFR the drones responded to over 1,000 separate incidents and the program continues to serve the residents of Chula Vista by reducing response times and increasing safety. The program utilizes DJI Matrice 210 v2's. And recently began flying the DJI Matrice 300.

Chief Roxana Kennedy has called DFR one her most important tools in improving situational awareness, de-escalating dangerous situations, and protecting her officers and community. DFR, along with Live911, are just two of several components in the Chief's Public Safety Innovation (PSI) Initiative. The PSI Initiative is an example of the commitment of CVPD in supporting the City's role as a leader in the international Smart Cities movement.

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