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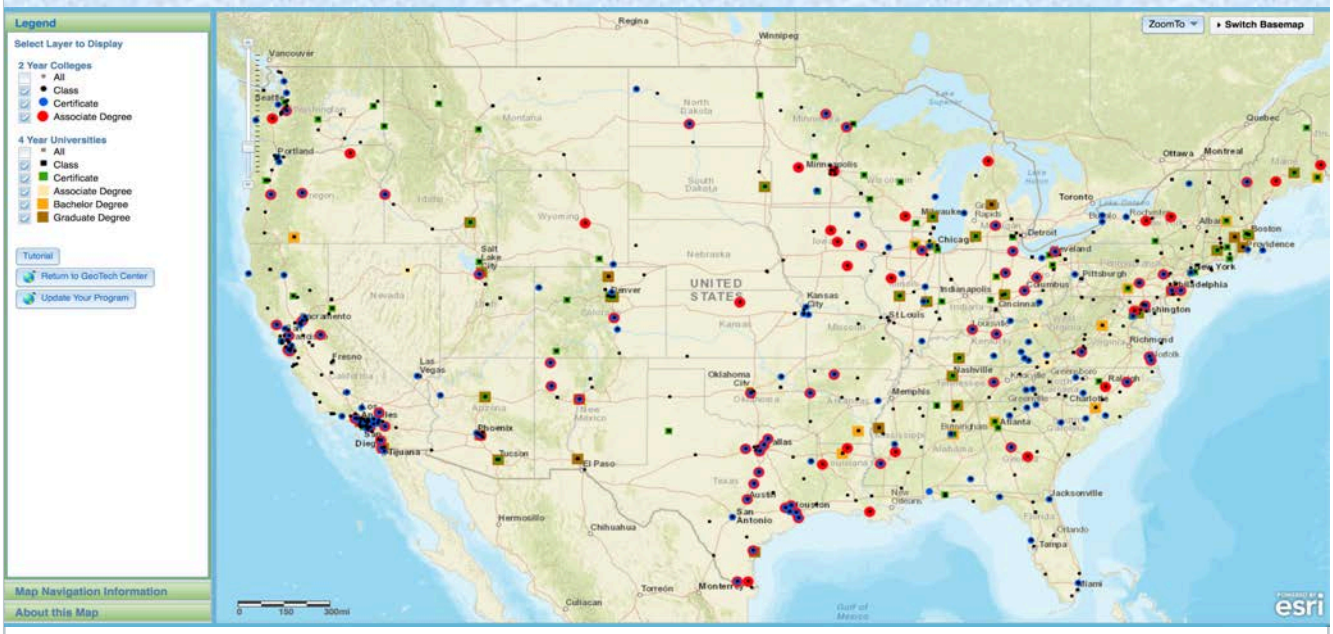
Empowering Colleges: Expanding the Geospatial Workforce



Esri Education User Conference, 2017

By Ann Johnson, Associate Director, GeoTech Center

This past July 7 to July 11, in San Diego, CA, the EdUC brought together faculty from high schools, community colleges and universities focused on geospatial education. More than 700 attended this year's event in San Diego. GeoTech hosted a Community College Special Interest Group (SIG) meeting that drew more than 40 individuals interested in issues important to two-year colleges. Topics discussed included curriculum development, student attraction and retention, and faculty preparation and management. Attendees signed up to be put on a Listserv so that they can continue to network with other two-year college educators on issues related to teaching GIS. If you are interested in being on the listserv, please send a request to be put on the

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GeoTech Center Information

This material is based on work supported by the National Science Foundation (DUE #1700496). Any opinions, findings, and conclusions expressed in this material are those of the authors(s) and not necessarily those of the National Science Foundation.

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.

JCTC
1000 Community College Drive
Louisville, KY 40272
(502) 213-GEOT
GeoTech@kctcs.edu

Contact Information

For Center questions, contact:
Vince DiNoto, Center Director
vince.dinoto@kctcs.edu
502-213-7280

To submit an article for the newsletter, contact:
Ken Yanow, Newsletter Editor
kyanow@swccd.edu
619-421-6700, ext. 5720

My Top Five Impressions from the Esri Ed and International User Conferences

By Wing Cheung, Assistant Director, GeoTech Center, Professor of Geography and Geospatial Science, Palomar College

ArcGIS Pro: ArcMap was minimally mentioned in this year's conference. While the plenary promised that ArcMap is going to be supported long into the future, it also emphasized that all future development efforts will be focused exclusively on ArcGIS Pro. The demonstrations and workshops (which were all conducted in Pro in this year's conference) stressed Pro's ability to work with 3D data and multiple layouts, as well as its integration with ArcGIS Online to streamline data sharing and its ability to leverage multi-core processor (parallel processing).

WebGIS and Integration: While many of us have worked with ArcGIS Online, the ability to work with different types of data ranging from vector tiles, real time data layers, 3D data, and drone data within ArcGIS Online was emphasized. Moreover, a plethora of analytical tools and contents (e.g. Living Atlas, and high resolution imagery basemap) are now available for ArcGIS Online users.

Interoperability: Esri strives to work with a variety of other organizations such as AutoDesk, Microsoft, Adobe, and Open Geospatial Consortium (OGC) in order to streamline data integration and data analysis across platforms through Apps and software plug-ins such as ArcGIS Maps for Adobe Creative Cloud (make maps in Illustrator by using ArcGIS Online contents) and ArcGIS Maps for Office (make maps and presentations with Excel and Powerpoint). These tools are expected to benefit GIS professionals, drafters, designers, and cartographers alike.

Powerful Analytics: Through the tighter integration with Rand Python, ArcGIS saw an improvement in analytical capabilities. There was also a heavy emphasis on relatively new software products such as GeoEvents and GeoServer, which facilitated more efficient analyses of real-time data and big data, respectively. In addition, the partnership between ESRI and Microsoft facilitated the development of capabilities such as the dynamic classification of land-use raster layers through the use of artificial intelligence, which is only one example of ArcGIS' relatively new ability to perform the dynamic processing of raster layers.

Collaboration and Sharing: A variety of tools, old and new, were introduced and reintroduced to stress the potential of GIS as a way to empower citizens and democratize decision-making. In particular, ArcGIS Hub was introduced as a suite of project templates, which can be adopted and modified by local governments to solicit feedback from concerned citizens, and enable citizens to leverage online GIS tools to suggest potential solutions to policymakers.

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Geospatial Technology at Southwestern College: Seeing the World. Making a Difference.

The Southwestern College Geospatial Technology program introduces geospatial concepts and applications. All of the courses in the program are fast-track ***and*** completely (100%) online. Course curriculum is based upon the Department of Labor (DoL) Geospatial Technology Competency Model (GTCM).

Track 1 Certificate of Proficiency:

Designed for continuing students in a "spatial" major who would like to develop (or strengthen) their geospatial tool-set. Track 1 can be completed in 1 semester. Courses include:

- GEOG 145: An Introduction to Mapping and GIS (3 unit, 8 week course)
- GEOG 150: Exploring Our World: Maps and Geospatial Science (3 unit, 8 week course)
- GEOG 152: Advanced GIS using ArcGIS (3 unit, 8 week course)

Track 2 Certificate of Achievement:

Designed for students seeking an entry level, technician position, professionals needing more training, or students who would like to expand (or strengthen) their geospatial toolset. Track 1 can be completed in 2 semesters. Courses include:

- GEOG 145: An Introduction to Mapping and GIS (3 unit, 8 week course)
- GEOG 150: Exploring Our World: Maps and Geospatial Science (3 unit, 8 week course)
- GEOG 152: Advanced GIS using ArcGIS (3 unit, 8 week course)
- GEOG 153: Internship (3 units, 8 week work experience, can be completed remotely or at a workplace)
- GEOG 154: Introduction to Remote Sensing (3 units, 16 week course)
- GEOG 155: Introduction to Image Analysis (3 units, 8 week course)

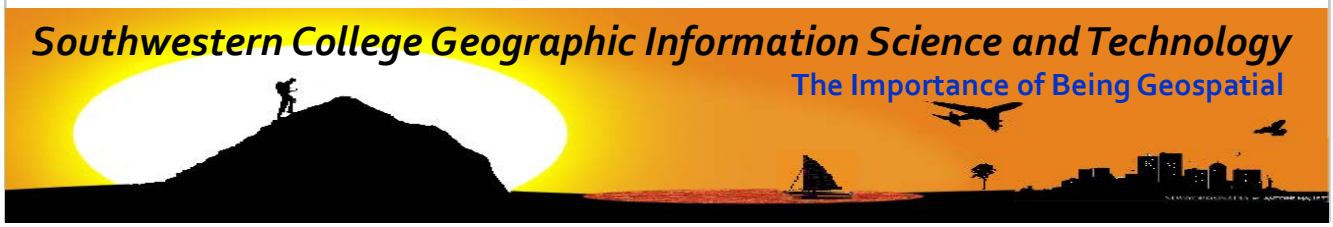
For more information about the Southwestern College Geospatial Program, please contact Ken Yanow (Associate Director, GeoTech Center, Professor of Geographical Sciences, Southwestern College) at: kyanow@swccd.edu

New courses (and a new program) are presently being developed at Southwestern College in the area of Unmanned Aerial Systems (UAS).

The Southwestern College Geospatial Program has been developed with two NSF grants (DUE #0501247 and #802408).

Southwestern College is located at:

900 Otay Lakes Road
Chula Vista, CA 91910
http://www.swccd.edu
(619) 421-6700



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discussed included curriculum development, student attraction and retention, and faculty preparation and management. Attendees signed up to be put on a Listserv so that they can continue to network with other two-year college educators on issues related to teaching GIS. If you are interested in being on the listserv, please send a request to be put on the list to Ann Johnson at ann@baremet.com. Esri is also working on a program that will allow two-year colleges to offer and proctor the Esri Certification exam that should help boost program enrollment.

The EdUC included Formal Plenary and attendee presentations, lightning talks, self-organized sessions and hands on Labs with ample time to network with everyone during evening receptions.

Hot topics included the discussion of teaching with or about ArcGIS Pro. It looks like Esri is moving to a "platform based" architecture made up of ArcGIS Desktop, ArcGIS Online (for Organizations), ArcGIS Pro and ArcWeb Servers and Enterprise Server options. While more people are thinking of moving to Pro, most say this will be "in the future." Questions from industry about the use of Pro are the same, with comments saying it reminds them of the transition from ArcINFO to ArcView to ArcGIS in the past. For education, the consensus seems to be that more teaching resources are needed, including faculty training, before most will consider adopting its use. Also, for students new to the technology, they seem to learn Pro much easier than those who have grown up with ArcGIS Desktop. Also with the new Platform architecture and Pro, licensing is very different with the "Platform" licensing being linked to a named user in an Organization. There also was lot more emphasis on imagery and remote sensing, but not too much mentioned about UAS (Unmanned Aerial Systems) or Drones. The larger Esri User Conference with 16,000 attendees included 15 or so vendors with Drones packed into the HUGE Exhibit halls.

Technical Corner: Batch Geocoding Using QGIS

By Vince DiNoto, Director, PI, GeoTech Center

QGIS is free and open source geographic information systems (GIS) software. You can download a copy of QGIS at:

http://qgis.org/en/site/

QGIS 2.14 was used with Google Maps as the locator service to geocode addresses saved in a .csv file. Open Street Map could also have been used as the locator service. Geocoding is the process of taking address data (address, city, state, zip code) and transforming that data into a coordinate. When geocoding is done, a locator file is used to compare the address with street segments to determine the location of the address. In general, cities geocode relatively accurately, but more rural environments can have a drastic decrease in accuracy. When using an app on a smart device, the mapping program -- such as Google Maps -- uses a geocoding process to locate the address on the map. For geospatial technology, many times a much larger data set must be geocoded (known as batch geocoding). Generally, the data is in a spreadsheet or in .csv format.

For this process, QGIS was selected. The process could also have been done in either Esri ArcMap or Esri ArcGIS Online. One of the issues in any geocoding is to find a good locator that will allow for large enough batch geocoding. Most of the Geocoders, including the U.S. Census Bureau, limit the number of addresses that can be processed.

Process:

1. Install the QGISInstall which is a plugin installed through the plugin menu. The feature used was MMQGIS. There are multiple useful features in this plugin, but only the Geocoding feature was selected.
2. The address file must be in a .csv format. This is a comma-delimited format that was originally constructed from an Excel spreadsheet. The file had a header row with a counter, address, city, state and zip code.
3. When the geocoder was opened it automatically attempted to match the header information. It also allows for manual identification, which was not needed in this case.
4. The name and storage location is needed for the output file (which will is directly added to QGIS) for errors (unmatched addresses). For this case I had a permission issue on the default storage location and had to manually change the storage location.
5. The last item required is the locator that is to be used. I selected Google Maps, but I could have selected Open Street Map.

The geocoding provided accurate locations for my test case. One shortcoming of the process was that no window popped up that showed how the process was going. I only saw the spinning cursor indicating that something was happening. By the way, no other operations can be done in QGIS while the geocoding is being done.

The biggest issue in coding of the address was poorly constructed data, which could not properly be used by locator and thus a location was not returned. This included post office boxes, apartments and letters used with the address numbers like 117 E. Oak St.

In future issues, I will discuss items commonly used for demographical research of student data in Open Source software, such as tabular and spatial joins, clipping, and merging, along with simple queries.

If you have a software recommendation that you would like the GeoTech Center to explore for any variety of processing or mapping tasks, please contact Vince DiNoto at vince.dinoto@kctcs.edu with your recommendation.