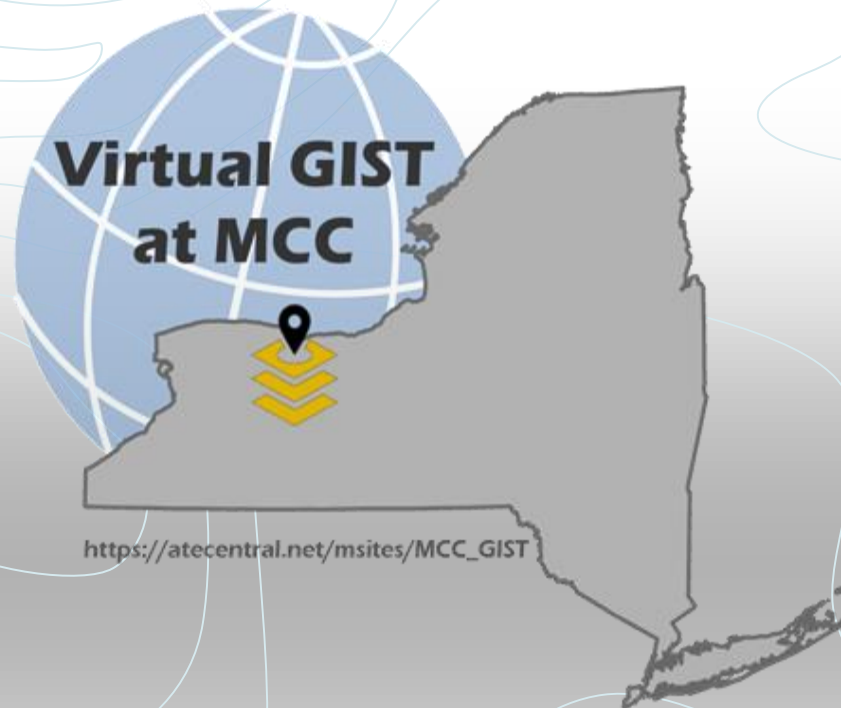
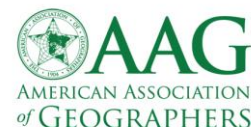


Meeting Workforce Needs with Virtual GIST:

The story of one community college's quest to create remote access to GIST education in Upstate New York



American Association of Geographers Annual Conference, 2022
Nia Beazer; Catherine DuBreck, GISP; Jon Little NSF ATE PI



2018-2028 GIST Job Outlook

GIS Scientists, Technologists, Technicians:

Employment: 412,800 - 413,000

Projected Growth: Faster than avg, 7-10%

Median Wage: \$88,550

Cartographers and Photogrammetrists:

Employment: 11,800

Projected Growth: Much faster than avg, 11%+

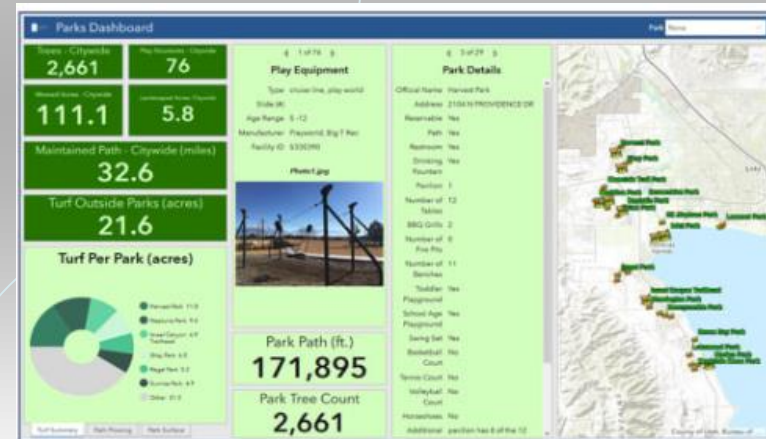
Median Wage: \$65,470

Remote Sensing Technicians:

Employment: 72,400

Projected Growth: Faster than avg, 7-10%

Median Wage: \$50,550



Source: Bureau of Labor Statistics. Employment figures are for 2018; projected growth is for the period 2018-2028; median wages are for 2019.



Meeting Workforce Needs for Skilled Geospatial Technicians: Grant Goals

- Developed Associate in Applied Science degree in GIST
 - fully accessible on campus and online
- Built advanced 9 credit GIST micro-credential for professionals
- Created 3 new courses, update existing courses
- New GIST lab with virtual student tutors
- Alumni GIST mentors
- Virtual internships
- Outreach to librarians
- Social Media promotion



The Geospatial Information Science & Technology Certificate*

Available completely online!

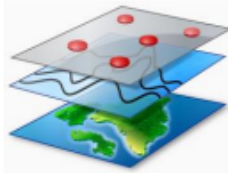
What do Geospatial Information Scientists and Technologists do?

Geographic technologies, such as **Geographic Information Systems (GIS)**, **Remote Sensing**, **Global Positioning Systems (GPS)**, and **online mapping**, are increasingly important for understanding our complex world. Geospatial Information Scientists and Technologists research and develop geospatial technologies. They may produce databases, perform applications programming or coordinate projects. Many also specialize in areas such as agriculture, mining, health care, retail trade, urban planning, or military intelligence.

Job Outlook and Wages

In 2010 the US Department of Labor released a statement highlighting geospatial technology as one of the **most important emerging and evolving fields** in the technology industry.

Normal pay for Geospatial Information Scientists and Technologists is \$54,457 per year. That is about \$4,538 per month, or \$26.18 per hour. New workers generally start around \$28,242 per year, while highly experienced workers can earn as much as \$93,155 per year.



Two-Semester Sequence

Fall Semester:

Physical Geography Lab (GEG 100) – 1 cr.

Physical Geography (GEG 101) – 3 cr.

Digital Earth (GEG 130) – 3 cr.

Cartography (GEG 131) – 3 cr. (Fall only)

Intro to Remote Sensing (GEG 133) – 3 cr. (Fall only)

Spring Semester:

Human Geography (GEG 102) – 3 cr.

Spatial Analysis and GIS (GEG 230) – 3 cr.
(Spring only)

Capstone Course in Geospatial Technology
(GEG 239) – 2 cr. (Spring only)

Elective (speak with advisor for options) – 3-4cr.

* All courses are available online!

AAS in Geospatial Information Science & Technology (GIST)

Table 1

FALL Year 1	Cr	SPRING Year 1	Cr
Introduction to GIST	3	<i>Web Mapping</i>	3
Cartography	3	Spatial Analysis	3
English	3	Art/Foreign Language	3
Introduction to Remote Sensing	3	Physical Geography Lab	1
Math	3	Physical Geography	3
		Physical/Health Education	2
FALL Year 2	Cr	SPRING Year 2	Cr
<i>UAS Data Acquisition and Management</i>	3	<i>Introduction to Programming for GIS</i>	3
Statistics	3	Capstone Course in Geospatial Technology	2
Elective	3	American History	3
Human Geography	3	Program Elective	3
Elective	3	Elective	3
		Elective	3

Micro-credential

Micro-credential

Micro-credential



A.A.S. degree in Geospatial Information Science Tech (GIST)!

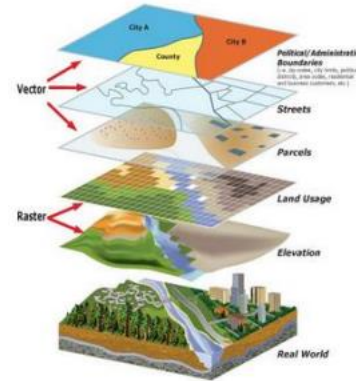
What is GIST?

Geospatial Information Science & Technology (GIST) is a growing field of study that includes Geographic Information System (GIS), Remote Sensing (RS), drones, and Global Positioning System (GPS). GIST allows us to acquire data and use it for analysis, modelling and visualization. GIST is a part of everyone's daily life (finding nearest restaurant) to marketing, politics, and environment.

Salary? What do GIST Professionals do?

Projected growth* through 2028 is faster than average. Median wage* for mid-career \$50-88K/yr.

Potential employers include: EagleView, LaBella Associates, Esri, NY City, Town of Oswego, and more. GIST professionals pursue careers in education; business; government; and nonprofit organizations. Job titles: Geospatial technician and analyst, Remote Sensing Analyst, Drone pilot, cartographer, surveying and mapping technicians.



New Courses (micro-credential*):

GEG 236 Geospatial Data Acquisition & Management

GEG 237 Web Mapping

GEG 238 Introduction to Geospatial Programming

GIS: Geographical Information Systems in which users can collect, manage, model analyze, and visualize data. This is a part of BIG data!

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GPS: Global Positioning Systems allows users to determine one's location. Smart phones have GPS receivers in them, as do airplanes, and tracking devices.

*GIST A.A.S. degree and 9 credit micro-credential approved!

*2019 Bureau of Labor Statistics.



Video (scroll down, start at 5:55):

<https://www.monroecc.edu/academics/majors-programs/stem/geospatial-information-science-and-technology-associate-of-applied-science/>

Micro-credential in GIST



**Starts Fall Semester!
Finish Your Micro-Credential Spring Semester**

GIST CERTIFICATE – PREPARE FOR ENTRY LEVEL WORKFORCE POSITION OR MICRO-CREDENTIAL

Earning MCC's 24-credit *GIST Certificate* prepares you for the GIST workforce and/or the micro-credential, or transfer to a bachelor's degree program in Geography of geospatial technology. Complete the program in one or two years depending on your life demands. You can also earn the AS in Geography along with the GIST Certificate at the same time!

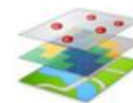
GIST CERTIFICATE includes a 50-hour internship

GROWING JOB MARKET

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* 2019 Bureau of Labor Statistics.

Employers include: EagleView, LaBella Associates, Esri, New York City, MRB Group, local towns





Earn a Micro-credential for GIST Professionals! Fall 21/Spring 22

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- GEG 237 Web Mapping (Spring)
- GEG 238 Introduction to Geospatial Programming (Spring)

GEG 236 Geospatial Data Acquisition & Management (Fall only): Learn best practices for geospatial data collection, processing and management in: UAS data collection and processing, Database management systems, Advanced geodatabase design, Topology, and enterprise postGIS.



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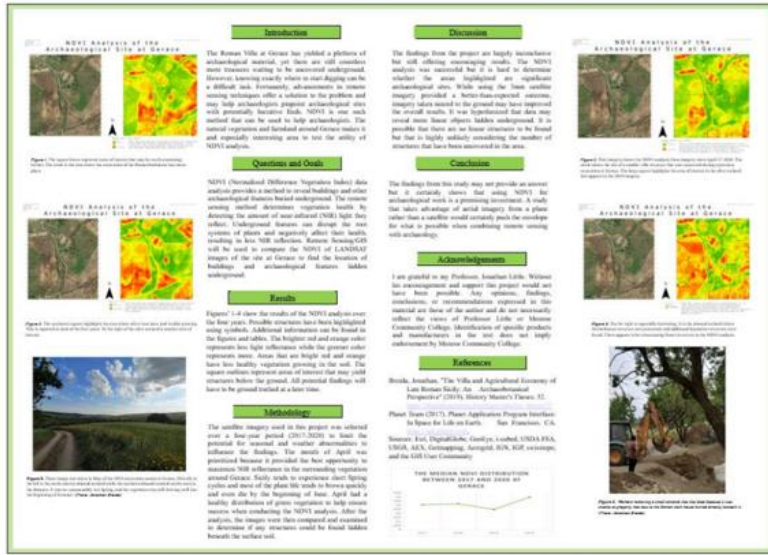
* 2019 Bureau of Labor Statistics.



Sample Student Work

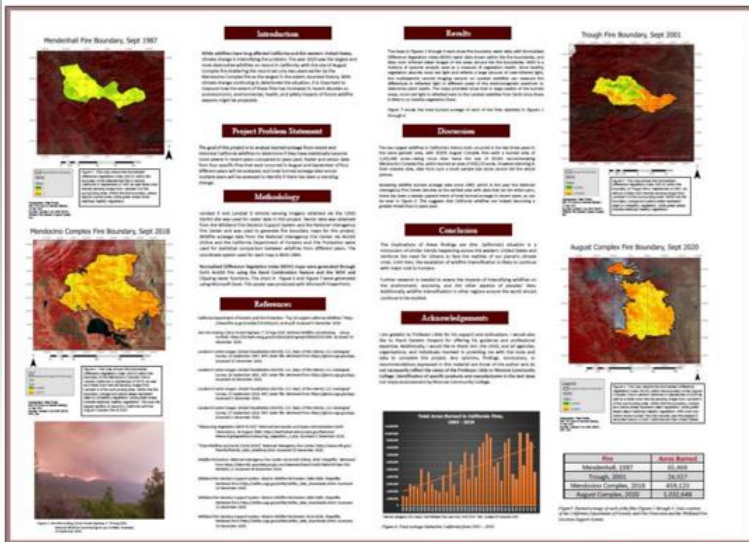
Secrets in the Soil: An NDVI Analysis of the Archaeological site at Gerace

By Jonathan Brezina
GEO 133

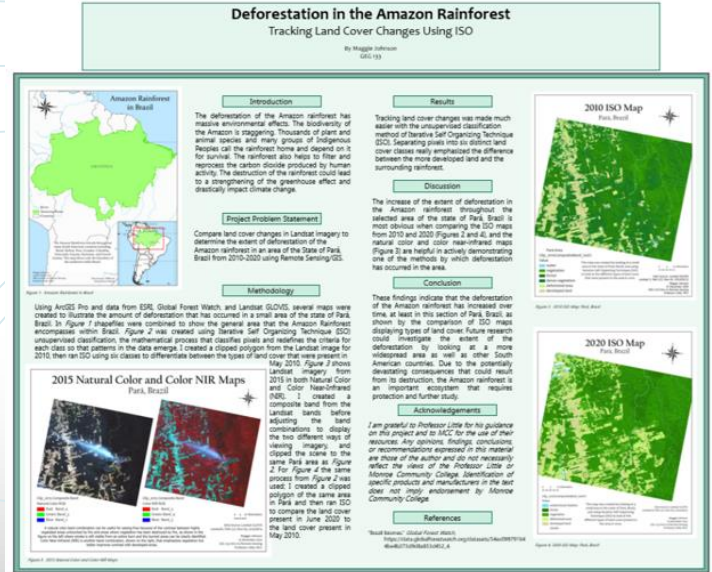
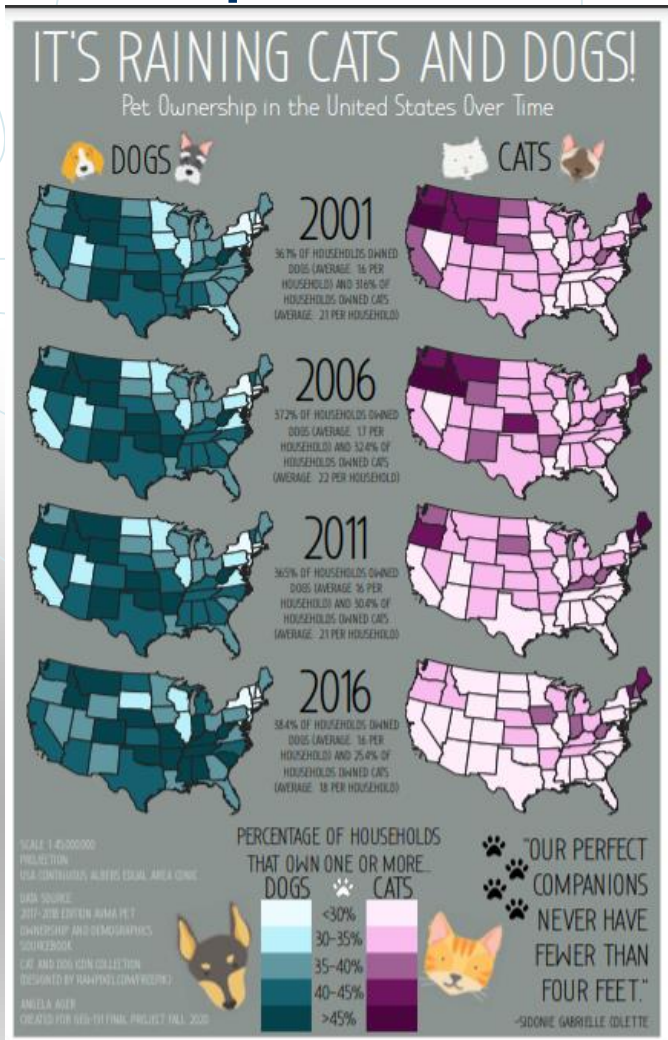


The Intensification of California Wildfires

Peter Fowley
GEO 133 (Intro to Remote Sensing)



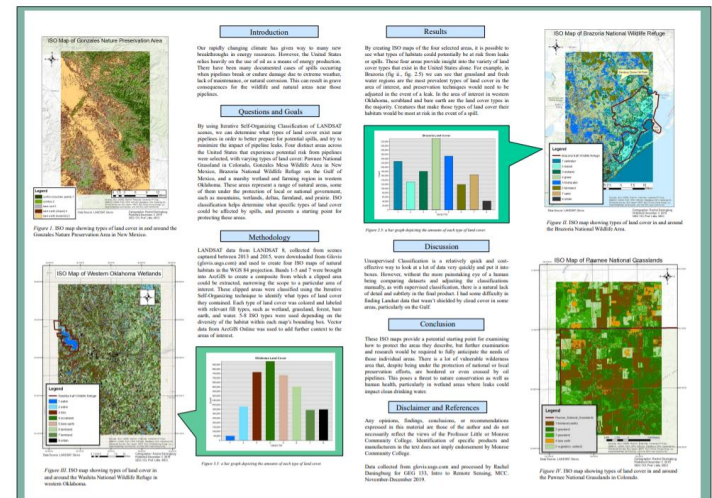
Sample Student Work



Stewardship and GIS

Using Unsupervised Classification to Protect Our Wilderness

By Maggie Johnson
GEO 133



Every Fall

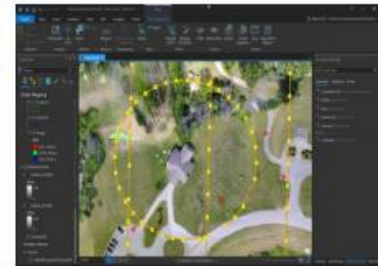
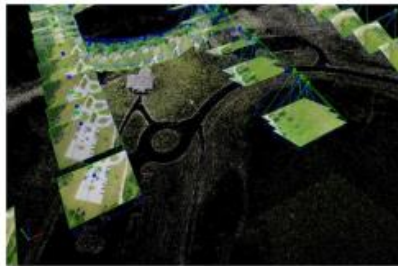
Geospatial Data Acquisition and Management

GEG 236 (3 credit hours) - Part of the micro-credential series (GEG 236, 237, 238), the A.A.S. in GIST and as an elective in the GIST Certificate program.



This course addresses the interpretation and understanding of a variety of data formats used by geospatial professionals. It introduces the fundamental concepts such as primary Geospatial Information Science (GIS) data creation, geodatabase design and creation, data management, and discusses quantitative techniques for the collection, classification, integration, and management of geographical data. Advanced topics include: UAS data collection and processing, mobile data collection, automation using Python and enterprise geodatabases. Students will be guided through a series of lectures hands-on computer-based exercises, and an end of semester project.

Prerequisites: Introduction to Remote Sensing (GEG 133) or permission of the instructor.



Students in this course:

- Learn important geospatial data management skills that are in high demand!
- Learn the fundamentals of UAS (drone) training, safety, mission and flight planning.
- Develop skills in UAS data collection and processing.
- Learn advanced skills in mobile data collection.
- Interact in a multi-user environment using postGIS.

Topics covered:

- Data models, data formats and data management
- Best practices for data collection and processing
- Database management systems and schema
- Advanced geodatabase design
- Topology
- Enterprise geodatabase design
- Using QGIS in a multiuser, postGIS environment
- Introduction to Python automation



Every Spring Web Mapping

GEG 237 (3 credit hours) Part of the new micro-credential series (236, 237, 238)



This course is an introduction to Web-based GIS. Students will learn about the usefulness and application of Web GIS tools such as ArcGIS Online Story Maps, Esri Dashboard, Esri Insights, Volunteered Geographic Information (Open Street Map), and Map services (Mapbox or GISCloud). Students will become adept at storing and accessing spatial data in the cloud, practice developing Story Maps to communicate spatial data, and learn how web mapping is key to mobile GIS applications such as field data collection (Esri Field Maps). Students will be guided through a series of lectures and hands-on computer-based lab exercises. An end of a semester project will allow students to work on a project of their own design. Course material used are based upon the United States Department of Labor's Geospatial Technology Competency Model (GCTM) for entry level geospatial occupations including Geospatial or GIS Technicians or Technologists.

Prerequisites: Digital Earth (GEG 130) or permission of the instructor.



Students in this course:

- Learn important geospatial web mapping skills that are in high demand!
- Apply web GIS tools such as ArcGIS Story Maps, Open Street Maps, and MapBox.
- Develop field data collection apps.
- Apply cartographic principles in online map design.
- Practice using web maps as a tool for topics such as emergency management.

Topics covered:

- Web Mapping vs. Desktop
- Spatial Data in the cloud
- Web GIS platforms
- Online map publication on a web service
- Story Map Design
- Apply critical-thinking skills to solve problems by using Web GIS tools in the development, management, completion, and evaluation of a comprehensive geospatial project.



Catherine:

<https://storymaps.arcgis.com/stories/879436aeb48545c2aee4c1f8af9628a6>

Nia :

<https://arcg.is/1LzD4e>

SPRING 2022

Introduction to Geospatial Programming

GEG 238 (3 credit hours)

Part of the micro-credential series (GEG 236, 237, 238) and the A.A.S. in GIST.



This course teaches how to customize and automate Geospatial Information Science (GIS) applications using the Python scripting language. Automation can make your work easier, faster, and more accurate, and knowledge of a scripting language is a highly desired skill in GIS analysis. Upon completion, students will be able to solve geospatial problems and streamline GIS workflows through the creation and modification of scripts. Students will be guided through a series of lectures and hands-on computer-based lab exercises. Course material used are based upon the United States Department of Labor's Geospatial Technology Competency Model (GCTM) for entry level geospatial occupations including Geospatial or GIS Technicians or Technologists.

Prerequisites: GEG 130, GEG 133, and GEG 230 or GEG 236 all with a grade of C or higher or permission of the instructor.



```
1 # -*- coding: utf-8 -*-
2 ***
3 Generated by ArcGIS ModelBuilder on : 2021-10-29 22:13:52
4 ***
5 import arcpy
6 from sys import argv
7
8 def ModelBuilder_1(Workspace, Connections, Output):
9
10     # To allow overwriting outputs change overwriteOutput option to
11     arcpy.env.overwriteOutput = False
12
13     arcpy.ImportToolbox("c:\program files\arcgis\pro\Resources\Arc
14     # Model Environment settings
15     with arcpy.EnvManager(scratchWorkspace="C:\Student\000238_RTS\
16         Bus_Stops = "stops_XYTableToPoint_Project"
17         Census_tracts_2010 = "tableblock2010_10_pophu_clip_0"
```

Students in this course:

- Learn to automate geoprocessing tools and to modify and create scripts in Python.
- Learn geospatial coding best practices.
- Design and develop custom GIS applications.
- Modify user interfaces to increase productivity.
- Understand introductory programming concepts, methods, approaches and workflows.
- Explain advanced programming concepts.

Topics covered:

- Introduction to Python and geoprocessing tools.
- Model Builder and programming fundamentals.
- Geoprocessing and object-oriented programming.
- GIS inventory using the data access module.
- Debugging and error handling.
- Data access and creation with geodatabases.
- Working with geometry and map layout.
- Jupyter notebooks.



Alumni Mentoring



Four alumni are providing support to our current students!



February 2022

January '22							March '22						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
						1			1	2	3	4	5
2	3	4	5	6	7	8	6	7	8	9	10	11	12
9	10	11	12	13	14	15	13	14	15	16	17	18	19
16	17	18	19	20	21	22	20	21	22	23	24	25	26
23	24	25	26	27	28	29	27	28	29	30	31		
30	31												

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	31	1 AL 2-3PM	2 KH 12-1PM	3 AL 2-3PM	4 KH 12-1PM	5
6 CD 5-7PM	7	8 AL 2-3PM	9 KH 12-1PM	10 AL 2-3PM	11 KH 12-1PM	12
13 CD 5-7PM	14	15 AL 2-3PM	16 KH 12-1PM	17 AL 2-3PM	18 KH 12-1PM	19
20 Winter Recess CD 5-7PM	21 Winter Recess	22 Winter Recess	23 Winter Recess	24 Winter Recess	25 Winter Recess	26 Winter Recess
27 CD 5-7PM	28	1	2	3	4	5

Recruitment of Students

- 1) GIST summer camp
- 2) dual credit enrollment
- 3) targeted recruitment of introductory GIST students
- 4) MCC Mapping Club events – 400 attended in the fall!



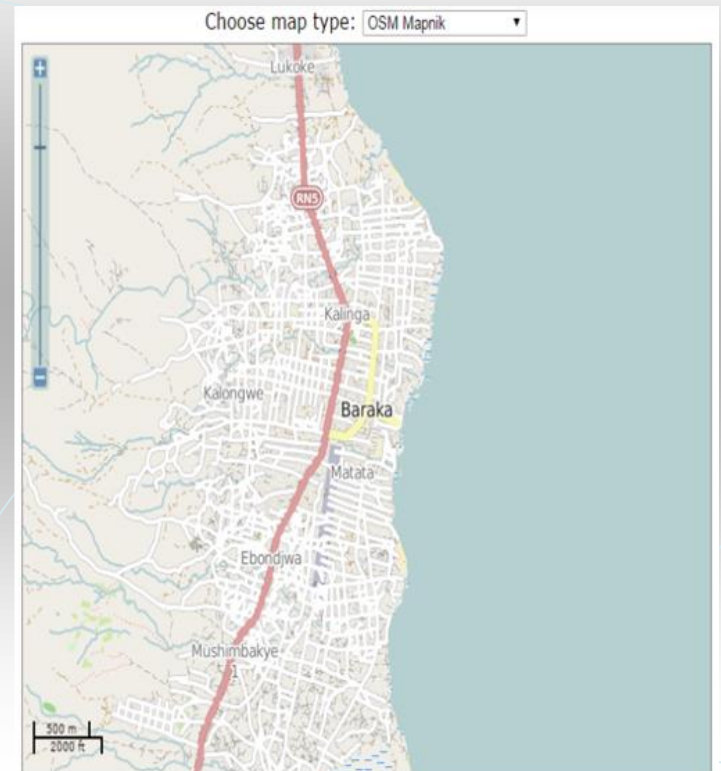
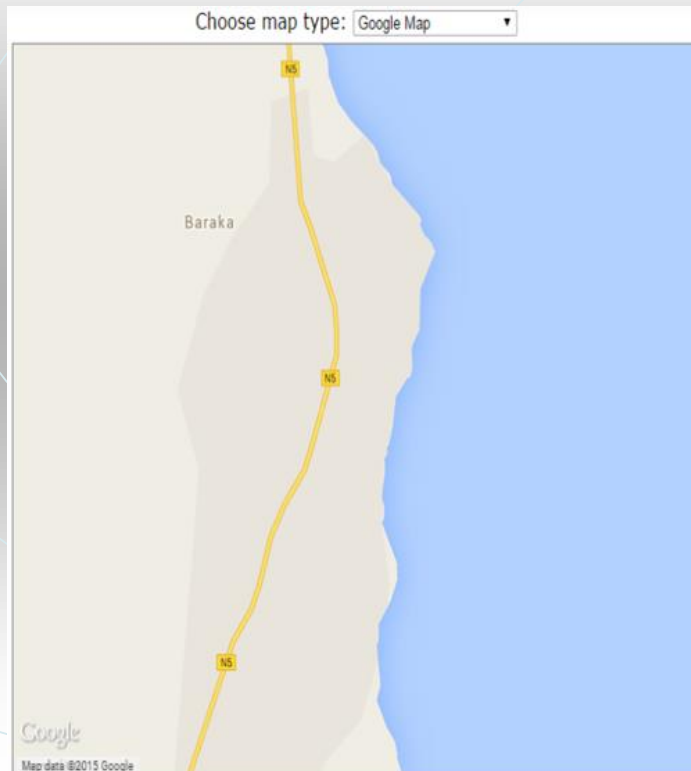
Mapping Club

- First NYS community college chapter of YouthMappers
- MCC Excellence in Innovation Award, 2019



Mapping Club - Mapathons

- Organized each semester
- Humanitarian OpenStreetMap Team
- Counts as volunteer experience
- Helping global community





Archive

Select Month ▼

Recent Posts

- New Job Added! 02/07/2022
- Columbia Announces GIS Health Data Workshop 02/07/2022
- River Management Society Webinar 02/02/2022
- National States Geographic Information Council (NSGIC) seeks a full-time Executive Director 01/26/2022
- NYS GIS Association Members Contribute to HSDI Report 01/26/2022

Monroe Community College Hosts Mapathon for Geography Awareness Week

Nov 12, 2021



Looking for a Geography Awareness Week event to participate in?

Everyone is welcome to attend Monroe Community College's Mapathon on **Monday, Nov 15 at 6 pm and/or Thursday, Nov 18th at 12:30 pm!**

The events are led by MCC's Mapping Club, a YouthMappers Chapter. Youth Mappers "capitalizes on web-based open geospatial technologies and a network of universities around the globe. The mission is to cultivate a generation of young leaders to create resilient communities and to define their world by mapping it." The events focus on crisis or preventative mapping in under/unmapped areas around the world.



Social Media Campaign

Method	Group	Audience Reached	Comments
Facebook	ESRI Higher Ed group	19,852	
Facebook	Co-PI's Personal page	175	shared/posted 6 times
Facebook	MCC page	17,541	posted 5 times
Facebook	Henrietta Highlights group	11,300	post about 24credit cert
Twitter	MCC	6,316	posts on the program
Twitter	NYS GISA	2,655	posts on the program/retweets of MCC
LinkedIn	Professional Geographers	13,125	
LinkedIn	Upstate NY APA	575	
LinkedIn	GIS Professional & Network	34,955	
LinkedIn	GIS Training and Education	9,038	
LinkedIn	GIS and Geography	51,476	
LinkedIn	SWOGIS - Southwest Ohio C	172	
LinkedIn	New Zealand Esri Users	734	
LinkedIn	Houston Area Arc Users Gro	846	
LinkedIn	MCC	48,337	
LinkedIn	Co-PI's Personal	184	
LinkedIn	NYS GISA	275	
LinkedIn	APA Los Angeles	1,533	
LinkedIn	APA MA	718	
LinkedIn	APA: Housing and Commun	995	
LinkedIn	Esri Network	33,151	
LinkedIn	APA: Urban Design and Pre	3,165	
LinkedIn	APA California Northern	1,751	
LinkedIn	Esri Connected	4,549	
LinkedIn	APA Sustainable Communit	7,340	
LinkedIn	ESRI MidAtlantic User Grou	738	
LinkedIn	GIS, Mapping, and Geo Tech	71,863	



Monroe Community College

49,964 followers

11mo •

Geospatial technology has been identified by the US Dept of Labor as one of the most emerging & evolving fields in the tech industry. In addition to MCC's Geospatial Info Science & Tech Certificate, the College now offers a micro-credential that consists of 3 GIST courses. For more info, contact: Professor Jonathon Little jlittle@monroecc.edu or Professor Heather Pierce hpierce@monroecc.edu

GET THE GIST!



THE GEOSPATIAL
INFORMATION
SCIENCE
& TECHNOLOGY
CERTIFICATE



NYS GIS Association

@NYS_GISA

Are you a GIS professional looking for an affordable way to expand your knowledge-base? Check out [@MonroeCC](#)'s new 9-credit GIST micro-credential! Program kicks off Fall 2021 with a zoom-based Geospatial Data Acquisition & Mgmt course. monroecc.edu/go/geospatial



Monroe Community College

STATE UNIVERSITY OF NEW YORK



Earn a Micro-credential for GIST Professionals!

Fall 21/Spring 22

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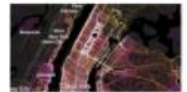
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Python Map Automation



Catherine DuBreck, GISP (She/Her)
Junior Planner at Town of Penfield
4mo •

Wanted to share with anyone looking to build on their educational background --
- in addition to the new 9-credit micro-credential for those working in the field
already, Monroe Community College in Rochester, NY now has an Assc ...see more



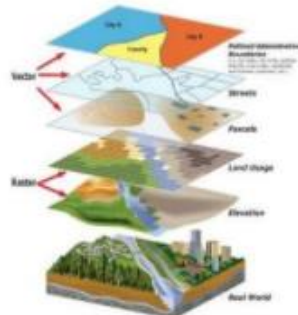
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*GIST A.A.S. degree and 9 credit micro-credential approved!
*2019 Bureau of Labor Statistics.



For more information: contact

Jonathon Little (jlittle@monroecc.edu) or Heather Pierce (hpierce@monroecc.edu)



Want to learn programming for GIS or brush up on skills? Check out @MonroeCC's brand new Intro to Geospatial Programming course offered for the first time starting January 2022!

SPRING 2022

Introduction to Geospatial Programming

GEG 238 (3 credit hours)

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MCC Offers GIST Micro-Credential

Monroe Community College in Rochester, NY now has a brand new 3-class (9-credit) GIST micro-credential. The 9-credit micro-credential is geared toward GIST professionals and covers skills in database acquisition, data management, Python for GIS, and web mapping.

The first course in the micro-credential, *Geospatial Data Acquisition and Management*, will be offered this Fall 2021 semester.

MCC also offers our popular 24-credit [GIST Certificate](#).

If you would like to learn more about the program or are interested in enrolling, please feel free to reach out to Catherine DuBreck at cdubreck001@monroecc.edu or Professor Jon Little jlittle@monroecc.edu with any questions.



Monroe Community College

STATE UNIVERSITY OF NEW YORK

Global Virtual GIST Internships

Current

- Malawi: Cornell University and partner in Malawi
- Mexico: Universidad Autónoma de San Luis Potosí
- Kazakhstan: Kazakh State Agrotechnical University

Past

- Colombia: Fundación Universitaria Tecnológico Comfenalco
- Costa Rica: Monteverdi Institute



Sample Virtual Internships/Partnerships

- American Red Cross
- New York State Department of Environmental Conservation
- NY State Department of Health
- Water for South Sudan
- National GeoTech Center of Excellence
- Genesee Land Trust

Maya
Description
• This map shows the old and new paths of the Erie Canal in a Vintage Style
• This map also shows some of the
Evan_Valenti_GEG239_Spring2020.mp4
▷ 8:13 ⌂ Jun 11

Researching the Survey
• In this part of my class project that gave the most trouble...
• In order to this, I had to go to the work property
• I had to spend a lot of time doing a survey to work property
• Next part will be the...
Michael_Andrus_GEG239_Spring2020.mp4
▷ 12:47 ⌂ Jun 11

GIS Training Tour
Feature Layers and Creating Maps
Peter_Bowman_GEG239_Spring2020.mp4
▷ 9:59 ⌂ Jun 11

Supervised Classification
▷ Training polygons, view Histograms
▷ Create signature file
▷ Maximum Probability Classification
▷ Reclassify data
Derrick_Neidig_GEG239_Spring2020.mp4
▷ 14:18 ⌂ Jun 11

Kazakh Soil and Steppe Types
Salvatore_John_Ragusa_GEG239_Spring2020.mp4
▷ 22:34 ⌂ Jun 12

Data and Methods
Data:
• Sentinel-2 Imagery from 2015 and 2020
• ASTER Level 1T Imagery from 2003 and 2019
• Landsat 5 Imagery from 1980 and 2010
• Shapefiles from Humanitarian Data Exchange
Methods:
• Temporal spatial analysis of mangroves (compare and assess changes over multiple years)
• Composite Bands tool, Extract by Rectangle tool, band combination analysis
• Get Cell Values tool to create spectral signature graphs
Catherine_DuBreck_GEG239_Spring2020.mp4
▷ 14:31 ⌂ Jun 12

The Darkness Below the Canopy
• Better growth in meadows or forested areas?
• Traditionally poor growth below the dark canopy.
Alex_Tedrow_GEG239_Spring2020.mp4
▷ 11:59 ⌂ Jun 12

Supervised Classification
▷ Training polygons, view Histograms
▷ Create signature file
▷ Maximum Probability Classification
▷ Reclassify data
Colin_Dahlberg_GEG239_Spring2020.mp4
▷ 12:24 ⌂ Jun 12

THE PROBLEM
• The problem was that this was too complex of a problem for me to solve within the given time period
• I didn't know anything about the program, knowledge had to be built up
• I spent a lot of time researching the program and worked with them, learn was amazing that would help with the specific problem.
Michael_Coughlin_GEG239_Spring2020.mp4
▷ 12:30 ⌂ Jun 12

Survey123 for ArcGIS
Survey Form, Smarter Field Data
Maggie_Weisensel_GEG239_Spring2020.mp4
▷ 8:21 ⌂ Jun 12

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Thank you! Questions?

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Jonathon Little: Associate Professor of Geography/GIST and NSF ATE Principal Investigator

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