

# ***MCC's Geospatial Information Science Technology (GIST) Program at WAM!***



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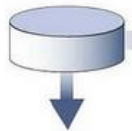
The *Meeting Workforce Needs for Skilled Geospatial Technicians through Virtual Geospatial Information Science Technology Education* project was funded through the U.S. National Science Foundation (NSF) Office of Advanced Technological Education under Grants Award # 1955256 to Monroe Community College. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

# What is Geospatial Technology?

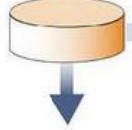
Integration of Geographical Information Systems, Remote Sensing, and GPS.

## Data source

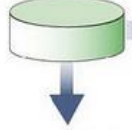
Street data



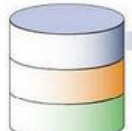
Buildings data



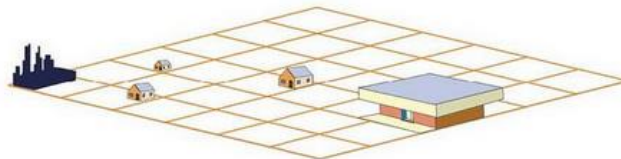
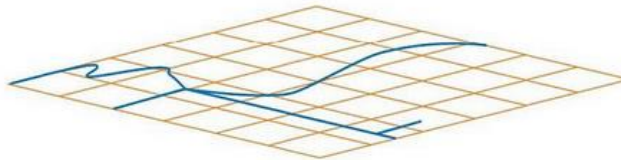
Vegetation data



Integrated data



## Data layers



# MCC's Geospatial program

Current:

24 Credit GIST Certificate

9 credit advanced GIST microcredential

Expected 2022:

A.A.S. in GIST

## Geospatial Information Science and Technology (Gist)

● Certificate [Department of Chemistry and Geosciences](#)

GET THE "G.I.S.T." ON THE GROWING FIELD OF GEOSPATIAL INFORMATION SCIENCE AND TECHNOLOGY

Geospatial Information Science and Technology (G.I.S.T.) is used virtually everywhere. It converts remote sensing information provided by satellites and imagery into digital data.

[Start My Application >](#)

[Explore Careers >](#)

[School of Science, Technology, Engineering & Math \(STEM\)](#)





# 2018-2028 GIST Job Outlook

## **Geospatial Information Scientists & Technologists:**

Employment: 413,000

Projected Growth: Faster than avg, 7-10%

Median Wages: \$88,550

## **Geographic Information Systems Technicians:**

Employment: 412,800

Projected Growth: Faster than avg 7-10%

Median Wages: \$88,550

## **Cartographers and Photogrammetrists:**

Employment: 11,800

Projected Growth: Much faster than avg, 11%+

Median Wages: \$65,470

## **Remote Sensing Technicians:**

Employment: 72,400

Projected Growth: Faster than avg, 7-10%

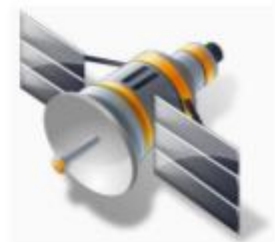
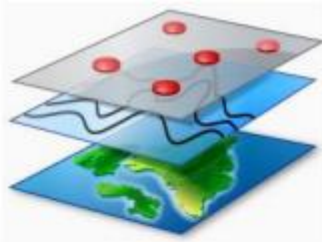
Median Wages: \$50,550

### **Common Courses/program for 4-year students:**

- GEG 130* (Intro GIS, aka Digital Earth)
- GEG 133* (Remote Sensing, fall only)
- GIST Certificate

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

# 24 credit GIST Certificate



## 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!

**Introduction to GIS (GEG 130):** summer, fall & spring

**Course Substitution?** Physical Geography, elective, and/or Human Geography – potential to reduce to 14-20 credits.

# 9 credit microcredential and AAS in GIST

**Table 1**

<b>FALL Year 1</b>	<b>Cr</b>	<b>SPRING Year 1</b>	<b>Cr</b>
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
<b>FALL Year 2</b>	<b>Cr</b>	<b>SPRING Year 2</b>	<b>Cr</b>
<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,  
GEG 237

Micro-credential,  
GEG 236

← Micro-credential,  
GEG 238



**Fall 2021**

## Geospatial Data Acquisition and Management

**GEG 236 (3 credit hours) - Part of the proposed micro-credential series (GEG 236, 237, 238) and A.A.S. in GIST (awaiting SUNY approval)**

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



**Day/Time:**

**Weds. 5:30 to 9:11 PM**

**Faculty:**

**Wayne D. Howard**

**Registration:**

<http://www.monroec.edu/depts/recreg/howtoreg.htm>

**Remote learning or face to face (TBD)**

**For more information, email: [whoward11@monroec.edu](mailto:whoward11@monroec.edu)**

**Register for a course or two:**

<https://www.monroec.edu/admissions/i-am/taking-a-class-or-two/>

**Spring 2022**

## 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.



**Day/Time:**

**ONLINE**

**Faculty:**

**Jonathon Little**

**Registration:**

<http://www.monroec.edu/depts/recreg/howtoreg.htm>

**Sample [Web Map](#)**

# Alumni Mentoring



Four alumni are providing support to our current students!





# 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
- Labella Associates

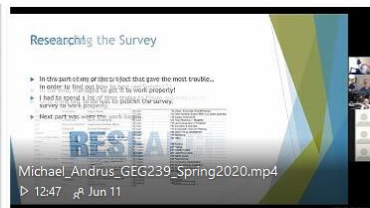


**Maya**

Description

- This map shows the old and new paths of the Erie Canal in a Vintage Style
- This map also shows some of the

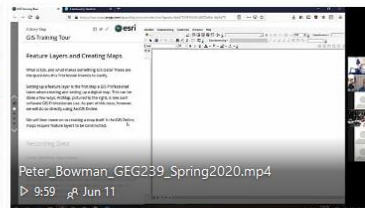
Evan\_Valenti\_GEG239\_Spring2020.mp4  
▷ 8:13 ⌂ Jun 11



**Researching the Survey**

- In this part of my presentation I will give the most trouble...
- In order to find the best way to work properly...
- I had to spend a lot of time to find the best way to work properly...
- I had to spend a lot of time to find the best way to work properly...

Michael\_Andrus\_GEG239\_Spring2020.mp4  
▷ 12:47 ⌂ Jun 11



**GIS Training**

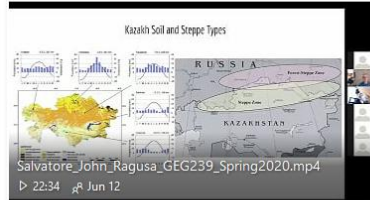
Feature Layers and Creating Maps

Peter\_Bowman\_GEG239\_Spring2020.mp4  
▷ 9:59 ⌂ Jun 11



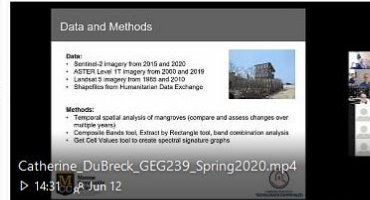
**Derrick Neidig**

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**


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.

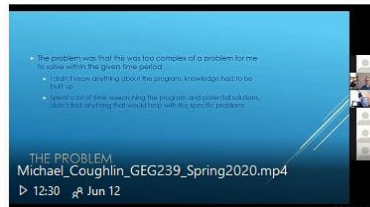
Alex\_Tedrow\_GEG239\_Spring2020.mp4  
▷ 11:59 ⌂ Jun 12



**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**

Michael\_Coughlin\_GEG239\_Spring2020.mp4  
▷ 12:30 ⌂ Jun 12



**Survey123 for ArcGIS**

Maggie>Weisensel\_GEG239\_Spring2020.mp4  
▷ 8:21 ⌂ Jun 12

# Global Virtual GIST Internships

## Current

- Malawi: Cornell University (FARMS4Biodiversity) with Professor Rachel Bezner-Kerr
- Mexico: Universidad Autónoma de San Luis Potosí
- US Embassy in Kazakhstan: Wheat Disease research

## Future Travel

- Rwanda/RIT Project disaster resilience
- Zambia?



## Past

- Colombia: Fundación Universitaria Tecnológico Comfenalco
- Costa Rica: Monteverdi Institute
- Kazakhstan: Kazakh State Agrotechnical University

# Library Professional Development

- Deliver innovative outreach and enriched virtual support from Public Librarians!
- Syracuse University Library Science Graduate Students



~ 20 Librarians in fall of 2020!



# Mapping Club and Humanitarian Mapping Events

MCC Mapping Club events – 400 attended in the fall!

- 1) Virtual event Mon, April 5 at noon and 4 pm  
email me if interested – [jlittle@monroecc.edu](mailto:jlittle@monroecc.edu)
- 2) GIST summer camp for RCSD students



# **Thank you! Questions? [jlittle@monroecc.edu](mailto:jlittle@monroecc.edu)**

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

*Heather Pierce: Assistant Professor of Geography/GIST and co-PI*

*Catherine DuBreck: co-PI & EagleView*

*Wayne Howard: Senior team member, Adjunct, & co-founder Solara Concepts*

*Alumni: Drew Ortego, Catherine DuBreck, Kareem Howard, & Enith (Annie) Lay Soler*

*NSF External Evaluator: Donna Lange, Rochester Institute of Technology Professor/PI DeafTEC*

## **Special thanks to:**

*Board of Trustees and Provost Wade*

*Curriculum Office at MCC (Andy Freeman), STEM (Margaret Kaminsky), and Chem/Geo (Jessica Barone)*

*MCC Library Staff, Katie Ghidiu, and Public Librarians*

*Rochester Regional Library Council, Tina Broomfield*

*Monroe County Library System & Patricia Uttaro, Pioneer Library System and Ronald Kirsop*

*Jian Qin (Syracuse University) and Keith Jenkins (Cornell University)*

*Rochester City School District and Carmelita Brown-Wallace (Upward Bound)*

*GIST Advisory Committee: Vince DiNoto, Buffy Quinn, Dan Allen, Andy Mendola, Justin Cole, Jackie Sax*

*Internships: NY State Department of State at University of Albany, Genesee Land Trust, National GeoTech Center of Excellence, New York Geographic Alliance, GIS Scholars, EagleView, GIS-SIG, Water for South Sudan, River Area Council of Governments, Tug Hill Commission, Labella Associates, and Genesee River Watch.*

**Grant web site: [https://atecentral.net/msites/MCC\\_GIST](https://atecentral.net/msites/MCC_GIST)**

**MCC GIST program web site: <https://www.monroecc.edu/depts/geography/>**

**Questions: Jonathon Little at [jlittle@monroecc.edu](mailto:jlittle@monroecc.edu)**



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