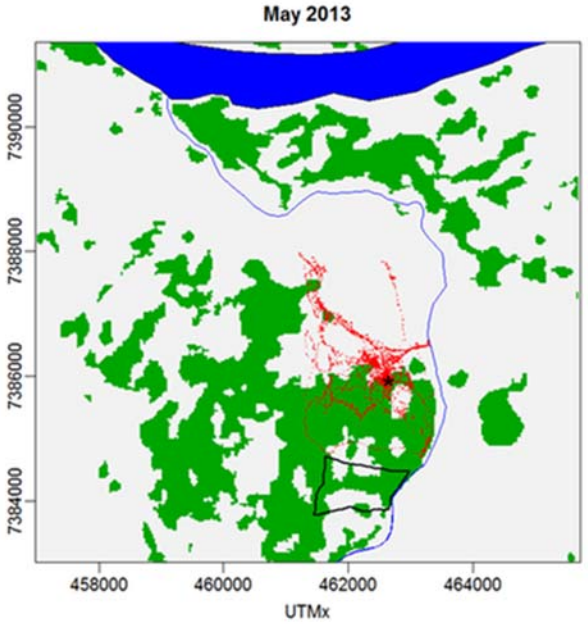
The US Department of Labor has identified *Geospatial Information Scientists and Technologists, Geographic Information Systems Technicians,* and *Cartographers and Photogrammetrists* as **occupations** that are expected to **grow rapidly**, will have more than average **job openings**, or are new and **emerging careers**!

GIScience credits can count toward a master's degree in several departments such as Geography, Physical Science, Environmental Sciences, Technology Management, and Information Technology. Please see an advisor in the appropriate department.

GIScience electives:

- BSC 510/PS 510 Remote Sensing/GIS Applications (4 credit hours)
- BSC 511/PS 511 Digital Image Processing/GIS Model (4 hrs.)
- GEO 529 Principles of GIS 2 – Vector Analysis (4 hrs.)
- GEO 530 GIS – Raster Analysis (4 hrs.)
- GEO 531 Principles of Remote Sensing and Photogrammetry (3 hrs.)
- GEO 532 Enterprise GIS (3 hrs.)
- GEO 533 GPS and Mobile Geospatial Technologies (3 hrs.)
- GEO 540 Spatial Statistics and GIS (4 hrs.)
- GEO 631 Applied GIS Projects (3 hrs.)
- GEO 690 Internship (1-6 hrs.; must be GIScience approved by the student's advisor in advance)
- IS 645 Geographic Information Systems (3 hrs.)
- NRRM533 GIS and Remote Sensing in Natural Resource Management (3 hrs.)
- NRRM602 GIS/RS Research Method in NRRM (3 hrs.)
- PS 570 Practicum (4 hrs.; must be GIScience approved by the student's advisor in advance)
- PS 670 Advanced Practicum (4 hrs.; must be GIScience approved by the student's advisor in advance)
- Special Topics courses as approved by the GIScience Curriculum Committee
- Independent Studies courses as approved by the student's advisor in advance



Livestock tracking in Madagascar.
MU Faculty Research in GIScience.

For more information, see
http://www.marshall.edu/giscience

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E-mail: Leonard@marshall.edu

Geospatial Information Science

Graduate Certificates

Harper's Ferry, West Virginia
Image: USGS, National Aerial Photography Program (NAPP).

Basic Certificate

Admission Requirements
Students may pursue the graduate certificate while enrolled in any master's program OR as a certificate-only student. Students already enrolled in a master's degree program should submit to the Graduate College a Secondary Program Request form available at www.marshall.edu/graduate/. Applicants interested in the certificate-only program should apply for admission to Marshall University as a Certificate/Professional Development student and select on the application form the Certificate in Geospatial Information Science - Basic.

Program
A graduate certificate in Geospatial Information Science - Basic consists of a minimum of 12 graduate credit hours in courses designated as GIScience Courses, including regularly offered courses as well as special topics courses. Students must have a B (3.0) average in their GIScience courses and no grade below a C (2.0) in their GIScience courses to earn the certificate. The program is designed to:

- offer GIS study in a variety of disciplines with a variety of applications;
- teach students GIS techniques;
- teach students to apply GIS to solve scientific research problems;
- encourage students to gain experience in the GIS field by means of internships;
- integrate GIS applications with computer science concepts;
- prepare students for GIS employment or additional work at the doctoral level.

GIScience required course:
GEO 526 Principles of GIS (4 hrs.) – requirement waived if GEO426 or its equivalent taken as an undergraduate.

Electives: Choose additional GIScience electives to reach 12 hours. For a complete list, see the list on the back of this brochure or http://www.marshall.edu/giscience.

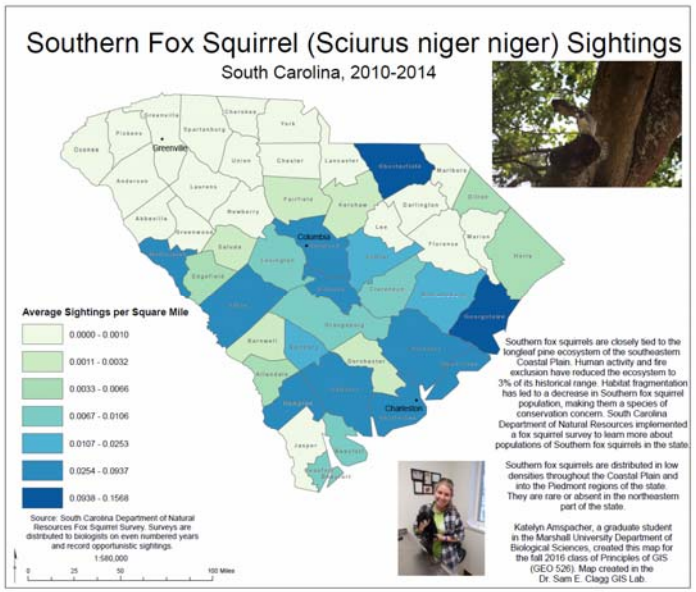
GIScience and You

Geospatial Information Science is a research field utilizing computer technology for presentation and analysis of all types of science and social science data referenced to the earth's surface. GIScience uses an infinite variety of mapped data, drone and aerial photographs, digital elevation models, satellite imagery, and more to solve problems and answer questions.

"A GIScience Certificate from Marshall University provides evidence of achievement in the growing fields of Geographic Information Systems, Global Positioning Systems, and Remote Sensing technologies."

Among academic fields, Geography (both as an earth science and a social science), Environmental Science, Geology, History, Biology, Sociology, Archaeology, Engineering, Planning, Political Science, Criminal Justice, Natural Resources and Recreation Management, and Demographics are but a sampling of those using GIScience. In fact, it has been estimated that about 80% of all data has a spatial component, opening limitless potential uses for GIScience (http://www.gis.com).

Below: MU Student Research using GIScience



Advanced Certificate

Admission Requirements
Applicants to the Graduate GIScience Certificate – Advanced program must have completed the Certificate in Geospatial Information Science – Basic or the equivalent of the Basic certificate before entry into the program.

Program
An Advanced graduate certificate in GIScience consists of a minimum of 12 graduate credit hours in courses designated as GIScience courses beyond the requirement for the GIScience Certificate - Basic. Students must have a B (3.0) average in all their GIScience courses and no grade below a C (2.0) in their GIScience courses to earn the certificate. Students who complete the requirements for the Advanced certificate should be able to:

- perform advanced GIScience techniques using vector, raster, and remote sensing data;
- apply GIScience to display, support, and analyze research questions in the social or natural sciences;
- collect and create GIScience data using various technologies and softwares;
- recognize and apply computer science concepts such as data collection, representation, queries, and storage; and
- enter GIScience employment or continue GIScience work at the doctoral level.

Required courses:

- At least one advanced analysis course: GEO 529 Principles of GIS 2 — Vector Analysis or GEO 530 GIS Raster Analysis. Requirement is waived if a student completed one of these courses as part of the Certificate in Geospatial Information Science – Basic, an undergraduate equivalent of one of these courses, or an equivalent advanced analysis course from another institution.
- At least one remote sensing course: GEO531 Principles of Remote Sensing and Photogrammetry (3 hours), BSC/PS510 Remote Sensing with GIS Applications (4 hours), BSC 511/PS 511 Digital Image Processing and GIS Modeling (4 hrs.), NRRM533 GIS and Remote Sensing for Natural Resource Management (3 hrs.), or a Special Topics remote sensing course. This requirement is waived if a student completed one of these courses as part of the Certificate in Geospatial Information Science – Basic, an undergraduate equivalent of one of these courses, or an equivalent Remote Sensing course from another institution.
- At least one applications course, research methods, or internship (minimum three credit hours): GEO 631 Advanced GIS Projects, GEO 690 Internship (must be GIScience approved by the student's advisor in advance), or NRRM602 GIS/RS Research Method in NRRM .

Electives: Choose additional GIScience courses to reach 12 hours. For a complete list, see the list on the back of this brochure, or http://www.marshall.edu/giscience.