Mengyu Liang

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Education

Bachelor of Science (Honors) Expected Graduation: May 2017

Geography and Cartography/Geographic Information System (GIS) *University of Wisconsin-Madison*

GPA: 3.87/4.00

Independent Honors Senior Thesis Research

2016-2017

Department of Geography

Title

Interaction of Human Settlement, Vegetation Patterns and Soils in the Northern Minnesota Prairie-Forest Region from the Euro-American Settlement Era to Present

Abstract

From studying pollen and charcoal in lake sediments, scientists have reconstructed the past climate, fire frequency and intensity as well as the vegetation patterns in the state of Minnesota. They concluded that the climate was wetter 4000 years ago and fire occurrence was less frequent, and both factors have led to forest invasion into prairie vegetation and shaped the modern day natural land-scape in the region. An additional factor in understanding the past landscape's relation to the modern landscape is Euro-American settlement and land use in this region over the past two centuries. Both climate- and land-use-induced vegetation change have significantly affected soils, especially their storage of carbon. To reveal more about their interaction, Public Land Survey data and digital soil surveys will be used to study whether there is a mismatch between soil and vegetation patterns during the Euro-American settlement era. The spatiotemporal relationship between soil and vegetation patterns may reflect soils' delayed response to past vegetation change. The project will then compare the earliest aerial images to the modern day's images to study the early Euro-American settlement in relation to vegetation and soil, as well as whether this relation has been changing in recent decades. This research is needed in order to understand the effects of past vegetation change and human land use on soils and their carbon storage.

Research Experience

Data Science/Visualization Technician 2016-2017

Department of Agricultural and Applied Economics

- Program Python tools to extract and analyze large geocoded datasets related to agricultural practices from web-based APIs
- Independently navigate web-based statistical visualization library, Altair, to organize, classify data and produce aesthetic data visualization results
- Collaborate with one faculty and three other student programmers to analyze data and build models based social science and economic theories

Paleogeography Data Analyst 2016

Paleogeography Lab, Department of Geography

- Communicate with faculty and researchers to gather datasets and articles on North America paleo pollen counts
- Collaborate with multiple researchers across disciplines and campuses to update Neotoma Paleoecology Database
- Conduct data management and databasing tasks independently and provide timely updates to faculty members

Research Assistant 2016

Center for Sustainability and Global Movement, Nelson Institute

- Work closely with faculty and a team of graduate/undergraduate students on a multidisciplinary NASA-funded project studying land cover land use change in Southeast Asian cities

- Apply dense-time-stack technique on 50+ Landsat satellite imagery to select training data for land use categorization
- Utilize supervised support vector machine, a machine learning algorithm, to classify the land use types

Research Assistant and Lab Technician 2014-2016

Geomorphology Lab*, Department of Geography*

- Conduct field sampling work and laboratory experiments to analyze Minnesota soil sample
- Work closely with Dr. Joseph Mason to practice innovative method on analyzing soil aggregates
- Organize and achieve soil samples and experiments data using Excel

Working and Volunteer Experience

Volunteer web-based mapping designer 2016-2017

Antarctic Meteorological Research Center, Space Science & Engineering Center

- Acquire and archive real-time and existing Antarctic meteorological data using UNIX system
- Utilize JavaScript to design a web-based interactive map to present the active research activates and extreme natural conditions of McMurdo station in Antarctica

GIS and Cartography Academic Coach 2015

Division of Diversity, Equity & Education Achievement

- Provide academic support by designing extracurricular activities and study materials to enhance student's understanding of cartographic and GIS principles

Honors and Awards

2016: L&S Honors Summer Senior Thesis Grant, $3000

2016: Kohn Award- Department of Geography, $750

2016: UW-Madison Cartography Lab Annual Design Challenge Honorable Mention

2015: College of Letters and Science General Scholarship, $500

2014: Welton Summer Sophomore Research Apprenticeship Grant, $2000

2014-2017: College of Letters and Science Honors Program

2013-2017: Dean's List (6 semesters)

Publications

Mason, Joseph, Kasmerchak, Chase, Keita, Hawa, **Liang**, **Mengyu,** Gruley, Kristine, 2016, Effects of Holocene vegetation change on soils across the forest-grassland transition, northern Minnesota, and implications for erosion processes, Geophysical Research Abstracts Vol. 18, EGU2016-5275.

Mason, Joseph, Kasmerchak, Chase, **Liang, Mengyu**, 2016, Monitoring aggregate disintegration with laser diffraction: A tool for studying soils as sediments, Geophysical Research Abstracts Vol. 18, EGU2016-5279.

Upcoming Presentations

Undergraduate Symposium, University of Wisconsin – Madison April 2017

Senior Honors Thesis Symposium, University of Wisconsin – Madison May 2017

Skills

Programming		Software		Language skills	
Python	●●●●●	ArcGIS	●●●●●	Chinese	●●●●●
MATLAB	●●●●○	Microsoft Suite	●●●●●	English	●●●●●
HTML/CSS	●●●○○	Adobe Illustrator	●●●●●	Japanese	●●●○○
JavaScript	●●●○○	Adobe Photoshop	●●●●○		
GDAL/OGR	●●●○○	ENVI	●●●○○		