

# JASON A. MATNEY

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## OBJECTIVE

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I am a geospatial analyst and Ph.D. Candidate in the Center for Geospatial Analytics at North Carolina State University. My research interests include geospatial decision support tools, the history and frontiers of web GIS, machine learning methods for remote sensing, and spatiotemporal data modeling. In these efforts, I leverage social media analytics, geospatial modeling tools, and ArcGIS Server systems. As an Environmental Science educator, I strive to develop engaging online GIS courses that I hope inspire students to analyze the world from a holistic perspective. The projected date of my dissertation defense is May 2019. My professional objective is to gain employment as a geospatial analyst within the Washington metropolitan area.

## EDUCATION

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<b>Ph.D. Candidate</b> Center for Geospatial Analytics, NC State University <i>Raleigh, NC</i>	2017 - 2019
<b>Ph.D. Student</b> Department of Forestry and Environmental Resources, NC State University <i>Raleigh, NC</i>	2015 - 2017
<b>Master of Science</b> Department of Geography, Michigan State University <i>East Lansing, MI</i>	2011 - 2014
<b>Bachelor of Arts</b> Program in the Environment, University of Michigan <i>Ann Arbor, MI</i>	2004 - 2009

## PEER-REVIEWED ARTICLES

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<b>Published and In Preparation</b> <i>Articles in Preparation in support of Dissertation</i>	2013 - 2019
<ul style="list-style-type: none"><li>• <b>Matney, J.</b>, Slocumb, W., Smith, J., Bonsall, P., &amp; Supak, S. (2019) (In Press). Implementation and Evaluation of a Geospatial Management Solution for the U.S. National Park Service's Rivers, Trails, and Conservation Assistance Program. Manuscript accepted to the Journal of Park and Recreation Administration.</li><li>• <b>Matney, J.</b>, Supak, S., van Berkel, D., Reich, B., &amp; Tieskens, K. (2019) (In Preparation). Decision support for parks and protected areas: Leveraging big social media data to estimate visitation and examine visitor behavior. Manuscript in preparation for Proceedings of the National Academy of Sciences of the United States of America.</li><li>• <b>Matney, J.</b>, Supak, S., Slocumb, W. (2019) (In Preparation). The Intelligent Web Mapping Era: What is it, how does it alter the direction of the web GIS literature, and what are its future directions? Manuscript in preparation for Transactions in GIS.</li><li>• Smith, J. W., Slocumb, W. S., Smith, C., &amp; <b>Matney, J.A.</b> (2015). A Needs-Assessment Process for Designing Geospatial Data Management Systems within Federal Agencies. Journal of Map &amp; Geography Libraries, 11(2), 226-244.</li><li>• Babcock, C., <b>Matney, J.</b>, Finley, A., Weiskittel, A., &amp; Cook, B. (2013). Multivariate spatial regression models for predicting individual tree structure variables using LiDAR data. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 6(1), 6-14.</li></ul>	

## TECHNICAL REPORTS

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Professional reports completed in support of client-funded projects	2017 - 2018
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- **Matney, J. A.**, Slocumb, W. S., Hipp, A. J. (2018). Feasibility study and report to assess migration of a web GIS portal for geospatial data management to service the National Park Service Conservation and Outdoor Recreation Branch and Related Programs. Raleigh, NC: Center for Geospatial Analytics, NC State University.
- **Matney, J. A.**, Slocumb, W. S., Smith, J. W., Hipp, A. J., Smith, C. T., & Vatsavai, R. (2017). Needs assessment and guidance to define a clear vision for a geospatial mapping system to service the needs and opportunities of the National Park Service Conservation and Outdoor Recreation Branch and Related Programs. Raleigh, NC: Center for Geospatial Analytics, NC State University.

## PROJECTS

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### **Growers - Precision Agriculture**

Spring 2018

#### *Management Zone Administration*

- Implemented Management Zones across 1000+ acres for a startup precision agriculture company, using SMS software.
- Offered insights from extensive experience with deploying web mapping applications to CEO while working to develop a novel agriculture mapping and data analysis mobile tool.
- Reported to Chief Data Scientist while assessing influence of crop production covariates (Mg, S, etc.) for generation of planting and seeding prescriptions.

### **North Carolina Department of Transportation**

Spring 2018

#### *Tax parcel and Easement mapping project*

- Collaborated with project managers to assess tax implications of NCDOT propose construction throughout the Raleigh-Durham region
- Performed precise geospatial analysis, including manual digitization based on converted CAD data, on heterogeneous GIS layers acquired from various regional websites
- Spatially-Joined tax parcel data with state easement and right-of-way requests, producing an operational data table for organizational assessment
- Overlapped and mapped CAD polyline data, NC orthoimagery rasters, and CAD polygon easement requests, eliminating anomalies throughout data collection

### **Markov Chain Monte Carlo visualization: Gerrymandering in real-time**

November 2017

#### *Hackathon Project*

- Synthesized socio-political and legal gerrymandering issues into a visual web app for public consumption.
- Distilled spatial Bayesian MCMC procedures into a simulated geographic representation of redistricting.
- Integrated Leaflet into a Shiny application for mapping support within an R web application.
- Collaborated with leading experts from academia and geospatial industries.
- Project available for viewing at <https://jamatney.shinyapps.io/mcmcviz-master/>

### **Geospatial Management Solution**

January 2015 - present

#### *NPS-funded Project*

- Designed, developed, and delivered a three-application suite for the National Park Service that provides geospatial data upload, storage, view, edit, and delete functionality for over 2,000 funded projects nationwide.
- Facilitated productive communication between NPS decision-makers, NC State faculty and IT staff for a competitive, grant-funded project. Liaisoned with multiple stakeholders to arrive at product development compromises.
- Administered a Qualtrics survey of web GIS suite users with the goal of improving customer satisfaction.
- Took needed troubleshooting action based on feedback, including implementing Esri product updates in real-time, adding requested functionality like project monitoring, and implementing custom web proxies for secure GET requests.
- Produced a novel geospatial solution for natural resource management agencies to improve data management - results collected into research paper for publication.

## **Park and Protected Area (PPA) visitation forecasting and estimation**

January 2017 - present

### *Dissertation Project*

- Consolidated heterogeneous data sources (social media, shapefile, raster) into a multivariate regression workflow.
- Juxtaposed modeling paradigms and realized quantifiable improvements in visitation estimation accuracy.
- Contributed to a multidisciplinary research team to better understand explanatory covariance relationships.
- Incorporated time series forecasting methods using AutoRegressive Integrated Moving Average (ARIMA) models.

## **LiDAR Uncertainty and Classification on ROGER**

May 2017

### *UCGIS Project*

- Unified a suite of classification tools for efficient LiDAR classification using distributed computing resources.
- Implemented remote Hadoop calls on the ROGER supercomputer for analyzing massive LiDAR rasters.
- Selected from a number of competitive groups to present findings to leading CyberGIS researchers.
- Leveraged algorithms from the Python Data Abstraction Library (PDAL) to increase speeds for building classification from LiDAR point clouds.

## **GRADUATE STUDENT EMPLOYMENT**

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### **PhD Student**

January 2015 – present

#### *NC State University, Raleigh*

- Designed and deployed a comprehensive suite of Web-enabled GIS applications for the US National Park Service.
- Worked closely with federal agency staff while customizing software in the ESRI suite using the JavaScript for ArcGIS 4.X API.
- Identified on-demand solutions for clients using advanced tools to visualize and track over 2000 funding streams valued at millions of dollars throughout the nationwide NPS system.
- Excelled in technical courses like Spatial Data Mining in R, Geoprocessing in Python, GRASS GIS, & Enterprise Server management in ArcGIS 10.5.

### **Graduate Student**

October 2011 – April 2014

#### *Michigan State University, East Lansing*

- Front-end scripting in R - implementing the spBayes package alongside MySQL database management.
- Improved prediction of environmental covariates extracted from LiDAR datasets using spatial Bayesian models.
- Developed charts using ggplot2 and reprojected remote sensing data via R's Raster package on GNU/Linux systems.
- Excelled in technical courses like Spatial data analysis, probability theory, Linear algebra, & Landscape Use and Land Cover simulation.

## **COURSES TAUGHT**

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### **Professor – Environmental Science Capstone**

Jan. 2019 – present

#### *NC State University, Raleigh*

- Lead an in-person capstone course for NCSU undergraduate seniors in environmental sciences or related majors.
- The course teaches use of analytical approaches for solving environmental problems, and for communicating results, and emphasizes development of student projects that lead to environmental decision-making, such as devising a resource management plan, developing a predictive model, prioritizing risk, identifying tipping points, designing new software or technologies, or predicting outcomes of environmental policies.
- Facilitated development of individual student projects, ensuring they fit within a team framework to simulate a work environment.
- Managed student-sponsor interactions, supporting student engagement with the Chatham County, NC Climate Change Advisory Committee.
- Interfaced with professional organizations in support of the course, including the NC Department of Environmental Quality

**Co-Instructor – Introduction to Geographic Information Systems**

Sept. 2015 – Dec. 2018

*NC State University, Raleigh*

- Managed new content production for a 200-person online course required for all students matriculated within the Master of Geospatial Science and Technology program.
- Modernized the curriculum by integrating ArcGIS web-mapping applications, Spatial Data Analysis in R, and video tutorials throughout the curriculum.
- Fielded continuous troubleshooting requests by leveraging triaged feedback strategies while prioritizing student success and interactive engagement with the material.

**Co-Instructor – WebGIS Frontiers: Protocols, Services, and Applications**

Sept. 2017 – Dec. 2018

*NC State University, Raleigh*

- Delivered insight into real-time GIS using GeoEvent Server to advanced graduate students.
- Improved breadth of the course by developing instructional material for custom hosted web apps using ArcGIS API 4.X for JavaScript.
- Supported distance education students through standardized feedback and assistance, including one-on-one google hangout consultation sessions.

**Course Developer – Introduction to Geoprocessing with ArcPy**

January 2016 – January 2017

*Michigan State University, East Lansing*

- Managed the creation of a new Introduction to Geoprocessing course for MSU's onGEO Online initiative.
- Developed a curriculum focused on automating tasks with Python for ArcGIS batch processing.
- Delivered instructional video support, comprehensive lesson plan, and novel assignments to the MSU onGEO team.
- Incorporated advanced python geoprocessing functionality, including hosting tools in ArcGIS Online

**R Programming Instructor**

June 2014 - August 2014

*DevBootcamp, New York City*

- Provided instructional sessions on R programming to students and staff of a Ruby on Rails bootcamp free of charge.
- Lead 25-person lessons to advanced programmers, detailing syntax, use cases, and statistical concepts.
- Identified value-added curricular interventions to maximize efficiency in order to respect tight timelines.

**CONFERENCE PRESENTATIONS**


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ISSRM – <i>Park and Protected Area visitation estimation</i>	2018
UCGIS – <i>LiDAR Uncertainty and Classification on ROGER</i>	2017
NCGIS – <i>Web GIS For Federal Agencies With The National Park Service RTCA Program</i>	2017
PSAC-CESU – <i>A Geospatial Database and Web Mapping Application for the NPS</i>	2015
ISSRM – <i>A Needs Assessment for Geospatial Data Management Systems in Federal Agencies</i>	2015

**AWARDS**


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Admission to the Center for Geospatial Analytics – Accepted into prestigious Ph.D. program	2017
Hackathon Developer – Accepted into Geometry of Redistricting workshop at Duke University	2017
UCGIS Summer School – Accepted into inaugural CyberGIS Summer School for GIS graduate students	2017
Columbia University Visiting Researcher – Developed models for biomass prediction using LiDAR data	2013
NASA-MSU Award – Professional Enhancement	2013

## TECHNICAL STRENGTHS

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<b>Skills</b>	Geospatial data analysis, web app customization, online technical instruction
<b>Interests</b>	Applied web mapping, machine learning, big data, and distributed computing
<b>Design Software</b>	Adobe Illustrator
<b>Platforms</b>	ArcGIS, R (Shiny, Leaflet), Python (ArcPy, Numpy, scikit-learn, Pandas), GRASS
<b>Databases</b>	PostgreSQL, PostGIS, MSSQL Management Studio, Hive, Hadoop

## GEOSPATIAL ANALYTICS COURSES

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Udemy: Python for Data Science and Machine Learning Bootcamp	Spring 2019
ST 590 Applied Bayesian Analysis	Spring 2016
ST 590 Statistical Learning and Data Mining	Spring 2016
GIS 595 Advanced Environmental Remote Sensing	Spring 2016
GIS 550 Geospatial Data Structures and Web Services	Fall 2015
MEA 582 Geospatial Modeling	Fall 2015
GIS 540 Geospatial Programming	Spring 2015
CSC 791 Spatial and Temporal Data Mining	Spring 2015