# JASON A. MATNEY

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## CURRENT EMPLOYMENT

**Dewberry**                                                                                                July 2019 - present
*Senior GIS Professional*

· Directly support Dewberry's Customer-Centered Communications (C3) contract. C3 is an arm of the NYC-based marketing firm HWC that partners with FEMA to build flood resilience for the real world. In this effort, I regularly liaison with the C3 Research and Analytics team to support data-driven insight generation using the Civis Platform. The overarching goal of this work is to help C3 meet their goal of locking-in more National Flood Insurance Program (NFIP) contracts nationwide.

· Directly support Dewberry's Probabilistic Flood Risk Assessment (PFRA) contract. My work with PFRA involves pioneering innovative ways to assess risk, incorporating techniques from the burgeoning field of geospatial statistics, which is still in its infancy. In this effort, I leverage cutting-edge spatial Machine Learning algorithms, vector- and raster-based big data, and interactive geovisualization platforms.

· Develop and deploy interactive geovisualizations using R Shiny with Leaflet JS, ArcGIS Web AppBuilder, and Tableau. I aim to generate intuitive and data-rich map products that feature appealing design components and informative user interfaces.

· Lead and collaborate on the development of national scale geospatial analytical modeling efforts, as well as geospatial data collection, development, processing, cleaning, and validation.

· Develop scripts to automate data input preparation, process implementation and structure output format. Innovate methods to expedite and streamline large geospatial analytic processes.

· Coordinate with the internal and external stakeholders to collect requirements, inform analyses, and develop engaging, interpretable presentations of results. Build and maintain longterm relationships with an array of invested collaborators.

· Communicate results effectively and efficiently, both verbally and in writing. Tailor analytical results to both technical and non-technical audiences.

## SECURITY CLEARANCE

EOD-Approved FEMA Security Clearance                                                                August 2019
*Moderate Risk*

## EDUCATION

**Doctor of Philosophy**                                                                                         2015 - 2019
Center for Geospatial Analytics
NC State University
*Raleigh, NC*

**Master of Science**                                                                                              2012 - 2014
Department of Geography
Michigan State University
*East Lansing, MI*

**Bachelor of Arts**                                                                                                2004 - 2009
Program in the Environment
University of Michigan
*Ann Arbor, MI*

## PEER-REVIEWED ARTICLES

### Published and In Preparation
*Articles in Preparation in support of Dissertation*

2013 - 2019

· **Matney, J. A.**, Slocumb, W. S., Smith, J. W., Bonsall, P., & Supak, S. K. (2019). Implementation and evaluation of a geospatial management solution for the U.S. National Park Service's Rivers, Trails, and Conservation Assistance Program. Journal of Park and Recreation Administration. doi: 10.18666/JPRA-2019-9250

· **Matney, J.**, Supak, S., van Berkel, D., Reich, B., & 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.

· **Matney, J.**, 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 of the Institute of British Geographers.

· Smith, J. W., Slocumb, W. S., Smith, C., & **Matney, J.A.** (2015). A Needs-Assessment Process for Designing Geospatial Data Management Systems within Federal Agencies. Journal of Map & Geography Libraries, 11(2), 226-244.

· Babcock, C., **Matney, J.**., Finley, A., Weiskittel, A., & 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.

## TECHNICAL REPORTS

### Professional reports completed in support of client-funded projects

2017 - 2018

· **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

### Growers - Precision Agriculture
*Management Zone Administration*

Spring 2018

· 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
*Tax parcel and Easement mapping project*

Spring 2018

· Collaborated with project managers to assess tax implications of NCDOT 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-politcal 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 - June 2019
*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 Qualitrics 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 - June 2019
*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

### PhD Student    January 2015 – June 2019
*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

**Instructor – Environmental Science Capstone**        Jan. 2019 – June 2019
*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 polices.
- 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.

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

## AWARDS

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|---|---|
| NC State's Esri Development Center Student of the Year – Innovative use of Esri technologies in research | 2019 |
| 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 Award | 2013 |

## TECHNICAL STRENGTHS

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|---|---|
| **Skills** | Geospatial data analysis, web app customization, online technical instruction |
| **Interests** | Applied web mapping, machine learning, big data, and distributed computing |
| **Design Software** | Adobe Illustrator |
| **Platforms** | ArcGIS, R (Shiny, Leaflet), Python (ArcPy, Numpy, scikit-learn, Pandas), GRASS |
| **Databases** | 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 |