Jacob W. Arndt

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EDUCATION

University of Minnesota, Minneapolis, MN — May 2018
Master of Geographic Information Science — GPA 3.96
M.S. Graduate Minor in Computer Science

University of Minnesota, Minneapolis, MN — May 2016
B.S. in Geography — GPA 3.89
B.A. in Music

WORK EXPERIENCE

U-Spatial, University of Minnesota, Minneapolis, MN — Jan 2017 - Present
Graduate Research Assistant

- Answer technical questions at the help desk about GIS, remote sensing, and spatial computing
- Web map application development using ArcGIS JavaScript API
- Processed CMIP5 daily downscaled climate model data and created summarized climate datasets for web applications
- Worked with American Community Survey data, calculated vulnerability indices, and created datasets for web applications

NASA Jet Propulsion Laboratory, Pasadena, CA — June 2017 – August 2017
DEVELOP Student Intern

- Conducted remote sensing research in the Health and Air Quality application area for a project that focused on identifying methane emissions patterns from dairy farms in California
- Identified methane plumes in data products derived from HyTES, AVIRIS, and AVIRIS-NG hyperspectral sensors
- Utilized data from Planet's RapidEye satellite constellation for land classification to understand dairy farm management practices

University of Minnesota, Minneapolis, MN — Jan 2017 - May 2017
Graduate Research Assistant to Dr. Eric Shook

- Assisted in the development and design of a domain-specific language for Geographic Information Science
- Helped design spatiotemporal data models for the language
- Worked extensively with Python and third-party Python libraries such as GDAL, numpy, and fiona for processing spatial data

University of Minnesota Center for Dendrochronology, Minneapolis, MN — May 2016 – Jan 2017
Graduate Research Assistant to Dr. Dan Griffin

- Analyzed tree rings and climate data
- Participated in field work which involved collecting samples and observing forest ecology
- Lab supervisor – supervised and trained undergraduate lab technicians to use lab equipment and computer software

Polar Geospatial Center, University of Minnesota, St. Paul, MN — Jan. 2015 – Sep. 2016
Undergraduate Geospatial Support Assistant

- Collected and processed imagery
- Designed maps for polar researchers
- Assisted senior staff members with additional tasks

AWARDS

- 2016 University of Minnesota's Undergraduate Minnesota GIS/LIS Student Scholar Award winner
- Winner of the Newton H. Winchell Award for Excellence in Earth Science at the 2016 Winchell Undergraduate Research Symposium
- Research funded through the University of Minnesota's Undergraduate Research Opportunities Program that explored the relationship between flight times, wind speed in the upper atmosphere, and climate variability
- 2016 Outstanding Graduating Senior Award in the Department of Geography, Environment, and Society at the University of Minnesota

PROFESSIONAL AND ACADEMIC EXPERIENCES

- Paper presentation at the 2018 American Association of Geographers Annual Meeting
- Poster presentation at the 2017 NASA Annual Earth Science Applications Showcase
- 2016-2017 Secretary of the Geographic Information Science Student Organization at the University of Minnesota
- Poster presentation at the 2016 Winchell Undergraduate Research Symposium

PROJECTS

Minnesota Climate Change Vulnerability Assessment pilot tool

A project that I am currently working on as a graduate research assistant in collaboration with the Minnesota Department of Health

- Web GIS application development using ArcGIS JavaScript API, HTML, CSS, and JavaScript
- Dataset development using ArcGIS Desktop, ArcGIS Online, Python, and third-party Python libraries (ArcPy, numpy, netCDF4-python, GDAL)
- Processed daily downscaled projected climate data from CMIP5 models for two emission scenarios. Calculated monthly, seasonal, and annual summary climate statistics on precipitation and temperature data, aggregated the statistics to administrative boundaries, and incorporated the data into the web application in the form of map layers and time series
- Worked with American Community Survey data and calculated social vulnerability indices

Spatial Operations in Deep Learning for Satellite Image Classification

An ongoing research project that incorporates spatial statistics into convolutional neural networks for satellite image classification. The goal is to use global and local spatial autocorrelation statistics in convolutional neural networks and understand their impact on classification accuracy and training.

- Used TensorFlow to build input pipelines, convolutional neural networks, and training loops
- Experience training convolutional neural networks from scratch on a satellite image dataset

Calculating the Keetch-Byram Drought Index and McArthur's Forest Fire Danger Index

A project where I implemented the Keetch-Byram Drought Index and McArthur's Forest Fire Danger Index for a fire ecology study.

- Conducted literature review to understand the indices and how to calculate them
- Used Python for calculating the drought indices on weather station data

SKILLS

Proficient

- Software – ArcGIS Desktop, ERDAS IMAGINE, GDAL, Google Earth Engine
- Programming – Python
- Remote Sensing
- Web map development – ArcGIS JavaScript API

Experienced

- Software – ArcGIS Pro, ENVI, TensorFlow
- Programming – Java, MATLAB, SQL
- Machine learning – deep learning, neural networks, convolutional neural networks
- Web development – JavaScript, HTML, CSS