

Miranda Lv

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SUMMARY

A self-motivated, fast-learning, and detail-oriented geospatial data science professional with over 10+ years of expertise in geospatial data analytics and machine learning, complemented by over 5+ years of experience in artificial intelligence and deep learning. Committed to closing the gap between research and technology through advanced analytics, with a focus on delivering actionable insights and fostering innovative decision-making to advance sustainable development.

TECHNICAL SKILLS

Languages: Python, R, SQL, MATLAB, Delphi

Packages: Pandas, scikit-learn, PyTorch, TensorFlow, geoPandas, shapely, rasterio, matplotlib, seaborn.

Others: Git, Jupyter, ArcGIS, Quantum GIS, Google Earth Engine, IDRISI, High-Performance Computing (HPC), Convolutional Neural Networks in Computer Vision, MySQL, PostGIS/PostgreSQL, Linux/Ubuntu, Microsoft Azure, AWS;

PROFESSIONAL EXPERIENCES

Virginia Institute of Marine Science

Data scientist/Senior geospatial researcher

2021 - Present

- Leading the new shoreline inventory data collection by designing and developing **computer vision algorithms** and **machine learning** model architectures with **Python (PyTorch)** to automatically extract useful features from remote sensing imagery;
- Accomplished an open-source [tool](#) (written in Python) for mapping and classifying shoreline stabilization structures from remotely sensed imagery, with **two peer-reviewed first-author papers** published by **Q1 journals** and many others under review; The product and tool **shortened** the traditional **data collection** procedure **from over a decade to weeks**;
- Secured over **\$370,000** in funding from DEQ, Virginia Coastal Zonal Management Program as Co-PI: Advancing the use of spatial data and coastal modeling in implementing adaptive management to support coastal community resilience.

AidData

Geospatial Researcher

2016 - 2021

Geospatial Data Analyst

2014 - 2016

GIS Analyst Intern

2014

- Worked on geospatial impact evaluation projects by designing and developing parallel computing methods and tools to process satellite imagery, economic, health, environmental, and other geospatial datasets using HPC clusters. The product (**GeoQuery**) enables individuals and organizations of **all skill levels** to freely find and aggregate over **50+** global level satellite, economic, health, conflict, and other spatial data into a single, simple-to-use file **in minutes**. GeoQuery has been widely used by **1000+** researchers and stakeholders across the **globe**, including the **WorldBank**, **Millennium Challenge Corporation (MCC)**, and **USAID**. Peer-reviewed [article](#) and open-source data extraction [tool](#).
- Led the development of tools and the framework for object detection, land use, and land change mapping projects with state-of-the-art **deep learning** and **computer vision** techniques (**image detection and instance segmentation**) using **Python**.
- Produced an extensible spatial data framework in Python using open-source tools capable of automating the management, integration, and processing of many types of datasets including satellite imagery, open-source geospatial data, geospatial subnational boundaries, and international aid finance data.
- Led annual GIS/open data training provided to interns (**>100**), and offered data science mentorship to research fellows.

Clark Labs

GIS Software Developer

2013

- Developed and designed analytics modules in IDRISI for complex mathematics calculations and image processing.

- Enhanced algorithms, UI, and UX to effectively optimize overall performance and efficiency.

EDUCATION

William and Mary, Applied Science Department	2024
Ph.D, Computational Geography/Geospatial Data Science	
Clark University, Geography Department	2013
M.S., GIS for Development and Environment	
M.S., Environmental Science & Policy	
North University of China, Engineering Department	2010
B.E., Environmental Engineering	

LICENSES AND SPECIALIZATIONS

- Microsoft Certified: [Azure AI Fundamentals](#) (2023)
- Datacamp Certified: [Data Engineer](#) (2023)
- Microsoft Certified: [Azure Data Science Associate](#) (2023)
- [Generative Adversarial Networks](#) (GAN) - Coursera (2023)
- [Machine Learning](#) - Coursera (2022)
- Deep Learning.AI [TensorFlow Developer](#) Specialization (2021)
- [Deep Learning](#) Specialization - Coursera (2021)

TEACHING EXPERIENCES

- **Instructor.** Introduction to GIS and Geospatial Data - Using GeoQuery and QGIS for Spatial Data Analysis. Green Climate Fund (GCF), Independent Evaluation Unit (IEU). Incheon, South Korea. Spring 2019.
- **Instructor.** Introduction to GIS and Geospatial Data. William & Mary. Summer 2015 & 2016 & 2017.
- **Teaching Assistant.** 1). Python Programming 2). Computer Programming for GIS. Clark University. Fall 2013.

PEER-REVIEWED PUBLICATIONS

- *Under preparation:* **Lv Z.**, Herman J., Brewer E., Nunez K., Runfola D. BathyFormer: A transformer-based deep learning method to map nearshore bathymetry with high-resolution multispectral satellite imagery.
- Brewer E., ..., **Lv Z.**, ... Granularity at Scale: Estimating Neighborhood Well-Being from High-Resolution Orthographic Imagery and Hybrid Learning. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2024.
- Runfola D., Stefanidis A., **Lv Z.**, Baiera H. A multi-glimpse deep learning architecture to estimate socioeconomic census metrics in the context of extreme scope variance. International Journal of Geographical Information Science, 2024.
- **Lv Z.**, Nunez K., Brewer E., Runfola D. Mapping the tidal marshes in coastal Virginia: A hierarchical transfer learning approach. GIScience & Remote Sensing. Nov, 2023. doi: 10.1080/15481603.2023.2287291
- **Lv Z.**, Nunez K., Brewer E., Runfola D. pyShore: A deep learning toolkit for shoreline structure mapping with high-resolution orthographic imagery and convolutional neural networks. Computers & Geosciences 171, 105296.
- Goodman S., BenYishay A., **Lv Z.**, Runfola D. GeoQuery: Integrating HPC systems and public web-based geospatial data tools. Computer and Geosciences, 2019.

REPORTS, COMPUTER CODE, DATASETS, AND METHODOLOGIES

- *Mitchell M., **Lv Z.**, ...* 2023. Enhancing the development of strategies for coastal wetland conservation prioritization in Virginia under climate change: Final Report. Virginia Institute of Marine Science, William & Mary.
- *Brewer E., **Lv Z.**, Runfola D.* Tracking the industrial growth of modern China with high-resolution panchromatic imagery: A sequential convolutional approach. arXiv. 2023. doi: <https://doi.org/10.48550/arXiv:2301.09620>.
- *BenYishay, A., Goodman, S., **Lv Z.**, Runfola, D.* 2019. Endline Report: Impact Evaluation of Road Improvement in Tanzania. Millennium Challenge Corporation / Mathematica. Annex C7.
- *BenYishay, A., Goodman, S., Runfola, D., **Lv M.*** 2019. Final Report: Evaluation of investments in the road infrastructure of Ghana. Millennium Challenge Corporation / Mathematica. Annex E7.
- *Runfola, D., **Lv Z.**, BenYishay, A.,* 2017. GeoMatch: A R Package for Propensity-Score Matching in Conditions of Intervention Spillover. <https://github.com/itpir/geoMatch>
- *BenYishay, A., Rotberg, R., Wells, J., **Lv Z.**, Goodman, S., Kovacevic, L., Runfola, D.* 2017. Geocoding Afrobarometer Rounds 1 - 6: Methodology & Data Quality. AidData.
- *Desai, H., **Lv Z.**, Perla, C., & Parks, B.* 2016. An Open-Source Methodology for Tracking Natural Resource Concessions in Liberia: Version 1.0. AidData.

SELECTED PRESENTATIONS & INVITED TALKS

- ***Lv Z.*** Advancing coastal infrastructure monitoring with Deep learning. Harvard University GeoAI conference, Cambridge, MA. May, 2024.
- ***Lv Z.*** Implementing a hierarchical transfer learning approach for tidal marsh mapping in coastal Virginia. SEDAAAG. Norfolk, VA. November 2023.
- ***Lv Z.*** Harnessing deep learning and high-resolution overhead imagery in Coastal Resource Management. ACM/IEEE Supercomputing Conference 2023. Denver, CO. November 2023.
- ***Lv Z.**, Nunez K, Brewer E, Runfola D.* A deep learning approach to map shoreline structures with high-resolution imagery and convolutional neural networks. York River and Small Coastal Basins Symposium, VIMS. May 2023.
- ***Lv Z.*** Mapping shoreline structures with high-resolution imagery and deep learning. 13th National Monitoring Conference, Virginia Beach, VA. April 2023.
- ***Lv Z.*** Hybrid Object-Based Image Analysis and Convolutional Neural Network Approach to Computer Vision for Satellite Image Analysis. William & Mary Graduate Research Symposium, Summer 2021.
- ***Lv Z.*** Environmental Application of Geographic Information Science in Project Measurement and Evaluation. Green Climate Fund (GCF) Independent Evaluation Unit (IEU). Incheon, South Korea. January 2019.
- *Runfola, D., Goodman, S., **Lv Z.*** Practical Spatial Data Analysis for Everyone: Introducing GeoQuery. World Bank, DC. 2017
- *Goodman, S., Runfola, D., **Lv Z.*** High-Performance Computation for Everyone: Integrating Web-portals and HPC. GeoComputation '17. Leeds, UK. September 2017.
- *Runfola, D., Goodman, S., **Lv Z.**, Ariel BenYishay.* Machine Learning and Heterogeneity in Impact Effects: A Case Study of the GEF. GeoComputation '17. Leeds, UK. September 2017.