Mara Zwicker

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EDUCATION

University of Wisconsin — Madison | Expected 08/26
BS in Geographic Information Systems | Data Science and Geospatial Data Science Certificate
Activities: Division 1 Student Athlete - Wisconsin Women's Rowing Team
Member of FinTech@UW Technology Committee

EXPERIENCE

Data Intern, Tiny Earth | Madison, WI **10/2023 — 06/2025**

- Conducted statistical analysis on 20,000+ environmental samples to identify discovery patterns and trends across geographic regions
- Engineered automated ETL pipelines using Python to process 10,000+ records, improving data quality and reducing manual processing time
- Integrated multiple data streams through database redesign, ensuring data consistency and enabling cross-dataset analysis
- Developed complex SQL queries for data extraction and analysis supporting research initiatives and grant applications

TECHNICAL PROJECTS

Climate-Conscious GPU Optimizer **06/2025**

- Built Streamlit application for multi-criteria optimization across 1000+ cloud GPU instances, balancing environmental impact, performance, and cost constraints
- Integrated global infrastructure networks and climate data using NetworkX graph algorithms for optimal resource allocation
- Deployed production application with caching optimization reducing computation time by 85% for real-time decision making

Neural Network Bathymetric Reconstruction System **03/2025**

- Developed custom U-Net architecture for spatial interpolation of missing data in incomplete NOAA bathymetric datasets
- Achieved 0.0294 MAE in out-of-sample terrain prediction using ensemble methodology with uncertainty quantification
- Engineered multi-objective loss functions (MSE + gradient + Laplacian) to preserve critical topographic features in high-dimensional data

Rancho Palos Verdes Landslide Susceptibility Analysis **02/2025**

- Performed time series analysis on 18-year terrain evolution data (2000-2018) to model dynamic risk exposure in coastal regions
- Developed multi-factor risk model in R incorporating slope dynamics, geological proximity, and hydrological patterns
- Created predictive visualizations and proposed machine learning algorithms for enhanced risk forecasting accuracy

Magnetic Nanoparticle-Virus Binding Analysis **05/2023-02/2024**

- Developed automated quantitative analysis pipeline for microscopy images to measure particle clustering and binding efficiency
- Implemented computer vision algorithms using OpenCV for feature extraction and statistical pattern recognition
- Built reproducible analysis framework processing 100+ images with statistical validation and performance metrics

SKILLS

Programming: Python, Java, R, SQL, Julia, Swift | Data Analysis: Pandas, NumPy, Matplotlib, Statistical Analysis, ETL Pipelines | Machine Learning: TensorFlow, Keras, Scikit-learn | Geospatial: ESRI ArcGIS Suite, QGIS, Google Earth Engine, ENVI | Tools: Git, VS Code, Jupyter, Web Scraping | Interests: Finance & Markets, Meteorology & Climate Analytics, Fintech