Dennies Bor

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Professional Summary

Geospatial and remote sensing computational scientist building reproducible spatial data products, infrastructure maps, and interactive web visualizations. Experienced in GIS algorithms, satellite/overhead imagery workflows, spatial statistics, and Python-based geospatial pipelines for decision-relevant analysis.

Technical Skills

- **Geospatial Computing:** GDAL, geopandas, rasterio; projections/CRS, vector–raster pipelines, spatial joins, network/topology processing.
- **Spatial Analysis:** Hotspot/cold-spot analysis, clustering/LISA-style workflows, exposure/vulnerability mapping, quality control.
- **Remote Sensing & CV:** Satellite/overhead imagery processing; object detection for infrastructure assets (YOLO); feature extraction.
- **Web Mapping:** Interactive dashboards; map-based UX for spatial QA and reporting (Leaflet/Cesium-style workflows).
- **Scientific Python:** NumPy, SciPy, Pandas, Matplotlib; reproducible notebooks and batch pipelines.

Education

- **George Mason University** — Fairfax, VA, USA
  PhD in Earth Systems and Geoinformation Sciences (Advisor: Dr. Edward Oughton) — *Sep 2023 – Present*

  Selected Coursework: Quantitative Methods; Remote Sensing; GIS Algorithms/Programming; Web-based GIS; Hyperspectral Imaging; Spatial Computing; Earth Image Processing; Geographic Information Systems.

  GPA: 3.85

- **Technical University of Kenya** — Nairobi, Kenya
  BEng in Aeronautical Engineering (First Class Honors) — *Sep 2013 – May 2019*

Research Experience

- **Graduate Research Assistant** — George Mason University, VA, USA
  Geospatial Modeling, Infrastructure Mapping, Spatial Analytics — *May 2022 – Present*
  - Built geospatial datasets and algorithms to quantify infrastructure exposure and vulnerability under hazard scenarios.
  - Developed reproducible GIS pipelines from open data sources; produced map-based products for analysis and stakeholder communication.

- **Engineering Intern** — Broglio Space Center, Malindi, Kenya
  Satellite Operations, RF Systems — *Aug 2018 – Nov 2018*
  - Supported ground station operations and data acquisition workflows for Earth observation and geospatial applications.

Selected Projects

- **spw-geophy-io**: Grid Infrastructure Mapping + Dashboard — spw-geophy-io
  - Open-source framework to map electricity transmission infrastructure for space-weather/GIC risk analysis with reproducible workflows.
  - Interactive dashboard: spw-geophy-io dashboard.
- **substation-assets-identification**: Asset Detection in Overhead Imagery (YOLO) — substation-assets-identification
  - Applied object detection to identify substation assets (e.g., transformers) from overhead imagery for infrastructure inventory workflows.
  - Structured training/inference pipeline for repeatable experiments and evaluation.
- **us_broadband**: Spatial + Temporal "Cold Spot" Analysis — us_broadband

- Spatial analysis of broadband availability using threshold-based definitions and cluster diagnostics to identify persistent underserved regions.
- Produced maps and time-evolution summaries for spatial decision support.

- **C-SWIM**: Space Weather Risk Dashboard (Geospatial Outputs) — C-SWIM
  - Generated geospatial data products supporting hazard-to-impact analysis for space-weather-driven power-grid disruption.
  - Results dashboard: space-weather-grid.

Selected Publications & Preprints

- **A Reproducible Method for Mapping Electricity Transmission Infrastructure for Space Weather Risk Assessment (Co-Author):** arXiv:2412.17685 — Dashboard: spw-geophy-io
- **Socio-economic impact of electricity grid infrastructure failure due to severe space weather events (Primary Author):** arXiv:2412.18032 — Code: C-SWIM — Dashboard: space-weather-grid
- **GIC-Related Observations During the May 2024 Geomagnetic Storm in the United States (Co-Author):** arXiv:2507.07009

Professional Development

- **National Center for Atmospheric Research** — Boulder, CO, USA
  Early Career Faculty Innovators Program — *2023 – 2025*
- **African Institute of Mathematical Sciences** — Cape Town, South Africa
  Africa Data Science Intensive Program — *2022*

References

Available upon request.