

# Dennies Bor

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Scholar: [Google Scholar](#)

## PROFESSIONAL SUMMARY

Computational scientist specializing in numerical modeling, high-performance computing, and infrastructure resilience analysis. Expertise in developing physics-based simulations, econometric models, and spatial algorithms. Strong background in scientific computing (Python, Pyomo, IPOPT), parallel computing workflows, and cloud-based HPC infrastructure.

## TECHNICAL SKILLS

- **Computational Physics:** Numerical methods (Euler, RK4, SOR), finite difference methods, particle dynamics, PDEs, electromagnetic field simulations.
- **Signal Processing:** Frequency-domain analysis, matched filters, coherence estimation, Welch PSD, spectral methods.
- **Econometric Modeling:** Input-Output models, Computable General Equilibrium (CGE), nonlinear optimization (Pyomo, IPOPT), uncertainty quantification.
- **Remote Sensing & Computer Vision:** Hyperspectral imaging, multispectral analysis, satellite image processing, deep learning for object detection (YOLO, CNNs), LiDAR processing.
- **Geospatial Computing:** GIS algorithms, spatial analysis (GDAL, geopandas, rasterio), web mapping (Cesium, Leaflet), point cloud processing.
- **Scientific Programming:** Python (NumPy, SciPy, Matplotlib, Pandas, TensorFlow, PyTorch), Go, React, MATLAB, parallel computing, cloud HPC (AWS EC2).
- **DevOps & Infrastructure:** Docker, GitHub Actions (CI/CD), Nginx, systemd, AWS deployment, REST APIs.

## EDUCATION

- **George Mason University** Fairfax, VA, USA  
*PhD in Earth Systems and Geoinformation Sciences (Advisor: Dr. Edward Oughton)* Sep 2023 – Present  
  
*Relevant Coursework:* Computational Physics, Applied Electromagnetics, Atmospheric Physics, Earth Image Processing, Spatial Computing, Hyperspectral Imaging, GIS Algorithms  
*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  
*Computational Modeling, Spatial Analysis, Infrastructure Resilience* May 2022 – Present
  - Develop computational models integrating numerical simulations, econometric analysis, and geospatial processing to quantify infrastructure resilience and socio-economic impacts of natural hazards.
- **Engineering Intern** Broglie Space Center, Malindi, Kenya  
*Satellite Operations, RF Systems* Aug 2018 – Nov 2018
  - Supported satellite tracking, telemetry processing, and RF communication systems for Earth observation missions.
  - Assisted in ground station operations and real-time data acquisition for geospatial applications.

## SELECTED PUBLICATIONS & PREPRINTS

- **A Reproducible Method for Mapping Electricity Transmission Infrastructure for Space Weather Risk Assessment:** [arXiv:2412.1768](https://arxiv.org/abs/2412.1768)  
— Interactive Dashboard: [denniesbor.github.io/spw-geophy-io](https://denniesbor.github.io/spw-geophy-io)
- **A Physics-Engineering-Economic Model Coupling Approach for Estimating Socio-economic Impacts of Space Weather:** [arXiv:2412.18032](https://arxiv.org/abs/2412.18032) — Code: [github.com/denniesbor/spw-geophy-io](https://github.com/denniesbor/spw-geophy-io)

## 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

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Available upon request.