Dennies Bor

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Professional Summary

PhD candidate and computational scientist developing coupled physics–engineering–economic models for space-weather risk and infrastructure resilience. Focused on reproducible research software, uncertainty quantification, geospatial data products, and decision-relevant impact metrics.

Skills Summary

- **Coupled Systems Modeling:** Physics-based modeling, power-grid risk modeling, socio-economic impact modeling (Input-Output / CGE-style).
- **Uncertainty Quantification:** Probabilistic simulation (Monte Carlo), scenario design, sensitivity analysis, validation workflows.
- **Geospatial & Remote Sensing:** Infrastructure mapping, GIS algorithms, satellite/overhead imagery processing, reproducible spatial pipelines.
- **Scientific Computing:** Python scientific stack, numerical methods, optimization (Pyomo, IPOPT), scalable scenario studies.
- **Research Software:** Open-source research artifacts, dashboards, reproducible workflows, version-controlled 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; Hyperspectral Imaging; Earth Image Processing; Spatial Computing; Applied Electromagnetic Theory; Computational Physics II; Digital Signal Processing; Earth Sci Data / Advanced Data Analysis.

  GPA: 3.85

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

Experience

- **Graduate Research Assistant** — George Mason University, VA, USA
  Computational Modeling, Spatial Analysis, Infrastructure Resilience — *May 2022 – Present*
  - Developed coupled hazard-to-impact models integrating numerical simulation, geospatial processing, and socio-economic impact estimation for infrastructure resilience.
  - Built reproducible research software (data ingestion, scenario generation, simulation, postprocessing) and delivered results as open-source artifacts and dashboards.
  - Conducted numerical simulations and uncertainty quantification using cloud computing workflows.
- **Engineering Intern** — Broglio Space Center, Malindi, Kenya
  Satellite Operations, Remote Sensing — *Aug 2018 – Nov 2018*
  - Supported satellite tracking and telemetry for geospatial applications.
  - Assisted in the maintenance and operation of RF communication systems.

Publications & Preprints

- **A Physics-Engineering-Economic Model Coupling Approach for Estimating Socio-economic Impacts of Space Weather (Primary Author):** arXiv:2412.18032 — Code: C-SWIM — Dashboard: space-weather-grid
- **A Reproducible Method for Mapping Electricity Transmission Infrastructure for Space Weather Risk Assessment (Co-Author):** arXiv:2412.17685 — Dashboard: spw-geophy-io
- **GIC-Related Observations During the May 2024 Geomagnetic Storm in the United States (Co-Author):** arXiv:2507.07009
- **Quantifying Political Polarization on Key Policy Issues Using Sentiment Analysis (Primary Author):** arXiv:2302.07775 — Results: Dashboard — Code: twitter_political_polarization

Projects & Proposals

- **Coupled Space Weather Impact Model (C-SWIM):** GitHub — Results Dashboard
- **Reproducible Grid Mapping + Data Collection (spw-geophy-io):** GitHub — Dashboard
- **Space Radiation Risk for the Global Satellite Fleet (sat-model):** GitHub
- **GIC Prediction Model Evaluation (tfpy):** GitHub
- **Computer Vision for Power Substation Asset Detection (substation-assets-identification):** GitHub

Professional Affiliations

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

References

Available upon request.