

Loucas Diamant-Boustead

Geospatial Analyst · Spatial Modelling & Optimization · North Sea Marine Spatial Planning

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PROFILE

Geospatial analyst and physical geographer with four years of professional experience building, calibrating, and validating data-driven models, supported by an MSc in Geography from Carleton University. Lead developer on a VLAIO-funded North Sea marine spatial planning platform integrating offshore wind, fisheries, ecology, and shipping data across seven North Sea countries, built around a linear-programming optimization engine. Particular strength in harmonising large, heterogeneous datasets from many public sources into reproducible, well-documented pipelines. R and Python, open-source by default.

EXPERIENCE

Geospatial Analyst — ORG (Permanent Modernity)

April 2023 – Present · Brussels, Belgium

- **REEF / North-C-Neutralizer — North Sea marine spatial planning (VLAIO research grant, 2023–present):** Lead developer on a multi-objective optimization platform for North Sea infrastructure planning, in partnership with Mantis Consulting and Ortelius for Belgium's Blue Cluster. Responsible end to end for data collection and cleaning, model development, validation, and implementation. The platform pulls the Marine Spatial Plans of all North Sea countries alongside a wide array of geospatial data — offshore wind, fisheries, ecology (Natura 2000, EEA, JNCC, PDOK, OFB), shipping, and HVDC infrastructure — and combines them in a PuLP linear-programming engine that computes optimal marine-use configurations under economic, environmental, and political constraints, with parallelised metric computation across comparative scenarios.
- **Ecological impact mapping (REEF):** Generated cumulative human-impact maps for more than a dozen species and six technology types using the EcolImpactMapper tool, feeding the platform's ecological constraint layer.
- **Antwerp multi-modal transit model:** Built and validated the routing core of a regional mobility model, migrating it from Dijkstra shortest-path calculations to the RAPTOR transit-routing algorithm. Tested multiple open-source RAPTOR implementations before building a custom version matched to project needs, validated against both established RAPTOR implementations and the Google routing API, and Numba-accelerated for origin–destination matrix runs at city scale.
- **Urban environmental data and EO pipeline (Flanders & Brussels, 2025–present):** Designed a multi-region geospatial pipeline integrating building, vegetation, hydrology, and Copernicus environmental layers. NDVI and tree-canopy mapping from Sentinel-2 and aerial imagery; piloting a U-Net segmentation model for individual tree-crown detection.
- **SPACE4Cities / Urban Mobility Intelligence System:** Proposed, wrote, and won the tender, then led development of a system using cell-phone GPS data to discern human movement within a city and the intrinsic and extrinsic factors behind it. Data cleaning combined Hidden Markov map-matching on rustworkx graphs with Iterative Proportional Fitting for population estimation.
- **Environmental change analysis:** Multi-decadal satellite time-series analysis of snowmelt in the Lebanese high mountains for a regional master plan; a 40-year river-change and floodplain study on the Piraí River, Bolivia, using high-resolution DEMs and long-term precipitation records; and site-suitability frameworks for technology siting in Palestine.

Geomatics Technician & Officer — Fisheries and Oceans Canada

May 2020 – Aug 2021 · Ottawa, Canada · Two consecutive summer terms

- Shoreline extraction and feature classification from satellite imagery using PCI Geomatica (now Catalyst) and ArcPro — a direct earth-observation-to-vector pipeline, with peer review of public-release outputs.
- Automated GIS workflows in Python (arcpy) supporting hydrographic and undersea-feature applications.

- Acted as secretariat for the national Advisory Committee on Undersea Feature Names and the international SCUFN committee, preparing formal submissions and facilitating meetings between international stakeholders within the GEBCO framework.
- Initiated and produced a Geographical Names Day 2020 story map for public release.

FIELD EXPERIENCE

Exploration Field Technician — GroundTruth Exploration

May 2017 – Aug 2019 · Canadian Arctic & Subarctic · Three consecutive field seasons

- Three field seasons across Nunavut, Labrador, and the Yukon — fly-in remote camps under sustainable-exploration protocols.
- Soil sampling for downstream geochemical analysis; trained subsequent field staff.

EDUCATION

MSc Geography (Physical Geography) — Carleton University

2021 – 2024 · Ottawa, Canada

Thesis on stable-isotope hydrology in the Mackenzie Delta: 111 storm events analysed using NOAA HYSPLIT atmospheric back-trajectory modelling to trace storm moisture sources, alongside field-collected $\delta^{18}\text{O}$ and $\delta^2\text{H}$ samples from Richards Island (borehole drilling and ice-wedge sampling). Conference paper at the International Conference on Permafrost (ICOP).

BA Geography — Carleton University

2016 – 2020 · Ottawa, Canada

Concentration in Physical Geography; minor in Geomatics.

TECHNICAL SKILLS

- **Programming:** Python (primary), R, SQL, Bash
- **Modelling & methods:** linear programming and spatial optimization (PuLP), model calibration and validation, network routing (RAPTOR, Dijkstra), Hidden Markov Models / map-matching, Iterative Proportional Fitting, atmospheric back-trajectory modelling (HYSPLIT)
- **Data integration:** multi-source harmonisation across vector, raster, tabular, and API sources; reproducible ETL pipelines; geodatabase design and data documentation
- **Scientific computing & ML:** NumPy, SciPy, Numba, scikit-learn, PyTorch
- **Geospatial:** GeoPandas, Shapely, rasterio, pyproj, Fiona, OSMnx, PostGIS, QGIS, GDAL, ArcPro / arcpy, PCI Geomatica / Catalyst
- **Performance & scale:** Numba, rustworkx, ProcessPoolExecutor, large-scale raster and trajectory processing

LANGUAGES

- English — Native
- French — Basic
- Dutch — Basic, actively learning

PUBLICATION

Diamant-Boustead, L., and Burn, C. R. (2024). Influence of storm trajectory on the stable isotope composition of precipitation at Inuvik, NT. In Proceedings, 12th International Conference on Permafrost, p. 65–72, Whitehorse, YT. Canadian Permafrost Association. <https://doi.org/10.52381/ICOP2024.77.1>