Vadim Bertrand

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France



UGA Research Engineer & PhD student in Oceanography at IGE

Education

2024— **PhD**, Institut des Géosciences de l'Environnement – **OPERA** team
Stochastic Modelling of Drifting Object Trajectories at the Ocean Surface using Machine Learning
Supervised by Julien Le Sommer (CNRS Researcher), Emmanuel Cosme (UGA Professor) and Adeline Samson (UGA Professor)

→ Implementing the `Python` package `pastax`

2023 **Master's Degree in Statistics and Data Science**, Université Grenoble Alpes – IM^{2}AG
Graduated with High Honors
Bayesian statistics, Computational statistics, Spatial statistics, Operations research and optimization, Non-parametric and functional estimation, Supervised and unsupervised learning

2014 **Engineering Degree**, Grenoble INP – Phelma / Ensimag
Signal processing, Algorithms and programming, Graph theory, Information theory

Academic and Professional Experience

2025— **Research Engineer**, Université Grenoble Alpes – Institut des Géosciences de l'Environnement
Scaling up processing workflows for large-scale observational and modeling data of the Earth System

2024—2025 **Summer School**, Ocean Training Course 2025 – Organized by the European Space Agency
Advanced Training Course on Ocean Synergy Remote Sensing focusing on the joint use of satellite and in-situ instruments to observe oceanic and atmospheric processes
Shore-based component of 14 training sessions on different Earth Observation satellite measurements
Ship-based component of 6 weeks from Tromsø (Norway) to Nice (France) aboard the Statsraad Lehmkuhl

→ Designed and assembled low-cost surface drifters deployed during the campaign, more details here

→ Organized a drifter position prediction challenge taking place during the shipboard training, see here

2023 **Research Engineer**, Institut des Géosciences de l'Environnement – **MEOM** team
Variational cyclogeostrophic inversion for estimating ocean surface currents
Supervised by Emmanuel Cosme (UGA Professor) and Julien Le Sommer (CNRS Researcher)

→ Implemented the `Python` package `jaxparrow`, leveraging `JAX`. 10.5281/zenodo.14871648

2023 **Research Internship**, TIMC – **MAGe** team
Exploration of joint deconvolution algorithms for omic data (report, poster)
Supervised by Magali Richard (CNRS Researcher)

2022—2023 **Mentored Master's Project**, Université Grenoble Alpes – IM^{2}AG
Effect of anthropogenic noise on narwhals behavior (as part of this larger study)
Supervised by Adeline Samson (UGA Professor)

2022 **Research Internship**, Laboratoire Jean Kuntzmann – **DAO** team
Deep generative learning for next-generation drugs (report)
Supervised by Sergei Grudinin (CNRS Researcher)

2016—2021 **Software Engineer**, Inria / GIPSA-lab – **DanCe** team
Supervised by Carlos Canudas-de-Wit (CNRS Researcher)

→ Developed the web-application GTL-VILLE, collecting, estimating and predicting road traffic indicators in real time in the Grenoble Metropolis (subsequent publication)

Teaching

2026 **Computing and Data Analysis Project (Supervision of 1 student)**, Université Grenoble Alpes - Master in Earth, planetary and environmental sciences

2024 **Computing and Data Analysis Project (Supervision of 2 students)**, Université Grenoble Alpes - Master in Earth, planetary and environmental sciences

2024 **Statistics (Practical Session)**, Université Grenoble Alpes - Bachelor in Biochemistry

Internship Supervision

2026 **Nora Mergui (Master, Université Grenoble Alpes)**, with Florian Le Guillou and Emmanuel Cosme
Mapping Sea Surface Height With Innovative Methods Based on Physical Constraints and Deep Learning

2024 **Léo Boux de Casson (Bachelor, École Normale Supérieure de Lyon)**, with Julien Le Sommer
Eulerian comparison of lagrangian drifter velocities and reconstructed sea surface currents within the SWOT swath in the Mediterranean sea

2017 **Baptiste Gouin (Master, Université Paris Sud)**, with Giacomo Casadei
Aggregation and travel time calculation over large scale traffic networks

Scientific Activities

2026 **Journal Article** - T. Uchida , B. Yadidya, V. Bertrand, B. Arbic, J. Shriver, J. Le Sommer, *A Strictly Geostrophic Product of Sea-Surface Velocities From the SWOT Fast-Sampling Phase*, GRL, 2026. 10.1029/2026GL121978

2026 **eLightning Presentation** - V. Bertrand, A. Samson, E. Cosme, J. Le Sommer, *Stochastic modeling of ocean surface trajectories using physical forcings and data-driven calibration*, OSM, Glasgow, Scotland. Online material

2026 **Journal Article** - V. Bertrand, J. Le Sommer, V. Zaia De Almeida, A. Samson, E. Cosme, *A robust minimization-based framework for cyclogeostrophic ocean surface current retrieval*, Ocean Sci., 2026. 10.5194/os-22-241-2026

2025 **Journal Article** - E. Amblard, V. Bertrand, ..., Y. Blum, M. Richard, *A robust workflow to benchmark deconvolution of multi-omic data*, Genome Biol., 2025. 10.1186/s13059-025-03897-9

2025 **Hackathon** - Attendee in the JAXATHON organized at IGE, Grenoble, France.
Gave an informal presentation of the JAX ecosystem. PDF

2024 **Poster Presentation** - *Stochastic and differentiable simulators of drifting objects trajectories*, EDITO WP2 Workshop, Grenoble, France. PDF

2024 **Oral Presentation** - *Cyclogeostrophic inversion for estimating Sea Surface Currents from SWOT altimeter data*, 30YPRA-OSTST, Montpellier, France. PDF

2024 **Poster Presentation** - *Cyclogeostrophic inversion for estimating Sea Surface Currents*, EGU, Vienna, Austria. 10.5194/egusphere-egu24-17489

2023 **Poster Presentation** - *Scoring and ranking strategies to benchmark cell type deconvolution pipelines*, JOBIM and ISMB, Nice and Lyon, France. PDF

2018 **Journal Article** - G. Casadei, V. Bertrand, B. Gouin, C. Canudas-de-Wit, *Aggregation and travel time calculation over large scale traffic networks: An empiric study on the Grenoble City*, Transportation Research Part C: Emerging Technologies, 2018. 10.1016/j.trc.2018.07.033

Open Source Contributions

Personal Projects, developper and maintainer of:

`pastax` *Parameterizable Auto-differentiable Simulators of ocean Trajectories in jAX*
`jaxparrow` *A package for computing the inversion of the cyclogeostrophic balance based on a variational formulation approach.* 10.5281/zenodo.14871648

Community Projects, contributor to:

`clouddrift` *Accelerates the use of Lagrangian data for atmospheric, oceanic, and climate sciences*
`quax` *Multiple dispatch over abstract array types in JAX*
`widetrax` *Toolbox for manipulating wide-swath altimetry ocean data*

Miscellaneous

Living languages

English: fluent, Spanish: notions

Programming languages

Python (JAX, PyTorch, NumPy, Xarray, etc...), Julia, R ; Git ; Shell scripting

Hobbies

Rugby (2 years in sports study) & Touch rugby (what is this?), Rowing, Cycling, Diving, Mountain stuff...