Vadim Bertrand

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Grenoble area
France

2nd year PhD student in Oceanography – Master's Degree in Statistics – Software Engineer

Education

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

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 different satellite instruments to observe oceanic and atmospheric processes
Shore-based component of 14 training sessions on different Earth Observation satellite measurements
Ship-based componant of 6 weeks from Tromsø (Norway) to Nice (France) aboard the Statsraad Lehmkuhl
→ Designed and assembled low-cost surface drifters to be deployed during the campain, 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 – Team **MEOM**
Variational cyclogeostrophic inversion for estimating ocean surface currents
Supervised by Emmanuel Cosme (UGA Full Professor) and Julien Le Sommer (CNRS Researcher)
→ Implemented the `Python` package `jaxparrow`, leveraging `JAX`. 10.5281/zenodo.14871648

2023 **Research Internship** | TIMC –Team **M**odels and **A**lgorithms for **Ge**nomics
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 Leclercq Samson (UGA Full Professor)

2022 **Research Internship** | Laboratoire Jean Kuntzmann – Team **D**onnées, **A**pprentissage et **O**ptimisation
Deep generative learning for next-generation drugs (report)
Supervised by Sergei Grudinin (CNRS Researcher)

2016-2021 **Software Engineer** | Inria / GIPSA-lab – Team **D**ynamics **a**nd **C**ontrol of **Ne**tworks
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

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

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

Scientific Activities

2025 **Journal Article** *in preparation* | V. Bertrand, J. Le Sommer, M. Ballarotta, V. Zaia De Almeida, A. Samson, E. Cosme, *Robust inversion of the cyclogeostrophic balance equation: Application to global Sea Surface Height maps.*

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) and now Touch rugby (what is this?), Running, Ski touring, Diving