Victor Trappler

Postdoctoral researcher in Applied Mathematics, Uncertainty Quantification

victor.trappler@gmail.com
vtrappler.github.io
vtrappler
victortrappler

Research interests

PhD in Applied Mathematics, I am currently a postdoctoral researcher on **Multiobjective Optimisation under Uncertainties**, with a focus on **Bayesian Optimization**. My research interests revolve around **Uncertainty Quantification**, **Data Assimilation** and **Machine Learning**.

Education

2017–2021 **PhD in Applied Mathematics**, *AIRSEA, Inria/LJK*, Grenoble, France
Title: Parameter control in the presence of uncertainties
Abstract: Classical methods of parameter estimation usually imply the minimisation of an objective function, that overlooks the role of uncertain parameters. Strategies taking into account these uncertainties need to be defined.
Keywords: Parameter Estimation; Optimisation under Uncertainties; Gaussian Processes
Advisors: A. Vidard, É. Arnaud, L. Debreu

2015–2017 **MSc Mathematical Modelling and Computation**, *Danmarks Tekniske Universitet*, Kgs. Lyngby, Denmark
Double Degree with École Centrale Lyon
Focus points: Applied mathematical analysis, Dynamical Systems, Scientific Computing, Statistical modelling, Stochastic simulations

2013–2017 **Engineering Degree**, *École Centrale Lyon*, Écully, France
Interests and courses oriented toward applied mathematics
Double Degree with Denmarks Tekniske Universitet

Experience

Post-doctoral Positions

2024–2025 **Post-doctoral researcher**, *Camille Jordan Institute (ICJ)*, Lyon, France
Title: Multiobjective optimisation under uncertainties
Abstract: Many real world decision problems can be summarized as multi objective optimization problems, where the sought quantity is the Pareto front. In the presence of uncertainties, many definitions of robustness can be defined, and appropriate numerical methods must be derived.
Keywords: Multiobjective optimisation under uncertainties, Uncertainty Quantification, Gaussian Processes

2021–2023 **Post-doctoral researcher**, *Joint Laboratory Eviden/Inria*, Grenoble, France
Title: Data Assimilation in latent spaces
Abstract: In this work, we propose to use ML in order to build state-dependent preconditioners for the inner loop in Variational Data Assimilation, and apply this method to a toy-model of a Shallow Water assimilation system. This work has led me to work on the different aspects and interactions of Data Assimilation, Machine Learning and Linear Algebra, within the R&D team "AI4Sim" of Eviden
Keywords: Data Assimilation; Uncertainty Quantification; Machine Learning; Linear Algebra

Internships/Master thesis

2017 **Master Thesis**, *AIRSEA, Inria/LJK*, Grenoble, France
Title: Parameter control in the presence of uncertainties: Robust estimation of bottom friction
Advisors: Uffe Høgsbro Thygesen (DTU), Élise Arnaud, Arthur Vidard, Laurent Debreu (Inria)

2015 **Intern**, *EDF R&D*, Chatou, France
Developement of MATLAB tools for hydrodynamical model TELEMAC3D, application to residence time

Teaching and Supervising Experience

Supervisory Experience

2022 - **Exaucé Luweh Adjim Ngarti**, *Joint laboratory Eviden/Inria*, PhD candidate
Title: Deep Learning for Inverse Problems, application to oceanography
Robust Parameter Estimation Using Variational Inference and Generative Neural Networks

Teaching: Total hours 162h

2024 **Teaching assistant (24h)**, *École Centrale Lyon*
Lectures in calculus for undergraduates.
- L3: 24h of Applied Calculus for 1st year Engineering students

2017–2019 **Teaching assistant (138h)**, *Grenoble-Alpes University*
Lectures in calculus, algebra, and computer lab sessions in statistics for undergraduates students:
- L2 STA301: 90h of lab work on statistics using the R language
- L1 MIASHS: 20h of exercise sessions on calculus
- L1 MAT104: 28h of lectures and exercise sessions on geometry and algebra

2017–2020 **Research and Teaching Label**, *Grenoble-Alpes University*
PhD completed with RES label: Specific doctoral training for students wanting to pursue an academic career, mostly on teaching methods and reflexions on higher education

Publications and Preprints

2024 Trappler, Victor and Arthur Vidard (2024). "State-dependent preconditioning for the inner-loop in Variational Data Assimilation using Machine Learning". preprint. URL: https://hal.science/hal-04707967.

2021 Trappler, Victor (June 2021). "Contrôle de Paramètre En Présence d'incertitudes". PhD thesis. Université Grenoble Alpes. URL: https://theses.hal.science/tel-03275015.

2021 Trappler, Victor, Élise Arnaud, Arthur Vidard, and Laurent Debreu (2021). "Robust calibration of numerical models based on relative regret". In: *Journal of Computational Physics* 426, p. 109952. ISSN: 0021-9991. DOI: https://doi.org/10.1016/j.jcp.2020.109952. URL: https://www.sciencedirect.com/science/article/pii/S0021999120307269.

Oral and Poster presentations

2024 **Talk**: Single and Multi-objective Bayesian Optimization under uncertainties – *Mexico Network meeting*

2024 **Talk**: Multiobjective Bayesian Optimization under uncertainties – *CIROQUO Days, CEA DAM*

2023 **Poster**: State-dependent preconditioning for VarDA – *9th International Symposium Data Assimilation*, Bologna, Italia

2023 **Poster**: State-dependent preconditioning for VarDA – *54th International Colloquium for Oceanography*, Liège, Belgium

2022 **Poster**: Regret-based estimates using GP – *CIROQUO scientific days*, Grenoble, France

2019 **Talk**: *Seminar of the Uncertainty Quantification Group*, MIT, USA

2019 **Talk**: *Applied Inverse Problems Conference*, mini-symposium "Dimension reduction in inverse problems", Grenoble, France

2018 **Talk**: *National Colloquium for Data Assimilation*, Rennes, France

2018 **Poster**: *Workshop on Sensitivity Analysis and Data Assimilation in Meteorology and Oceanography*, Aveiro, Portugal

Languages and programming skills

Languages	French	*Fluent - Native*
	English	*Fluent - TOEFL IBT score: 105/120 (2015) and abroad experiences*
	German	*Adapted for casual conversations*
Sci. Comp.	Python	*Numpy, Scipy, Machine Learning (PyTorch, scikit-learn, MLFlow, Botorch)*
	R, Matlab, Julia, FORTRAN, C++	*Notions*
Utilities	LaTeX, bash, git, Docker, slurm	

Miscellaneous

2024 **ORENI project**
Participation in some developements for the ORENI project (Optimisation of strategies of building refurbishment/construction under uncertainties `https://oreni.plateforme-tipee.com`)

2023 **UQ Working-Group**, *AI4Sim (Eviden)*
Launched and animated a working-group on Uncertainty Quantification applied to Geophysics within the AI4Sim team.

2022- **Individual Thesis Follow-up Committee**
Member of the Individual thesis follow-up committee (Comité Suivi Individuel) of Katarina Radišić (INRAE)

2020 **Representative of non-permanent employees**, *LJK, Grenoble*
Elected as a representative of the non-permanent employees (PhD, interns, postdocs fellows, engineers) of the Jean Kuntzmann Laboratory. Participation at the lab council