Victor Trappler

Postdoctoral Researcher in Data Assimilation, Uncertainty Quantification and Machine Learning

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Research interests

PhD in Applied Mathematics, I am looking for a post-doctoral or a scientist position. My research interests revolve around

- **Data Assimilation**
- **Uncertainty Quantification**
- **Machine Learning**
- **Earth System models**

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; Data Assimilation
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

Experience

Post-doctoral Position

2021–2023 **Post-doctoral researcher**, *Joint Laboratory Eviden/Inria*, Grenoble, France
Title: Data Assimilation in latent spaces
Abstract: Data assimilation is widely used in forecast systems, but due to the high dimension of the state vectors encountered, it shows challenging computational problems. In this project, I 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.
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, with the purpose of estimating the 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

Teaching Experience

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

2017–2019 **Teaching assistant**, *Grenoble-Alpes University*
Lectures in calculus, algebra, and computer lab sessions in statistics for undergraduates students. Teaching time adding up to **138h**:
- 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

Publications

2021 Trappler, Victor (June 2021). "Contrôle de Paramètre En Présence d'incertitudes". These de Doctorat. Université Grenoble Alpes.

2020 Trappler, Victor, Élise Arnaud, Arthur Vidard, and Laurent Debreu (Nov. 2020). "Robust Calibration of Numerical Models Based on Relative Regret". In: *Journal of Computational Physics*, p. 109952. ISSN: 0021-9991. DOI: 10.1016/j.jcp.2020.109952.

Oral and Poster presentations

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, dvc)*
	R, Matlab, Julia, FORTRAN, C++	*Notions*
Utilities	LaTeX, bash, git, Docker, Elisp	

Miscellaneous

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

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