

# Tom Beucler

✉ tom.beucler@unil.ch • 🌐 unil.ch/dawn • 📧 Tom Beucler • 🌐 tbeucler

CV last updated on May 20, 2026

## Research Interests

---

Atmospheric Physics, Climate Informatics, Clouds and Convection, Deep Learning, Downscaling, Environmental Data Science, Fluid Dynamics, Scientific Machine Learning, Tropical Meteorology, Weather and Climate Extremes.

## Education

---

### MIT Program in Atmospheres, Oceans, and Climate

*Ph.D. in Atmospheric Science: Interaction between Water Vapor, Radiation and Convection*

Thesis committee: K. Emanuel (co-advisor), T. Cronin (co-advisor), P. O’Gorman, Z. Kuang, C. Bretherton.

2014 – 2019

Cambridge, USA

### École Polytechnique

*Master of Science in Mechanics*

Major in fluid dynamics and environmental science.

2013 – 2014

Palaiseau, France

### École Polytechnique & Lycée Sainte-Geneviève

*Bachelor of Engineering*

Coursework in mechanics, physics, mathematics, chemistry and biology.

2009 – 2013

Versailles & Palaiseau, France

## Academic Employment

---

### University of Lausanne, Switzerland

*Associate Professor (Tenured)*

Starting Aug. 1, 2026

Lausanne, Switzerland

### University of Lausanne, Switzerland

*Assistant Professor of Environmental Data Science (Tenure-track)*

2021 – Present

Lausanne, Switzerland

### University of California, Irvine

*Assistant Project Scientist in Atmospheric Science: Machine Learning for Climate Science*

Principal investigators: M. Pritchard and P. Gentine.

2019 – 2021

Irvine, USA

### University of California, Irvine and Columbia University

*Postdoctoral Scholar in Atmospheric Science: Deep Learning for Convection and Clouds*

Co-advisors: P. Gentine and M. Pritchard.

2019

Irvine & NYC, USA

## Awards and Visiting Positions

---

- (2021–2025) **Visiting scholar**, Earth System Science Department, UCI
- (2019–2023) **Visiting scholar**, Scripps Institution of Oceanography, UCSD
- (2023) **AGU 2022 Editor’s citation for excellence in refereeing**, Journal of Advances in Modeling Earth Systems
- (2022) **AGU 2021 Editor’s citation for excellence in refereeing**, Geophysical Research Letters
- (2021) **AGU 2020 Editor’s citation for excellence in refereeing**, Journal of Advances in Modeling Earth Systems
- (2019) **Rossby award for best doctoral thesis**, Program in Atmospheres, Oceans and Climate, MIT
- (2019) **Invited scholar**, Max Planck Institute for Meteorology
- (2019) **Summer fellow**, 2nd ICTP Summer School on Climate Dynamics and Convective Organization
- (2018) **Finalist of the “Climate Changed” @ MIT competition**, *Higher Grounds* at MIT
- (2018) **AGU 2017 Editor’s citation for excellence in refereeing**, Geophysical Research Letters
- (2018) **Best poster prize (Water & Society)**, *Preparing MIT for 2050 Floodwaters* at the MIT Water Night
- (2018) **Graduate research fellow**, Program on Math. and Stat. Methods for Climate & the Earth System at SIAM Institute
- (2017) **Summer fellow**, Les Houches Summer School on Fundamental Aspects of Turbulent Flows in Climate Dynamics
- (2015) **Geophysical fluid dynamics fellow**, Woods Hole Oceanographic Institution
- (2014-2015) **Rasmussen fellow**, MIT Department of Earth, Atmospheric and Planetary Sciences
- (2014) **Outstanding Master’s thesis**, École Polytechnique

## Funding

---

- (2024-Present) **Lead PI, SNSF Project Funding: RobustSR: Improving the Robustness of Super-Resolution Algorithms to Climate Change and Extreme Events**. Estimated value of resources awarded to  $\partial^3$ AWN: **CHF 584,989**
- (2024-Present) **Co-PI, Horizon Europe (CL5 Call): AI4PEX: Artificial Intelligence and ML for Enhanced Representation of Processes and Extremes in Earth System Models**. Estimated value of resources awarded to  $\partial^3$ AWN: **CHF 523,999**
- (2024-Present) **Lead PI, UNIL Teaching Innovation Fund (FIP): Promoting the Teaching of Computational Sciences at the Faculty of Geosciences and Environment**. Estimated value of resources awarded: **CHF 54,000**

- (2021-Present) **Principal Investigator, Canton of Vaud funding for all IDYST professors:**  $\partial^3$ AWN Lab at IDYST. Estimated value of awarded resources: **CHF 120,000/year** (2 PhD students)
- (2026) **Lead Applicant, Climate Informatics 2026 Conference Funding:** Combined support from UNIL FGSE's "Fonds d'investissement" (FINV; **CHF 20,000**), SNSF Scientific Exchanges (**CHF 8,000**), and the UNIL foundation's deficit guarantee for a scientific symposium organization (**CHF 10,000**). Estimated value of awarded/ guaranteed resources: **CHF 38,000**.
- (2026) **Lead PI, Interface-Volteface & CAP2037 (UNIL):** *From measurement to action to sustainably reduce the environmental footprint of research computing and data infrastructures*. Resources awarded to  $\partial^3$ AWN: **CHF 25,000**.
- (2026) **Co-Applicant, Swiss AI Initiative:** *Earth System Foundation Model & ClimLlama* ~700k GPU-h on CSCS Alps; personnel funding, engineering support, and outreach funds for pre-training & applications. Lead PIs: S. Schemm (Cambridge), T. Hoefler (ETH), S. Mishra (ETH), M. Salzmann (EPFL/SDSC), O. Fuhrer (MCH). Estimated value of awarded resources for 14 PIs: **CHF 7,000,000**. UNIL Role: ESFM evaluation & constraining.
- (2025-2026) **Lead PI, Swiss Data Science Center's Call for End-User Innovation Projects:** *Democratizing Neural Weather Forecasting for Switzerland: An Open Platform Approach*. Estimated value of resources awarded: **CHF 100,000**
- (2025) **Lead PI, Alliance Campus Rhodanien Seed Fund for Franco-Swiss Collaborative Projects:** *Towards Physics-Informed Neural Operators for Climate Modeling*. Estimated value of resources awarded to  $\partial^3$ AWN: **EUR 8,000**
- (2020-2021) **Principal Investigator, Columbia University subaward:** *Physics-Guided Deep Learning for Climate Predictions*. Estimated value of awarded resources: **\$51,986**
- (2020-2021) **Co-Investigator, XSEDE computational resources allocation:** *Simulating global climate with turbulence-permitting cloud superparameterization to train machine learning emulators and advance understanding of aerosol-cloud feedbacks*. Lead PI: Mike Pritchard. Estimated value of awarded resources: **\$2,025,427**

## Peer-Reviewed Publications and Book Chapters

---

1. (2026, *Accepted*) Heuer, H., **T. Beucler**, M. Schwabe, J. Savre, M. Schlund & Veronika Eyring: Beyond the Training Data: Confidence-Guided Mixing of Parameterizations in a Hybrid AI-Climate Model. *Journal of Advances in Modeling Earth Systems*.
2. (2026) Lin, J., Z. Hu, **T. Beucler**, K. Frields, H. Christensen, W. Hannah, H. Heuer, ... & M. Pritchard: Crowdsourcing the Frontier: Advancing Hybrid Physics-ML Climate Simulation via \$50,000 Kaggle Competition. *Journal of Advances in Modeling Earth Systems*.
3. (2026) Ismaili, E., R. J. Wills & **T. Beucler**: Machine Learning of Vertical Fluxes by Unresolved Midlatitude Mesoscale Processes. *Machine Learning: Earth*.
4. (2026, *Accepted*) Furtado, J. C., M. J. Molina, M. C. Arcodia, W. Anderson, **T. Beucler**, J. A. Callahan, L. M. Ciasto, ... & B. G. Zimmerman: Setting the Standard: Recommended Practices for Data Preprocessing in Data-Driven Climate Prediction. *Bulletin of the American Meteorological Society*.
5. (2026) Largeau, L., E. Koch, D. Leutwyler, G. Mariethoz, V. Chavez-Demoulin & **T. Beucler**: Investigating the Robustness of Extreme Precipitation Super-Resolution Across Climates. *Weather and Climate Extremes*.
6. (2026) Gomez, M., L. Poulain-Auzeau, A. Berne & **T. Beucler**: Global Forecasting of Tropical Cyclone Intensity Using Neural Weather Models. *Artificial Intelligence for the Earth Systems*, **5**, 250073.
7. (2025) Grundner, A., **T. Beucler**, J. Savre, A. Lauer, M. Schlund & V. Eyring: Reduced Cloud Cover Errors in a Hybrid AI-Climate Model Through Equation Discovery And Automatic Tuning. *Scientific Reports*, **15**, 43836.
8. (2025) Leclerc, A., E. Koch, M. Feldmann, D. Nerini & **T. Beucler**: Improving Predictions of Convective Storm Wind Gusts through Statistical Post-Processing of Neural Weather Models. *npj Natural Hazards*, **2**(1), 100.
9. (2025) Hibbert, D., **T. Beucler**, K. Domingo & S. Leibel: Respiratory Emergencies in Pediatrics: Associations in Redlining, Air Quality and Traffic Regulation. *Journal of Racial and Ethnic Health Disparities*.
10. (2025) Yu, S., Z. Hu, A. Subramaniam, W. Hannah, L. Peng, J. Lin, M. Bhouri, R. Gupta, B. Lütjens, J. Will, G. Behrens, J. Busecke, N. Loose, C. Stern, **T. Beucler**, ... & M. Pritchard: ClimSim-Online: A Large Multi-scale Dataset and Framework for Hybrid ML-physics Climate Emulation. *Journal of Machine Learning Research*, **26**, 142.
11. (2025) Wang, Z., R. Rios-Berrios, D. P. Stern, A. J. Baker, **T. Beucler**, S. J. Camargo, J.-P. Duvel, ... & E. Wisinski: On the Definition and Tracking of Tropical Cyclone Seeds from a Climate Perspective. *Bulletin of the American Meteorological Society*, **106**, E1815–E1822.
12. (2025) Tam, F. I., F. Augsburger & **T. Beucler**: From Winter Storm Thermodynamics to Wind Gust Extremes: Discovering Interpretable Equations from Data. *Environmental Data Science*, **4**:e48.
13. (2025) Sullivan, S. C., P. Vautravers, **T. Beucler**, T. Makgoale & J. Yin: Moisture-Precipitation Couplings for Mesoscale Convective Systems in Tracking Data and Idealized Simulations. *Journal of the Atmospheric Sciences*, **82**, 1885–1902.
14. (2025) Ricard, L., **T. Beucler**, C. Stephan & A. Nenes: A Causal Intercomparison framework unravels precipitation drivers in Global Storm-Resolving Models. *npj climate and atmospheric science*, **8**, 245.
15. (2025) **Beucler, T.**, A. Grundner, S. Shamekh, P. Ukkonen, M. Chantry, R. Lagerquist: Distilling Machine Learning's Added Value: Pareto Fronts in Atmospheric Applications. *Artificial Intelligence for the Earth Systems*, **4**, e240078.
16. (2025) Behrens, G., **T. Beucler**, F. Iglesias-Suarez, S. Yu, P. Gentine, M. Pritchard, M. Schwabe & V. Eyring: Simulating Atmospheric Processes in Earth System Models and Quantifying Uncertainties with Deep Learning Multi-Member and Stochastic Parameterizations. *Journal of Advances in Modeling Earth Systems*, **17**, e2024MS004272.
17. (2025) Lin, J., S. Yu, L. Peng, **T. Beucler**, E. Wong-Toi, Z. Hu, P. Gentine, M. Geleta & M. Pritchard: Navigating the Noise: Bringing Clarity to ML Parameterization Design with O(100) Ensembles. *Journal of Advances in Modeling Earth Systems*, **17**, e2024MS004551.
18. (2025) Aarnink, J., **T. Beucler**, M. Vuaridel & V. Ruiz-Villanueva: Automatic detection of instream large wood in videos using

- deep learning. *Earth Surface Dynamics*, **13**, 167–189.
19. (2024) Cache, T., M. Gomez, **T. Beucler**, J. Blagojevic, J. Leitaó & N. Peleg: Enhancing generalizability of data-driven urban flood models by incorporating contextual information. *Hydrology and Earth System Sciences*, **28(24)**, 5443-5458.
  20. (2024) **Tam, F. I., T. Beucler** & J. Ruppert: Identifying Three-Dimensional Radiative Patterns Associated with Early Tropical Cyclone Intensification. *Journal of Advances in Modeling Earth Systems*, **16**, e2024MS004401.
  21. (2024) Feldmann, M., **T. Beucler**, M. Gomez & O. Martius: Lightning-Fast Convective Outlooks: Predicting Severe Convective Environments with Global AI-based Weather Models. *Geophysical Research Letters*, **51(22)**, e2024GL110960.
  22. (2024) Christopoulos, C., I. Lopez-Gomez, **T. Beucler**, Y. Cohen, C. Kawczynski, O. Dunbar & T. Schneider: Online Learning of Entrainment Closures in a Hybrid Machine Learning Parameterization. *Journal of Advances in Modeling Earth Systems*, **16**, e2024MS004485.
  23. (2024) Eyring, V., W.D. Collins, P. Gentine, E.A. Barnes, M. Barreiro, **T. Beucler**, ... & L. Zanna: Pushing the frontiers in climate modeling and analysis with machine learning. *Nature Climate Change*, **14**, 916–928.
  24. (2024) Rampal, N., S. Hobeichi, P. B. Gibson, J. Baño-Medina, G. Abramowitz, **T. Beucler**, J. González-Abad, W. Chapman, P. Harder & José Manuel Gutiérrez: Enhancing Regional Climate Downscaling Through Advances in Machine Learning. *Artificial Intelligence for the Earth Systems*, **3(2)**, 230066..
  25. (2024) **Beucler, T.**, E. Koch, S. Kotlarski, D. Leutwyler, A. Michel & J. Koh: Next-Generation Earth System Models: Towards Reliable Hybrid Models for Weather and Climate Applications. *SATW Whitepaper on “AI for Climate Change Mitigation”*, **5.2**, 32-45.
  26. (2024) Grundner, A., **T. Beucler**, P. Gentine & V. Eyring: Data-Driven Equation Discovery of a Cloud Cover Parameterization, *Journal of Advances in Modeling Earth Systems*, **16**, e2023MS003763.
  27. (2024) Iglesias-Suarez, F., P. Gentine, B. Solino-Fernandez, **T. Beucler**, M. Pritchard, J. Runge & V. Eyring: Causally-informed deep learning to improve climate models and projections, *Journal of Geophysical Research: Atmospheres*, **129**, e2023JD039202.
  28. (2024) Mooers, G., **T. Beucler**, M. Pritchard & S. Mandt: Understanding Precipitation Changes through Unsupervised Machine Learning, *Environmental Data Science*, **3**, e3.
  29. (2024) **Beucler, T.**, P. Gentine, J. Yuval, A. Gupta, L. Peng, J. Lin, S. Yu, S. Rasp, F. Ahmed, P. O’Gorman, D. Neelin, N. Lutsko & M. Pritchard: Climate-Invariant Machine Learning, *Science Advances*, **10**, eadj7250.
  30. (2023) **Beucler, T.**, I. Ebert-Uphoff, S. Rasp, M. Pritchard & P. Gentine: Machine Learning for Clouds and Climate, *Clouds and Their Climatic Impact: Radiation, Circulation, and Precipitation*, edited by: Sullivan, SC and Hoose, C., Wiley–American Geophysical Union: 327-346.
  31. (2023) Mooers, G., M. Pritchard, **T. Beucler**, P. Srivastava, H. Mangipudi, L. Peng, P. Gentine & S. Mandt: Comparing Storm Resolving Models and Climates via Unsupervised Machine Learning, *Scientific Reports*.
  32. (2023) Zanetta, F., D. Nerini, **T. Beucler** & M. Liniger: Physics-constrained deep learning postprocessing of temperature and humidity, *Artificial Intelligence for the Earth Systems*, **2**, e220089.
  33. (2023) Ganesh S., S., **T. Beucler**, F. I. Tam, M. Gomez, J. Runge & A. Gerhardus: Selecting Robust Features for Machine Learning Applications using Multidata Causal Discovery, *Environmental Data Science*, **2**:e27.
  34. (2022) Grundner, A., **T. Beucler**, P. Gentine, F. Iglesias-Suarez, M. Giorgetta & V. Eyring: Deep Learning Based Cloud Cover Parameterization for ICON, *Journal of Advances in Modeling Earth Systems*, e2021MS002959.
  35. (2022) Wu, Z., **T. Beucler**, E. Székely, W. Ball & D. Domeisen: Modeling Stratospheric Polar Vortex Variation and Identifying Vortex Extremes Using Explainable Neural Networks. *Environmental Data Science 1: e17*.
  36. (2022) Behrens, G., **T. Beucler**, P. Gentine, F. Iglesias-Suarez, M. Pritchard & V. Eyring: Non-Linear Dimensionality Reduction with a Variational Encoder Decoder to Understand Convective Processes in Climate Models. *Journal of Advances in Modeling Earth Systems*, e2022MS003130.
  37. (2021) Gentine, P., V. Eyring & **T. Beucler**: Deep Learning for the Parametrisation of Subgrid Processes in Climate Models, *Deep learning for the Earth Sciences: With Applications and R, Second Edition*, **307-314**.
  38. (2021) Mooers, G., M. Pritchard, **T. Beucler** et al.: Assessing the Potential of Deep Learning for Emulating Cloud Superparameterization in Climate Models with Real-Geography Boundary Conditions. *Journal of Advances in Modeling Earth Systems*, **13**, e2020MS002385.
  39. (2021) **Beucler, T.**, M. Pritchard, S. Rasp, J. Ott, P. Baldi & P. Gentine: Enforcing Analytic Constraints in Neural-Networks Emulating Physical Systems, *Physical Review Letters*, **126.9**: 098302. **Editors’ Suggestion**.
  40. (2020) Brenowitz, N., **T. Beucler**, M. Pritchard & C. Bretherton: Interpreting and Stabilizing Machine-Learning Parametrizations of Convection, *Journal of the Atmospheric Sciences*, **77.12**, 4357-4375.
  41. (2020) **Beucler, T.**, D. Leutwyler & J. Windmiller: Quantifying Convective Aggregation Using the Tropical Moist Margin’s Length, *Journal of Advances in Modeling Earth Systems*, **12.10**, e2020MS002092.
  42. (2020) Abbott, T., T. Cronin & **T. Beucler**: Convective Dynamics and the Response of Precipitation Extremes to Warming in Radiative–Convective Equilibrium, *Journal of the Atmospheric Sciences*, **77**, 1637-1660.
  43. (2019) **Beucler, T.**, T. Abbott, T. Cronin & M. Pritchard: Comparing Convective Self-Aggregation in Idealized Models to Observed Moist Static Energy Variability Near the Equator, *Geophysical Research Letters*, **46**, 17-18.
  44. (2019) **Beucler, T.**: Interaction between Water Vapor, Radiation and Convection in the Tropics, *Ph.D. Thesis in Atmospheric Science*.
  45. (2018) **Beucler, T.** & T. Cronin: A Budget for the Size of Convective Self-Aggregation, *Quarterly Journal of the Royal Meteorological Society*, **145**, 947– 966.
  46. (2018) **Beucler, T.**, T. Cronin & K. Emanuel: A Linear Response Framework for Radiative-Convective Instability, *Journal of Advances in Modeling Earth Systems*, **10**, 1924-1951.
  47. (2016) **Beucler, T.** & T. Cronin: Moisture-Radiative Cooling Instability, *Journal of Advances in Modeling Earth Systems*, **8**, 1620–1640.
  48. (2016) **Beucler, T.**: A Correlated Stochastic Model for the Large-Scale Advection, Condensation and Diffusion of Water Vapour.

## Peer-Reviewed Conference and Workshop Publications

---

- (2023, NeurIPS Conference) Yu, S., W. Hannah, L. Peng, M. Bhouri, R. Gupta, J. Lin, B. Lütjens, J. Will, G. Behrens, J. Busecke, N. Loose, C. Stern, **T. Beucler** et al.: ClimSim: A large multi-scale dataset for hybrid physics-machine learning climate emulation. *Advances in Neural Information Processing Systems*. “**Oustanding Datasets and Benchmarks**” award.
- (2023, NeurIPS Workshop) Lin, J., M. A. Bhouri, **T. Beucler**, S. Yu & M. Pritchard: Stress-testing the coupled behavior of hybrid physics-ML climate simulations on an unseen, warmer climate. *2023 Conference on Neural Information Processing Systems*.
- (2021, NeurIPS Workshop) Mangipudi, H., G. Mooers, M. Pritchard, **T. Beucler** & S. Mandt: Analyzing High-Resolution Clouds and Convection using Multi-Channel VAEs. *2021 Conference on Neural Information Processing Systems*.
- (2020, IGARSS) **Beucler, T.**, M. Pritchard, P. Gentine & S. Rasp: Towards Physically-Consistent, Data-Driven Models of Convection. *IEEE International Geoscience and Remote Sensing Symposium 2020*.
- (2020, Climate Informatics) Mooers, G., J. Tuyls, S. Mandt, M. Pritchard & **T. Beucler**: Generative Modeling of Atmospheric Convection. *Proceedings of the 10th International Conference on Climate Informatics*, 98-105.
- (2019, ICML Workshop) **Beucler, T.**, S. Rasp, M. Pritchard & P. Gentine: Achieving Conservation of Energy in Neural Network Emulators for Climate Modeling. *2019 International Conference on Machine Learning*.

## Preprints and Submitted Manuscripts

---

- (*In prep.*) Assouline, D., E. Koch, F. Amato, F. Quarenghi, D. Nerini, T. Loiseau, K. van de Langemheen & **T. Beucler**: SwAIther-Precip: Lead-Time-Aware Bias Correction Enables Kilometer-Scale Downscaling of Global AI Precipitation Forecasts over Switzerland.
- (*Submitted*) Ferretti, S. L., J. Lin, S. Shamekh, J. W. Baldwin, M. S. Pritchard & **T. Beucler**: Data-Driven Integration Kernels for Interpretable Nonlocal Operator Learning.
- (*Submitted*) Simm, M., C. Hoose & **T. Beucler**: Calibrated Conformal Prediction Intervals for Microphysical Process Rates.
- (*Submitted*) Quarenghi, F., R. Cotsakis & **T. Beucler**: Emulating Non-Differentiable Metrics via Knowledge-Guided Learning: Introducing the Minkowski Image Loss.
- (*Submitted*) Gomez, M., M. McGraw, S. Ganesh S., F. I.-H. Tam, I. Azizi, S. Darmon, M. Feldmann, S. Bourdin, L. Poulain–Auzéau, S. J. Camargo, J. Lin, D. Chavas, C.-Y. Lee, R. Gupta, A. Jenney & **T. Beucler**: TCBech: A Benchmark for Tropical Cyclone Track and Intensity Forecasting at the Global Scale.
- (*Submitted*) Fons, E., I. L. McCoy, **T. Beucler**, D. Neubauer & U. Lohmann: Dissipating the correlation smokescreen: Causal decomposition of the radiative effects of biomass burning aerosols over the South-East Atlantic.
- (*Submitted*) Ganesh S., S., F. I.-H. Tam, M. S. Gomez, M. McGraw, M. DeMaria, K. Musgrave, J. Runge & **T. Beucler**: Multidata Causal Discovery for Statistical Hurricane Intensity Forecasting.
- (*Submitted*) Defez, M., F. Quarenghi, M. Vrac, S. Mandt & **T. Beucler**: A Scale-Adaptive Framework for Joint Spatiotemporal Super-Resolution with Diffusion Models.
- (*Submitted*) Fatihi, A., J. Caldeira, **T. Beucler**, S. T. Thiele & A. Samsu: Towards robust fracture mapping: benchmarking automatic fracture mapping in 2D outcrop imagery. *EGUsphere 2026*, 1–35.

## Invited Seminars

---

- (May 26) AI4PEX 2nd General Assembly, Brest, France. *Machine Learning the Missing Physics of Precipitation Processes: From Cloud Microphysics to Nonlocal Convection and Monsoon Rainfall*.
- (Apr 26) N. Boers' ML Group Meeting. *Joint Downscaling & Parameterization of Observed Cloud Cover via 3D Conditional Diffusion*.
- (Apr 26) ENS Interdisciplinary workshop in math/data science/physics/climate science. *Four challenges in AI for Earth System Modeling*.
- (Mar 26) UniBern KUP Seminar. *From Atmospheric Physics to Machine Learning and Back*.
- (Mar 26) IPSL Seminar at ENS Ulm (Paris). *From Atmospheric Physics to Machine Learning and Back*.
- (Feb 26) Meteo France AI Days. *Improving the Robustness of Empirical Downscaling Algorithms to Extreme Events and Climate Change*.
- (Feb 26) **Keynote** at the Cambridge INI workshop “AI Across Scales: From Molecules to Planet Earth”. *Artificial Intelligence Pathways from Weather to Climate*.
- (Feb 26) UCLA Atmospheric Dynamics Seminar. *From Atmospheric Physics to Machine Learning and Back*.
- (Feb 26) UCLA IPAM Workshop on “Mathematics and ML for Earth System Simulation”. *AI Pathways from Weather to Climate*.
- (Jan 26) Climate Analytics Group Presentation at UCSD. *Equation Discovery & Hybrid AI-Physics Modeling*.
- (Oct 25) **Keynote** at the workshop on Ocean Benchmarks and AI-Native Solutions for Digital Twins of the Ocean in Brest, France (Remote). *TCBech: A Benchmark for Tropical Cyclone Track and Intensity Forecasting at the Global Scale*.
- (Aug 25) MeteoSwiss NWP Seminar in Zurich, Switzerland. *Improving the Robustness of Empirical Downscaling Algorithms to Extreme Events and Climate Change*.
- (May 25) UVA Climate AI Workshop. *How to use AI to generate local information about climate extremes under climate change?*
- (Apr 25) Université Grenoble-Alpes MEOM Group Seminar. *Improving the Robustness of Super-Resolution Algorithms to Extreme Events and Climate Change*.
- (Apr 25) University of Lausanne IDYST-ISTE Seminar. *From Atmospheric Physics to Machine Learning and Back*.

16. (Mar 25) University of Leeds Scientific ML Seminar. *From Atmospheric Physics to Machine Learning and Back*.
17. (Mar 25) USMILE ML Retreat in Umhausen, Austria. *"Online Learning" for Hybrid Earth System Modeling*.
18. (Mar 25) UniGe Research Seminar in Statistics. *From Atmospheric Physics to Machine Learning and Back*.
19. (Feb 25) Caltech Geological and Planetary Sci. Division Seminar. *From Atmospheric Physics to Machine Learning and Back*.
20. (Feb 25) UCSD Special Climate and Atmosphere Seminar. *From Atmospheric Physics to Machine Learning and Back*.
21. (Feb 25) UCI Earth System Science Special Seminar. *From Atmospheric Physics to Machine Learning and Back*.
22. (Sep 24) **Keynote** at the Croucher Advanced Study Institute: Revolutionizing Weather Forecast and Climate Prediction Through AI in HKUST, Hong Kong. *From Data-Driven Parameterizations to Neural Weather Models: AI for Convection, Clouds, and Precipitation*.
23. (Jul 24) CleanCloud Monthly Seminar Series. *Data-Driven Parameterization of Cloud Processes: From Deep Learning to Equation Discovery*.
24. (Jun 24) TROPICAL Cyclones in ANthropocene: physics, simulations & Attribution (TROPICANA) seminar in Orsay, France. *AI for Tropical Meteorology: Challenges and Opportunities*.
25. (May 24) ETHZ Colloquium "Atmosphere and Climate". *Distilling Machine Learning's Added Value: Pareto Fronts in Atmospheric Applications*.
26. (Apr 24) Data Science for the Sciences (DS4S) conference in Bern, Switzerland. *Atmospheric physics-guided machine learning for climate modeling and weather forecasting*.
27. (Mar 24) Joint CLIMACT-ECCE Seminar in Lausanne, Switzerland. *Tropical Precipitation in a Changing Climate*.
28. (Jan 24) US CLIVAR Predictability, Predictions, and Applications Interface (PPAI) Panel's Webinar. *Atmospheric physics-guided machine learning for climate modeling and weather forecasting*.
29. (Apr 23) UN's International Telecommunication Union (ITU) "AI for Good" Seminar Series. *AI for tropical meteorology: Challenges and opportunities*.
30. (Jan 24) Jeudi du climat, National Centre for Meteorological Research in Toulouse, France. *Atmospheric Physics-Guided Machine Learning for Climate Modeling and Weather Forecasting*.
31. (Oct 23) Joint Climate Impacts- $\partial^3$ AWN Group Meeting. *Demystifying Data-Driven Weather Forecasting*.
32. (Sep 23) Grenoble Alpes University's Institute of Environmental Geosciences Seminar in Grenoble, France. *Atmospheric Physics-Guided Machine Learning for Climate Modeling and Weather Forecasting*.
33. (Jun 23) Caltech Climate Modeling Alliance (CliMA) Seminar. *Systematically Generating Hierarchies of Machine-Learning Models, from Equation Discovery to Deep Neural Networks*.
34. (Apr 23) ai4oac2023: Workshop on AI for Ocean, Atmosphere and Climate Dynamics in Brest, France. *Physically and Causally-Informed ML for Climate Modeling*.
35. (Jan 23) ETHZ Atmospheric Predictability Extended Group Meeting. *Atmospheric Physics-Guided Machine Learning*.
36. (Jan 23) CSSI-Gravity Wave journal club. *Systematically Generating Hierarchies of Machine-Learning Models, from Equation Discovery to Deep Neural Networks*.
37. (Jan 23) **Core Science Keynote** at the 103rd AMS Annual Meeting. *Systematically Generating Hierarchies of Machine-Learning Models, from Equation Discovery to Deep Neural Networks*.
38. (Nov 22) Institute for Mathematical and Statistical Innovation (iMSi) workshop on "ML for Climate and Weather Applications". *Systematically Generating Hierarchies of Machine-Learning Models, from Equation Discovery to Deep Neural Networks*.
39. (Oct 22) ESiWACE2 Second Virtual Workshop on Emerging Technologies for Weather and Climate Modelling. *Atmospheric Physics-Guided Machine Learning*.
40. (Oct 22) UNIL "Machine Learning Café" seminar series. *Physically and Causally-Informed ML for Climate Modeling*.
41. (Sep 22) IPSL LSCE seminar on the Paris-Saclay university campus in France. *Climate-Invariant, Causally-Consistent Neural Networks as Robust Emulators of Subgrid Processes across Climates*.
42. (Sep 22) EPFL Environmental Engineering Seminar Series. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
43. (Sep 22) Royal Meteorological Society workshop on "Machine Learning for Atmospheric Sciences: Values and Controversies". *Systematically Generating Hierarchies of Machine-Learning Models, from Equation Discovery to Deep Neural Networks*.
44. (Jun 22) NVIDIA Invited Webinar. *Climate-Invariant, Causally-Consistent Neural Networks as Robust Emulators of Subgrid Processes across Climates*.
45. (Jun 22) Aspen Global Change Institute workshop "Exploring the Frontiers in Earth System Modeling with Machine Learning and Big Data". *Climate-Invariant Machine Learning*.
46. (Jun 22) CIRA/CSU Invited Seminar in Fort Collins, CO, USA. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
47. (May 22) EGU General Assembly 2022. *Climate-Invariant, Causally-Consistent Neural Networks as Robust Emulators of Subgrid Processes across Climates*.
48. (May 22) Climate Informatics 2022 Conference. *Climate-Invariant, Causally-Consistent Neural Networks as Robust Emulators of Subgrid Processes across Climates*.
49. (Apr 22) "Machine Learning and sampling methods for climate and physics" IXXI workshop at ENS Lyon in France. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
50. (Apr 22) Second workshop of the ELLIS Program 'Machine Learning for Earth and Climate Sciences'. *Climate-Invariant Machine Learning*.
51. (Feb 22) "AI Super-Resolution Simulations: From Climate Science to Cosmology" CMU workshop. *Atmospheric Physics-Guided Machine Learning*.
52. (Feb 22) UCLA AOS 271 and Journal Club seminar. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.

53. (Feb 22) Postdam Institute for Climate Impact Research invited seminar on “ML applications in climate science”. *Climate-Invariant, Causally-Consistent Neural Networks as Robust Emulators of Subgrid Processes across Climates*.
54. (Jan 22) AMS 102nd Annual Meeting. *Climate-Invariant, Causally Consistent Neural Networks as Robust Emulators of Subgrid Processes across Climates*.
55. (Jan 22) Caltech Climate Modeling Alliance (CliMA) Seminar. *Atmospheric Physics-Guided Machine Learning*.
56. (Nov 21) ESA-ECMWF Workshop 2021: Machine Learning for Earth System Observation and Prediction. *Atmospheric Physics-Guided Machine Learning*.
57. (Nov 21) MeteoSwiss APP Seminar in Locarno, Switzerland. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
58. (Nov 21) University of Bern’s Colloquium in Climatology, Climate Impact and Remote Sensing. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
59. (Jul 21) AI2ES NCAR Summer School on Trustworthy AI. *Invited Tutorial: Integrating Physics into Machine Learning*.
60. (May 21) Princeton Plasma Physics Laboratory (PPPL) Machine Learning Seminar. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
61. (May 21) MIT Sack Lunch Seminar Series (SLS) Seminar. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
62. (May 21) NCAR’s Climate and Global Dynamics (CGD) seminar series. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
63. (May 21) LANL’s Conference on Machine Learning in Solid Earth Geoscience. *Atmospheric Physics-Guided Machine Learning: Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
64. (Jan 21) AMS 101st Annual Meeting. *Climate-Invariant Nets: Using Physical Rescalings to Help Neural Networks Generalize to Out-of-Sample Climates*.
65. (Oct 20) UCI Earth System Science Departmental Seminar Series. *Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
66. (Oct 20) UCSD SIO Machine Learners Group Meeting. *Towards Physically-Consistent, Data-Driven, and Interpretable Models of Convection*.
67. (Oct 20) 2020 IEEE International Geoscience and Remote Sensing Symposium. *Towards Physically-Consistent, Data-Driven Models of Convection*.
68. (Aug 20) First Annual Workshop on Knowledge-Guided Machine Learning (UMN). *Towards Physically-Consistent, Data-Driven Models of Convection*.
69. (Jul 20) SIAM 2020 Conference on “Mathematics of Planet Earth”. *Climate-Invariant Nets: Physical Rescalings can Help Neural Networks Generalize to Out-of-sample Climates*.
70. (Jun 20) LANL’s “Machine Learning for Turbulence” webinar. *Towards Physically-Consistent, Data-driven, and Interpretable Parametrizations of Convection*.
71. (Apr 20) NOAA Satellite Applications and Research (STAR) Seminar Series. *Towards Physically-Consistent, Data-driven, and Interpretable Parametrizations of Convection*.
72. (Dec 19) AGU Fall Meeting 2019. *Building a Hierarchy of Hybrid, Neural-network Parametrizations of Convection*.
73. (Jul 19) Joint Max-Planck-Institute for Meteorology & University of Hamburg Seminar. *Physical Mechanisms of Convective Self-Aggregation in the Tropics*.
74. (Dec 18) Seminar in Geosciences, ENS Ulm in Paris, France. *Interaction between water vapor, radiation and convection in the Tropics*.
75. (Sep 18) MIT Sack Lunch Seminar Series (SLS) Seminar. *Interaction between water vapor, radiation and convection in the Tropics*.
76. (Oct 18) Yale AOCD Speaker Series in New Haven, CT, USA. *Interaction between water vapor, radiation and convection in the Tropics*.
77. (Aug 18) UCLA Atmospheric & Oceanic Sciences Department (Special Seminar). *Interaction between water vapor, radiation and convection in the Tropics*.
78. (Aug 18) UCI Earth System Science Department (Special Seminar). *Interaction between water vapor, radiation and convection in the Tropics*.
79. (Dec 17) Seminar in Geosciences, Université Pierre et Marie Curie in Paris, France. *A Spectral Budget for the Size of Convective Self-Aggregation*.
80. (Jan 17) Seminar in Geosciences, ENS Ulm in Paris, France. *Radiative-Convective Instability*.

## Conference Oral Presentations

---

1. (May 26) EGU General Assembly 2026. *Reassessing the Scaling of AI-Powered Climate Models Against Dynamical Counterparts*.  
**Highlight talk.**
2. (Jun 25) D-A-CH 2025 Meteorology Conference. *Distilling ML’s Added Value: Pareto Fronts in Atmospheric Applications*.
3. (May 25) Third Paris Workshop on “Bias Correction in Climate Studies” *Improving the Robustness of Empirical Downscaling Algorithms to Extreme Events and Climate Change*.
4. (Apr 25) EGU General Assembly 2025. *Distilling Machine Learning’s Added Value: Pareto Fronts in Atmospheric Applications*.
5. (May 24) AMS 36th Conference on Hurricanes and Tropical Meteorology. *Data-Driven Equation Discovery of a Parameterization for Tropical Precipitation*.
6. (Apr 23) 12th International Conference on Climate Informatics. *Systematically Generating Hierarchies of Machine-Learning Models, from Equation Discovery to Deep Neural Networks*.
7. (Jun 22) AMS 23rd Conference on Atmospheric and Oceanic Fluid Dynamics. *Systematically Generating Climate Model Hierarchies from Data using Machine Learning*.
8. (Mar 22) EPFL Applied Machine Learning Days (AMLD). *Atmospheric Physics-Guided Machine Learning*.

9. (Jan 20) AMS 100th Annual Meeting. *Building a Hierarchy of Hybrid, Neural Network Parameterizations of Convection*.
10. (Jun 19) Ninth Northeast Tropical Workshop in Dedham, MA, USA. *Towards Interpretable Neural-Network Parametrizations of Convection*.
11. (Feb 19) UCP 2019: "Understanding Clouds and Precipitation" in Berlin, Germany. *Understanding the Zonal Variability of Thermodynamic Feedbacks in the Tropics*.
12. (Apr 18) AMS 33rd Conference on Hurricanes and Tropical Meteorology. *A Spectral Budget for the Size of Convective Self-Aggregation*.
13. (Jul 17) AMS 17th Conference on Mesoscale Processes. *A Moist Static Energy Perspective on Atmospheric Rivers*.
14. (Jun 17) AMS 21st Conference on Atmospheric and Oceanic Fluid Dynamics. *The Vertical Structure of Radiative-Convective Instability*.
15. (Aug 16) 2016 International Atmospheric Rivers Conference in San Diego, CA, USA. *A Moist Static Energy Perspective on Atmospheric Rivers*.
16. (Apr 16) AMS 32nd Conference on Hurricanes and Tropical Meteorology. *Instabilities of Radiative Convective Equilibrium with an Interactive Surface*.

## Conference Posters

---

1. (Dec 20) AGU Fall Meeting 2020. *Climate-Invariant Nets: Using Physical Rescalings to Help Neural Networks Generalize to Out-of-Sample Climates*.
2. (Jan 20) AMS 100th Annual Meeting. *Comparing Convective Self-Aggregation in Idealized Models to Observed Moist Static Energy Variability near the Equator*.
3. (Dec 19) AGU Fall Meeting 2019. *Comparing Convective Self-Aggregation in Idealized Models to Observed Moist Static Energy Variability near the Equator*.
4. (Jun 19) International Conference on Machine Learning 2019's workshop "Climate Change: How Can AI Help?". *Achieving Conservation of Energy in Neural Network Emulators for Climate Modeling*.
5. (Dec 18) AGU Fall Meeting 2018. *A budget for the size of convective self-aggregation*.
6. (Jan 17) AMS 97th Annual Meeting. *Moisture-Radiative Cooling Instability*.

## Teaching Experience

---

<b>FGSE, University of Lausanne (5 occurrences: Fall 22-25 &amp; Spring 22)</b> Main Instructor of "Machine Learning for Earth and Environmental Sciences" (5 ECTS, ≈25 students) Design and delivery of yearly 12-week course open to all Master's and PhD students in Earth/env. sci. & geography.	<b>Jan 2022 – Present</b> Lausanne, Switzerland
<b>FGSE, University of Lausanne (4 occurrences: Fall 22-25)</b> Main Instructor of "Introduction to Scientific Programming with Python" (2 ECTS, ≈50 students) Design and delivery of yearly 4-week course open to all Master's and PhD students in Earth/env. sci. & geography.	<b>Sep 2022 – Present</b> Lausanne, Switzerland
<b>FGSE, University of Lausanne (4 occurrences: Fall 22-25)</b> Main Instructor of "Géomatique et Systèmes d'Information Géographique" (3 ECTS, ≈100 students) Design and delivery of yearly 12-week course open to all Bachelor students in Earth/env. sci. & geography.	<b>Sep 2022 – Jan 2026</b> Lausanne, Switzerland
<b>International Centre for Theoretical Sciences</b> Lecturer at the "Advanced Machine Learning for Earth System Modeling" Program Delivered a short tutorial and lecture on physics-guided ML for Earth system modeling.	<b>Jul 2025</b> Bangalore, India (Remote)
<b>International Centre for Theoretical Physics</b> Teacher and panelist at the 6th Summer School on Climate Dynamics: AI and Climate Modelling Designed and delivered tutorials on hybrid AI-climate modeling and ML for Earth & environmental sciences.	<b>May 2025</b> Trieste, Italy
<b>FGSE, University of Lausanne (1 occurrence: Fall 24)</b> Main Instructor of "Géoinformatique I" (6 ECTS, ≈100 students) Design and co-delivery of yearly 12-week course open to all Bachelor students in Earth/env. sci. & geography.	<b>Sep 2024 – Jan 2025</b> Lausanne, Switzerland
<b>Institut Pascal &amp; Université Paris-Saclay</b> Co-Instructor at the TROPICANA Program on Tropical Cyclones' Physics, Simulation, and Attribution Co-designed and delivered a lecture followed by a tutorial on machine learning applied to tropical cyclones.	<b>Jun 2024</b> Orsay, France
<b>Foundation of Research and Technology-Hellas &amp; University of Oxford</b> Main Instructor of the iMIRACLI 3rd Summer School on climate data science Designed and delivered a one-day block course on physics-guided machine learning.	<b>Sep 2023</b> Patras, Greece
<b>European Centre for Medium-Range Weather Forecasts (MOOC)</b> Consultant, Reviewer, and Content Provider for "Machine Learning for Weather and Climate" Main instructor for the "Physics-Guided ML" & "Parametrisation emulation" e-learning modules.	<b>Mar 2022 – Mar 2023</b> Remote, Luxembourg
<b>MIT Teaching and Learning Laboratory</b> Kaufman teaching certificate program Program for MIT graduate students aimed at improving teaching skills.	<b>Feb 2017 – May 2017</b> Cambridge, USA
<b>PAOC, MIT</b> Teaching Assistant in 12.801, The General Circulation of the Ocean Prof. Raffaele Ferrari.	<b>Feb 2016 – May 2016</b> Cambridge, USA

## PAOC, MIT

Teaching Assistant in 12.815, Atmospheric Radiation and Convection  
Prof. Sara Seager and Prof. Kerry Emanuel.

Sep 2015 – Dec 2015  
Cambridge, USA

## Lycée Sainte-Geneviève

Teaching Assistant in physics

Undergraduate level: waves, electromagnetism, optics, newtonian, solid and fluid mechanics.

Sep 2012 – Mar 2014  
Versailles, France

## Public Engagement and Outreach

---

- (Mar 26) L'intelligence artificielle au service des sciences du climat. *Études et Recherche Auteuil. Speaker*
- (Mar 26) L'intelligence artificielle au service des sciences du climat. *Études et Recherche Auteuil.*
- (Mar 25) "L'heure H" : L'IA et le climat : amis ou ennemis? *EPFL Outreach Event. Speaker*
- (May 24) Climat, IA et lois physiques, un partenariat gagnant. *Co-author*
- (Mar 24) Modéliser la physique atmosphérique, prévoir la formation de cyclones tropicaux, et prédire le climat futur. *Co-author as part of the contribution to: "Évaluer les risques naturels, simuler le devenir des glaciers ou encore appréhender la complexité des réseaux urbains : les géosciences évoluent avec les progrès de l'intelligence artificielle."*
- (Feb 24) AI and Climate Science & Anticiper l'avenir climatique grâce à l'AI. *Co-author*
- (Jan 24) À la croisée de la physique et de l'intelligence artificielle : les nouveaux horizons de la modélisation. *UNIL Honorary and Retired Professors Ceremony. Speaker.*
- (Sep 23) L'intelligence artificielle au service des sciences du climat. *UNIL FGSE Academic Year Opening Ceremony*
- (Jun 23) CLIMACT Atmospheric Science Day 2023. *Author*
- (Dec 22) Intelligence artificielle : quels enjeux pour l'université ? *Contributor*
- (Mar 21) Teaching a Neural Network the Hard Way. *APS Physics 14*
- (Jun 20 – Jun 21) US CLIVAR Data Science Webinar Series. *Co-organizer and Moderator*
- (Nov 20) Modelling Clouds and Climate. *Communications of the ACM*
- (Aug 20) Outsourcing Sub-Grid Cloud Physics to Neural Networks. *E3SM Blog Post*
- (Jun 18) When the Wind Blows: Predicting how Hurricanes Change with Climate. *CaféSci Boston*
- (Jan 18) Higher Grounds. *MIT Climate Changed Ideas Competition*

## Mentorship and Supervision

---

### Direct Research Supervision (PhD students & Postdocs)

Aug 2021 – Present  
Lausanne, Switzerland

- (Mar 2025 – Present) Shivanshi Asthana (PhD student at UNIL)
- (Dec 2024 – Present) Fangfei Lan (Postdoctoral researcher at UNIL)
- (Nov 2024 – Present) Filippo Quarenghi (PhD student at UNIL)
- (Aug 2021 – Present) Milton Gomez (PhD student at UNIL)
- (Sep 2021 – Present) Frederick Iat-Hin Tam (PhD student at UNIL)
- (Aug 2021 – Dec 2023) Saranya Ganesh Sudheesh (Postdoctoral researcher at UNIL)

### Technical Advising (weekly to biweekly mentoring of early-career scientists)

Jul 2019 – Present  
Europe & USA

- (Mar 2025 – Present) Jurij Schoenfeld (PhD student at the German Aerospace Center)
- (Jun 2024 – Present) Miriam Simm (PhD student at KIT)
- (Apr 2024 – Present) Helge Heuer (PhD student at the German Aerospace Center)
- (Sep 2021 – Present) Costa Christopoulos (Previously PhD student then research scientist at Caltech)
- (Sep 2022 – Aug 2024) Jingyan Yu (Postdoctoral fellow at UNIL)
- (Jan 2020 – Mar 2024) Arthur Grundner (Previously PhD student then postdoc at the German Aerospace Center)
- (Jul 2019 – Feb 2024) Gunnar Behrens (Previously PhD student then postdoc at the German Aerospace Center)
- (Apr 2019 – Dec 2023) Griffin Mooers (Previously PhD student at UC Irvine, then postdoc at MIT)
- (Feb 2022 – Nov 2023) Francesco Zanetta (PhD student at ETH/MeteoSwiss, Visiting student at UNIL)
- (Dec 2019 – Jul 2021) Andrea Jenney (Postdoctoral fellow at UC Irvine)

### PhD Thesis Committee Member (annual meetings)

Jan 2020 – Present  
Europe & USA

- (Mar 2026 – Present) Paul Oliver (UNIL)
- (Aug 2025 – Present) Julien Schmitt (Caltech)
- (Jan 2025 – Present) Ana Marza (UNIL)
- (Sep 2024 – Present) Andrea Davin (UNIMI)
- (Feb 2024 – Present) Lucas Schmutz (UNIL)
- (Apr 2023 – Present) Kejdi Lleshi (UNIL)
- (Jan 2023 – Present) Tabea Cache (UNIL)
- (Sep 2021 – Mar 2025) Janbert Aarnink (UNIL): "From Survey to Satellite: Advancing River Wood Dynamics Monitoring"
- (Jan 2022 – Nov 2024) Costa Christopoulos (Caltech): "Towards Hybrid Physics-Machine Learning Parameterizations: Employing Data Assimilation for Online Learning of Turbulence and Convection Closures in a Unified Scheme"

- o (Sep 2022 – Aug 2024) Ségolène Crossouard (IPSL)
- o (Jan 2020 – Apr 2023) Griffin Mooers: “Improving the Modeling and Analysis of Tropical Convection and Precipitation Through Machine Learning Methods”, *Earth System Science Department, UC Irvine*.

**PhD Jury Member (only on final evaluation committee)**

**Oct 2022 – Present**

- o (Jul 2025) Fatemeh Zakeri: “High-Spatiotemporal-Resolution Data-Driven Downscaling, Forecasting, and Hindcasting Method Applied to Snow Dynamics from Climate Data”, *Faculty of Geosciences and Environment, University of Lausanne*.
- o (Jul 2024) Raghul Parthipan: “Towards machine learning for the weather: developing methods using simplified dynamical systems”, *Department of Computer Science and Technology, University of Cambridge*.
- o (Jun 2024) Shahine Bouabid: “Transforming kernel-based learners to incorporate domain knowledge from climate science”, *Department of Statistics, University of Oxford*.
- o (May 2024) Kai Jeggle: “Towards an improved understanding of cirrus clouds - Machine learning enabled insights from satellite data”, *Institute for Atmospheric and Climate Science, ETH Zürich*.
- o (Oct 2022) Blanka Balogh (CNRM, Toulouse): “Towards Using Artificial Intelligence in Numerical Climate Models”, *Ocean/Atmosphere/Climate Program, CNRM, University of Toulouse*.

**Direct Research Supervision (Bachelor & Master students)**

**Jul 2020 – Present**

*Europe & USA*

- o (Mar 2025 – Aug 2025) Max Defez (Master’s student at Centrale-Supélec & ECCE intern)
- o (Mar 2025 – Jul 2025) Mathieu Prioux (Master’s student at Centrale-Supélec & ECCE intern)
- o (Dec 2023 – Aug 2025) Alyssia Leclercq (Bachelor student at UNIL)
- o (Sep 2024 – Jun 2025) Anton Grudiev (Bachelor student at UNIL)
- o (Nov 2022 – Jan 2025) Fabien Augsburg (Master’s student at UNIL)
- o (Apr 2024 – Aug 2024) Mauricio Lima (Master’s student at Sorbonne University & ECCE intern)
- o (Mar 2024 – Aug 2024) Louise Largeau (Master’s student at EPFL & ECCE intern)
- o (Apr 2024 – Aug 2024) Antoine Leclerc (Master’s student at École Polytechnique & ECCE intern)
- o (Sep 2023 – Apr 2024) Louis Poulain-Auzeau (Master’s student at EPFL)
- o (Jun 2023 – Aug 2023) Aser Atawya (Bachelor fellow at UNIL)
- o (May 2023 – Aug 2023) Marine Berthier (Master’s student at ENSTA & ECCE intern)
- o (Apr 2023 – Aug 2023) Jo Lécuyer (Master’s student at École Polytechnique & UNIL intern)
- o (May 2022 – Aug 2022) Léo Micollet (Master’s student at ENSTA & UNIL intern)
- o (Mar 2022 – Jul 2022) Deborah Bassotto (Post-Master’s intern at UNIL)
- o (Sep 2021 – Jun 2022) Meryam Cherqaoui (Bachelor student at UNIL)
- o (Jul 2020 – Dec 2020) Ankitesh Gupta (Master’s student at UC Irvine)

**Service**

**Reviewer for Journals and Workshops (46 submissions, 76 rounds)**

**Nov 2016 – Present**

*AGU Books, EDS, GMD, GRL, JAMES, JAS, JCLI, JGR, JHM, JMLR, MWR, Nature, Nat. Mach. Intell., NeurIPS, PLOS ONE, PNAS, PRL, QJRM, RSE, Sci. Adv.*

**Reviewer for Proposals (11 submissions)**

**Sep 2020 – Present**

*American NSF, Belgian Science Policy Office, CLIMACT, Climate Change AI, German Aerospace Centre*

**ECCE: Expertise Center for Climate Extremes**

**Oct 2022 – Present**

*Scientific Committee Member and Co-Founding Member*

*Lausanne, Switzerland*

**Atmospheric Science Day in Lausanne (3 occurrences: Fall 22+23+24)**

**May 2022 – Present**

*Founder and co-organizer of the annual one-day workshop bringing together EPFL & UNIL groups*

*Lausanne, Switzerland*

**Artificial Intelligence Advisory Panel for UNIL**

**Mar 2024 – Present**

*Committee Member*

*Lausanne, Switzerland*

**Digital Earths Lighthouse Activity, World Climate Research Programme (WCRP)**

**Sep 2024 – Present**

*Co-chair of the “Data-Model Fusion” effort*

*Europe & USA*

**Swiss Geocomputing Centre**

**Mar 2022 – Present**

*Scientific Committee Member*

*Lausanne, Switzerland*

**ISTE/IDYST Seminar Series**

**Oct 2025 – Present**

*Lead Faculty Organizer for IDYST (planning & coordination)*

*Lausanne, Switzerland*

**UNIL FGSE’s Faculty Council**

**Sep 2023 – Present**

*Committee Member*

*Lausanne, Switzerland*

**UNIL FGSE’s Environmental Science Master’s Program**

**Sep 2021 – Present**

*Scientific Committee Member*

*Lausanne, Switzerland*

**Climate Informatics 2026 Conference**

**Aug 2025 – May 2026**

*General Co-Chair: coordinated committees, fundraising, venue/logistics, and scientific program*

*Lausanne, Switzerland*

<b>D-A-CH 2025 Conference (German, Austrian and Swiss Societies for Meteorology)</b> <i>Convener of the session: Machine Learning for Weather and Climate Applications</i>	<b>Aug 2024 – Jun 2025</b> <i>Bern, Switzerland</i>
<b>EGU General Assembly 2025</b> <i>Co-convener of the session: Machine Learning for Climate Science</i>	<b>Oct 2024 – May 2025</b> <i>Vienna, Austria</i>
<b>UNIL FGSE's Research Council</b> <i>Committee Member</i>	<b>Apr 2023 – Aug 2024</b> <i>Lausanne, Switzerland</i>
<b>Professor Hiring committee at IGD, UNIL</b> <i>Committee Member for the "Human Geography and/or Sustainable Urban/Regional Planning" position</i>	<b>Sep 2023 – Apr 2024</b> <i>Lausanne, Switzerland</i>
<b>UNIL Climate Physics Journal Club</b> <i>Co-founder and faculty support for student-driven seminar series</i>	<b>Dec 2021 – Jun 2023</b> <i>Lausanne, Switzerland</i>
<b>PAT Hiring committees at UNIL</b> <i>Committee Member for the position of "Computational Geoscientist" (IDYST/ISTE)</i>	<b>Jul 2022 – Mar 2023</b> <i>Lausanne, Switzerland</i>
<b>20th Edition of the Swiss Geoscience Meeting</b> <i>Co-chair of the session: Spatial Data Science</i>	<b>Feb 2022 – Sep 2022</b> <i>Lausanne, Switzerland</i>
<b>AMS 21st Conference on AI for Environmental Science</b> <i>Co-chair of the session: Applications of AI for Improved Estimation and Prediction of Weather and Climate</i>	<b>Apr 2021 – Jan 2022</b> <i>Houston, USA</i>
<b>CLIVAR Webinar: Emerging Data Science Tools for Climate Variability &amp; Predictability</b> <i>Invited Working Group Member: Co-organizer and moderator of the webinar</i>	<b>May 2020 – July 2021</b> <i>USA</i>
<b>NeurIPS 2020 Workshop: AI for Earth Sciences</b> <i>Co-organizer: Meta-reviewer and organizer of the atmospheric science session</i>	<b>Jun 2020 – Dec 2020</b> <i>Vancouver, Canada</i>
<b>Editor-in-Chief Search Committee for JAMES (AGU)</b> <i>Committee Member</i>	<b>Apr 2020 – Sep 2020</b> <i>USA</i>
<b>MIT Office of Sustainability</b> <i>Graduate research assistant in the Climate Resiliency Committee</i>	<b>Feb 2018 – Dec 2018</b> <i>Cambridge, USA</i>
<b>Student and Post-doc Atmospheric Dynamics Lunch</b> <i>Head of the organizing committee and founding member</i>	<b>Sep 2016 – May 2018</b> <i>Cambridge, USA</i>
<b>EAPS Graduate Student Advisory Council</b> <i>Secretary</i>	<b>Sep 2016 – May 2018</b> <i>Cambridge, USA</i>
<b>Program in Atmospheres, Oceans and Climate Colloquium Series</b> <i>Head of the organizing committee and founding member</i>	<b>Sep 2016 – Dec 2017</b> <i>Cambridge, USA</i>
<b>Program in Atmospheres, Oceans, and Climate 2015 and 2016 Retreats</b> <i>Co-organized 2015/2016 PAOC retreats for the professors, post-docs and students of the program</i>	<b>Jan 2015 – Oct 2016</b> <i>Hancock and Brewster, USA</i>
<b>EAPS Social Hour</b> <i>Organized the daily informal social gathering of the EAPS staff</i>	<b>Dec 2015 – Apr 2016</b> <i>Cambridge, USA</i>
<b>Graduate Climate Conference 2015</b> <i>Member of the organizational committee of the 2015 Graduate Climate Conference</i>	<b>Jan 2015 – Nov 2015</b> <i>Woods Hole, USA</i>
<b>EAPS Student Retreat 2015</b> <i>Co-organized the 2015 EAPS retreat for the students of the department</i>	<b>Jul 2015 – Sep 2015</b> <i>Lakeville, USA</i>

## Non-Academic Professional Experience

<b>Cronite Castings Limited</b> <i>Maintenance engineer</i> Engineering and operator internship in the Crewkerne foundry.	<b>Jul 2013 – Aug 2013</b> <i>Crewkerne, UK</i>
<b>French Air Force</b> <i>Lieutenant</i> Leadership training as part of the engineering school's curriculum.	<b>Sep 2011 – Apr 2012</b> <i>Cazaux, France</i>

## Computer Skills

**OS:** Linux, Unix, Windows      **Programming:** Python, Matlab, Fortran 77/90, VBA, Java      **GIS:** QGIS, ArcGIS Pro

## Language Skills

**Native:** French, **Fluent:** English, **Intermediate:** German, **Beginner:** Japanese (N5), Spanish.

## Interests

Weather Forecasting, Weightlifting, Swimming, Jogging, Hiking, Video Games, Rescued two feral kittens (photo).