Shahine Bouabid

shahineb@mit.edu | shahineb.github.io

Education

PhD in Statistics — University of Oxford, Oxford, UK **2020 – 2024**

MSc in Machine Learning (MVA) — ENS Paris-Saclay, Paris, France **2018 – 2019**

MSc in Applied Mathematics — École Centrale Paris, Paris, France **2015 – 2019**

Classes préparatoires — Lycée Saint-Louis, Paris, France **2013 – 2015**

Research experiences

Postdoctoral Associate — MIT EAPS, Cambridge, Massachusetts **2024 – now**

Visiting Researcher — CISPA, Saabrücken, Germany **2023**

Visiting Researcher — University of Valencia, Valencia, Spain **2023**

Grants and Fellowships

Helmholtz Visiting Researcher Grant **2023**

European Comission Marie-Skłodowska Curie Fellowship **2020**

Publications

In review

S. Bouabid, A. Souza, R. Ferrari, Score-based generative emulation of impact-relevant Earth system model outputs

Published / In press

C. Womack, G. Flierl, **S. Bouabid**, A. Souza, P. Giani, S. Eastham, N. Selin , A theoretical framework to understand sources of error in Earth System Model emulation, *Earth System Dynamics*, **2026**

N. Mankovich, **S. Bouabid**, P. Nowack, D. Bassotto, G. Camps-Valls, Analyzing Climate Scenarios with Dynamic Mode Decomposition with Control, *Environmental Data Science*, **2025**

S. Bouabid, D. Sejdinovic, D. Watson-Parris, FaIRGP : A Bayesian Energy Balance Model for Surface Temperature Emulation, *Journal of Advances in Modelling Earth Systems*, **2024**

A. Singh, S. L. Chau, **S. Bouabid**, K. Muandet, Domain Generalisation via Imprecise Learning, *International Conference on Machine Learning*, **2024 (3% top submissions)**

S. Bouabid, D. Watson-Parris, S. Stefanovic, A. Nenes, D. Sejdinovic, Aerosol optical depth disaggregation : toward global aerosol vertical profiles, *Environmental Data Science*, **2024**

S. Bouabid*, J. Fawkes*, D. Sejdinovic, Returning the Favour : When Regression Benefits from Probabilistic Causal Knowledge, *International Conference on Machine Learning*, **2023 (2.4% top submissions)**

D. Watson-Parris, Y. Rao, D. Olivié, Ø. Seland, P. Nowack, G. Camps-Valls, P. Stier, **S. Bouabid**,..., ClimateBench v1. 0: A Benchmark for Data-Driven Climate Projections, *Journal of Advances in Modelling Earth Systems*, **2022**

S. L. Chau*, **S. Bouabid***, D. Sejdinovic, Deconditional Downscaling with Gaussian processes, *Advances in Neural Information Processing Systems*, **2021**

Contributed presentations

2026

University of Oxford **Invited Talk**
Advances in generative climate emulation to support impact assessment

2025

University of Chicago **Invited Talk**
Score-based generative emulation of impact-relevant Earth system model outputs

MIT Ocean Engineering Seminar **Talk**
Score-based generative emulation of impact-relevant Earth system model outputs

MIT Center for Sustainability Science and Strategy Student Seminar **Talk**
Score-based generative emulation of impact-relevant Earth system model outputs

Climate Week NYC Innovation Showcase **Booth Demo**
Fast climate projections to inform climate adaptation and mitigation efforts

Gordon Research Conference on Machine Learning for Actionable Climate Science **Poster**
Emulation of impact-relevant climate model outputs

2024

MIT Center for Sustainability Science and Strategy Seminar **Talk**
Developing emulators with Gaussian processes

ICLR Workshop on Tackling Climate Change with Machine Learning **Poster**
Calibrating Earth System Models with Bayesian Optimal Experimental Design

EGU General Assembly Meeting **Poster**
Analyzing Climate Scenarios Using Dynamic Mode Decomposition with Control

2023

EGU General Assembly Meeting **Talk**
Probabilistic climate emulation with physics-constrained Gaussian processes

International Conference on Machine Learning **Talk**
Returning the Favour : When Regression Benefits from Probabilistic Causal Knowledge

Helmholtz Center for Information Security **Invited Talk**
Opportunities for Data-driven Modelling in Climate Science

2022

University College London **Invited Talk**
Deconditional Downscaling with Gaussian processes

NeurIPS Workshop on Tackling Climate Change with Machine Learning **Poster**
Bayesian inference for aerosol vertical profiles

iMiracli Summer School **Talk**
A simple Bayesian model to reconstruct aerosol vertical profiles

2021

Neural Information Processing Systems **Poster**
Deconditional Downscaling with Gaussian processes

ICML Workshop on Tackling Climate Change with Machine Learning **Poster**
Reconstructing aerosol vertical profiles with aggregate output learning

2020

NeurIPS Workshop on Tackling Climate Change with Machine Learning **Poster**
Predicting Landsat reflectance with deep generative fusion

Diversity & Outreach Efforts

Nechfate **2022–present**
Co-founded Nechfate, the first online media that popularizes climate change, its impacts, and adaptation solutions in Morocco. Through short, illustrated, and data-driven articles, our goal is to inform readers about Morocco's challenges in terms of climate change, water & agriculture, and governance & society.

EAPS Sack Lunch Seminar **2025–present**
Organised regular seminar fostering conversations in small-group settings. The seminar provides an informal venue for research discussions and is often used by students as a platform for pre-defense practice.

Oxford Stats Green Team **2022–2023**
Assisted in developing guidelines for department members to assess and reduce their carbon footprints. Raised awareness about aviation-related carbon emissions, encouraging environmentally responsible actions.

European Researchers Night **2022**
Organised an outreach session at the Stockholm Bolin Center to introduce high school students to the mechanisms of aerosol-cloud interactions and their significance for climate.

OxCSML Equality, Diversity & Inclusion Committee **2020–2022**
Organised the department's first student-led EDI group, which aims to develop and sustain a diverse, inclusive, and equitable academic environment and community. Activities included organising student-only seminars, arranging accessible social events and setting up a safe feedback system for students.

Academic Service

Peer reviewer for *Journal of Advances in Modeling Earth Systems, Neural Information Processing Systems, Geophysical Research Letters, Geoscientific Model Development, Earth System Dynamics, Journal of Geophysical Research, Workshop on Tackling Climate Change with Machine Learning*

Teaching

Undergraduate Research Supervision **2026**
Supervision of an undergraduate student on generative modeling with consistency models

Co-supervision of Master Research Project **2023–2024**
Supervision of a Master's student on Bayesian inference for climate sensitivity

Teaching Assistant: Applied Statistics, Computational Statistics, Applied Probability **2022**

Tutor: Part A Statitics **2021–2022**

Oxford StatML Center for Doctoral Training **2021**
Organised an introductory workshop on automatic differentiation with PyTorch

Professional experiences

Research Intern — Met Office, Exeter, UK **2023**

Research Intern — Cervest, London, UK **2020**

Research Intern — Deepomatic, Paris, France **2019**

Data Science Intern — Jumia PTC, Porto, Portugal **2018**

Computer and Language skills

Technical Skills

Python, Julia, Unix — Fully Proficient
PyTorch, JAX, xarray — Fully Proficient
Java, R, JS — Working Knowledge

Language

French, Arabic — Native Language
English — Fully Proficient
Spanish — Working Knowledge