

# Project Title: Machine Learning for Understanding Extreme Weather in a Changing Climate

**Lead Institution/Department:** University of Bristol, School of Geographical Sciences

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**Co-Supervisor:** Ben Booth, Met Office

**Co-Supervisor:** Milan Kloewer, Atmospheric, Oceanic and Planetary Physics, University of Oxford

**Scholarship:** A fully funded PhD studentship including UK or international fees, annual stipend, and a research budget, is available at the University of Bristol. Study will begin in September 2025 and is funded for four years. The deadline for applications is 31<sup>st</sup> January 2025.

## Project aims and methods

This project will focus on better understanding how extreme weather will change over future decades, applying novel machine learning (ML) approaches. One particularly exciting research area is application of new ML-based global atmospheric models, which have been trained to learn the dynamics behind observed weather and can produce many “worlds that might have been”. A potential project direction is using these tools to constrain climate change trends in the properties of weather, which is very important for understanding our climate trajectory and cannot be done using weather observations alone. Another is to apply them to generate large samples of weather scenarios for understanding potential extreme weather impacts. Downscaling, producing local-scale data critical for impacts modelling, is another key research area. There is flexibility about event types and regions to focus on – European rainfall is a particular strength, but we have also worked on multiple other phenomena.

## Candidate Requirements

Prior experience with machine learning is not required, but applicants should have previous programming experience or be able to demonstrate clear potential to develop this. We welcome and encourage applications from under-represented groups.

## Useful Links

Please contact Peter Watson ([peter.watson@bristol.ac.uk](mailto:peter.watson@bristol.ac.uk)) for informal enquiries.

- <https://www.bristol.ac.uk/geography/courses/postgraduate/>
- <https://www.bristol.ac.uk/study/postgraduate/research/geographical-sciences-physicalgeography/>

**How to Apply:** Please apply to the “Geography- (PhD)” programme at <https://www.bristol.ac.uk/study/postgraduate/apply/>