

## Education

University of Cambridge, MRes + PhD Artificial Intelligence for Environmental Risk (AI4ER CDT) 2019-2024

Developing and applying computational approaches to address environmental challenges such as climate change, air pollution, and biodiversity monitoring and conservation.

*PhD thesis: 'Improving precipitation predictions across High Mountain Asia using probabilistic machine learning'.*

Focus on improving historical and future precipitation estimates for the 1.9 billion people who rely on these mountains for water security. Project awarded \$25,000 from Microsoft 'AI for Earth' programme.

*MRes thesis: 'Precipitation prediction in the Upper Indus Basin using Gaussian Processes'.* Produced machine learning model for future precipitation predictions in key area for Pakistani, Indian, and Chinese water security.

- A. J. Pressland Fund: £1000 grant to study Korean at Seoul National University for three months (2022).
- Entrepreneurship programme: led team to propose business plan for a drug-discovery start-up with mentorship from the Head of Strategy and Chief of Staff to the VP of Artificial Intelligence at AstraZeneca Cambridge (2020).

Imperial College London, MSci Physics 2015-2019

Courses taken include atmospheric physics, information theory, computational physics incl. numerical methods.

*MSc thesis: 'Cloud Identification in Satellite Images using Artificial Intelligence'.* Developed a deep learning model to improve cloud prediction for Sentinel 3 satellites by over 30% over polar regions where cloud cover is most important to global radiation forcing and most challenging to identify.

*BSc thesis: 'Modelling the Behaviour, Occurrence and Emissions of Wildfire on a Global Scale'.*

- Stevenson Award: £6000 bursary to undertake an international research placement with a leading female professor at a similar institution (2019).
- Imperial delegate to Tsinghua University's Environment Summer School (2017) where we designed and pitched a policy project to overcome one of China's environmental challenges to leading academics and policymakers.

## Additional research experience

Frontier Development Lab 2022

- Led team of PhD students and post-doctoral researchers to study PyroCb clouds associated with the most intense and unpredictable wildfires with support from Google, NVIDIA, and the European Space Agency.
- Created the first global PyroCb database and machine learning forecasting system and conducted causal invariance modelling to better understand PyroCb drivers.

Geophysical Fluid Dynamics Group, University of Oxford 2018

- Investigated the 2016 stalling of the Quasi-Biennial Oscillation through laboratory experiments.
- Designed framework to simultaneously run twelve motors in different wave patterns to generate pseudo-gravity waves in a water filled annulus and analysed footage of the waves using particle image velocimetry.

Planetary Science Group, University of Oxford 2017

- Designed and built a light source for evaluating three-dimensional thermal emissions from lunar and asteroid samples with a cooling system.
- Built electronic interface to move two-axis platform and measured performance of light source and radiometer.

## Key achievements

Student Award for Outstanding Achievement,  
Imperial College London, 2019

Awarded to one graduate for outstanding achievements in extramural activities that brings credit to the College.

Winter Olympic Games, Sochi, 2014

Represented Morocco in the Women's Alpine Skiing Giant Slalom and Slalom events and competed in international circuits (FIS races, South America Cup and French Cup).

## Selected publications \* presented at international conference

Tazi, K., et al. (In preparation). Extreme precipitation over High Mountain Asia: assessing likelihoods under different climate scenarios using Bayesian Committee Machines. \*

Tazi, K., et al. (Under review). Precipitation prediction from large-scale climatic features over the Upper Indus Basin using Gaussian Processes. *Environmental Data Science*. \*

Tazi, K., et al. (Under review). Downscaling precipitation over High Mountain Asia using Multi-Fidelity Gaussian Processes: Improved estimates from ERA5. *Hydrology and Earth System Science*. \*

Tazi, K., et al. (2023). Beyond intuition, a framework for applying Gaussian Processes to real-world data. In *ICML 2023 Workshop on Structured Probabilistic Inference and Generative Modelling*. \*

Tazi, K., et al. (2022). Pyrocast: A Machine Learning Pipeline to Forecast Pyrocumulonimbus (PyroCb) clouds. In *NeurIPS 2022 Workshop Tackling Climate Change with Machine Learning*. \*

Diaz, E., Tazi, K., et al. (2022). Identifying causes of Pyrocumulonimbus (PyroCb). In *NeurIPS 2022 Workshop on Causality for Real-world Impact*. \*

Lalchand, V., Tazi, K., et al. (2022). Kernel Learning for Explainable Climate Science. In *UAI 2022 Workshop on Bayesian Modelling Applications*. \*

Poulsen, C., Egede, U., Robbins, D., Sandeford, B., Tazi, K., & Zhu, T. (2020). Evaluation and comparison of a machine learning cloud identification algorithm for the SLSTR in polar regions. *Remote Sensing of Environment*.

## Skills

Languages	English and French (fluent), Korean (conversational, TOPIK Level 3), German (basic)
Programming	Python (incl. TensorFlow and PyTorch), Julia, MATLAB, Arduino, R, HTML, GIS
Other	Cloud and high-performance computing, mechanical workshop and graphic design training

## Teaching and workshops

### University of Cambridge

2020-present

- Organise Cambridge 'Stochastic Processes Workshops' to collaborate on applications to real-world problems.
- Lecture and run practical sessions on Bayesian ML for PhD students.
- Lecture on FAIR data practices and host weekly pair programming sessions for AI4ER CDT members.
- Supervise and assess students undertaking their 3<sup>rd</sup> year projects in the Department of Engineering. Topics range from civil, mechanical, information and bioengineering.

### Libra Education

2018-present

Private tutoring with a focus on Maths, Computer Science and Physics at high school and undergraduate level.

## Recent volunteer work

### Himalayan University Consortium, High Mountain Data Working Group Lead

2023-present

Drive the curation, accessibility, and development of datasets to better understand resources, hazards, exposure, and vulnerabilities over data-sparse Hindu Kush Himalayas incl. through the application of machine learning.

### Cambridgeshire County Council, Consultant

2020-2021

Undertook research for the Council through the Cambridge University Science and Policy Exchange (CUSPE) creating the Cambridgeshire Decarbonisation Fund, a new policy framework to decarbonise the county by 2050.

### All Party Parliamentary Group on Air Pollution

2020

Guided a small team to submit evidence on ways to keep low air pollution levels as UK exited the first Coronavirus Lockdown. Measures including making temporary cycle and pedestrian lanes were implemented.

### Science Museum (London), Consultant

2018-2019

Advised curators on instrument displays and public engagement for the 'London: City of Science' exhibit.