KENZA TAZI

kt484@cam.ac.uk
https://kenzaxtazi.github.io/

EDUCATION

University of Cambridge, MRes + PhD Environmental Data Science 2019-2024

PhD thesis: *Predicting precipitation over High Mountain Asia using Gaussian processes.* Focus on improving historical and future precipitation estimates for the 1.9 billion people who rely on these mountains for water security.

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

Imperial College London, MSci Physics 2015-2019

MSc thesis: *Cloud identification in satellite images using artificial intelligence.* Deep learning model to improve cloud identification for Sentinel 3 satellites by over 30% over polar regions where clouds are 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.*

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.

AWARDS

Best student precipitation presentation award, AGU23	2023
First place in Cambridge ICCS Reproducibility Hackathon	2022
AJ Pressland Fund, University of Cambridge	2022
AI for Earth Grant, Microsoft	2021
AI for Environmental Risk CDT Studentship	2019
Stevenson Award, Imperial College London	2019
Student Award for Outstanding Achievement, Imperial College London	2019
Dean's Fund, Imperial College London	2018
Royal Astronomical Society Grant	2018

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. (2024). Precipitation prediction from large-scale climatic features over the Upper Indus Basin using Gaussian Processes. *Environmental Data Science*. *

Tazi K, et al. (2024). 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*.

TEACHING

Lecturer

- Gaussian processes in practice, NERC Bayesian Machine Learning as a Tool for Climate Scientist Workshop (2024)
- FAIR data practices, AI for Environmental Risk CDT (2020, 2021, 2022, 2023)

Workshop organiser

- Weekly pair programming sessions, AI for Environmental Risk CDT (2021-2024)
- University of Cambridge 'Stochastic Processes Workshops' to collaborate on applications to real-world problems (2021, 2023)

Supervisor

- Advised and assessed students undertaking their 3rd year projects in the Department of Engineering. Topics range from civil, mechanical, information and bioengineering (2021, 2022, 2023)

Tutor

- Private tutoring with a focus on Maths, Computer Science and Physics at high school and undergraduate level (2018-2022)

INVITED TALKS

Alan Turing Institute, *Environment & Sustainability Seminar Series*	Oct 2024
University of Leeds, *SciML Seminar Series*	Oct 2024
University of Cambridge, *Atmospheric Chemistry Group*	Oct 2024
University College London, *Environment and Sustainability Group*	Jul 2024
Shanghai AI Lab, *Lu Group*	May 2024
MILA – Québec AI Institute, *Rolnick Group*	Apr 2024
NERC Bayesian Machine Learning for Climate Scientists Workshop	Mar 2024
AGU, *Precipitation Technical Committee Seminar*	Mar 2024
NASA Jet Propulsion Laboratory, *SUDS Seminar*	Dec 2023
Morocco AI, *Research Webinar Series*	Jul 2023
University of Cambridge, *Energy and Environment Group*	Jun 2023
University of Cambridge, *AI for Environmental Risk CDT*	Nov 2022

CONFERENCES

Climate Informatics (talk)	Mar 2024
AGU Fall Meeting (poster and talk)	Dec 2023
ICML – Probabilistic Inference & Generative Modelling Workshop (poster)	Jul 2023
AI for Environmental Risk CDT showcase (talk)	May 2023
NeurIPS– Tackling Climate Change with AI Workshop (poster)	Dec 2022
Climate Informatics (poster)	Apr 2022
Lunar and Planetary Science Conference (poster)	Apr 2018

ACADEMIC SERVICE

Programme leadership

High Mountain Data Co-Lead for the Himalayan University Consortium (2023-present)

Outreach

- BCG 'Climate and Sustainability Stewardship' Programme (2022-2024)
- She Talks Science Webinar (2021, 2023)
- Raspberry Pi magazine: Hello World (2022), Issue 19: Sustainability & Computing
- Rocket Seeds - see Fernando B, Wade J, Tazi K. (2016) Sowing seeds from space. Astronomy & Geophysics. 2016 Oct 1;57(5):5-11

Reviews: Climate Informatics; ICML – Structured Probabilistic Inference and Generative Modelling Workshop; Journal of Geophysical Research - Atmospheres

POLICY

Polar Summit, Paris Peace Forum, invited delegate 2023

Worked collectively with other scientists to secure 1 billion EUR pledge towards polar and high mountain research from French government.

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, lead author 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.

Tsinghua University's Environment Summer School, invited delegate 2017

Imperial delegate sent to design and pitch policy project to overcome one of China's environmental challenges to leading academics and policymakers.

OTHER EXPERIENCES

EntrepriseTech, University of Cambridge 2020-2021

Led team to propose business plan for a drug-discovery start-up with mentorship from the Head of Strategy to the VP of Artificial Intelligence at AstraZeneca Cambridge.

Science Museum, London 2018-2019

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

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).

LANGUAGES

English and French (fluent), Korean (conversational, TOPIK Level 3), German (basic)

Python (incl. TensorFlow and PyTorch), Julia, MATLAB, Arduino, R, HTML

OTHER SKILLS

Cloud and high-performance computing, mechanical workshop and graphic design training