Centre for AI-Fundamentals
RAEng Google DeepMind Summer Internship Programme 2025

Project proposal

Project Title	Extreme weather- tracking extreme rainfall to inform resilience
Lead supervisor	Ruth Wood
Project Description	**Background:** Extreme weather events are set to occur more frequently with climate change. However within existing weather records there are challenges in identifying clear trends of extreme events. Data outliers can be the result of measurement error or genuine observations, however distinguishing between the two is challenging. In this project you will focus on rainfall and use two hourly global observations on stream flow and rainfall to detect measurement errors vs real extremes. Applying this new knowledge to global rainfall data will enable trends in extremes to be clearly identified and quantified, helping track climate change and inform our understanding of the future. **Project objectives:** Aim to integrate data on rainfall and stream flow in order to differentiate outliers in rainfall data between real observations and measurement errors to support the identification in global changes in extreme rainfall events. **Work plan:** Week 1: familiarisation with weather datasets and data integration methods Week 2: familiarisation with Quality Control software Week 3: development of a categorisation system for rainfall outliers based on corresponding stream flow data. Week 4-5: trial of methodologies on a sub-set of global rainfall and stream flow data and revision of methods Week 6: display of key results and publication of new datasets. Week 7: write up and publication of code **LOs from the project:** To understand and apply quality control procedures To understand and apply data integration methods To understand the structure of global weather datasets and their use in monitoring climate change

	References: Rainfall data: https://doi.org/10.1175/JCLI-D-18-0143.1 Quality control method: https://doi.org/10.1016/j.envsoft.2021.105169 Flow data: https://grdc.bafg.de/ Quantifying the impacts of QC: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2022GL099138