Duncan Watson-Parris

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Synopsis

I am a senior post-doctoral Research Associate within the Department of Physics, University of Oxford. My research focusses on the role of aerosol on our climate from their microscopic interactions with clouds to their global radiative effects and therefore necessarily spans a range of approaches and techniques. I am at the forefront of the use of machine learning to tackle the challenges inherent in understanding these non-linear multi-scale processes. Specifically, using supervised classification to detect and quantify aerosol perturbations in satellite imagery and causal methods to measure these interactions in observations with (hidden) confounders. This complements the work I pioneered in our group exploring parameter space using Gaussian process emulators to quantify and constrain model parametric uncertainties. I also enjoy mentoring and teaching students and was excited to contribute to the iMIRACLI Marie Curie Innovative Training Network proposal for which I am now Course Director.

Education and professional experience

2020 - Present **Senior Research Associate and Course Director, University of Oxford**
Senior researcher in the Climate Processes group.

2015 - 2020 **Post-doctoral Research Associate, University of Oxford**
Researcher in the Climate Processes group.

2011 - 2015 **Data Analytics Consultant, Tessella Ltd. Abingdon**
I completed various projects for national and multi-national R&D organisations.

2007 - 2011 **PhD Theoretical Physics, University of Manchester**
Title: Carrier localization in InGaN/GaN quantum wells

2003- 2007 **1st Class BSc. (Hons.) Theoretical & Computational Physics, Cardiff University**
Project: Computer simulation studies of spin-glass systems (awarded 81%).

Awards, Fellowships, and Grants

2021	*Named Researcher:* "ML4CLOUDS", Natural Environment Research Council: ~£800k total
2020	Amazon Web Services (AWS) Machine Learning Research Awards: **$40,0000**
2019	NeurIPS 2019 Climate Change AI workshop – Best Paper and **$10,000** in Microsoft credits
2019	ICML 2019 Climate Change AI workshop – Best Paper
2018	*Co-wrote:* "iMIRACLI on AWS", AWS Grant: **$150,000**
2018	NVIDIA GPU Grant: ca. **£2000**
2017	*Researcher Co-I: "*EVADE", UK Science and Technology Facilities Council: **£50,399**
2015	Alan Taylor visiting lecturer award, University of Oxford
2009	ICNS-8 Conference paper selected for cover-page of journal special issue
2009	Institute of Physics "Research Student Conference Fund" for ICNS-8
2009	UKNC Travel Bursary for ICNS-8

Publications

ORCID iD: 0000-0002-5312-4950; Google Scholar

37 peer-reviewed publications (9 first author) with a further 7 under review, 8 peer-reviewed conference proceedings and contributions to two books. Currently > 1100 citations; h-index 17.

Invitations

2022	UN AI for Good - Accelerating Climate Science with AI, Virtual
2021	International Aerosol Modeling Algorithms Conference, Virtual
2021	AGU Fall Meeting, Virtual (declined)
2021	Machine Learning for Climate, UC Santa Barbra
2021	ISC High Performance, Virtual
2021	US CLIVAR Data Science Webinar, Virtual
2021	ETH Zurich Institute for Atmospheric and Climate Science ML Seminar, Virtual

(Updated January 2022)

2021	Department of Atmospheric, Oceanic and Planetary Physics, University of Oxford
2020	Hebrew University Climate, Atmosphere and Oceanography, Virtual
2020	University of Wyoming Department of Atmospheric Science, Virtual
2020	ECMWF-ESA Workshop on ML for Earth System Observation and Prediction, Virtual
2020	University of Bath Department of Computer Science, Virtual
2018	World Climate Research Programme workshop, Ringberg
2017	Swedish Meteorological and Hydrological Institute
2008	Rank Prize Funds symposium

Contributed presentations

>26 oral presentations and 5 posters

Mentoring

- Climate Change Faculty for Stanford AI for Climate Change Bootcamp (2020-present)
- Super Mentor for Frontier Development Lab (FDL) summer projects (2019-present)
- 5 Phd Students: Peter Manshausen (2020-present); Sofija Stefanović (2020-2021); Andrew Williams. (2019-present); Tom Langton (2018-present); Shipeng Zhang (2018-2020).
- 3 MPhys projects: Thomas Matthews (2019); Robin Gan (2019); Sam Sutherland (2018).

Professional activities

Conference and workshop organisation

- Lead Convener of "Machine Learning for Climate Science" EGU 2022 session
- Co-chair of the UN AI for Good - Accelerating Climate Science with AI series (2021-2022)
- Meta-reviewer for Climate Change AI workshop at ICML 2021
- Chair of "Machine Learning" session at UK Atmospheric Science Conference 2021
- Program committee member for Climate Change AI workshop at NeurIPS 2020
- Program committee member for AI for Earth Sciences workshop at NeurIPS 2020
- Co-chair of Climate Informatics 10th international conference (2020)
- Organising Committee member for "Machine Learning for Nowcasting" workshop (2020)
- Convener of the machine learning in climate science research forum (2019 – present)
- Co-host of the 1st Oxford Machine Learning in Climate Science (2018)

Proposal review for: Swiss Data Science Center (SDSC) Collaborative Data Science Projects; Research Council of Norway for Chinese-Norwegian Collaboration Projects within Climate Systems; Climate Change AI Innovation Grants (meta-reviewer).

Peer review for: Geophysical Research Letters; Journal of Geophysical Research – Atmospheres; Nature Communications; Atmospheric Chemistry and Physics (Letters); Geoscientific Model Development; Journal of Advances in Modelling Earth Systems; Atmospheric Environment; International Journal of Climatology; AGU Books.

Outreach

- AGU News "COVID-19 lockdowns temporarily raised global temperatures" (2021)
- Featured in "Climate Researchers Enlist Big Cloud Providers for Big Data Challenges" Wall Street Journal (2020)
- Interviewed for the "Fix This" podcast and a blog post by the CTO of Amazon (2020)
- "Climate change: difficult choices" Science Week at Europa School, Culham (2017 and 2020)
- "Stargazing+" open day for children with additional support needs (2018 and 2019)
- "Stargazing live" departmental public day (2017)

Committee memberships: AeroCom and HAMMOZ international modelling consortiums.

Other: Co-organised a departmental Equality, Diversity and Inclusion (EDI) session (2021)

Scientific computing skills

Programming: I consider myself fluent in Python and Fortran, and have extensive experience using C++ and the Tensorflow, GPy and Keras machine learning libraries.

Open source projects: CIS (lead developer and maintainer); ESEm (lead developer and maintainer); iris (contributor); cartopy (contributor) and xarray (contributor).