

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 - **Senior Research Associate and Course Director, University of Oxford**
Present Senior researcher in the Climate Processes group.
- 2015 - **Post-doctoral Research Associate, University of Oxford**
2020 Researcher in the Climate Processes group.
- 2011 - **Data Analytics Consultant, Tessella Ltd. Abingdon**
2015 I completed various projects for national and multi-national R&D organisations.
- 2007 - **PhD Theoretical Physics, University of Manchester**
2011 **Title:** Carrier localization in InGaN/GaN quantum wells
- 2003- **1st Class BSc. (Hons.) Theoretical & Computational Physics, Cardiff University**
2007 **Project:** Computer simulation studies of spin-glass systems (awarded 81%).

Awards, Fellowships, and Grants

- *Co-wrote: iMIRACLI on AWS*, February 2018, Amazon Web Services (AWS): **\$150,000**
- *Researcher Co-I: access to EnVironmental Analytics for Developing countriEs (EVADE)*, March 2017, UK Science and Technology Facilities Council (STFC): **£50,399**
- Microsoft Azure cloud grant (2020) for CUMULO extension: **\$36,000**
- NVIDIA GPU Grant (2018): ca. **£2000**
- NeurIPS 2019 Climate Change AI workshop – **Best Paper and \$10,000 in Microsoft Azure cloud computing credits** (Zantedeschi, 2019)
- ICML 2019 Climate Change AI workshop – **Best Paper** (Watson-Parris, 2019)
- 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 (2009)

Publications

ORCID iD: [0000-0002-5312-4950](https://orcid.org/0000-0002-5312-4950); [Google Scholar](#)

34 peer-reviewed publications (8 first author) with a further 7 under review, 8 peer-reviewed conference proceedings and contributions to two books. Currently > 1000 citations; h-index 16.

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 Kavli Institute for Theoretical Physics Workshop, UC Santa Barbra
2021 ISC High Performance, Virtual
2021 US CLIVAR Data Science Webinar, Virtual

(Updated November 2021)

2021 ETH Zurich Institute for Atmospheric and Climate Science ML Seminar, Virtual
 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

>24 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).