Name, Surname: William Gregory
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Education

- 28/12/2021 **PhD in Climate Science**. Department of Earth Sciences, University College London, United Kingdom. Thesis title: *Machine learning tools for pattern recognition in polar climate science*. Supervisors: Michel Tsamados, Julienne Stroeve.
- 15/09/2014 **MSc in Petroleum Geophysics**. Department of Earth Science and Engineering, Imperial College London, United Kingdom. Thesis title: *Finite difference modelling to understand the nature of wave propagation at salt-sediment interfaces*. Supervisor: Jenny Collier. *Distinction.*
- 15/06/2013 **BSc in Geology with Geophysics**. Department of Geology, University of Leicester, United Kingdom. *1st class honours.*

Employment

- 19/01/2022 – Present. **Postdoctoral Research Associate**. Princeton University, USA.
- 10/11/2014 – 28/07/2017. **Depth Imaging Geophysicist**. Petroleum Geo-Services Ltd, UK.
- 15/06/2012 – 15/09/2012. **Geotechnical field assistant**. Mineral Exploration Network, Finland.

External visibility / esteem / professional activities

- **Refereeing activities**
  - 12/12/2024. AGU Fall Meeting 2024 Outstanding Student Presentation Award (OSPA) judge.
  - 09/2024. Reviewer for National Science Foundation (NSF) Arctic Natural Sciences program.
  - 2019 – Present. Peer reviewer for numerous international journals, including: The Cryosphere, Journal of Advances in Modeling Earth Systems, American Meteorological Society (AMS) Journal of Climate, Climate Dynamics, Quarterly Journal of the Royal Meteorological Society, AMS AI for Earth Systems, npj Climate and Atmospheric Science.

- **Conference (session) organisation**
  - AGU Fall Meeting 2024 convener & chair for session: "*NG011-II. Data Driven Science: Developments in Machine Learning Subgrid-Scale Parameterizations and in Reanalyses across Earth System Modeling*".

- **Invited talks**
  - 24/06/2024. "From component to coupled: evaluating the performance of a machine-learned sea ice bias correction scheme in fully-coupled seasonal predictions." Nansen SuperIce Webinar.
  - 14/06/2024. "Towards improving numerical sea ice predictions with data assimilation and machine learning." NOAA Arctic All Hands Meeting. *Virtual.*
  - 01/05/2024. "Applications of machine learning to sea ice data assimilation." 10th US Climate Modeling Summit. NOAA Geophysical Fluid Dynamics Laboratory, Princeton USA.
  - 12/04/2024. "Towards a machine-learned sea ice model parameterization from data assimilation increments." Euro-Mediterranean Center on Climate Change (CMCC), Bologna Italy.
  - 09/11/2022. "Deep learning of systematic model biases from data assimilation increments." New York University Courant Institute of Mathematical Sciences Guest Seminar Series, USA.
  - 27/05/2022. "Machine learning tools for pattern recognition in polar climate science." EGU General Assembly 2022, Vienna Austria, EGU22-12785.
  - 05/03/2020. "Machine learning in climate science." UK Government Digital Service, London.

- **Scholarships and awards**
  - 25/09/2017. Scholarship for the London NERC Doctoral Training Partnership (DTP), including £7,000 research funds, £66,212 stipend, and £18,000 tuition.
  - 09/2013. Imperial College MSc scholarship of £25,000 from British Petroleum.
  - 15/06/2013. Shell Geophysics Prize of £250 for highest achievement in BSc program.
  - 15/06/2012. Departmental award of £50 for academic excellence in BSc Geophysics program.

Research funding

- Princeton University does not support postdoctoral researchers seeking to acquire research funding as PI or Co-I. However, I have experience preparing grant applications for submission. This includes one grant for the 2023 UK NERC Independent Research Fellowship (IRF) call and another for the 2024 European Commission Marie Curie Postdoctoral Fellowship call.

Teaching experience

- 01/2020 – 04/2020. Teaching assistant in **BSc Geodynamics**, Department of Earth Sciences, University College London. *Class size*: 15-20. *Format*: Tutorials.
- 01/2020 – 04/2020. Teaching assistant in **BSc Ocean Physics**, Department of Earth Sciences, University College London. *Class size*: 15. *Format*: Tutorials.
- 11/2019. Teaching assistant in **BSc Principles of Climate**, Department of Earth Sciences, University College London. *Class size*: 10-15. *Format*: Tutorials.
- 10/2018 – 12/2019. Teaching assistant in **BSc Foundations of Physical Geoscience**, Department of Earth Science, University College London. *Class size*: 10-12. *Format*: Lectures and Tutorials.
- 10/2018 – 10/2020. Teaching assistant in **BSc Introduction to Matlab**, Department of Earth Sciences, University College London. *Class size*: 15-20. *Format*: Lectures and Tutorials.

Supervising experience

- 12/2024 – present. Co-supervising Surya Dheeshjith, a laboratory associate within the Courant Institute for Mathematical Sciences at New York University. Surya is tasked with building a data-driven 3D ocean emulator, with Prof. Laure Zanna. My responsibilities are to guide Surya in the understanding of climate physics and the manifestation of ocean biases in coupled models.
- 01/2022 – 09/2022. Co-supervised Ronald MacEachern, a postgraduate student undertaking the **MSc Machine Learning** course within the Department of Computer Science at University College London. The primary supervisor was Prof. Marc Deisenroth, however I designed the MSc dissertation project, which was titled "*Sea Ice Freeboard Interpolation using Gaussian Process Regression*". Ronald was a self-funded student and achieved a thesis grade of *Distinction*.

Public engagement and outreach

- 12/12/2023. AI is transforming climate forecasts for melting sea ice. *Advanced Science News Article*.
- 11/2023 – 07/2024. Project development chair for the Climatematch Academy outreach programme. Responsible for managing individuals developing material for student projects.
- 11/2022 – 07/2023. Curriculum content reviewer for the Climatematch Academy outreach programme. Responsible for reviewing all content relating to fundamentals of climate science.
- 28/06/2022. Delivered a presentation on Equality, Diversity and Inclusion (EDI) progress within NOAA and GFDL. *GFDL, Princeton USA.*
- 05/12/2016. Delivered science outreach presentations to year 10 and 12 students. *King Solomon Academy school, London UK*.
- 11/2012 and 11/2013. Assisted in the Department of Geology open days at the University of Leicester. Responsibilities were to welcome members of the public to the department, and also talk to prospective students about the Geology with Geophysics BSc programme.

Management, administrative and community service

- 01/10/2018 – 02/10/2018. Field assistant on London NERC Doctoral Training Partnership field course to Norfolk UK with the University College London Department of Earth Science. Responsibilities included organising field equipment before the trip and assisting in field demonstrations.
- 09/2012 – 06/2013. President of the Department of Geology SEG-AAPG student chapter at the University of Leicester. Responsibilities included managing the chapter committee, as well as organising social events and invited speakers.

Personal development and developing others

- 05/2017 – 07/2017. Supported staff transitioning from signal processing to depth imaging department at Petroleum Geo-Services. Provided class-based training exercises and lectures to

develop staff members technical skillset and knowledge-base in depth imaging.

Publications

- **Refereed full papers**
  - Balwada, D., …, **Gregory**, **W**., et al. 2024. Learning machine learning with Lorenz-96. *Journal of Open Source Education*. 7, 241.
  - **Gregory**, **W**., MacEachern, R., Takao, S., Lawrence, I.R., Nab, C., Deisenroth, M., Tsamados, M. 2024. Scalable interpolation of satellite altimetry data with probabilistic machine learning. *Nature Communications.* 15, 7453.
  - Bushuk, M., …, **Gregory**, **W**., et al. 2024. Predicting September Arctic sea ice: a multi-model seasonal skill comparison, *Bulletin of the American Meteorological Society*. 105, E1170-E1203.
  - **Gregory**, **W**., Bushuk, M., Zhang, Y., Adcroft, A., Zanna, L. 2024. Machine learning for online sea ice bias correction in global ice-ocean simulations. *Geophysical Research Letters.* 51, e2023GL106776.
  - Zhang, Y., Bushuk, M., Winton, M., Hurlin, W., **Gregory**, **W**., Landy, J.C., Jia, L. 2023. Improvements in September Arctic sea ice predictions via assimilation of summer CryoSat-2 sea ice thickness observations. *Geophysical Research Letters*. 50, e2023GL105672.
  - **Gregory**, **W**., Bushuk, M., Adcroft, A., Zhang, Y., Zanna, L. 2023. Deep learning of systematic sea ice model errors from data assimilation increments. *Journal of Advances in Modeling Earth Systems*. 15, e2023MS003757.
  - Nab, C., Mallett, R., **Gregory**, **W**., Landy, J.C., Lawrence, I.R., Willatt, R., Stroeve, J., Tsamados, M. 2023. Synoptic variability in satellite altimeter-derived radar freeboard of Arctic sea ice. *Geophysical Research Letters.* 50, e2022GL100696.
  - **Gregory**, **W**., Stroeve, J., Tsamados, M. 2022. Network connectivity between the winter Arctic Oscillation and summer sea ice in CMIP6 models and observations. *The Cryosphere.* 16, 1653-1673.
  - **Gregory**, **W**., Lawrence, I.R., Tsamados, M. 2021. A Bayesian approach towards daily pan-Arctic sea ice freeboard estimates from combined CryoSat-2 and Sentinel-3 satellite observations. *The Cryosphere.* 15, 2857-287.
  - **Gregory**, **W**., Tsamados, M., Stroeve, J., Sollich P. 2020. Regional September sea ice forecasting with complex networks and Gaussian processes. *Weather and Forecasting*. 35, 793-806.

- **Select Conference abstracts**
  - **Gregory**, **W**., Bushuk, M., Zhang, Y., Adcroft, A., Zanna, L. Towards improving numerical sea ice predictions with data assimilation and machine learning. EGU General Assembly 2024, Vienna Austria, 14–19 Apr 2024, EGU24-11288.
  - **Gregory**, **W**., Bushuk, M., Zhang, Y., Adcroft, A., Zanna, L. Machine learning for online sea ice bias correction within global ice-ocean simulations. AGU Ocean Sciences Meeting 2024, New Orleans USA, 19–23 Feb 2024.
  - **Gregory**, **W**., Bushuk, M., Adcroft, A., Zhang, Y., Zanna, L. Deep learning of systematic sea ice model errors from data assimilation increments. EGU General Assembly 2023, Vienna Austria, 23–28 Apr 2023, EGU23-10351.
  - **Gregory**, **W**., Bushuk, M., Adcroft, A., Zhang, Y., Zanna, L. Using deep learning to predict systematic model error from sea ice data assimilation increments in a fully coupled climate model. AGU Fall Meeting 2022, Chicago USA, 12–16 Dec 2022. C52C-0383.
  - Bushuk, M., …, **Gregory**, **W**., et al. A multi-model comparison of September Arctic sea ice seasonal prediction skill. AGU Fall Meeting 2022, Chicago USA, 12–16 Dec 2022. GC52B-02.
  - **Gregory**, **W**., Lawrence, I.R., Tsamados, M. A Bayesian approach towards daily pan-Arctic sea ice freeboard estimates from combined CryoSat-2 and Sentinel-3 satellite observations. EGU General Assembly 2021, Vienna Austria, 19–30 Apr 2021, EGU21-11462.
  - **Gregory**, **W**., Tsamados, M., Stroeve, J., Sollich, P. Random Walks through Climate Networks: Sea Ice Prediction with Bayesian Inference. EGU General Assembly 2020, Vienna Austria, 4–8 May 2020, EGU20-20595.