HELEN GREATREX

Assistant Professor in Remote Sensing and Geospatial Analysis

hlg5155@psu.edu **E**
211 Walker Building, Penn State **A**
https://www.linkedin.com/in/hgreatrex **W**
https://scholar.google.com/citations?hl=en&user=qTMhQ6gAAAAJ **S**

PROFESSIONAL PROFILE

I use remote sensing, geostatistics and qualitative research techniques to illustrate
the links between weather hazards and impact. Focus on parametric weather risk management, disaster response,
weather related disease, pollinators and any other topic where the weather might play a complex impact.
I spend a lot of my time understanding and validating satellite rainfall estimates across the tropics.
Statistics focus on applied space-time analysis.

EDUCATION

PhD in Meteorology
University of Reading, UK
2007 – 2012
Thesis: *Application of seasonal rainfall forecasts & satellite rainfall to crop yield forecasting in Africa*

Post-graduate diploma (PgDip) Atmosphere Ocean and Climate
University of Reading, UK (Distinction)
2006-2007

MPhys, Physics with Astrophysics
University of Manchester, UK
(1st class honors)
2002-2006

PROFESSIONAL MEMBERSHIP

American Association of Geographers

Royal Meteorological Society

American Meteorological Society

Royal Anthropological Society

AWARDS

2018 - American Meteorological Society Editors Award for the journal Weather Climate and Society

EXPERIENCE

Pennsylvania State University
2019-Present | Assistant Professor, Remote Sensing & Geospatial Analysis
Department of Geography, Department of Statistics,
Co-hire of the Institute for Computational and Data Sciences (ICDS)

Tailored disaster indices, parametric weather risk management,
weather perceptions, convergent mixed methods, geospatial analysis

World Meteorological Organization's Social and Economic Working Group (WMO - SERA)
2020-Present | Representative
Cyclone forecast best practice guides, value chains.

International Research Institute for Climate and Society, Columbia University, New York
2016-2019 | Associate Research Scientist in weather risk management
2013-2016 | Post-doctoral Scholar

Weather Risk Management, Parametric/Index insurance design,
Satellite rainfall analysis, Rainfall geo-statistics, Social equity,
National meteorological agency support, Adaptation and gender,
Tailored weather information for disasters & the humanitarian sector,
Focus on sub-Saharan Africa and Latin America

Global Climate Adaptation Partnership, Oxford UK
2012-2013 | Climate Adaptation Analyst

East African climate adaptation policy, Vulnerability analysis,
Agrometeorology, Climate Projections, Project Management

Statistical Services Centre (now Stats4Development), Reading UK
2011-2012 | Weather Data Analyst

Weather statistics,   National meteorological agency support,
Satellite rainfall education

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TEACHING (PENN STATE)

Undergraduate

Statistics-462: Applied Regression Analysis (Spring 2020,2021,2022)

Geography-364: Spatial Analysis (Fall 2019, 2020, 2021)

Geography-497: Pattern Analysis (Spring 2022)

Graduate

Geography-586: Geographic Information Analysis (Spring 2021)

GRANTS

Standardizing Satellite Weather Analysis
Summer 2021 | Role: PI | Funding Agency: Penn State ICDS RISE Seed grant
Backstopping tailored weather analysis with advanced computing techniques

Measuring Hazard to Forecast Disaster
2020 - 2021 | Role: PI | Funding Agency: AXA-XL (insurance industry)
Mixed methods research to create tailored weather indices for Somalian humanitarian agencies

P3H personalized predictive health
2019 onward | Role: co-I | Funding Agency: NIH
Assessing the impact of the weather on infant hydrocephalus and COVID-19

Model-driven social distancing and resource allocation strategies for COVID-19 and other infectious diseases through an optimal control & data assimilation framework
2020 - 2021 | Role: PI | Funding Agency: Penn State Seed grant
Assessing new modelling strategies to support COVID-19 modelling

SatWIN-ALERT: Satellite Data for Weather Insurance-Agricultural Early Warning Systems
2018-2020 | Role: institutional PI | Funding Agency: UK National Environmental Research Council (NERC)
Meteorological and Social co-research with 6 large index insurance organizations in sub-Saharan Africa

NASA-GEO: Driving Global Flash Flood Early Warning Early Action
2020 - 2021 | Role: co-I | Funding Agency: NASA GEO
Working with the International Federation of the Red Cross Red Crescent and NASA-Disasters
to enhance flash flood observations, forecasting and action

CCAFS-SIWIA: The Social impact of Weather Insurance for Agriculture
2015-2018 | Role: Institutional PI | Funding Agency: CGIAR CCAFS
Weather insurance impact assessment,

CCAFS-CASCAID: Capacitating African Smallholders with Climate Advisories and Insurance Development
2019 onward | Role: co-I | Funding Agency: NIH
Tailored satellite rainfall & insurance basis risk assessment design for Ghanaian agricultural development

Remote Sensing and Early Warning Climate Analysis for Resilience Programmes in Somalia
2017 | Role: co-I | Funding Agency: Concern Worldwide (industry)
Mapping weather related humanitarian action in Somalia

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SELECTED PAPERS

A. Kruczkiewicz ; M. Braun; S. McClain; H. Greatrex; L. Padilla; L. Hoffman-Hernandez; K. Siahaan; M. Nielsen; B. Llamanzares; Z. Flamig; 2019, "Flood Risk and Monitoring Data for Preparedness and Response: From Availability to Use", *AGU book chapter.*

Maidment, R., Black, E., Greatrex, H., & Young, M. (2020). "TAMSAT". In *Satellite Precipitation Measurement* (pp. 393-407). Springer, Cham.

E. Fisher, J. Hellin, **H. Greatrex**, N. Jensen, 2019 "Index insurance and climate risk management: Addressing social equity". *Development Policy Review*; 00:1–22. https:// doi.org/10.1111/dpr.12387

R. Maidment, D.I.F.Grimes, E. Black, E. Tarnavsky, **H. Greatrex**, et al. 2017 "A new, long-term daily satellite-based rainfall dataset for operational monitoring in Africa", *Nature Scientific Data*, 4

E. Black, E. Tarnavsky, R.I. Maidment, **H. Greatrex**, A. Mookerjee, T. Quaife, M. Brown (2016), "The use of remotely sensed rainfall for managing drought risk: a case study of weather index insurance in Zambia", *Remote Sensing* 8 (4), 342

H. Greatrex, J. Hansen, S. Garvin, R. Diro, S. Blakeley, M. Le Guen, K. Rao, D. Osgood, (2015), "Scaling up index insurance for smallholder farmers: Recent evidence and insights". *CCAFS Report No. 14. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)*

H. Greatrex, D.I.F. Grimes, and T.R. Wheeler, (2014), "Advances in the Stochastic Modelling of Satellite-Derived Rainfall Estimates Using a Sparse Calibration Dataset". *Journal of Hydrometeorology*, 15, 1810–1831

SESSION CHAIR

American Meteorological Society (Boston, 2020)
> Presidential Forum: Bridging the gap between meteorologists and the Humanitarian Sector

American Meteorological Society (Phoenix, 2019)
> Communicating with Data Users and the Public: Bridging the Valley of Death
> Advances In Monitoring and Analyzing Precipitation Extremes Using Remote Sensing

HIGHLIGHTED TALKS

Invited Seminar: "Weather Risk Management", University of Portland Geographies of Uncertainty series, Oct- 2020

Invited Panellist: "Why the climate crisis is a water crisis", AXA-XL Industry Webinar

American Meteorological Society 2019, "Achieving Success in Weather Insurance: A Value Network Analysis Approach, 12 Jan, 2019, Austin Texas

Invited Seminar: "Geo-statistical approaches to the quantification of satellite rainfall uncertainty", Meteorology Department Colloquium, the Pennsylvania State University, 31st October 2018

American Meteorological Society 2018 "Moving Beyond Data Portals: How Insurers and NGOs are Using Tailored Weather Data for International Development Operations, 9 Jan, 2018, Austin Texas

Royal Anthropological Institute 2016: "Interdisciplinary entanglements in index insurance, Royal Anthropological Institute Conference on Anthropology", Weather & Climate Change, London, 27-29 May 2016