

# ANDREW I.L. WILLIAMS

Scripps Institution of Oceanography, UC San Diego

Email: andrewwilliams@ucsd.edu // Citizenship: Dual U.K. and U.S.A.

## EDUCATION

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### University of Oxford

DPhil (PhD) in Climate Physics

October 2019 - July 2023

Advisor: Philip Stier

### University of Oxford

Bachelors & Masters degrees in Physics

October 2015 - June 2019

Classification: 1<sup>st</sup>

## EMPLOYMENT

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### Postdoctoral Scholar

Scripps Institution of Oceanography

October 2025 - present

### Postdoctoral Research Associate

Princeton University & NOAA GFDL

August 2023 - August 2025

### Visiting Researcher

TU Delft

June 2022 - July 2022

### Visiting Researcher

Max Planck Institute for Meteorology

April 2022 - May 2022

### Research Associate

Massachusetts Institute of Technology

June 2019 - January 2020

### Summer Undergraduate Research Fellow

California Institute of Technology

Summer 2018

## GRANTS & FUNDING

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### CIMES Postdoctoral Fellowship

Princeton University

2023-2025

### NOAA Climate & Global Change Postdoctoral Fellowship

Yale University (declined)

2023-2025

### NERC PhD Studentship

Awarded fully funded place on NERC Environmental Research Doctoral Programme at the University of Oxford, covering tuition, stipend and research grant (Approx. £100,000).

2019-2023

### Laidlaw Research and Leadership Scholarship

Awarded £10,000 to fund research at MIT with Prof. Paul O'Gorman.

2019

### Caltech Summer Undergraduate Research Fellowship

Awarded \$8,000 to fund research at Caltech with Prof. Tapio Schneider.

2018

## AWARDS

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### Outstanding Early Career Presentation Award

CFMIP-GASS meeting, Paris

2023

<b>Outstanding Student and PhD candidate Presentation Award</b>	2022
EGU	
<b>Outstanding Student Presentation Award</b>	2022
AGU Fall Meeting	
<b>Moritz-Heyman Scholarship</b>	2015-2019
Scholarship for low-income students who won a place at Oxford University (£16,000 total).	
<b>St. Hilda's College, 125th Anniversary Scholarship</b>	2019
Prize for high grades in first year examinations at Oxford (£1,250 total)	

## PUBLICATIONS

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### Manuscripts in preparation

- Davenport, D., Madan, V. and co-authors including Williams, A. I. L.: JCM v1.0 : A Differentiable, Intermediate-Complexity Atmospheric Model  
*Geoscientific Model Development (anticipated submission December 2025)*
- Risi, C. and co-authors including Williams, A. I. L.: Amplification of temperature changes with altitude in the tropics and subtropics  
*Reviews of Geophysics (anticipated submission December 2025)*

### 2025

- Williams, A. I. L.: Bridging Clarity and Accuracy: A Simple Spectral Longwave Radiation Scheme for Idealized Climate Modeling  
*Journal of Advances in Modeling Earth System (revised)*
- Williams, A. I. L. & Merlis, T.M.: State-dependence of polar amplification in an idealized GCM  
*Geophysical Research Letters (revised)*
- Williams, A. I. L. & Jeevanjee, N.: Sea-surface temperature patterns, radiative cooling, and hydrological sensitivity  
*Geophysical Research Letters (accepted)*

- Williams, A. I. L. & Jeevanjee, N.: A robust constraint on the response of convective mass fluxes to warming  
*Journal of Advances in Modeling Earth Systems*  
[10.1029/2024MS004695](https://doi.org/10.1029/2024MS004695)

- Watson-Parris, D. and co-authors including Williams, A. I. L.: Weak surface temperature effects of recent reductions in shipping SO<sub>2</sub> emissions, with quantification confounded by internal variability  
*Atmospheric Chemistry & Physics*  
[10.5194/egusphere-2024-1946](https://doi.org/10.5194/egusphere-2024-1946)

- Mackie, A. , Byrne, M.P., van de Koot, E. & Williams, A. I. L.: Circulation and cloud responses to patterned SST warming  
*Geophysical Research Letters*  
[10.22541/essoar.172736799.93094846](https://doi.org/10.22541/essoar.172736799.93094846)

- Herbert, R. J., Williams, A. I. L., Weiss, P., Klocke, D. & Stier, P.: Isolating aerosol-climate interactions in global storm-resolving simulations  
*Atmospheric Chemistry & Physics*  
[10.5194/egusphere-2024-1689](https://doi.org/10.5194/egusphere-2024-1689)

### 2024

- Schmidt, H. & co-authors including Williams, A. I. L.: Effects of vertical grid spacing on the climate simulated in the ICON-Sapphire global storm-resolving model  
*Geoscientific Model Development*  
[10.5194/gmd-17-1563-2024](https://doi.org/10.5194/gmd-17-1563-2024)
- Bloch-Johnson, J. and co-authors including Williams, A. I. L.: The Green's Function Model Intercomparison Project (GFMIP) Protocol  
*Journal of Advances in Modeling Earth Systems*  
[10.1029/2023MS003700](https://doi.org/10.1029/2023MS003700)

## 2023

- Dagan, G., Yeheskel, N. & Williams, A. I. L.: Enhanced radiative forcing from aerosol-cloud interactions due to large-scale circulation adjustments  
*Nature Geoscience*  
[10.1038/s41561-023-01319-8](https://doi.org/10.1038/s41561-023-01319-8)
- Williams, A. I. L., Watson-Parris, D., Dagan, G. & Stier, P.: Dependence of fast changes in global and local precipitation on the geographical location of absorbing aerosol  
*Journal of Climate*  
[10.22541/au.167364749.93845737/v1](https://doi.org/10.22541/au.167364749.93845737/v1)
- Williams, A. I. L., Jeevanjee, N. & Bloch-Johnson, J.: Circus Tents, Convective Thresholds and the Non-Linear Climate Response to Tropical SSTs  
*Geophysical Research Letters*  
(**Editor's Highlight**)  
[10.1029/2022GL101499](https://doi.org/10.1029/2022GL101499)

## 2022

- Williams, A. I. L., Stier, P., Dagan, G. & Watson-Parris, D.: Strong control of effective radiative forcing by the spatial pattern of absorbing aerosol  
*Nature Climate Change*  
(**Press coverage**)  
[10.1038/s41558-022-01415-4](https://doi.org/10.1038/s41558-022-01415-4)
- Dagan, G., Stier, P., Dingley, B. & Williams, A. I. L.: Examining the regional co-variability of the atmospheric water and energy imbalances in different model configurations - linking clouds and circulation  
*Journal of Advances in Modeling Earth Systems*  
[10.1029/2021MS002951](https://doi.org/10.1029/2021MS002951)
- Williams, A. I. L. & O'Gorman, P. A.: Summer-Winter Contrast in the Response of Precipitation Extremes to Climate Change over Northern Hemisphere Land  
*Geophysical Research Letters*  
[10.1029/2021GL096531](https://doi.org/10.1029/2021GL096531)

## 2021

- Watson-Parris, D., Williams, A. I. L., Deaconou, L. & Stier, P.: Model calibration using ESEm v1.0.0 - an open, scalable Earth System Emulator  
*Geoscientific Model Development*  
[10.5194/gmd-14-7659-2021](https://doi.org/10.5194/gmd-14-7659-2021)

## PRESENTATIONS

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### 2025

- **Scripps Institution of Oceanography (upcoming)** **Invited talk**  
Tales of climate dynamics & outreach
- **Texas A&M University (upcoming)** **Invited talk**  
Tales of climate dynamics & outreach
- **University of Exeter** **Invited talk**  
State-dependence of polar amplification in an idealized, ice-free GCM

- **Gordon Research Conference on Radiation and Climate** Poster  
Bridging Clarity and Accuracy: A Simple Spectral Longwave Radiation Scheme for Idealized Climate Modeling
- **Florida State University** Invited talk  
The physics of tropical convection and the large-scale circulation in a warming climate
- **ECS & Cloud Feedbacks Virtual Symposium**  
How do convective mass fluxes respond to global warming?
- **EGU General Assembly Meeting**  
A robust constraint on the response of convective mass fluxes to warming
- **University of Washington** Invited talk  
A robust constraint on the response of convective mass fluxes to warming

## 2024

- **GFDL Lunchtime Seminar**  
A robust constraint on the response of convective mass fluxes to warming
- **CLIVAR TROPICS working group, Hamburg** Invited talk  
Is there a “hydrological constraint” on tropical circulation weakening?
- **City College of New York** Invited talk  
Physical constraints on the response of convective mass fluxes to warming
- **AOFD** Talk  
A robust constraint on the response of convective mass fluxes to warming
- **CFMIP** Talk  
A robust constraint on the response of convective mass fluxes to warming
- **Hebrew University of Jerusalem** Invited talk  
A robust constraint on the response of convective mass fluxes to warming
- **Princeton University** Talk  
A robust constraint on the response of convective mass fluxes to warming
- **Columbia University** Invited talk  
A robust constraint on the response of convective mass fluxes to warming

## 2023

- **University of East Anglia** Invited talk  
Non-linear climate response to tropical SSTs explained by a convective threshold
- **Center for Atmosphere Ocean Science, NYU** Invited talk  
Non-linear climate response to tropical SSTs explained by a convective threshold
- **Reading University** Invited talk  
Do convective mass fluxes constrain the tropical circulation response to warming?
- **Gordon Research Conference on Radiation and Climate** Poster  
Circus tents, convective thresholds and the non-linear climate response to tropical SSTs
- **CFMIP-GASS meeting** Talk  
Circus tents, convective thresholds and the non-linear climate response to tropical SSTs  
(Winner of an Outstanding Early Careerr Presentation Award)
- **ECS & Cloud Feedbacks Virtual Symposium** Talk  
Circus tents, convective thresholds and the non-linear climate response to tropical SSTs
- **4th biennial workshop on the regional climate response to aerosol** Talk  
Understanding the dependence of fast changes in global and local precipitation on the geographical location of absorbing aerosol

## 2022

- <b>AGU Fall Meeting</b>	Talk
Circus tents, convective thresholds, and the non-linear climate response to tropical SSTs	
- <b>NOAA GFDL</b>	Invited talk
Strong control of effective radiative forcing by the spatial pattern of absorbing aerosol	
- <b>Princeton University</b>	Invited talk
Circus tents, convective thresholds, and the non-linear climate response to tropical SSTs	
- <b>Yale University</b>	Invited talk
Non-linearities in the pattern effect explained by a convective threshold	
- <b>3rd Pan-GASS Meeting, Monterey</b>	Poster
Impact of warm-rain suppression on the climate of a mock-Walker circulation	
- <b>TU Delft</b>	Invited talk
Clouds, aerosols and the global circulation	
- <b>2nd Workshop on Cloud Organization, Utrecht</b>	Poster
Aerosol-cloud-circulation interactions in cloud-resolving simulations with an imposed SST gradient	
- <b>CLIVAR Pattern Effect Workshop</b>	Poster
SST Green's Functions for regional precipitation	
- <b>EGU General Assembly Meeting</b>	Invited talk
Strong control of effective radiative forcing and precipitation by the spatial pattern of absorbing aerosol (Winner of an Outstanding Student Presentation Award)	

## 2021

- <b>AGU Fall Meeting</b>	Talk
Contrasting Seasonal Response of Northern Hemisphere Precipitation Extremes to Climate Change (Winner of an Outstanding Student Presentation Award)	
- <b>AGU Fall Meeting</b>	Poster
Understanding the “pattern effect” of absorbing aerosol	

## 2019

- <b>EGU General Assembly Meeting</b>	Poster
Optimizing the number of convective plumes in EDMF cloud parameterization schemes using high-resolution LES simulations	

## TEACHING

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<b>Mentoring of a GFDL summer intern</b>	2024-present
<i>Training and mentoring of a student from University of Puerto Rico at Mayagüez, working on the response of rainfall extremes to CO<sub>2</sub>. I have continued meeting with the student to support them as they progress through graduate school.</i>	
<b>Guest Lecturer, Colorado State University</b>	2024
<i>Gave a guest lecture on non-linear aspects of Earth’s energy balance</i>	
<b>Guest Lecturer, City University of New York</b>	2023
<i>Gave a guest lecture on basic aspects of Earth’s atmospheric circulation</i>	
<b>Supervision of an Oxford Masters’ student</b>	2022-2023
<i>Day-to-day supervision of a Master’s student studying the response of regional precipitation to SST anomalies</i>	
<b>Teaching Assistant: Atmospheric Physics Master’s Course</b>	2020-2022
<i>Marked homework assignments and provided weekly feedback on students’ work.</i>	
<b>Lecturer / Course Lead</b>	2020-2023
<i>Designed and delivered a course for first-year PhD students on modeling the global-mean climate using energy balance models. Delivered blackboard lectures and interactive Python coding demonstrations.</i>	

## DIVERSITY & OUTREACH EFFORTS

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### **Climate Up Close ([climateupclose.org](http://climateupclose.org))**

2024 – present

Small team of climate scientists committed to making the essentials of climate science accessible to a broad audience through public lectures, Q&A sessions and demos.

### **Harlem StreetSquash volunteer**

2023 – 2024

Providing weekly math and physics tuition to students and young adults in Harlem, with the aim to ensure all participants graduate from high school, enroll in and complete a post-secondary program, and gain meaningful employment. I also assist in running weekly squash training sessions for the students.

### **GFDL Diversity, Equity, Inclusion & Accessibility Committee**

2023 – 2025

Development and execution of DEIA efforts to monitor and enhance lab culture and community at GFDL. Activities included: outreach efforts with minority serving institutions, organizing community events to promote wellness and community within the lab and promoting diversity in hiring practices at all levels of the lab.

### **AOPP Equality, Diversity & Inclusion Committee**

2020 – 2023

Organized the department's first student-led EDI group, which aims to develop and sustain a diverse, inclusive, and equitable academic environment and community. Activities included: collecting demographic data on student applicants to inform access efforts, setting up a community EDI library and arranging accessible coffee breaks and social events for the department.

### **PhD mentoring scheme**

2021 – 2023

Developed a mentoring scheme which matches incoming PhD students with a postdoc or more senior PhD student who can provide advice on adjusting to graduate study at Oxford. Scheme was trialed at a small-scale before being rolled out across the entire Oxford Physics department.

### **Oxford Sparks**

2020 – 2021

Recorded an [outreach video about clouds](#) which has reached over 150,000 people across social media.

### **Seren Hub**

2016 – 2023

Provided interview practice and entrance exam help for Welsh students from disadvantaged backgrounds who want to study Physics or Mathematics at university.

## ACADEMIC SERVICE

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**Peer reviewer** for *Nature*, *Nature Geoscience*, *Nature Climate Change*, *npj Climate and Atmospheric Science*, *Journal of Climate*, *Journal of Advances in Modeling Earth Systems*, *Scientific Reports*, *Atmospheric Chemistry and Physics*, *Geophysical Research Letters*, *Geoscientific Model Development*.

### **Session Convener**

2025

*Convening session on “Climate Sensitivity, Radiative Feedbacks and the Pattern Effect” at the EGU General Assembly Meeting 2025*

### **Proposal Reviewer - Department of Energy**

2024

*Reviewer for DOE Funding call on “Earth System Model Development and Analysis”*

### **Organizing Committee - CFMIP 2024**

2024

*CFMIP conference 2024, Boston College // [website link](#)*

### **Organizing Committee**

2023-present

*GFDL’s Climate Sensitivity Journal Club*

**Steering Committee** 2023-present  
*ECS & cloud feedback virtual symposia // [website link](#)*

**Session chair** 2022  
*Chair of session on “Absorbing Aerosols: Experiments, Observations, and Modelling” at the EGU General Assembly Meeting 2022*

**Policy briefing** Nov-Dec 2020  
*Commissioned by Shadow Secretary for Health and Social Care to research the intersection between ‘Pandemics and Climate Change’. Findings were written in a [white paper](#) and presented to the Government.*