

# Curriculum Vitae – Dr. Claudia Christine Stephan

## Personal data

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## Publication statistics

<https://www.webofscience.com/wos/author/record/AAL-4455-2020>

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## Academic positions

05/2019 – present	Group Leader
	Max Planck Institute for Meteorology, Hamburg
	I was awarded a Minerva Fast Track position by the Max Planck Society and am currently leading the group Cloud Wave Coupling.
05/2018 – 04/2019	Postdoctoral Scientist
	Max Planck Institute for Meteorology, Hamburg
	I worked on the project “Gravity Wave Interactions in the Global Atmosphere”, running the upper-atmosphere extension of the atmospheric general circulation model ICON (UA-ICON). By combining observations, UA-ICON simulations, and high-resolution global simulations I investigated sources, propagation, and effects of gravity waves from the surface to the mesosphere.
01/2016 – 05/2018	Postdoctoral Scientist
	National Centre for Atmospheric Science, Climate Division, University of Reading, Reading, UK

I worked on the project “Drivers of Regional East Asian Monsoon Variability” as part of a large collaboration between the UK and China. I investigated the drivers of precipitation variability over China on daily to decadal timescales. Furthermore, I tested how well MetUM simulations are able to reproduce observed variability and associated mechanisms.

2011 – 2015

PhD Student

University of Colorado, Department of Atmospheric and Oceanic Sciences, Boulder, Colorado, USA

Dissertation: November 2015, Title: “Improving the realism of gravity waves generated by convection in numerical models”

The main focus of my work with Dr. M. Joan Alexander (NorthWest Research Associates, Boulder) was on convection and small-scale atmospheric gravity waves. I ran and developed the NCAR Weather Research and Forecasting model (WRF) with the goal to improve the representation of gravity waves in global models.

2007 – 2011

Study of physics and meteorology

Rheinische Friedrich-Wilhelms Universität, Bonn, Germany

I earned a diploma with distinction in theoretical physics (2011) with a specialization in string theory and mathematical physics. Thesis title: “Phenomenological Aspects of Local F-Theory Models”, supervised by Prof. Hans Peter Nilles under a scholarship from the Bonn-Cologne Graduate School of Physics and Astronomy.

In addition to my diploma in physics I completed all classwork required for a diploma in meteorology. I first enrolled in meteorology and later added physics as a second major. Instead of writing a second diploma thesis in meteorology, I decided to transfer my credits to the atmospheric science program at the University of Colorado in Boulder, to use them towards a doctoral degree.

## Supervision

2022 – present

Lucile Ricard, PhD level, “Reponse of precipitation to dynamics in global-storm resolving models”. This project is part of the initiative “innovative MachInelearning to constrain Aerosol-cloud CLimate Impacts” (iMIRACLI).

2022

Nathanaël Asfaw, MSc level, “Diagnosing the non-linear spectral energy transfer in kilometer-scale models”

2022

Katharina Schmitt, BSc level, “Scaling laws of water vapor and precipitation distributions in observations and ICON simulations”

2020 – present	Dr. Laura Köhler, postdoctoral level, “A Data-Informed Framework for the Representation of Sub-grid Scale Gravity Waves to Improve Climate Prediction” (DataWave)
2020 – 2021	Marcel Kern, BSc level, “Surface energy budget in global coupled storm-resolving models”
2020	Alexis Mariaccia, MSc level, “Optimized hodograph analysis to identify gravity wave signals in atmospheric soundings”
2020 – present	Robert Vicari, PhD level, “Entropy-based automatic detection of wave signals in satellite imagery”
2019 – present	Yanmichel Morfa Avalos, PhD level, “The physics underlying horizontal and vertical kinetic energy spectra”
2017	Yan Ho Ng, MSc level, “Precursors and predictability of weather patterns associated with wintertime rainfall in China”

### **Leadership experience**

2021 – present	Convener of the session “Internal Gravity Waves” at the EGU General Assembly (previously co-convener in 2020).
2020	Organizer of the virtual conference “Remote sensing during EUREC <sup>4</sup> A”: I initiated this two-day workshop to inform the science community about all remote sensing measurements that were collected during EUREC <sup>4</sup> A. I invited the principal investigators (26 people) of all instruments to give talks, recorded them and made the videos available.
2020 – 2021	Scientific representative, Joint Workflow Task Force of the Max Planck Institute for Meteorology and the German Climate Computing Center (DKRZ). Together with scientific programmers, I designed innovative comprehensive workflows. This effort contributed to the proposals for the projects NextGEMS and WarmWorld.
2019	I helped establish the Joint PhD Program between the Universities of Hamburg and Melbourne, which is now funding one of my PhD students. The students graduate with degrees from both universities and spend at least one year abroad.
2019 – present	Principal investigator of the radiosonde network of the EUREC <sup>4</sup> A field campaign. I obtained the funding for close to 1000 radiosondes for the campaign, including the required helium supplies, organized the transport to Barbados, coordinated the measurement strategy between four research vessels, trained people at launching the sondes, and led the first data paper that emerged from the EUREC <sup>4</sup> A field campaign.

2019	Co-organizer (in partnership with the University of Hamburg) of an international workshop on waves (20 participants). To strengthen the collaboration between groups at the Max Planck Institute for Meteorology and the University of Hamburg, Prof. Nedjeljka Žagar and I invited internationally recognized theoreticians who are active in the field of atmospheric dynamics. The workshop resulted in various fruitful collaborations and a review article that I led.
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### **Other academic experience**

2023	Member of the PhD examination committee of Milena Corcos, Laboratoire de Météorologie Dynamique, France
2016	Student Faculty Representative, University of Colorado, USA
2006	Participation in the field project “Convective and Orographically-induced Precipitation Study”, Black Forest Region, Germany. I spent three months at the supersite near Sindelfingen to install and monitor instruments and engage in public outreach activities.
2014 – present	Journal review activities for <i>Atm. Chem. Phys.</i> , <i>Climate Dyn.</i> , <i>Env. Res. Lett.</i> , <i>Geophys. Res. Lett.</i> , <i>Geosci. Mod. Dev.</i> , <i>J. Adv. Mod. Earth Sys.</i> , <i>J. Atm. Sci.</i> , <i>J. Climate</i> , <i>J. Geophys. Res. Atm.</i> , <i>J. Hydrometeor.</i> , <i>Mon. Wea. Rev.</i> , <i>Nature</i> , <i>Quart. J. Roy. Meteor. Soc.</i> , <i>Wea. Clim. Dyn.</i> , <i>Earth. Sys. Sci. Data</i>
2019 – present	Proposal review activities for Deutsche Forschungsgemeinschaft (DFG), and the UK National Environmental Research Council (NERC)

### **Teaching**

2019	I organized a one-day training event for 20 international students in preparation of the EUREC <sup>4</sup> A field campaign.
2017	Lecturer – Advanced methods for climate data analysis, NCAS Climate Modeling Summer School at the University of Cambridge, UK
2017	Lecturer – Fluid Dynamics of the Atmosphere and Ocean, University of Reading, UK
2011 – 2012	Teaching assistant – Severe and Hazardous Weather, University of Colorado, USA
2011 – 2012	Lecturer – Atmospheric Science laboratory class, University of Colorado, USA
2010 – 2011	Teaching Assistant – Advanced theoretical particle physics, University of Bonn, Germany

2007 – 2008                      Teaching Assistant – Synoptic meteorology, University of Bonn, Germany

Outreach                              I regularly coach students and postdocs during designated career events, such as the annual retreat of our local PhD program, or as an invited guest to other programs. I also regularly engage in public outreach by speaking to the public and to TV and radio journalists.

## **Funding and awards**

2023                                  Invited by the Humboldt Foundation to speak at the 4. Japanese-American-German Frontiers of Science (JAGFOS) Symposium in the session “High-resolution Global Modeling for Weather and Climate”.

2022                                  International Space Science Institute Team award for the project “Synthetic Gravity Wave Analyses for New Exploitation of Satellite data (SWANS)”

2020 – 2025                      Funding for a postdoc and myself (principal investigator) within the project “A Data-informed Framework for the Representation of Sub-grid Scale Gravity Waves to Improve Climate Prediction” led by the University of Stanford (566 k€)

2021                                  Awarded membership of the Elisabeth-Schiemann Kolleg

2021                                  Selected to participate in the “Sign Up” program of the Max Planck Society

2020                                  Equipment for the EUREC<sup>4</sup>A field campaign funded by the Max Planck Society (1,633 k€)

2020 – 2023                      Funding for a PhD student through the Joint PhD program of the University of Hamburg and the University of Melbourne (125 k€)

2019:                                  Travel stipend for a research visit to the University of Melbourne and Monash University funded by the ARC Centre of Excellence for Climate Extremes (10 k€)

2019 – present                      Minerva Fast Track Fellowship funded by the Max Planck Society (533 k€)

2010 - 2011                      Stipend of the Bonn-Cologne Graduate School for Physics and Astronomy, University of Bonn, Germany

## Invited presentations

- 2015 University of North Dakota, Grand Forks, USA – *Modelling waves and turbulence with dry simulations*
- 2015 University of Reading, Reading, UK – *Improving the realism of gravity waves in numerical models*
- 2015 New York University, New York City, USA – *Improving the realism of gravity waves in numerical models*
- 2016 SPARC gravity wave symposium, University of Pennsylvania, USA – *Characteristics of gravity waves from convection using idealized model simulations*
- 2016 Met Office, Exeter, UK – *Effects of model horizontal resolution on the simulation of the Asian Monsoon*
- 2017 Institute of Atmospheric Physics, Beijing, China – *Coherent rainfall variability in China: Patterns, drivers and modelling potential*
- 2017 NCAS Climate Modeling Summer School, University of Cambridge, UK – *Advanced tools for climate data analysis*
- 2017 Supercomputing Centre, Jülich, Germany – *Modeling wave dynamics across spatial and temporal scales*
- 2018 Joint Seminar, Max Planck Institute for Meteorology, Hamburg, Germany – *Hierarchical modelling for understanding wave physics in weather and climate models*
- 2019 Institute for Atmospheric Physics, Kühlungsborn, Germany – *Resolved gravity waves in global simulations*
- 2019 University of Frankfurt, Frankfurt, Germany – *Gravity waves in the DYAMOND simulations*
- 2019 EGU, Vienna, Austria – *Gravity waves in convection-permitting simulations of general circulation models*
- 2019 DLR, Oberpfaffenhofen, Germany – *Resolved gravity waves in global simulations*
- 2020 Institut für Umweltphysik, University of Heidelberg, Germany – *Wave-mediated coupling of convection and circulation*
- 2021 SPARC online seminar series, virtual – *Gravity waves in kilometer-scale simulations of general circulation models*
- 2022 AGU, New Orleans, USA, two invited talks – 1) *Interactions between clouds, convection and gravity waves in the tropical troposphere* 2) *How atmospheric gravity waves may influence convection – inferences from a radiosonde network*
- 2022 SPARC gravity wave symposium, Frankfurt, Germany – *Atmospheric energy spectra in global kilometer-scale models*
- 2022 Meteorological colloquium of the Universities of Frankfurt and Mainz, Frankfurt, Germany – *The coupling of waves and convection from kilometer to planetary scales*
- 2022 Charles University of Prague, Czech Republic – *Cloud-wave coupling: success stories and the next challenges*
- 2022 ECMWF Annual Seminar, Reading, UK – *Atmospheric energy spectra in kilometer-scale global simulations*
- 2023 EGU, Vienna, Austria, invited talk in the session “Infrasound, acoustic-gravity waves, and atmospheric dynamics”
- 2023 Invited to speak at the October 2023 Humboldt JAGFOS Symposium in the session “High-resolution Global Modeling for Weather and Climate”.

## **Other participation at international workshops and conferences**

2013 Conference on the Middle Atmosphere, Newport, USA: talk  
2014 SPARC General Assembly, Queenstown, New Zealand: poster  
2014 National Center for Atmospheric Science, Boulder, USA: talk  
2014 Atmospheric Composition and Convection Workshop, JPL, Pasadena, USA: attended  
2014 Young Scientist Poster Conference CU Boulder, Boulder, USA: poster  
2014 Young Scientist Symposium on Atmospheric Research, Fort Collins, USA: talk  
2015 AMS annual meeting, Phoenix, USA: talk  
2015 AMS Atmosphere and Ocean Fluid Dynamics, Minneapolis, USA: talk  
2015 National Center for Atmospheric Science, Boulder, USA: talk  
2015 SPARC Workshop on Storm Tracks, Grindelwald, Switzerland: talk  
2015 Young Scientist Poster Conference CU Boulder, Boulder, USA: poster  
2015 SPARC, Chemical and Physical Processes in the Climate System, Boulder, USA: attended  
2015 AGU annual meeting, San Francisco, USA: talk  
2016 CLIVAR conference, Qingdao, China: poster  
2017 Workshop on East Asian Water Cycle, Beijing, China: talk  
2017 CSSP annual meeting, Xi'an, China: talk  
2017 NCAS annual meeting, Manchester, UK: poster  
2017 AGU annual meeting, New Orleans, USA: talk  
2019 EGU, Vienna, Austria: poster  
2019 EUREC<sup>4</sup>A meeting, LMD, Paris, France: talk  
2020 EGU, online: talk  
2021 EGU, online: talk  
2022 EGU, Vienna, Austria: talk