Dr Maria-Theresia Walach **m.walach@lancaster.ac.uk**

Academic Posts & Education:

Since 03/2017:	**Senior Research Associate**, Lancaster University, UK; Line Manager: Dr. Adrian Grocott

Undertaking of original research on the NERC-funded project "Time Variability of the ionospheric electric field: solar wind driving and atmospheric feedback" (2017-2020) and **"SD-WACCM: Predicting the Upper Atmospheric Response to Extremes of Space Weather Forcing" (**2020-2023)**:**

- **Lead Developer** of the Time Variable Ionospheric Electric field (TiVIE) **model**, the first event-based model for ionospheric electric fields, taking into account time history of the system
- Processing and archiving of **22 years of raw data** (> 30 TB) from the Super Dual Auroral Radar Network (SuperDARN)
- Co-author of **16 papers** and **9 open-source software packages**.
- Co-supervisor of two **Masters students** in Statistics (with Dr A. Gibberd)
- Co-supervisor of **PhD fully** (NERC DTP) **funded student** in Physics (with Dr A. Grocott)
- **Taught skills-based workshops** to help undergraduate students develop **report writing and data evaluation skills** (2020/2021)
- **Seminar coordinator** for the Space and Planetary Physics Group until 2018 (organisation of external speakers and management of **~£1k budget**)
- Convener of the **Autumn MIST meetings** (Nov. 2020; Nov. 2021), Co-organiser of the **RAS Discussion meetings** on "Global Monitoring of Geospace" (Jan. 2021) and "The Global Response of the Terrestrial Magnetosphere during Storms and Substorms" (Feb. 2019) and **LOC member** for National Astronomy Meeting 2019 and STFC Advanced Summer School in Space Plasma Physics (Sept. 2019)
- Reviewer for NASA GOLD-ICON Guest Investigator programme (2021)
- Participant in national outreach competition **I'm a Scientist Get me out of here** and active participant in Physics department **outreach programme**
- **Leader** of widening-participation project with **10 A-Level students from rural Lancashire**

2013–2017:	**PhD** studying **Solar wind-magnetosphere driving at Earth**, University of Leicester, UK; Supervisors: Prof. S. E. Milan & Dr. T. K. Yeoman

- **Analysis** using **spacecraft data**, **magnetometers**, **radars** and **numerical modelling**
- **3 first author papers**: Using physics-based model to test understanding of ionospheric flows with spacecraft and radar data [Walach et al., 2017a]; Comparative studies of magnetospheric responses [Walach and Milan 2015, Walach et al., 2017b]
- **Organised and lead** a Journal Club for fellow PhD students (2016/2017)
- Active participation of group's **outreach programme**
- **Undergraduate teaching:** Laboratory supervision and marking of lab notebooks

2009–2013:	**1st class Honors** from the **MPhys course in Physics**, University of Leicester, UK.

- Masters dissertation on auroral observations of substorms

Summer 2010:	**Research Assistant** with Prof. **J. Remedios** & Dr. **H**. **Sembhi** in the **Earth Observation Group**, University of Leicester, UK.

- **Developing improved cloud flagging procedures** for Envisat data above water to estimate sea surface temperatures. I tested existing procedures and curated testing intervals and data.

Grants & Prizes:

2019:

- **NERC Standard Grant (£704k FEC)**: Researcher Co-Investigator
- **Royal Astronomical Society Small Grant Scheme (£1.4k)**: Funding for discussion meeting
- Runner-up in the *Seaborgium zone* of **I'm a Scientist Get me out of here**

2016:
- **Shortlisted** for the University of Leicester Research Images Competition

2015:
- **Royal Astronomical Society Small Grant Scheme (~£1k)**: Funding to attend AGU Fall Meeting (San Francisco, US)
- **Best Student Talk: Rishbeth Prize** at the National Astronomy Meeting

2014:
- **Joint First Place: 3-Minute Wonder Competition**, Institute of Physics, Midlands Division

Publication Record (First-author Highlights):

- **7 first author publications** in **Journal of Geophys. Res.**, **Space Weather** and **A&G**:
  - **M.-T. Walach**, A. Grocott, and S. E. Milan (**2021**), *Average Ionospheric Electric Field Morphologies during Geomagnetic Storm Phases*, **J. Geophys. Re: Space Physics**, doi:10.1029/2021JA029337.
  - **M.-T. Walach**, and A. Grocott (**2019**), *SuperDARN scatter during geomagnetic storms and geomagnetically active times,* **J. Geophys. Res.: Space Physics**, doi: 10.1029/2019JA026816.
  - **M.-T. Walach**, S. E. Milan, K. R. Murphy, J. A. Carter, B. A. Hubert, and A. Grocott (**2017**), *Comparative study of large-scale auroral signatures of substorms, steady magnetospheric convection events, and sawtooth events*, **J. Geophys. Res.: Space Physics**, doi: 10.1002/2017JA023991.
  - **M.-T. Walach**, S. E. Milan, T. K. Yeoman, B. A. Hubert, and M. R. Hairston (**2017**), *Testing nowcasts of the ionospheric convection from the expanding and contracting polar cap model*, **Space Weather**, doi:10.1002/2017SW001615.
  - **M.-T. Walach**, S. E. Milan (**2016**), *The Irregular Pulse of the Magnetosphere*, **Astronomy & Geophysics**, doi: 10.1093/astrogeo/atw041.
  - **M.-T. Walach**, and S. E. Milan (**2015**), *Are Steady Magnetospheric Convection Events Prolonged Substorms?*. **J. Geophys. Res.: Space Physics**, doi: 10.1002/2014JA020631.
- **18 co-author publications** in **Space Sc. Rev.**, **J. of Geophys. Res.**, **Space Weather**, **A&G**.
- **Co-author of 9 software packages published on Zenodo/Github.**

Invited Talks:

- **Invited talk**: **14th International Conference on Substorms**, 03/10/2019, Tromsø, Norway.
- **Invited seminar talks**:
  Thayer School of Engineering, Dartmouth College (US), 02/03/2021, *virtual.*
  Ground Induced Currents & Machine Learning Group (US), 05/05/2020, *virtual*.
  University of Southampton, 30/04/2019, Southampton, UK.
  Mullard Space Science Laboratory (UCL), 19/03/2019, Surrey, UK.
  University of Leicester, 16/01/2019, Leicester, UK.
  Lancaster University, 18/03/2017, Lancaster, UK.
  Swedish Institute of Space Physics Uppsala, 03/02/2016, Uppsala, Sweden.

Community Leadership:

- **Co-authored five white papers** to the **STFC Solar System Advisory Panel** for its 2021 consultation (on Hemispheric Asymmetries; Outreach for UK Space Missions; Solar wind-magnetosphere-ionosphere coupling; Magnetosphere-ionosphere coupling; Sub-orbital science).
- **Co-authored** a **white paper** to **UK Space Agency** on Outreach for UK Space Missions (led by Graziella Branduardi-Raymont, UCL).
- **Panel member** of Royal Astronomical Society Grants, Awards and Prize Review (2020/21).
- **Chair** of the **MIST Awards Taskforce Team** (Chair since 2020, Member since 2019).
- **Elected member** of the **MIST** (Magnetosphere, Ionosphere and Solar-Terrestrial) **Community Council** since August 2019 (see www.mist.ac.uk).
- **Session convener** at the SuperDARN workshops in 2015 and 2018, the National Astronomy Meeting in 2019, 2021, and the 14th International Conference on Substorms in 2019.
- **Reviewer** for **Nature Astronomy** (since 2020); **Annales Geophysicae** (since 2019); **Radio Science** (since 2018); **Journal of Geophysical Research - Space Physics** (since 2014).
- Member of **SuperDARN Data Standards Working Group** and **Spacecraft Scheduling**

Working Group and Data Analysis Working Group.

- Member of **Whole Atmospheric Modelling Extension** led by Prof. D. Jackson (Met Office).
- Member of the **Solar wind Magnetosphere Ionospheric Link Explorer** (SMILE) **ESA/CAS mission** consortium and member of **Ground-based mission support and additional science working group** (founding member).
- **External examiner** for the University of KwaZulu-Natal in **South Africa**.

Public Engagement and Media:

- **Commentary** for the Royal Astronomical Society **Supermassive Podcast** on Radiation Belts (July 2021).
- **Commentary** for Physics World (March 2021) on Space Hurricanes.
- **Blogpost** for AuroraWatch UK (February 2018) on observing the aurora from space.
- Presenting **Journey across the Solar System**, **Light Up Lancaster, 2017.**
- Outreach talk, explaining research to the public, **Pub-hD talk**, Leicester, UK: **2015.**
- Setting up & talking to visitors at the **Stargazing Live Event**, Leicester, UK.
- **2015**: ionospheric & magnetospheric phenomena; **2014**: Space Weather; **2013**: Supernovae, Gamma Ray Bursts & SWIFT.
- Outreach talk, explaining research to the public, **Pub-hD talk**, Leicester, UK: **2015.**
- 3 Minute Presentation to a non-specialist audience explaining my research, **3 Minute Wonder Competition**, Institute of Physics: **2014 & 2015**.
- **Radio engagements**: I have previously appeared on BBC Radio Leicestershire (January 2013) and on the BBC Radio 4 show The Third Degree.