DR SOPHIE MURRAY

Space Scientist   Réalteolaí

INFO

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EDUCATION

PhD Solar Astrophysics

Trinity College Dublin, Ireland
2013

MSc (Dist.) Space Science

University College London, UK
2008

BA (Hons) Physics & Astrophysics

Trinity College Dublin, Ireland
2007

SOCIAL

Twitter
GitHub
LinkedIn

drsophiemurray

PROFILE

I am an expert in space weather at Dublin Institute for Advanced Studies (DIAS), with over a decade of experience in research and project management. I work with scientists, forecasters, and policy makers to develop operational space weather forecasting tools. My research interests include ensemble and deep learning techniques for solar eruption prediction, heliospheric propagation modelling, and thermospheric data assimilation. I am also involved in a variety of STEM education and outreach activities and student supervision responsibilities.

EXPERIENCE

Space Weather Research

DIAS and TCD, 2016 – Present

- Principal Investigator of a European Office of Aerospace Research and Development grant (€375,000), improving solar eruption prediction using innovative big data techniques developed for terrestrial weather forecasting.
- Project Management Board member of the EU Horizon 2020 €4 million Pre-European Solar Telescope, a European-wide research infrastructures project. Previously a board member of the €2.4 million FLARECAST project.
- Co-lead of NASA Flare Scoreboard and COSPAR International Space Weather Action Teams, defining international space weather forecasting benchmarks.
- Co-lead developer of SolarMonitor.org and communication lead for the SunPy open-source Python software community project.

Education and Public Engagement

DIAS and TCD, 2016 – Present

- Lecturer of TCD junior fresh Physics for Engineers (2019-present), senior fresh Physics for Earth Sciences (2018-2019), and senior fresh physics laboratories (2017-2020).
- Supervisor of 2 postdocs, 2 PhD students, 2 MSc students, and 4 final year undergraduate astrophysics projects.
- Principal Investigator of the SFI Astronomical Midlands Project (€200,000), managing an Education and Outreach Officer to engage rural communities with astronomy through the Irish Low Frequency Array telescope.

SKILLS

- Project management
- Financial administration
- Public engagement
- Science policy
- Stakeholder dissemination
- Research supervision
- Web development
- Data analytics/visualisation
- Mathematical modelling
- Forecast verification
- Quality assurance

EXPERTISE

- Mac OS X   ●●●●●
- Linux   ●●●●○
- Microsoft Office   ●●●●●
- Adobe Photoshop   ●●●●○
- WordPress   ●●●●●
- HTML/CSS   ●●●●○
- Python   ●●●●●
- IDL   ●●●●●
- R   ●●●●○
- Julia   ●●●○○
- SQL   ●●●○○
- Git   ●●●●●

SCIENCE HIGHLIGHTS

- > 300 citations since 2015.
- H index of 11; i-10 index of 13.
- Nature Astronomy and Nature Communication co-author (2019).
- > 25 invited talks since 2015.
- NASA Jack Eddy cross-disciplinary keynote speaker.

See sophiemurray.org/publications for a full list of publications and presentations.

EXPERIENCE

- National contact for the International Astronomical Union European Regional Office of Astronomy for Development and the Astronomy Education Coordinator Teams.
- Organiser of DIAS Astronomy & Astrophysics summer internship programme.
- Co-organiser of DIAS Dunsink Observatory Public Visitor Nights, and maintainer of the DIAS Dunsink webpages and social media.
- Regular contributor to the SFI Smart Futures scheme.
- External advisor of Science Gallery Dublin exhibitions.

Operational Product Development

Met Office, UK, 2013 – 2016

As a Space Weather Research Scientist, I worked closely with academics, forecasters, and end-users to transition basic science to operational space weather forecasting tools. Some typical daily tasks are listed below.

- Data analysis, e.g., data mining and visualization, and software development with supercomputing. I set up the centre's first solar flare forecasting system, and developed an improved spacecraft drag model with data assimilation.
- Model validation (code testing and documentation) and verification (statistical studies to determine forecast accuracy).
- Dissemination, e.g., customer requirement gathering, public outreach, academic collaboration, scientific publications.

ACHIEVEMENTS

Irish Research Council Postdoctoral Research Highlight (2018)

In recognition of my innovative research project that provides new scientific insight as well as developing an operational product. I am internationally recognised as an expert in research to operations, having organised and been an invited speaker for many scientific conferences every year around the world.

Space Weather Journal Editorial Highlight (2017)

In recognition of developing operational benchmarks for solar flare forecasting for the very first time. I have also written an invited commentary for Space Weather, am an Associate Editor for Frontiers Space Physics, and serve as a NASA Heliophysics review panelist.

Met Office Instant Recognition Scheme Award (2014, 2016)

In recognition of my project management skills as well as public engagement efforts. I now have a high profile nationally in Irish STEM outreach, with recent appearances in SFI Smart Futures cinema campaign, Irish Times Research Profiles, and Newstalk Science Week.