

# PEARSE MURPHY

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[pearse.murphy@dias.ie](mailto:pearse.murphy@dias.ie)  
[www.dias.ie/](http://www.dias.ie/)  
[pearsemurphy](#)

Dublin Institute for  
Advanced Studies,  
31 Fitzwilliam Place,  
Dublin 2,  
D02 XF86,  
Co. Dublin,  
Ireland

## PROFILE

I am a final year PhD student in Trinity College Dublin and the Dublin Institute for Advanced Studies (DIAS) under the co-supervision of Prof. Peter Gallagher and Dr. Eoin Carley. My research focuses on interferometric radio imaging of solar bursts using the LOw Frequency ARray (LOFAR) in order to study the turbulent nature of the solar corona.

I am also involved in the development of the REALtime Transient Acquisition ([REALTA](#)) backend for recording and processing data from the Irish LOFAR station [I-LOFAR](#) in Birr, County Offaly. I am one of I-LOFAR's Chief Observers and regularly monitor the sun for radio signatures of solar activity.

## EDUCATION

**Trinity College Dublin, Ireland — PhD. Astrophysics 2017-present**

Due to submit thesis in December 2021

**Trinity College Dublin, Ireland — B.A. Mod. Physics and Astrophysics 2013-2017**

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## RESEARCH AND TEACHING EXPERIENCE

**I-LOFAR Chief Observer — 2017-present**

Responsible for coordinating and running observations on I-LOFAR. This includes recording raw voltages with the REALTA backend or station statistics data with the local control unit. I have overseen the observational programming on I-LOFAR of a number of different radio sources including; solar radio emission, pulsars and jovian radio emission.

**Walton Club Lead Educator, Walton Club, Trinity College Dublin — 2017-2019**

Responsible for designing and teaching a physics and maths syllabus for the [Walton Club](#), a weekend Science Technology Engineering and Maths (STEM) club for 12-17 year olds.

**Laboratory and Teaching Assistant, School of Physics, Trinity College Dublin — 2017-2019**

Demonstrated for undergraduate physics laboratories for Junior Sophister (3rd year) students. Involved teaching a breadth of fundamental and applied concepts in physics, as well as experimental techniques and how to operate laboratory equipment.

### **I-LOFAR Construction Team Member, Birr — 2017**

During the summer of 2017 I was part of a team of undergraduates, postgraduates, postdoctoral researchers and senior academic staff who constructed I-LOFAR. This involved the assembly of 96 high band antenna tiles and 96 low band antennas and connecting them to the station electronics.

### **Final Year Undergraduate Research Project, Mullard Space Science Laboratory, University College London — 2016**

Completed a nine week research project on A Statistical Analysis of “EIT waves” and the Solar Phenomena Associated with them. Compared the velocity of waves in the solar corona with other solar phenomena including solar flares, coronal mass ejections, solar energetic particles and type III radio bursts. The project report was awarded a grade of first class honours.

### **PROFESSIONAL AFFILIATIONS AND ACTIVITIES**

Postgraduate research student at the School of Physics Trinity College Dublin and the Astronomy and Astrophysics section of the Dublin Institute for Advanced Studies.

Regular member of the Solar and Space Weather Key Science Project of the international LOFAR telescope.

Fellow of the Royal Astronomical Society.

Member of the Astronomical Society of Ireland.

### **AWARDS AND SCHOLARSHIPS**

Recipient of the Irish Research Council Government of Ireland Postgraduate Scholarship.

Awarded gold medal for exceptional merit in final year undergraduate exams.

### **PUBLICATIONS**

First Results from the REAL-time Transient Acquisition (REALTA) backend at the Irish LOFAR station. **Pearse C. Murphy** et al. Astronomy & Astrophysics (in review)

LOFAR observations of radio burst source sizes and scattering in the solar corona. **Murphy, Pearse C.** ; Carley, Eoin P. ; Ryan, Aoife Maria ; Zucca, Pietro ; Gallagher, Peter T. Astronomy & Astrophysics, Volume 645, 2021.

LOFAR imaging of the solar corona during the 2015 March 20 solar eclipse. Ryan, A. M. ; Gallagher, P. T. ; Carley, E. P. ; Brentjens, M. A. ; **Murphy, P. C.** ; Vocks, C. ; Morosan, D. E. ; Reid, H. ; Magdalenic, J. ; Breitling, F. ; Zucca, P. ; Fallows, R. ; Mann, G. ; Kerdraon, A. ; Halfwerk, R. Astronomy & Astrophysics, Volume 648, 2021.

A Statistical Analysis of the Solar Phenomena Associated with Global EUV Waves. Long, D. M. ; **Murphy, P.** ; Graham, G. ; Carley, E. P. ; Pérez-Suárez, D. Solar Physics, Volume 292, Issue 12, 2017.

## **TALKS AND PRESENTATIONS**

### **I-LOFAR Science and Techniques Workshop**

**I-LOFAR Education Centre, Birr Castle, Co. Offaly, Ireland**

**2nd - 4th March 2020**

Scattering of radio waves in the solar corona.

### **I-LOFAR Science and Techniques Workshop**

**I-LOFAR Education Centre, Birr Castle, Co. Offaly, Ireland**

**2nd - 4th March 2020**

Single Station Data Analysis Tutorial.

### **Young European Radio Astronomers Conference**

**Dublin Institute for Advanced Studies/Trinity College Dublin, Ireland**

**26th - 29th August 2019**

Interferometric Imaging of Type III Bursts in the Solar Corona.

### **Community of European Solar Radio Astronomers Workshop**

**Leibniz-Institut für Astrophysik Potsdam, Germany**

**8th - 12th July 2019**

Interferometric Imaging of Type III Bursts in the Solar Corona.

### **Irish National Astronomy Meeting**

**Birr, Ireland**

**5th - 7th September 2018**

Finding Fast Solar Radio Transients in I-LOFAR Transient Buffer Board Data.

## **SKILLS**

### **Research**

Interferometric radio imaging e.g. LOFAR Default Processing Pipeline, WSClean.

Oral and written communication.

Data visualisation e.g. matplotlib.

Data modelling e.g. Non-linear least squared fitting with scipy and lmfit.

Version control, e.g. git

### **Computer Languages**

Python, Bash.

### **Operating Systems**

Mac OSX, Linux Ubuntu, Windows 10.

### **Other**

Irish driver's licence, English as a first language.

## **PERSONAL INTERESTS**

Cycling, bouldering, musical theatre, playing guitar.