# Dúalta Ó Fionnagáin, PhD.

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## Bio

I am a data scientist with a PhD in physics and astrophysics, currently working as a research scientist investigating the impact of agricultural interventions against climate change using remote sensing and machine learning at the University of Galway. Skilled in Python, SQL, Tensorflow and Keras. Hands on experience applying techniques such as deep learning, regression, transformers, and classification techniques to large n-dimensional datasets.

## Employment

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| 01/23 - now | **SFI Postdoctoral Researcher** <br> *University of Galway* | Galway, Ireland |

Using large open-source earth observation data to quantify the effectiveness of agricultural interventions against climate change.

- Deep analysis of important geo-strategic food production regions in Africa and Asia.
- Analysing satellite imagery to determine the impact of multi-million $ interventions on crop resilience to climate change.
- Developing machine learning/AI models to classify cropland extent, as well as identifying adaptation to climate change due to investment.
- Identifying changes in land-use and management from remote sensing.

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| 10/20 - 10/22 | **IRC Postdoctoral Fellow** <br> *NUI Galway* | Galway, Ireland |

Investigated radio waves from space using state-of-the-art radio telescopes and simulations.

- Awarded funding (€100k) from the Irish Research Council to conduct my own research at NUIG.
- Data intensive (>TBs) research analysing spectral time-series data.
- Deep theoretical understanding of plasma physics and radiative processes.
- Commissioning team for OVRO-LWA Caltech radio telescope/correlator.

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| 10/16–06/20 | **Ph.D.** Physics & Astrophysics <br> *Trinity College Dublin* | Dublin, Ireland |

PhD through research of stellar physics, magnetic fields, and plasma physics.

- Thesis : "The winds of low-mass stars and solar wind evolution"
- Published 3 1st-author papers in international peer-reviewed academic journals.
- Worked closely with my research group, PhD advisor, and with international collaborators.
- Self-directed research for 4 years, focusing on 3D magnetohydrodynamics simulations and data analysis of stellar winds.
- Extensive use of python for data analysis and communication of results.
- Refereed and reviewed papers for international academic journals.

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| 09/18 - 05/19 | **Teaching Assistant - Fourier Analysis/Differential Calculus** <br> *School of Maths, TCD* | Dublin, Ireland |
| 09/16 - 05/19 | **Laboratory Demonstrator - Computational & Experimental Physics** <br> *School of Physics, TCD* | Dublin, Ireland |
| 06/17 - 12/17 | **Python tutor** <br> *Codify* | Dublin, Ireland |
| 04/13 - 09/13 | **Laboratory Scientist - Summer internship** <br> *Boliden Tara Mines* | Navan, Ireland |

# Education

| 2015–2016 | **M.Sc.** Space Science and Technology [1.1 Hon Distinction] | University College Dublin |
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- Thesis : "I-LOFAR: Study into using Transient Buffer Boards for Gathering Raw Data"
- Developed pipeline for I-LOFAR transient buffer board dataflow. High-cadence (5ns) and high-volume data (>TB).

| 2011–2015 | **B.A(mod)** Physics and Astrophysics [2.1 Hon] | Trinity College Dublin |
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- Thesis : "Detecting Radio Emission from Exoplanets"
- Developed analytical models predicting radio emission from exoplanet aurorae.
- Computer simulation, Numerical Methods, Special Rel., Quantum Mechanics, Thermodynamics.
- Donogh O'Malley Scholarship.
- Piano teacher in Royal Irish Academy of Music during undergraduate degree.

# Skills

- Deep understanding of physics, maths and statistics.

- Data analysis and machine learning in **python**.

- Data mining, preprocessing, reduction, formatting (**numpy**, **pandas**, **sklearn**, **keras**, **tensorflow**, **SQL**).

- Multi-spectral satellite imagery analysis (**geopandas**, **rasterio**, **folium**, Google Earth Engine, COGs, GeoTIFFs).

- Parallel programming with **MPI** and **OpenMP**. Extensive work with ICHEC's Fionn and Kay clusters as well as other platforms across Ireland. Comfortable with virtual environment tools such as **Singularity** and **Docker**.

- Visualisation and communication of data insights using a broad toolset including **python**, **matplotlib**, **pylab**, **seaborn**, **visit**, **tecplot**

- Expert at communicating scientific results. Gave many presentations and posters at international conferences. As well as leading and organising group meetings.

- Project management, satellite subsystems and control. Space mission design and documentation.

- Financial markets, time-series data analysis, real-time trade production algorithms on **AWS**.

- Ability to learn new tools at pace. (**HTML**, **CSS**, **C#**, **Javascript**, **C**, **Julia**).

# Achievements

| 2020 | Irish Research Council Fellow at NUIG | IRC |
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| 2020 | Python in Astronomy 2020 LOC | PyAstro |
| 2019 | European Research Council PhD | ERC |
| 2019 | Peter Curran Award | INAM/ASGI |
| 2018 | BCool Meeting LOC | BCool |
| 2017 | Postgraduate Representative | ASGI |
| 2016 | School of Physics Research Grant | Trinity College Dublin |
| 2016 | Postgraduate Research Studentship | Trinity College Dublin |
| 2011 | Donogh O'Malley Scholarship | Dept. of Education |