Dúalta Ó Fionnagáin

https://ie.linkedin.com/in/ofionnad | ofionnad@tcd.ie
https://github.com/ofionnad | ofionnad.github.io

Biography

I am currently an IRC post-doctoral fellow at NUIG. I hold a Ph.D. from TCD, a M.Sc. in Space Science and Technology, and a B.A. [Mod] in Astrophysics from Trinity College Dublin. Highly developed skills in physics, maths and coding that cross multiple domains including a deep problem-solving ability, modelling and algorithms, and data science.

Research Interests:
Brief bullet points on the areas I have a keen interest in:

- **Stellar-Planetary Systems**: Stellar activity, Stellar Winds, Exoplanets, Star-Planet Interactions, Exoplanet Aurorae, Magnetospheres, Planetary Winds, Atmospheric Loss, Planetary & Stellar Radio Emission
- **Planetary lightning**: Ground-based radio observations of terrestrial/Saturnian/Uranian lightning.
- **Data Science**: Machine Learning, Data Visualisation, Data Engineering, Astronomical Data, Machine Vision, Financial Markets

Research Experience

10/20 - current — **National University of Ireland Galway** — Galway, Ireland
IRC post-doctoral fellow
Ground-based radio observations of electrostatic discharges on planetary bodies such as Saturn, Uranus, and exoplanets. Radio astronomy research into low-mass stellar systems (stellar CMEs, planetary aurora, stellar winds).

09/16 - 09/20 — **Trinity College Dublin** — Dublin, Ireland
PhD Research Student
3D, finite-volume, magnetohydrodynamic simulations of low-mass stellar winds, characterising their global stellar effects (mass-loss and rotation) and their interaction with orbiting exoplanets.

04/16 - 09/16 — **Trinity College Dublin** — Dublin, Ireland
Masters Research Student
Processing of high-temporal resolution data from I-LOFAR transient buffer boards. Developing of data pipeline and feasibility study of early trigger mechanism for transient radio events.

09/14 - 01/15 — **Trinity College Dublin** — Dublin, Ireland
Undergraduate Research Student
Analytical study of radio emissions from exoplanets orbiting giant stars. Predicted radio fluxes from exoplanetary targets.

Teaching Experience

09/18 - 12/19 — **Trinity College Dublin** — Dublin, Ireland
Teaching Assistant
Taught tutorials for 2nd year Fourier Analysis & Differential Equations
Detailed achievements:
- Prepared and delivered over forty tutorial lectures.

09/18 - 12/19 **Trinity College Dublin** Dublin, Ireland
Lab Demonstrator
Taught undergraduates in experimental and computational physics laboratory

06/17 - 12/17 **Codify Dublin** Dublin, Ireland
Python tutor
Taught beginners the fundamentals of python, how to manipulate data etc.

Education

2016-current **Ph.D.** Astrophysics Trinity College Dublin
Advisor: Prof. Aline A. Vidotto
- Thesis : "Evolution of the winds of solar-type stars and their effects on orbiting planets"

2015–2016 **M.Sc.** Space Science and Technology [1.1 Hon Distinction] University College Dublin
Advisor: Prof. Peter T. Gallagher
- Thesis : "I-LOFAR: Study into using Transient Buffer Boards for Gathering Raw Data"

2011–2014 **B.A. (Mod)** Physics And Astrophysics [2.1 Hon] Trinity College Dublin
Advisor: Dr. Graham M. Harper
- Thesis : Detecting Radio Emission from Exoplanets

Further Training

2021 Introduction to Antennas, ASTRON, Online

2019 HPC & Python Workshop, ICHEC, Dublin, Ireland

2017 Computational MHD Workshop, Leeds, UK
Postgraduate diploma modules in Statistics, TCD

Service to Community

1. PhD award panelist, NUIG, 2021
2. LOC member "Python in Astronomy 2020", Dublin, 2020
3. Member of the BCool Consortia
4. Postgraduate representative on the ASGI Executive Committee
5. LOC member "7th BCool Meeting", Dublin 2018
6. Conducted peer-review on international journals (MNRAS, A&A)
7. Organiser stellar group meetings, Astrophysics Dept. Trinity College Dublin, 2017

Publications

Refereed Publications

1. "λ Andromedae: A post-main-sequence wind from a solar-mass star"
D. Ó Fionnagáin, A Vidotto, P Petit, C Neiner, W Manchester IV, C P Folsom, G Hallinan.
Monthly Notices of the Royal Astronomical Society, Volume 500, Issue 3, (2021): 3438–3453
2. "The circumstellar environment of 55 Cnc: The super-Earth 55 Cnc e as a primary target for star-planet interactions"
C. P. Folsom, **D. Ó Fionnagáin**, L. Fossati, A. A. Vidotto, C. Moutou, P. Petit, D. Dragomir and J.-F. Donati.
Astronomy & Astrophysics, 633, A48 (2020)

3. "MOVES–II. Tuning in to the radio environment of HD189733b."
   R. D. Kavanagh, A. A. Vidotto, **D. Ó Fionnagáin**, V. Bourrier, R. Fares, M. Jardine, Ch Helling, C. Moutou, J. Llama, and P. J. Wheatley.
   Monthly Notices of the Royal Astronomical Society, Vol. 485, no. 4 (2019): 4529-4538.
4. "The solar wind in time–II. 3D stellar wind structure and radio emission."
   D. Ó Fionnagáin, A. A. Vidotto, P. Petit, C. P. Folsom, S. V. Jeffers, S. C. Marsden, J. Morin, J. D. do Nascimento Jr, and the BCool Collaboration.
   Monthly Notices of the Royal Astronomical Society 483, no. 1 (2018): 873-886.
5. **D. Ó Fionnagáin**, and A. A. Vidotto. "The solar wind in time: a change in the behaviour of older winds?." MNRAS 476.2 (2018): 2465-2475.

Non-refereed Publications

1. "The Aging Solar Wind: a Break in Wind Evolution at Older Ages?"
   D. Ó Fionnagáin, and A. A. Vidotto. Proceedings of the IAU 13, no. S335 (2017): 98-101.
2. The Solar Wind in Time II: can we detect radio emission from young solar analogues?
   Ó Fionnagáin, D., Vidotto, A., Petit, P., Folsom, C., Jeffers, S., Marsden, S., Morin, J., do Nascimento Jr., J. (2018). Cool Stars 20. http://doi.org/10.5281/zenodo.1487988
3. ofionnad/radiowinds: Calculating Thermal Bremsstrahlung Emission from Stellar Winds (Version v1.1.0)
   D. Ó Fionnagáin. (2019, April 30). Zenodo. http://doi.org/10.5281/zenodo.2654877

Talks & Posters

2021

- "Simulating stellar winds from low-mass stars and observing planetary electrostatic discharges in our solar system", OVRO-Exoplanet Meeting, Caltech, California

2020

- "Simulating the winds of low-mass stars like our Sun", School of Maths seminar, NUIG, Galway
- "The winds of low-mass stars", PhD Viva Voce, TCD, Dublin

2019

- "The Solar Wind in Time: Thermal emission from the winds of solar-analogues", Poster, IAU 354, Copiapó, Chile
- "The Solar Wind in Time", School of Physics Postgraduate Seminar, Trinity College Dublin, Ireland
- "The super-Earth 55 Cancri e as a primary target for star-planet magnetic interactions", Contributed Talk, INAM, Armagh, Ireland

2018

- "The Solar Wind in Time", Poster, Cool Stars 20, Boston, USA
- "The solar wind in time: predicting thermal radio emission", Contributed Talk, BCool Conference, Dublin, Ireland
- "The solar wind in time: detecting solar-like winds in radio", Contributed Talk, INAM, Birr, Ireland

2017

- "The Aging Solar Wind: a Break in Wind Evolution at Older Ages?", Poster, IAUS 335, Exeter, UK
- "The solar wind in time: a break at older ages?", Contributed Talk, BCool Conference, Montpelier, France

Grants & Awards

2020 **Postdoctoral Fellowship** IRC
Awarded funding to study planetary electrostatic discharges with ground-based radio observations in NUIG. (value: €95,000)

2019 **Peter Curran Award** INAM/ASGI
Recognition of best student presentation at the Irish National Astronomy meeting

2019 **Computational Resources** ICHEC
Awarded HPC computational time on Ireland's largest computer Kay. 200k core hrs

2018 **Trinity Travel Trust Grant** Trinity College Dublin
Awarded travel grant to attend Cool Stars 20 in Boston, Massachusettes (€600).

2017 **Computational Resources** ICHEC
Awarded HPC computational time on Ireland's largest cluster Fionn, subsequently extended project for another year. 400k core hrs

2016 **School of Physics Research Grant** Trinity College Dublin
Awarded to deserving students in the School of Physics at a postgraduate level. (value: €70,000)

2016 **Postgraduate Research Studentship** Trinity College Dublin
This scholarship is awarded to prospective PhD students in Trinity College Dublin and aims to support and develop gifted research students. (value: €24,000)

2011 **Donogh O'Malley Scholarship** Dept. of Education
Awarded to candidates with the highest marks in STEM in the leaving certificate. (value: €66,000)

Public Outreach

2016

1. 2016 Partial Solar Eclipse, Public Event, TCD, Volunteer
2. 2016 Mercury Transit, Public Event, TCD, Volunteer

2018

3. "Using solar twins as proxies for the solar wind", Public Talk, Solarfest, Dunsink Observatory, Dublin, Ireland
4. Presented public exhibitions at the Body & Soul Festival, Ballinlough Castle, with Science Gallery, TCD

2019

5. 2019 Mercury Transit, Public Event, TCD, Organiser

Skills

Extensive coding ability and languages

- Python, Fortran, C, Bash, IDL, HTML, SQL

Large dataset analysis and visualisation in Python

- Python, Jupyter, Dask, Pandas

Parallel programming with MPI and OPENMP

- Extensive work with MPI Fortran code during my PhD on Ireland's largest supercomputer (Kay, ICHEC)

Visualisation of data using Python/Matplotlib, ViSIT, TecPlot

- Expert at presenting scientific results using python

Data analysis and machine learning in python

- Statistical methods for data preprocessing, reduction, formatting and analysis

Languages

- Native Irish and English speaker
- Basic French and Spanish

Financial APIs, time series data, real-time trading algorithms

- Financial algorithms, market APIs, high-frequency trading

Knowledge of Tensorflow, PyTorch, Flask