Cathal Maguire

PhD Student in Astrophysics · Trinity College Dublin

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Personal Information

Date of Birth 25/07/1998

Address 4a Rose View, Palmerstown, Dublin 20, Republic of Ireland

Nationality Irish

Education

2020–Present **Ph.D. in Physics**, *Trinity College Dublin, College Green, Dublin 2*

2016–2020 **B.A. in Physics & Astrophysics**, *Trinity College Dublin, College Green, Dublin 2*
First Class Honours
Awarded a Gold Medal for "exceptional merit at degree examinations".

2010–2016 **Leaving Certificate**, *Coláiste Cois Life, Lucan, Co. Dublin*

Research Experience

2020–Present **Postgraduate Researcher**, *Trinity College Dublin, College Green, Dublin 2*

Jun 2020–Aug 2020 **Research Assistant**, *PRACE*, CINECA, Bologna, Italy
- Worked remotely as part of the PRACE Summer of High-Performance Computing (SoHPC), under the supervision of Prof. Salvatore Orlando.
- Simulated highly energetic supernova explosions, and investigated their morphology and interactions with objects in their surrounding environments, using the PLUTO code for astrophysical modeling.

Sep 2019–Jan 2020 **Undergraduate Research Project**, *Trinity College Dublin, College Green, Dublin 2*
- Investigated the stellar wind of the red supergiant star Alpha Orionis, using a magnetohydrodynamic (MHD) Alfvén wave-driven simulation written in Fortran, under the supervision of Prof. Aline Vidotto.
- The output of this simulation was investigated in both IDL and Python, to determine the temperature profile and flux density contribution of the stellar wind. These results were then compared with radio observations.

Publications & Conference Talks (selected)

First-author peer-reviewed publications

C. Maguire, N. P. Gibson, S. K. Nugroho, S. Ramkumar, M. Fortune, S. R. Merritt, & E. de Mooij (2023). *High-resolution atmospheric retrievals of WASP-121b transmission spectroscopy with ESPRESSO: Consistent relative abundance constraints across multiple epochs and instruments*, ***MNRAS, 519, 1030***.

Conference Talks

November 2022 **DUblin STar formation, DeBris dIsks and plaNets (DUSTBIN) Meeting,** *Maynooth University*

September 2022 **AIP Thinkshop 2022: High-resolution spectroscopy for exoplanet atmospheres and biomarkers,** *Leibniz Institute for Astrophysics Potsdam*

August 2022 **Irish National Astronomy Meeting (INAM) 2022,** *Dunsink Observatory*

Teaching & Outreach

Sep 2020–Present **Teaching Assistant**, *Trinity College Dublin, College Green, Dublin 2*

Sep 2020–May 2022 **STEM Mentor**, *Innumeris Education*

Professional Skills

Research Interests Exoplanet atmospheres (observations & modelling), High-resolution spectroscopy, Cross-correlation analysis, Atmospheric retrievals, Planet formation, High-performance computing, Telluric correction of high-resolution spectra.

Programming Languages Python (Advanced), IDL (Intermediate), C/C++ (Intermediate), bash (Intermediate), JavaScript (Basic).

Web Interface & Misc. LaTeX (advanced), HTML/CSS (Intermediate)

Data Analysis Techniques Bayesian inference with MCMC, Cross-correlation analysis.

Languages

English **Mothertongue**

Irish **Fluent**

Spanish **Intermediate**

Miscellaneous

Dec 2015–Jun 2020 **Sales Consultant**, *Next Retail Plc.*, Fonthill Road, Clondalkin, Dublin 22

Jun 2018–Aug 2018 **Rides Operator**, *Canada's Wonderland*, Vaughan, ON L6A 1S6, Canada

Interests & Activities

I am passionate about sports, having participated in teams across a variety of sports, including soccer and gaelic football.

I am also interested in science and advancing technologies, with my main interest coming in the physical and space sciences.