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## PROFILE

I am an early career academic with a specialism in the study of the Magnetohydrodynamic (MHD) evolution of stellar and planetary atmospheres and their environments. This topic requires the use of modern numerical techniques to capture non-ideal magneto-fluid behaviour such as resistivity, thermal conduction and radiative transfer and the observable phenomena which result from the synergy between these processes. I am currently looking for a dynamic research group, in which I hope to apply my knowledge of these multi-physics environments. Please click on the link above to view my website.

## EDUCATION AND EMPLOYMENT

### Oct 2018 - Present: Maison de la Simulation, CEA-Scalay

Post-doc position studying the role of convection in stellar and planetary atmospheres in the ATMO (Atmospheres Across the Universe) research group under Dr Pascal Tremblin.

### 2014 - 2018: University of Birmingham

DPhil in Computational Astrophysics

Thesis title: "Radio Emission from Hot Stars and Planets"

STFC funded, supervised by Dr Ian Stevens

### 2010 - 2014: University of York

MPhys. (First class with Honours) Theoretical Physics (grade average: 75%)

Dissertation title: "Low-Temperature Atmospheric Pressure Plasma Jets for Biomedical Applications"

Modules: Fluid Dynamics, Fusion Plasma Physics, Astrophysical Plasmas, High Performance Computing

## PUBLICATIONS

### [3D MHD simulations and synthetic radio emission from an oblique rotating magnetic massive star](#)

Daley-Yates S., Stevens I. R., 2019, MNRAS, 489, 3251

### [Hot Jupiter accretion: 3D MHD simulations of star-planet wind interaction](#)

Daley-Yates S., Stevens I. R., 2019, MNRAS, 483, 2600

### [Inhibition of the electron cyclotron maser instability in the dense magnetosphere of a hot Jupiter](#)

Daley-Yates S., Stevens I. R., 2018, MNRAS, 479, 1194

### [Winds of Massive Magnetic Stars: Interacting Fields and Flow](#)

Daley-Yates S., Stevens I. R., 2018, COSKA, 48, 129

### [Interacting Fields and Flows: Magnetic Hot Jupiters](#)

Daley-Yates S., Stevens I. R., 2017, AN, 338, 881

### [Submillimetre free-free emission from the winds of massive stars in the age of ALMA](#)

Daley-Yates S., Stevens I. R., Crossland T. D., 2016, MNRAS, 463, 2735

## RESEARCH INTEREST

**Astrophysical:** Stellar winds, their dynamic behaviour, observable properties. The role the star plays in its environment and how it shapes the ISM and interacts with exoplanets. I am also interested in star and planet formation.

**Numerical:** Computational methods for Magnetohydrodynamics. The development of new techniques including fixed mesh, moving mesh and mesh-less methods and the development of subgrid models for unresolved physics.

## CONFERENCE TALKS AND POSTER PRESENTATIONS

Invited Seminar Talk: University of Tübingen, Planet Formation Group, 2018  
Contributed Talk: Stars With Stable Magnetic Fields, Czech Republic, 2017  
Contributed Talk: 14th Potsdam Thinkshop on Stellar Magnetism, Germany, 2017  
Contributed Talk: UK Exoplanet Meeting, UK, 2017  
Contributed Poster: IAU 329, The Lives and Death-throes of Massive Stars, New Zealand, 2016  
Contributed Poster: 6th Les Houches School in Computational Astrophysics, France, 2016  
Attended: St Andrews Monte Carlo Summer School, UK, 2015  
Contributed Talk: National Astronomical Meeting, UK, 2015

## PROFESSIONAL & TECHNICAL SKILLS

- Experience using and developing the **MHD code PLUTO** for research activities and publications
- **Non-ideal MHD** including cooling via optically thin radiative loss and resistivity
- **AMR** methods such as Patch and Block Structured approaches
- Experience using numerous MHD codes, including: **Athena++**, **FLASH**, **ENZO**
- Intimate knowledge of **Python**, **Fortran**, **c** and **c++**. Working knowledge of **HTML**
- Paralellisation of computer code using **OpenMP** & **MPI**
- Data processing and visualisation using **VisIt**, **Paraview** and the **yt-project**
- Collaboration and development software such as **Slack**, **Mattermost** and **Git**

## MENTOR & OUTREACH ROLES

**Mentoring of Masters Student:** Towards the end of my PhD I have had the opportunity to aid in the supervision of students during their dissertation. My role was to introduce and coach the use of MHD codes and simulation analysis tools. This experience places me in an excellent position to assist with the future supervision of research students.

**Head Postgraduate Rep for the School of Physics and Astronomy:** Responsible for representing the interests of all postgraduate students in the school of Physics and Astronomy. In this position I attended the Postgraduate Committee, liaising with staff to ensure the interests of postgraduates are safeguarded.

**Outreach:** Participating in numerous outreach events, representing the University of Birmingham at museums, local schools and events around the country. These activities include using demonstration equipment to explain concepts such as the curvature of space time, gravitational wave detection, exoplanet detection and gravitational lensing of galaxies.

## INTERNSHIPS

**Research internship (2013):** Summer paid internship at the University of York Plasma Institute. In this role, I worked on developing numerical tools to investigate the chemical evolution in plasma jets designed for use in biomedical treatment.

**Teaching internship (2012):** Summer paid internship at the University of York with the aim of developing on-line teaching materials for the Electromagnetic & Optics undergraduate module; providing me with experience of teaching in an academic context, using digital platforms such as Blackboard.

## REFERENCES

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