## Project title: The Terra Hunting Experiment

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| **Supervisor(s):** | **Prof. Christopher Watson** |
| **Email contact:** | **c.a.watson@qub.ac.uk** |
| **Helpful existing knowledge:** | **The candidate will have a background in astronomy, physics, or a closely related discipline.** |

**Project Description:** Despite the discovery of thousands of exoplanets over the past 30 years, we have yet to find a planetary system like our own solar-system, or a planet that resembles the Earth orbiting a sun-like star (an 'Earth-analogue'). The Astrophysics Research Centre is a partner in the ***Terra Hunting Experiment***, an ambitious decade-long radial-velocity survey dedicated to the detection of Earth-like planets around nearby Sun-like stars. The survey will commence full operations in 2026, and we are seeking a PhD candidate to help contribute to this transformative scientific effort.

A central challenge to the detection of Earth analogues is ***stellar variability***, a general term encompassing the complex signals produced by magnetic phenomena and surface flows on the stellar surface. These signals can mimic or mask the subtle signatures from low-mass, long-period planets. ***Understanding, modelling, and mitigating stellar variability is therefore essential to the success of the Terra Hunting Experiment***.

Working within an international collaboration including partners in the Netherlands, Spain, Sweden, Switzerland, and the USA, the candidate will:

- Analyse high-cadence, multi-year data from the Terra Hunting Experiment.
- Develop and test methodologies for disentangling stellar variability from bona-fide planetary signals, using either Terra Hunting data or datasets from other facilities.

This PhD project offers an exciting opportunity to contribute directly to one of the world's most sensitive searches for Earth-like worlds, and develop valuable skills in data science, astrophysical modelling, and participate in highly collaborative research at the forefront of exoplanet discovery.

**Useful references**

Terra Hunting Experiment homepage: https://www.terrahunting.org/index.html

"On the Feasibility of Intense Radial Velocity Surveys for Earth-Twin Discoveries":

https://ui.adsabs.harvard.edu/abs/2018MNRAS.479.2968H/abstract