

Forecasting Radiation for the Lunar Gateway Space Station: High-Performance-Computing Simulations

Code: 20/08

Company: Space & Atmospheric Physics Group, Imperial College London

Location: South Kensington, London

Project Description:

Large-scale eruptions from the Sun, such as solar flares and coronal mass ejections, can produce intense fluxes of Solar Energetic Particles (SEPs) which propagate Sun-to-Earth in incredibly short time-periods. These present a major concern for spacecraft and astronauts travelling beyond the protective influence of the Earth's magnetic field. The focus of the project will be to develop predictive capabilities for SEP radiation doses for specific scenarios and spacecraft missions. The primary focus will be the upcoming International Lunar Gateway Space Station which will be placed in a highly elliptical lunar orbit and act as a base for future exploration of the lunar south pole and Mars.

The project will simulate the propagation of SEPs through the heliosphere using Imperial's High-Performance-Computing facilities. The successful applicant will use and modify existing simulation codes and analyse the simulation results. A first step will be to study and characterise historical events, including several near-miss events of the Apollo missions and the famous Carrington event of 1859. Following this, the project will run an ensemble of simulations, with varying initial conditions, to predict and evaluate threats posed during upcoming solar cycles 25 and 26. Subsequent steps could include expanding this to scenarios for specific orbital trajectories and examining mitigation procedures available.

This is a computational research project with a mixture of physics and engineering elements. The successful applicant will gain a firm knowledge-base in space weather research and a strong transferable skill-set that is invaluable for research, but also broadly applicable to disciplines beyond.

Applicant Specification:

You will be studying for a degree in a STEM subject, or have an equivalent level of professional qualifications and/or experience. Prior experience of space-related research is not a prerequisite.

When selecting for this position the following criteria will be considered:

- Interest in space-related research

- Enthusiasm for problem solving
- Motivation to succeed
- Experience of coding

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Enquiries:

Informal enquiries can be addressed to: Dr Ravindra Desai - ravindra.desai@imperial.ac.uk

Start Date and Salary:

This is an 8 weeks minimum fixed term internship to be agreed with successful candidate but nominally with a start date of 20 June 2020 to attend the SPIN Induction day at the Satellite Applications Catapult, and completion before 20 September for the Showcase the following week. Salary is £1500 per calendar month.

Interviews:

19 & 20 March and 23 & 24 March.

While sending in your applications, ensure you will be available for an interview for the days mentioned above.

Closing Date for Applications: 5pm on 17 March

Applications should be made through the online form attaching a CV, before the closing date. Please note that elements of the form left incomplete will be deemed to render the application ineligible. They will be checked for eligibility and forwarded to the employer.