UNIVERSITY OF LEICESTER

Job Summary

Job Title: Research Associate (Mars)
Grade: 7
Salary: £39,355 per annum, pro-rata if part-time.
Department: Physics and Astronomy
Hours/Contract: Full-time, fixed term contract from to 30 June 2028
Reference: 11822

Role Purpose

To conduct postdoctoral research to achieve the aims of an STFC-funded Small Grant, investigating the mechanisms coupling the induced magnetotail of Mars with the nightside ionosphere and different types of aurorae, as well as allowing ionospheric outflow (escape) into space. The project will use existing data from several missions at Mars, such as Mars Express, MAVEN, EMM, MRO, Mars Odyssey, MSL and Tianwen-1, and upcoming missions such as EscaPADE. The candidate will work collaboratively and independently as part of a Mars ionosphere and plasma research team to achieve defined milestones and produce high quality research as part of a wider program.

Main Duties and Responsibilities

Research

- Responsible for independent and collaborative research in the field of Mars plasma environment (solar wind, magnetosphere, ionosphere, thermosphere), resulting in significant contributions to peer-reviewed journal papers (often as lead author).
- To lead in the collection, reduction, cross-calibration, and interpretation of different types of plasma data from the NASA missions: Mars Science Laboratory, MAVEN, EscaPADE, Mars Odyssey, and Mars Reconnaissance Orbiter. ESA missions: Mars Express, ExoMars-TGO, and BepiColombo (as upstream monitor for Mars), UAE mission: Emirates Mars Mission, and CNSA mission: Tianwen-1.
- To lead the discussions and collaborations with the three international collaborators of this project in Tokyo (Japan), and West Virginia and Colorado (US).
- To interpret and combine observations from the above mention datasets using knowledge of ionospheric and magnetospheric physical processes, and in particular, of the dynamics induced in both regions by the crustal magnetic fields on Mars' nightside and the particle precipitation thought them.
- To monitor space weather activity at Mars to be able to link it to the nightside observations of different types of aurorae.
- To have a broad and detailed knowledge of the effect of energetic particles (electrons and protons) in the nightside ionosphere of Mars via data analysis and modelling, and the mechanisms leading to these particles to travel through the magnetosphere and precipitate on Mars atmosphere.
- To have a broad and detailed knowledge of atmospheric escape processes, in particular ionospheric outflow.
- To develop data processing tools for the required data analysis in this project, and to support these via Github for the benefit of the community.
- To contribute to research outputs as a lead author and co-author for journal articles and technical papers.

- Represent the research group by disseminating results at national and international conferences and meetings, and to interact with all collaborators on the project, including national and international partners.
- Contribute to the overall group research program using innovative research models and approaches, testing and developing them to enable work to be carried out to generate new understanding within the research field.
- Contributing to determining the direction of the program in line with reaching the research goals.
- Co-supervision of research students and provision of advice and guidance to other members of the team, both research staff and students.
- To undertake such duties consistent with the grade of the post as may be reasonably required.

Professional Development

- Engage in work that support your own professional development and career interests, including the preparation of fellowship applications for independent funding opportunities.

Impact and Knowledge Exchange

- Network and contribute to the maintaining and furthering of the wider research programme and research area
- To consult effectively on own specialism directly with people external to the University
- To engage positively and pro-actively in research impact

Leadership and Citizenship

- Guidance to other team members both research staff and students
- Pro-actively build networks and collaborations.
- Providing mentoring and coaching to Early Career Researchers and research students.

Internal and External Relationships

- Work closely with collaborators within the Planetary Science Group, School of Physics and Astronomy, Institute for Space and Space Park Leicester with interests in planetary plasma physics and space weather.
- Coordinate research and work closely as a collaborative team with the principal investigator, graduate students and external collaborators on the project.
- Contribute to the supervision of graduate students and undergraduate students working on related projects.
- Liaison with external collaborators from the missions to be used in this project.

Planning and Organising

- You will be required to effectively manage your time to plan your research activity and to deliver on the priorities of the project:
- Prioritise tasks within agreed work schedules;
- Plan for specific aspects of research incorporating issues such as deadlines, project milestones and overall research aims;
- Adapt daily and weekly plans to accommodate new developments and be flexible to the changing priorities of the research project;

- Assist the principal investigator and collaborators in the planning, organisation and dissemination of the wider research programme, and preparation and planning for research proposals.
- To foster new collaborations and to maintain a network of other research scientists elsewhere in the UK and overseas.

Qualifications, Knowledge and Experience

Essential

- To hold, or expect shortly to hold, a PhD in a research area relevant to planetary plasma physics, particularly related to unmagnetised bodies*
- A good honours degree*
- Evidence of research experience and skills in solar wind and space weather interactions with unmagnetised bodies such as Mars, Venus or Titan*
- To have a broad and detailed knowledge of the field of space weather science and its interaction with planetary bodies, particularly unmagnetised bodies*
- Evidence of experience in presenting results at national & international meetings*
- Demonstrate knowledge of solar wind and space weather interactions with unmagnetised bodies at an international research level. *
- To have a record of productive research in planetary plasma science, particularly unmagnetised bodies, and to have demonstrated the ability to produce published peer-reviewed papers*
- Evidence of proven problem-solving capability with coding *
- Expertise in using multiple datasets from different missions and multiple regions of the system, and evidence of understanding how to handle, cross-linked and cross-calibrate them in order to get a better comprehension of a major-scale physical mechanism.

Desirable

- Demonstrate an understanding Mars magnetosphere and ionosphere interaction with the solar wind and with solar energetic particles.
- Experience in working with spacecraft data as part of multinational teams.
- Strong publication record in peer-reviewed journals.
- Experience of programming.
- Experience of collaboration.
- Evidence of leadership.
- Supervisory experience.

Skills, Abilities and Competencies

Essential

- Capabilities to develop innovative approaches to link complex datasets, modelling and interpretation of nightside physical processes on the Martian plasma system
- High level of proficiency in English, sufficient to undertake research, teaching and administrative activities utilising English Language materials and to communicate effectively with staff and students.
- Computer programming skills and the ability to program in scientific computing languages such as IDL, FORTRAN, Matlab or Python

- Evidence of good time management, organisational and problem-solving skills
- Willingness to travel nationally and internationally for data acquisition and dissemination
- Evidence of the ability to work both independently and as part of a wider research team
- Commitment to Continuous Professional Development (CPD) for yourself, and encourage commitment to learn and develop in others.

Desirable

- Ability to develop novel ideas and to promote own research agenda.
- Flexible and adaptable approach to work over a range of research duties.
- Willingness to foster new collaborations with national and international partners.
- Demonstrable success in producing publications of the very highest standard.
- Proven ability to work as part of a team.
- Ability to collaborate with scientists from different institutions and research areas.

Criteria to be used in shortlisting candidates for interview

Reason for Fixed Term Contract

The reason for the fixed term contract is stated in section 1.9 in the summary of contractual terms in your contract of employment.

Criminal Declaration

If you become an employee, you must inform your manager immediately, in writing, if you are the subject of any current or future police investigations/legal proceedings, which could result in a criminal offence, conviction, caution, bind-over or charges, or warnings.

Supporting University Activities

As a University of Leicester citizen, you are expected to support key university activities such as clearing, graduation ceremonies, student registration and recruitment open days. We expect all staff as citizens to work flexibly across the University if required.

University Values

Inclusive - We are diverse in our makeup and united in ambition. Our diversity is our strength and makes our community stronger.

Inspiring - We are passionate about inspiring individuals to succeed and realise their ambitions. We challenge our community to think differently, to get involved, and to constantly embrace new ideas.

Impactful - As Citizens of Change we will generate new ideas which deliver impact and empower our community

Equity and Diversity

We believe that equity, diversity and inclusion is integral to a successful modern workplace. By developing and implementing policies and systems that challenge stereotypes across all aspects of our work, we have a culture that recognises and values the diverse contributions of our staff which benefits everyone. Our strong values of inclusivity and equity support our efforts to attract a diverse range of

high quality staff and students, and identify our University as a progressive and innovative workplace that mainstreams equity, diversity and inclusion.