Job Description – PDRA (Lunar Volatiles), School of Physical Sciences

Full time
Fixed-term contract until 31 March 2023
Grade AC2
Walton Hall, Milton Keynes-based

The Role

Applications are invited for an STFC-funded PDRA position in the School of Physical Sciences at The Open University. Our research covers a wide range of Solar System science and exploration. We investigate the origin and evolution of the Solar System, through the physical, geological, chemical and biological processes that drive it. We use laboratory and space mission experiments, remote observation, environmental simulation and modelling to investigate the surfaces and atmospheres of the terrestrial planets, the Moon, asteroids, comets and extra-terrestrial materials.

The post-holder will be expected to work independently but will be part of an active Cosmochemistry Research Group (CRG). The research will involve carrying out a novel study that will explore the volatile inventory of the Moon through in situ measurements of the abundance and isotopic composition of volatiles (e.g., H, S, Cl) in lunar samples (focussing on nominally anhydrous minerals (NAMs) and melt inclusions (MIs)). To be effective in this role, the successful candidate will have a demonstrable prior experience in lunar petrology/geochemistry using standard petrological tools, good competency with SIMS/NanoSIMS, and a proven track-record of handling large and complex geochemical datasets for understanding geochemical processes as evidenced by relevant published work.

A successful outcome from this work will be a better understanding of the distribution and source(s) for these volatiles in the lunar interior and processes influencing their evolution over the geological history of the Moon. This work is analytically challenging, requiring significant skills and patience in manipulating rare and small samples, developing new NanoSIMS standards and protocols as required and the ability to work independently as well as part of team in a modern laboratory environment.

Key responsibilities

• To perform detailed chemical, mineral and isotopic measurements of volatiles in lunar samples, in particular in NAMs and MIs using NanoSIMS and/or other standard petrological tools.
• To prepare samples and standards for the chemical, mineral and isotopic measurements.
• To process data and synthesize results from chemical, mineral and isotopic measurements.
• To write papers on the research in a timely manner with the aim of publishing them in high-impact peer-reviewed journals, and to present findings at international conferences and workshops.
• To undertake any other duties, where required, as directed by the PI on the project.
• Weekend work may be required to maximise available machine time and complete on-going experiments without delay.

While experience in the above areas is welcome, opportunities will be provided to the successful applicant to further develop their skills through formal and informal training.
Person Specification

Skills and experience

Essential:
- PhD in geochemistry or in a closely related field.
- Demonstrable expertise in lunar geochemistry, minerology and petrology.
- A good track record of publishing in leading scientific journals.
- The ability to carry out micron to sub-micron scale sample analyses and standard preparation.
- Experience of using Secondary Ion Mass Spectrometry to acquire isotopic and/or elemental compositions in planetary materials at high-spatial resolution.
- Demonstrated ability to work both as part of a team and on own initiative;
- Ability to plan own work, prioritise workload and to deliver results on schedule;
- Strong verbal and written communication and presentation skills;

Desirable:
- Research experience relevant to the proposed research (e.g., volatiles measurements using SIMS/NanoSIMS).
- Experience in developing new analytical protocols (especially for SIMS) and/or sample preparation methodologies.
- Experience of decision-making, problem-solving, planning and organising.
- The ability to be proactive and self-motivated, and to work successfully without supervision.
- Embracing change: The ability to work adaptively and responsively as the research develops.
About the Planetary and Space Sciences at the Open University

Planetary and Space Sciences (PSS) is a research discipline with the School of Physical Sciences. PSS has a long history of involvement in major Solar System exploration missions through the exploitation of instruments developed at the OU, such as on Cassini Huygens, Stardust, Genesis and Rosetta, and through international collaborative teams. PSS members are active in the development of new mission proposals and studies with ESA, other space agencies and national programmes.

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Research activity in PSS is funded mostly by the UK Science & Technology Funding Council (STFC), the European Space Agency and European Union, but also draws in support from other research councils, charities and industry.

Our extensive laboratory facilities are broadly sub-divided into those used to characterise the chemistry and isotopic composition of matter in the Solar System or the simulation of Earth and Planetary processes. Instruments include start-of-the-art commercially sourced (e.g. NanoSIMS; FIB-SEM; laser Raman microprobe; MS and GC-MS) as well as unique instruments developed in-house (e.g. ‘Finesse’ mass spectrometer; Mars atmosphere and surface simulation chambers; Cometary surface simulation chamber; All-Angle Light Gas Gun). These are backed up by clean rooms and sample preparation facilities, instrument development laboratories and an extensive meteorite collection.

We have a vibrant community of research staff and PhD students, with regular opportunities for those interested in Planetary Sciences. Members of PSS contribute to a range of undergraduate courses - reflecting the multi-disciplinary nature of PSS research.

We are committed to building an inclusive research environment. We support flexible working arrangements, within the limits of the post, and particularly welcomes applications from groups traditionally under-represented in STEM.
About the Unit

Faculty of Science, Technology, Engineering & Mathematics
The Faculty of Science, Technology, Engineering and Mathematics (STEM) is comprised:

- School of Computing & Communications
- School of Environment, Earth & Ecosystem Sciences
- School of Engineering & Innovation
- School of Life, Health & Chemical Sciences
- School of Mathematics & Statistics
- School of Physical Sciences
- Knowledge Media Institute
- Deanery including teams supporting Curriculum, Research and Enterprise, Laboratory Infrastructure and Faculty Administration

“We aspire to be world leaders in inclusive, innovative and high impact STEM teaching and research, equipping learners, employers and society with the capabilities to meet tomorrow’s challenges”

The Faculty of STEM consists of 2500 staff including 1,800 Associate Lecturers. The Faculty delivers over 185 modules across undergraduate and postgraduate curriculum, supporting nearly 19,000 students (full time equivalents) which is 29% of the OU total.

The Faculty generates more research income (circa £17M) than any other Faculty in the University, supported by a comprehensive laboratory infrastructure.

We are proud of our distinctive values and capabilities underpinning our aspiration:

We are inclusive:
- We transform people’s lives, ensuring STEM education is openly accessible to many thousands of students from diverse backgrounds – our students express high satisfaction with their study experience.
- We engage the public in exciting citizen science and engineering, including through free open educational resources, multi-platform broadcasting, outreach to inspire the next generation and with programmes to encourage more women into STEM.

We are highly innovative:
- We are at the forefront of innovative developments in teaching practical science and engineering at a distance, through simulated and remote access laboratories and practical experimentation.
- Our high-quality teaching and curriculum are informed by world-leading research, strong links with professional bodies and communities of practitioners, as well as by scholarship focused on continuously improving our STEM pedagogy.

We deliver significant social and economic impact:
- We provide STEM higher education at a scale and reach unsurpassed in the UK, with a sizeable international reach and further growth potential.
- We inject transferable STEM skills and knowledge direct into the workplace for immediate employee and employer benefit, as students combine study while working.
• The employability value of our courses is underpinned by accreditation from leading STEM Professional Bodies and Learned Societies, as well as partnerships and sponsorship with leading employers.

• Our high quality, applied and academically relevant teaching and research addresses real-world issues, delivering impact for industry and society, including addressing pressing STEM skill-shortages across the UK.