Job Related Information

This document includes information about the role for which you are applying and the information you will need to provide with your application.

1. Role Details

<table>
<thead>
<tr>
<th>Vacancy reference</th>
<th>15531</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job title:</td>
<td>Space Radiation Environment Scientist</td>
</tr>
<tr>
<td>Reports to:</td>
<td>Senior Lecturer in Physical Sciences</td>
</tr>
<tr>
<td>Salary:</td>
<td>£33,199 to £39,609</td>
</tr>
<tr>
<td>Terms and conditions:</td>
<td>Research</td>
</tr>
<tr>
<td>Grade:</td>
<td>AC2</td>
</tr>
<tr>
<td>Duration of post:</td>
<td>Temporary contract until 31 March 2021</td>
</tr>
<tr>
<td>Working hours:</td>
<td>Full time (37 hours)</td>
</tr>
<tr>
<td>Location:</td>
<td>Milton Keynes</td>
</tr>
<tr>
<td>Closing date:</td>
<td>Noon on 5 April 2019</td>
</tr>
<tr>
<td>Type of application form accepted:</td>
<td>Your application should contain:</td>
</tr>
<tr>
<td></td>
<td>1. Short application form</td>
</tr>
<tr>
<td></td>
<td>2. CV</td>
</tr>
<tr>
<td></td>
<td>3. A covering letter detailing how you meet the person specification</td>
</tr>
<tr>
<td>Number of referees required:</td>
<td>3</td>
</tr>
<tr>
<td>Unit recruitment contact:</td>
<td><a href="mailto:Resourcing-Hub@open.ac.uk">Resourcing-Hub@open.ac.uk</a></td>
</tr>
</tbody>
</table>
2. Summary of duties

The Centre for Electronic Imaging (CEI) is a research centre within the School of Physical Sciences at the Open University. The CEI is a collaboration between the Open University and Teledyne e2v, a world-leading manufacturer of scientific and industrial image sensors. The CEI is dedicated to conducting research into advanced imaging, with a particular focus on space applications such as radiation damage to imaging sensors in orbit and provides excellent opportunities for knowledge exchange between UK industry and academia.

The CEI conducts its research in collaboration with many universities, space agencies and companies including the UK Space Agency, European Space Agency (ESA), NASA and Teledyne e2v. The CEI is heavily involved in space instrument development, including the Soft X-ray Imager (SXI) for the European Space Agency (ESA) and Chinese Academy of Sciences SMILE mission, the SXI on the THESEUS mission concept, the Wide Field Imager for the ESA Athena mission, the ESA Euclid VIS instrument, as well as the ESA JUICE mission and NASA’s WFIRST. The CEI has a responsibility on all of these missions involving the space radiation environment and its impact on the detectors that form the focal plane of the instruments. This fundamental understanding of the space environment and the impact on the detectors is essential to enable the missions to successfully complete their science objectives.

This post will involve working several small teams across the CEI, including the teams working on the aforementioned space missions. You will engage in many aspects of radiation environment modelling, including analysis of orbital data from previous missions to gain a better understanding of the environment in which the aforementioned missions will orbit, modelling of the instruments involved (in collaboration with the mechanical engineering team), and simulations of the impact of the radiation environment on the bespoke detectors that are being used in each mission. Of particular interest at the current time is the modelling of new optics technologies in the orbital radiation environment and the impact of the optic structure on the radiation dose received at the detectors.

Working collaboratively with CEI team members and scientists and engineers at partner organisations both nationally and internationally, you will also have the opportunity to explore the implications of these results on the scientific objectives of the missions. The job is a unique opportunity to gain valuable and in-depth knowledge about performance and modelling of detectors in space, the space radiation environment and to become a key member of the instrument teams across a range of space missions.

Main Duties

With appropriate training and support, you will be involved in most of the following activities:

1. Study of data from previous space mission data to analyse the nature of the radiation environment in a variety of orbits, including some of the missions listed above.
2. Investigation of the nature of Solar Energetic Particle (SEP) events and their variation in time, position, angular distribution, with particular reference to their impact on the radiation environment for the orbital parameters of the SMILE and THESEUS missions.
3. Development of models for the SMILE and THESEUS orbits in accordance with the above including how SEP events interact with the directionality of the SMILE SXI and THESEUS SXI optic components.
4. Development of incident spectra with time resolution for appropriate dose models.
5. Processing of the incident spectra, with support from current research team, to model the impact of the radiation environment on the detectors of the aforementioned missions.
6. Development of observation strategies in collaboration with the wider instrument teams to counteract the radiation environment.
7. Developing links with other expertise in the above areas across the UK and internationally.
8. Supporting the work of the research teams for other missions in which the CEI is involved, such as WFIRST and ATHENA, as appropriate.
Other Duties

All Faculty staff are expected to:

- Comply with the University’s Health and Safety, Equal Opportunities and Computing policies in the performance of their duties;
- Take reasonable care of the Health and Safety of themselves and that of any other person who may be affected by their acts or omissions at work;
- Co-operate with the University in ensuring as far as is necessary, Statutory Requirements, Codes of Practice, University and Faculty polices are complied with;
- Have a strong commitment to the principles and practice of equality and diversity;
- Attend appropriate staff development events.

3. Person specification

Requirements  (E = Essential/ D = Desirable)

Education, qualifications and training

Essential: A PhD in Astronomy, Physics, Engineering or a closely related subject, or comparable experience.

Knowledge, work and other relevant experience

**Essential:**
- Good understanding of and experience with data analysis;
- Proficiency in programming using C/C++, Java, Python or similar.

**Desirable:**
- Experience and/or understanding of space environment;
- Experience and/or understanding of the operation of imaging sensors for space applications;
- Knowledge or some experience in Astronomy/Space Science or applications of high-performance imaging sensors;
- Experience in the development of simulations to model physical effects and form predictive models to extrapolate performance;
- Experience of using SPENVIS, GEANT4 or similar software for radiation modelling.

Personal abilities and qualities

**Essential:**
- Good problem solving and analytical skills, demonstrated logical and rigorous approach to work;
- Demonstrated ability to work both as part of a team and on own initiative;
- Well-developed self-management skills with the ability to prioritise work appropriately, deal with several competing demands, manage own time effectively and deliver results to an agreed schedule;
- Excellent verbal and written communication in a team environment and good presentation skills. Ability to communicate effectively with colleagues from a wide range of backgrounds;
- Excellent work ethic.
4. About the unit/department

Faculty of Science, Technology, Engineering & Mathematics
The newly formed Faculty of Science, Technology, Engineering and Mathematics (STEM) comprises:

- 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 700 staff and 1,800 Associate Lecturers. The Faculty delivers over 185 modules across undergraduate and postgraduate curriculum, supporting more than 20,000 students (full time equivalents) which is 29% of the OU total.

The Faculty generates more research income (circa £20M) 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
School of Physical Sciences

The School of Physical Sciences is a lively and innovative community of approximately 85 academic and research staff and 70 PhD students, mostly based in Milton Keynes. Our curriculum is supported by associate lecturer staff based all over the UK and Ireland whilst each year our physics, astronomy and planetary sciences and interdisciplinary science modules are studied by thousands of students all over the world.

Our research covers a wide range of subjects, broadly aligned with the research disciplines of

- Astronomy
- Physics
- Planetary and Space Sciences
- Space Instrumentation
- Physics Education

We have an extensive suite of world class facilities and laboratories, including advanced analytical instrumentation, experimental and simulation chambers and instrument development laboratories, complemented by regular use of large-scale facilities such as synchrotrons (e.g. Diamond) and a wide array of ground based and space-based telescopes (e.g. VLT, Hubble) as well as our own robotic telescopes in Tenerife.

We play a major role in many well-known space missions such as Rosetta and ExoMars. We also apply much of our spaceflight and laboratory expertise to a wide array of real world problems including medical and environmental applications.

School members also contribute to the Open University’s teaching on a large range of modules and we have been at the forefront of many innovations in distance education, including the OpenScience Lab and the OpenScience Observatories. We are members of SEPnet, the South East Physics Network. Our commitment to equality and diversity has been recognised by the award of “Juno Champion” status by the Institute of Physics and an Athena SWAN Silver Award.

We currently offer undergraduate qualifications in Natural Sciences (with a physics route and an astronomy and planetary science route), with a strand which carries Institute of Physics accreditation, and in Mathematics and Physics. We also offer an MSc in Space Science and Technology. We are in the process of refreshing the curriculum at Stage 3, and are drawing up plans for adding an integrated MPhys to our portfolio, including topics in physics, astronomy, planetary and space science.

Priority Research Areas in the School of Physical Sciences

Astronomy

- The Compositional Universe: exploiting the spectroscopic discovery space from major facilities and projects including ALMA, JWST, SPICA, SOFIA and IRAM/NOEMA, E-ELT, VLT, SKA, JCMT, SALT, LOFAR, ELIPS, Herschel, SDSS-IV, Euclid etc., to study galactic star formation, evaporating exoplanets, and the physics of galaxies in the distant universe. We will further develop our laboratory/observational astrochemistry research to focus on the development of molecular compositional diagnostics.
- The Time-Domain Universe: exploiting the discovery space of new and future telescopes e.g. Gaia, LIGO, PLATO 2.0, TWINKLE, VLT and LSST, in studies such as galactic and extragalactic stellar populations using leading follow-up facilities such as SALT, or (as part of a wider follow-up network) our robotic telescopes, with a focus on key processes such as stellar binarity.

Physics

- Biomedical physics: to understand physical phenomena involved in conditions such as cancer and cardiovascular diseases and their treatment through experimental and theoretical investigations of a range of approaches such as electron-driven processes in radiation treatment and imaging, use of nanoparticles for cancer therapy and plasma sources for biomedical purposes.
- Quantum correlated systems: theoretical and experimental study of quantum correlations in atomic, molecular and condensed matter systems, and the development of practical applications such as quantum enhanced devices and the functionalisation of materials, as well as the development of multi-purpose software to treat electronic continua.
• Engineering physics: applied plasma research aimed at developing novel functional materials, understanding electron induced processes in nanofabrication and the development of plasma-driven techniques for advanced materials applications.

**Planetary and Space Science**

• Application of advanced analytical techniques, laboratory simulation, remote observation and modelling to investigate the key processes involved in the formation and evolution of the Solar System and the planetary bodies it contains, including the search for habitable environments and the presence of life.
• Maintain and build high scientific credibility for our analytical expertise by exploiting the performance of existing instruments and updating the analytical infrastructure in order to ensure leading involvement in upcoming sample-return missions, and maintain access to the most important planetary samples. Particular strengths are in the measurement of light-stable isotopes using conventional mass spectrometry and in-situ analysis of samples.
• Development and expansion of our expertise in planetary environments using modelling, remote sensing and the use of field analogues and simulation facilities on Earth, and secure further leading science team involvements in future planetary space missions.

**Space Instrumentation**

• Development of imaging sensors and instruments for space applications, with expertise in a range of wavelengths from IR to X-ray and the study of the effects of radiation damage, in order to secure involvement in future space missions.
• Development of miniaturized analytical instrument systems for planetary exploration missions, particularly for the measurement of volatiles, organic materials and their light stable isotope composition, and securing leading involvement in future planetary exploration missions.
• Knowledge exchange between the UK technology industry and academia, utilising the technologies and expertise in detectors and mass spectrometer systems to provide commercial products and solutions.

**Physics Education Research**

• Remote and virtual experimentation
• Concept inventories
• Interactive online assessment
• Demographic differences in achievement

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5. How to obtain more information about the role or application process

If you would like to discuss the particulars of this role before making an application please contact Dr David Hall on +44 (0) 1908 659579 or email: david.hall@open.ac.uk.

If you have any questions regarding the application process please contact the Resourcing-Hub@open.ac.uk.

6. The application process and where to send completed applications

Please ensure that your application reaches the University by: Noon on Friday 5 April 2019
Applications received after the closing date will not be accepted.

E-mail your application to: Resourcing-Hub@open.ac.uk
7. Selection process and date of interview

<table>
<thead>
<tr>
<th>The interview panel will be chaired by:</th>
<th>Professor Andrew Holland</th>
</tr>
</thead>
<tbody>
<tr>
<td>The other members of the interview panel will be:</td>
<td>Dr David Hall</td>
</tr>
<tr>
<td></td>
<td>Further panel members will be advised to candidates successful for interview.</td>
</tr>
<tr>
<td>The interviews will take place on:</td>
<td>Date still to be confirmed.</td>
</tr>
<tr>
<td>The selection process for this post will include</td>
<td>Will be advised to candidates successful for interview.</td>
</tr>
</tbody>
</table>

We will let you know as soon as possible after the closing date whether you have been shortlisted for interview. Further details on the selection process will also be sent to shortlisted candidates.