

Science Operations Software

Engineer

Job Location

Cheshire, UK (Head Office)

Area / Department

Software Data Management and IT

Contract Type

Permanent

Salary

Circa GBP 65,000 depending on experience, with excellent benefits

Closing Date

08/09/2023

Ref No

10245

At the SKAO we are coordinating a global effort to deliver one of the largest science facilities on the planet. The SKAO telescopes will be next-generation instruments that will help to answer key questions in astrophysics, drive technological innovation and support human capital development.

More than a dozen partner countries and over a thousand scientists and engineers around the world are already on board, making the SKA project an international collaboration like no other, and one of the most ambitious science and engineering endeavours of the 21st century.

Headquartered in the UK, with telescope sites in Australia and South Africa, the SKAO will be one observatory operating two telescopes, an endeavour spanning three continents. Multinational by design, in early 2021 the SKAO became an intergovernmental organisation, one of only a select handful of science infrastructures to do so worldwide.

Our Global HQ is located near the buzzing city of Manchester at the historic Jodrell Bank Observatory, a UNESCO World Heritage site located in the Cheshire countryside. It is home to a rapidly expanding international team of more than a hundred, working in a highly collaborative and inclusive way, in coordination with SKAO teams in Australia and South Africa as part of a global astronomy and engineering community.

Being part of Team SKA means contributing to something extraordinary: a uniquely exciting project to advance human knowledge that will last for decades. In return, we offer a diverse multicultural working environment, 30 days annual leave plus public holidays, a generous pension scheme, visa and support with relocation (if applicable), regular social events, a family-friendly environment and much more. Come and join us!

An amazing opportunity for a Software Engineer with a background in web-based systems for management of complex (ideally scientific) business processes and workflows, with a focus on the development of an integrated user experience across a range of applications, to join an international, multicultural organisation.

The Role

The SKAO Computing and Software team are looking for a talented Science Operations Software Engineer to work under the supervision of the Observation Management and Control (OMC) System Architect and alongside other engineers to ensure that the Observatory Science Operations (OSO) system for SKAO and its two telescopes is developed to the highest standards, providing their technical skills to all software development teams involved in the realisation of the OSO software.

The OSO software system comprises a suite of tools and services that allow end-users (astronomers) to prepare, manage and track their observations using the SKA telescopes and aids staff users in administering and scheduling these observations, sharing the telescope resources to maximise scientific productivity.

This role will be based at the SKAO Global Headquarters at the iconic Jodrell Bank Observatory, Cheshire, UK, and occasional international travel may be required (typically for one week, up to 4 times per year).

SKAO is committed to providing an inclusive and flexible working environment, meeting the requests of our Colleagues whilst also fulfilling the needs and objectives of the Observatory.

We encourage applications from under-represented groups such as women and individuals with disabilities, as well as open conversations during the recruitment process in relation to any specific requirements.

There may be occasions where this role requires the post holder to work across different time zones and, in line with SKAO policy, flexible working hours will be supported in agreement with the line manager.

Key Responsibilities, Accountabilities and Duties

- Work within the SKA Observation Monitoring and Control Agile Release Train in coordination with the OMC Architect and other OMC software engineers, also joining appropriate Communities of practice, such as UX and databases.
- Act as a technical expert in the development of the SKA OSO software system, by providing guidance and best practices in the development of complex user-facing software products.
- Actively participate in the software development activity by writing and reviewing code in critical areas of the project, working with international agile teams (e.g. Europe, India, South Africa, Australia) as needed for a given number of increments.
- Opportunity for international travel (typically for one week, up to 4 times per year).

Mandatory Knowledge, Skills and Experience

- Experience of software engineering applied to the development of intelligent web-based business applications, preferably in an agile/iterative environment.
- Expertise in at least one of Javascript and Python software development, using frameworks such as Angular and/or React and server-side technologies such as flask. Applicants are encouraged to provide evidence in the form of publicly available code if and where possible.
- Knowledge and experience in User Experience techniques.
- Understanding of the software development life cycle, based on common code versioning tools like Git, with particular attention to quality aspects, testing and configuration management.
- Be a flexible team player who is adaptable to change and able to work to deadlines.

Desirable Knowledge, Skills and Experience

- Experience in lean/agile principles adopting DevOps and Lean UX practices, or willingness to learn them.
- Working knowledge of virtualisation and containerisation technologies.
- Experience or knowledge of the science operations of astronomical observatories or similar science facilities.
- Understanding of database technologies and their place in full-stack development.

Equality Diversity and Inclusion Statement

SKA Observatory recognises that our diversity is a strength. We aim to create a welcoming and inclusive environment where everyone feels they belong, and diverse perspectives and ideas thrive. As such, Equality, Diversity, and Inclusion are at the core of SKA Observatory's agenda.

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Women have traditionally been under-represented in the fields of science and engineering; SKA Observatory welcomes and encourages female applicants.

Where applicants with a disability need facilities or adjustments to enable them to participate in the recruitment process, these will be provided.

SKA Observatory welcome all candidates, especially those from member countries.

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Operations Scientist

Job Location

Cape Town, South Africa

Area / Department

Science

Contract Type

Permanent

Salary

ZAR 650,000 - 900,000 depending on experience, plus excellent benefits

Closing Date

12/09/2023

Ref No

10264

At the SKAO we are coordinating a global effort to deliver one of the largest science facilities on the planet. The SKAO telescopes will be next-generation instruments that will help to answer key questions in astrophysics, drive technological innovation and support human capital development.

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Construction activities for the SKAO's telescopes in Australia and South Africa started in 2021, along with a ramping up of SKAO staff in both countries. It is expected that the transition from the Construction Phase to the Operations Phase will happen around 2028.

SKAO Operations in South Africa will be conducted in partnership with the South African Radio Astronomy Observatory (SARAO). SKAO Operations in Australia will be conducted in partnership with the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The Observatory will also partner closely with a global network of SKA Regional Centres through which astronomers will access science data products and a suite of tools and resources to further analyse the SKA telescopes' data.

For more information on the SKA project visit <https://www.skao.int/>

The SKA Observatory offers a competitive salary and a generous pension and benefits package. As an employee of an intergovernmental organisation, an appointee who is not a national of the country in which the role is based may be subject to personal Privileges and Immunities.

An ideal role for a radio astronomer with Observatory experience who is keen to contribute to the operational planning and commissioning of the SKAO and become involved in the science operations of the SKA precursor, MeerKAT.

The Role

The SKAO Operations group is seeking to employ up to four talented and motivated Operations Scientists to join the SKA-Mid team based at the Science Operations Centre in Cape Town, South Africa. With the SKA now in construction, planning for the operations of the SKA has entered an exciting phase. In order to support our planning, we are looking for individuals with broad operational and scientific experience within the full range of activities required to run a successful radio observatory. This includes knowledge of the telescope systems, data processing and analysis, as well as experience serving a diverse and distributed user community.

The Operations Scientists will draw on their experience, expertise within their established networks and the broader astronomical community to inform the detailed SKAO operational plan and policies. They will also be required to support the planning and execution of scientific commissioning and verification for the SKA Observatory. Good organisational, communication and collaborative skills are required for this role. In

addition, under a joint agreement between the SKAO and SRAO, the SKA-Mid Science Operations team will work jointly with the SRAO MeerKAT operations team to support MeerKAT science operations and commissioning of the MeerKAT extension, until the MeerKAT telescope is integrated into the SKA. This provides an opportunity to gain additional experience in an active observatory environment.

The roles are offered on a full time, permanent basis and the Operations Scientists will periodically need to work outside of normal office hours when fulfilling the Astronomer on Duty support role.

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Key Responsibilities, Accountabilities and Duties

Under the direction of the SKA-Mid Head of Science Operations, the successful candidate will support the future science operations of the SKA Observatory by:

- Supporting the development and continual refinement of the science operational model for the SKA telescopes.
- Ensuring consistency between the SKA System Level requirements with those needed for the successful future operation of the SKA telescopes.
- Contributing to commissioning and science verification of MeerKAT Extension and SKA-Mid Telescope, including the development of plans, requirements for early array releases and test procedures.
- Supporting the development of software needed to operate the SKA Telescopes or necessary for the SKA user community.
- Effectively collaborating with SKAO staff across the three sites. Occasional travel to the SKAO telescope sites in Australia and/or South Africa will be necessary (typically once a year for up to 2 weeks).
- Supporting MeerKAT science operations by serving as Astronomer on Duty on a roster basis, conducting feasibility reviews and providing user support as needed.

- Optionally undertaking a programme of personal research up to 25% of employed hours.
- Undertaking other duties as directed by the SKA-Mid Head of Science Operations.

Mandatory Knowledge, Skills and Experience

- University PhD degree in Astronomy, Physics, Engineering or another closely related and relevant field, or equivalent experience.
- Expertise in radio astronomy techniques including in the acquisition, reduction and analysis of astronomical data.
- Experience with the operation of astronomical observatories.
- Experience working with a diverse and globally distributed telescope user community and providing appropriate user support.
- Effective oral and written communication skills in English.
- Flexibility and adaptability to change.

Desirable Knowledge, Skills and Experience

- Experience commissioning radio astronomy instrumentation (or similar).
- Experience working in large collaborative projects.
- Experience understanding and articulating the needs of a user (e.g. radio astronomer) to inform the development of requirements (e.g. through a series of use cases) and/or operational policies.
- Ability to work effectively with engineers and scientists from a variety of cultures and influence people in widely differing parts of a complex organisation.
- Awareness of equitable practices, including accessibility, to facilitate the broadest possible access to the Observatory from the scientific user community.

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Radio Spectrum Scientist

Job Location

Cheshire, UK (Head Office)

Area / Department

Business Support

Contract Type

Permanent

Salary

GBP 41,000 - 48,000 depending on experience, with excellent benefits

Closing Date

16/10/2023

Ref No

10265

At the SKAO we are coordinating a global effort to deliver one of the largest science facilities on the planet. The SKAO telescopes will be next-generation instruments that will help to answer key questions in astrophysics, drive technological innovation and support human capital development.

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highly collaborative and inclusive way, in coordination with SKAO teams in Australia and South Africa as part of a global astronomy and engineering community.

Being part of Team SKA means contributing to something extraordinary: a uniquely exciting project to advance human knowledge that will last for decades. In return, we offer a diverse multicultural working environment, 30 days annual leave plus public holidays, a generous pension scheme, visa and support with relocation (if applicable), regular social events, a family-friendly environment and much more. Come and join us!

An amazing opportunity for an experienced radio astronomer to join an international, multicultural organisation in the protection of the Dark and Quiet Skies.

The Role

SKAO is the first intergovernmental organisation dedicated solely to radio astronomy. With radio telescopes under construction in Australia and South Africa observing the radio spectrum from 50 MHz to 25 GHz, the SKAO and its host countries have invested significant resources in the protection of the radio spectrum for scientific purposes.

SKAO telescopes are located in areas defined as Radio Quiet Zones (RQZ), protected by national legislation. In an RQZ the radio spectrum is managed to give priority to radio astronomical observations. The RQZs are the first and foremost important line of defense from radio frequency interference (RFI), with extensions of hundreds of kilometres on both telescope sites.

The SKAO Spectrum Management Group (SMG) works to protect and maximise the telescopes' access to an uncontaminated radio spectrum. It advocates in policy forums at international and national level in collaboration with similar-minded organisations and our site entities respectively. The office also interacts directly with industry whose applications can have a detrimental impact on the science return of the telescopes, especially satellite systems.

The rapid advance of communication technologies, especially in the space sector with the deployment of large constellations and direct to cell connectivity, is increasing the challenges for radio astronomy. The SKAO is one of the founders of the IAU Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference (IAU CPS) where it works on simulations, observation campaigns and software development to mitigate the impact on our science.

The Radio Spectrum Scientist will be responsible for the SKAO contributions to the IAU CPS in particular in the areas of: development of mitigation software, observations of satellites with radio telescopes, data reduction and statistical analysis, simulations of impact on radio telescopes and specific science cases.

The role includes the possibility to conduct research and publications in the area of RFI detection and mitigation in radio astronomy and the protection of Dark and Quiet Skies.

This role will be based at the SKAO Global Headquarters at the iconic Jodrell Bank Observatory, Cheshire, UK, and occasional international travel will be required to represent the Spectrum Management Group in scientific and technical meetings.

SKAO is committed to providing an inclusive and flexible working environment, meeting the requests of our Colleagues whilst also fulfilling the needs and objectives of the Observatory. This role is available on a full time, part time (minimum 80%) or job share basis, please state your preference in the application form or cover letter.

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Key Responsibilities, Accountabilities and Duties

- Participate as a core member of the IAU CPS SatHub in the activities mentioned before.
- Coordinate the work of radio astronomy collaborators to conduct radio observations and mitigation software within the IAU CPS.
- Work with SKA Software Engineering to effectively integrate software solutions that can be implemented in the SKA telescopes to mitigate the impact of large satellite constellations leveraging the existing design of the SKAO signal chains and processing pipelines. These can be in the form of prediction software, online or post processing.
- Collaborate with the Spectrum Management Group in compatibility studies between a wide range of radio systems and radio telescopes for spectrum management purposes, providing the scientific radio astronomy perspective to SKAO compatibility studies.
- Contribute to the preparation of documents to be used in policy and spectrum management forums, such as ITU-R working groups.
- Represent the SKAO Spectrum Management Group in policy and scientific meetings (virtual and in-person), presenting SKAO's own documents and reviewing third party documents on issues that can affect radio astronomical access to the radio spectrum.
- Collaborate with SKAO's Engineering team in identifying risks and mitigation measures to protect the SKA radio telescopes from external sources of RFI.
- Collaborate with the SKAO Science team in simulations of RFI impact and mitigation techniques at telescope level.

- Contribute to the SKAO RFI gitLab repository containing code for compatibility studies and RFI impact assessment of a variety of cases (from satellite systems to terrestrial mobiles).

Mandatory Knowledge, Skills and Experience

- Degree in radio astronomy or a closely related and relevant scientific discipline.
- Experience in conducting radio observations with radio telescopes, in particular with interferometers, processing data from telescopes, RFI cleaning, features detection and classification
- Vast experience in software development for radio astronomy in Python.
- Excellent organisational skills with the ability to collect and organise the work of a wide community of researchers and engineers.
- Excellent presentations skills with the ability to communicate science to wider audiences.
- Excellent oral and written communication skills in English, including formal emails, reports, documentation.
- Ability to work with multicultural and geographically dispersed teams.
- Be a flexible team player who is adaptable to change and able to work independently and as part of a team as required.
- Ability and willingness to travel internationally as required (typically for one week, up to 3 times per year).

Desirable Knowledge, Skills and Experience

- Experience in RFI impact assessment in science cases for radio astronomy.
- Knowledge of spectrum management and ITU-R methods of working, multilateral policy making.
- Knowledge of the RAS ITU-R protected radio frequency bands and their importance for radio astronomy.
- Knowledge of:
- Ongoing work for the protection of Dark and Quiet Skies;
- Space policy forums such as UN COPUOS;
- Electromagnetic propagation as applicable to interference calculation.

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Postdoctoral Researcher in Radio Astronomy Simulations

Job Location

Cheshire, UK (Head Office)

Area / Department

Science

Contract Type

Fixed Term Contract

Salary

GBP 41,000 - 48,000 depending on experience, with excellent benefits

Closing Date

31/10/2023

Ref No

10261

At the SKAO we are coordinating a global effort to deliver one of the largest science facilities on the planet. The SKAO telescopes will be next-generation instruments that will help to answer key questions in astrophysics, drive technological innovation and support human capital development.

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An amazing opportunity for an enthusiastic postdoctoral research assistant with experience of radio astronomical data modelling and simulation, and radio astronomical calibration and imaging algorithms and tools, to join an international, multicultural organisation.

The Role

The Postdoctoral Researcher in Radio Astronomy Simulations will play a major part in developing radio astronomy simulations in collaboration with existing Science and Operations team members, to support various activities necessary for the delivery of SKAO. An immediate application will be in support of the SKAO Science Data Challenges. This initiative, led by the SKAO Science team, aims to release with a regular cadence increasingly realistic simulated SKA datasets and data products to the international scientific user community, together with a specific data analysis exercise for them to solve (the challenge) and a set of tools and services to support the completion of the exercise and the evaluation of the results.

Further applications will depend on the progress and needs of SKAO science operations and science commissioning activities, and might include supporting the prototyping and validation of SKAO/SKA regional centres data analysis pipelines, supporting SKAO science commissioning/science verification observations, etc.

The role will report to the SKA Project Scientist with responsibility for the coordination of the SKA Science Data Challenges.

The role is a 3-year fixed term appointment and will be based at the SKAO Global Headquarters at the iconic Jodrell Bank Observatory, Cheshire, UK.

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Key Responsibilities, Accountabilities and Duties

- Development of radio astronomy simulations of SKAO data products using existing packages and code as well as customised packages and code in collaboration with the SKAO Science and Operations Team.
- Development of astrophysical sky models for use in radio astronomy simulations in consultation with the SKA user community.
- Development and maintenance of tools to support the SKA science data challenge progression (e.g. data challenge website, community forum, evaluation procedures).
- Publication of data challenge outcomes in major astronomical journals.
- Installation and maintenance of astronomy packages and software in a Linux cluster environment.
- The role will provide the opportunity for 25 percent independent research.
- The role will provide the opportunity for international travel to conferences and other events.

Mandatory Knowledge, Skills and Experience

- PhD in Astronomy, Physics or a closely related field.
- Experience with astronomical data modelling and simulation, and understanding of the concept of simulated astronomical observations.
- Significant familiarity with the major calibration and imaging packages used in Radio Astronomy (AIPS, Miriad, CASA), as well as with the underlying algorithms that those packages implement.

- Experience with installation, maintenance and customisation of astronomical software packages in a Linux/Unix/macOS environment.
- Experience or solid knowledge of Python scripting.
- Be a flexible team player who is adaptable to change.

Desirable Knowledge, Skills and Experience

- Expertise in software development including Version control/code collaboration tools (e.g. Git, Mercurial).
- Knowledge of software and tools to simulate radio astronomical observations (e.g. OSKAR, RASCIL).
- Knowledge of Open science and FAIR principles.
- Expertise in Code Optimization for multi-processor CPUs and/or GPUs.

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Safety Engineer

Job Location

Cheshire, UK (Head Office)

Area / Department

Engineering

Contract Type

Fixed Term Contract

Salary

GBP 50,000 - 57,000 depending on experience, with excellent benefits

Closing Date

22/09/2023

Ref No

10266

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An amazing opportunity for an Engineer with safety engineering knowledge and experience to join an international, multicultural organisation and influence the safety aspects of the SKA Telescopes.

The Role

The SKAO and its partners have developed the reference design of the two SKA Telescopes and their subsystems. This work included the execution of various Hazard Analyses which culminated in a consolidated Hazards Register which identifies the expected Safety Hazards associated with the construction and operation of the SKA Telescopes.

The SKAO is now contracting the final design, manufacturing and site installation of the Telescopes subsystems, and will then proceed with the integration, commissioning and verification of the Telescopes. Each supplier will be required to assess the Design Safety Hazards associated with their final designs in updated safety analyses, and implement suitable design or procedural mitigation measures. During this period the SKAO Engineering team will need to review and accept the identified hazards through a Design Safety Review process. This forms part of the formal verification of the delivered subsystems and the integrated telescopes.

Each of the two Telescopes have a dedicated Safety Manager that has the overall responsibility for the safe construction and operation of the Telescopes. A Design Safety Committee supports them by reviewing and accepting the Design Safety Hazards and the evidence that appropriate mitigation measures have been implemented.

The Safety Engineer will report to the Head of Engineering and will support the Design Safety Committee as its secretary as well as acting as the custodian of the Design Safety Hazards Register. The Safety Engineer will support the two Telescope Engineers and the Design Authorities of each subsystem to evaluate and capture the ongoing safety analyses in a consistent way, and assess the safety risk levels of each hazard.

This role will be a 4-year fixed term appointment and will be based at the SKAO Global Headquarters at the iconic Jodrell Bank Observatory, Cheshire, UK. Occasional national and international travel may be required.

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Key Responsibilities, Accountabilities and Duties

- Undertake surveillance of ongoing design and design for manufacture activities to anticipate and prevent the introduction of safety issues.
- Support the Product Assurance team in the verification of safety critical items.
- Support the Telescope Engineers and Design Authorities in identifying Significant, Unusual and Non-obvious Hazards and review their mitigations.
- Participate in the Engineering Change Proposal process with regard to safety aspects.
- Advise the Telescope Engineering Team and the Safety Managers in the establishment of the SKAO Design Safety Review process.
- Act as secretary to the Design Safety Committee and help ensure that the review process is applied consistently and achieves a safe telescope design.
- Advise and support the Design Authorities and contractors of the telescope subsystems during their design work to champion a safe design and implementation thereof.
- Facilitate the capturing of the safety analyses in the SKAO Design Safety Review tool (JIRA), and do an initial triage of the hazards.
- Participate in Design Reviews to help SKAO engineers identify potential safety hazards and assess their proposed mitigations.
- Occasionally travel nationally and internationally as required (typically up to one week, 1-2 times a year).
- Undertake any other reasonable duties as directed by the Head of Engineering.

Mandatory Knowledge, Skills and Experience

- Degree in Physics, Engineering or another closely related and relevant field, or equivalent experience.
- Experience in large multi-disciplinary development projects, preferably involving electro-mechanical systems such as telecommunication dishes, vehicles, aircraft or defence systems.
- Experience in performing safety analysis or reviewing safety hazards in accordance with design safety processes such as IEC61508, ISO26262, IEC 62279, IEC 62061 or IEC 61513.
- Experience in an engineering field addressing multifaceted technical issues.
- Good analytical skills.
- Ability to work independently and effectively within an extended team.
- Effective oral and written communication skills in English with the ability to influence internal and external stakeholders at all seniority levels.

Desirable Knowledge, Skills and Experience

- Membership of a recognised national or international engineering institute (such as CEng).
- Knowledge or interest in the development, operation and ethos of large-scale international research infrastructures such as observatories.

- Experience in design for volume production and/or in large-scale manufacturing and assembly.
- Familiarity with astronomical radio telescope development and operation.

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