

EUROPEAN SPACE AGENCY

Internal Research Fellow in Bringing Blockchain to Software Product Assurance

Job Req ID: 15406

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Vacancy Type: Internal Research Fellow

Date Posted: 13 June 2022



EUROPEAN SPACE AGENCY

Internal Research Fellowship Opportunity in the Directorate of Technology, Engineering and Quality.

ESA is an equal opportunity employer, committed to achieving diversity within the workforce and creating an inclusive working environment. For this purpose, we welcome applications from all qualified candidates irrespective of gender, sexual orientation, ethnicity, beliefs, age, disability or other characteristics. Applications from women are encouraged.

Post

Internal Research Fellow in Bringing Blockchain to Software Product Assurance

This post is classified F2 on the Coordinated Organisations' salary scale.

Location

ESTEC, Noordwijk, Netherlands

Our team and mission

The Software Product Assurance Section provides support to ESA projects by ensuring that all requirements specified in applicable documentation are met, and that the appropriate development tools and methods are used throughout the entire development lifecycle. The Section also offers services for software product evaluation for conformity, software safety and dependability and software process assessment. Some of the activities related to the software engineering aspects will be carried out in collaboration with experts from the Software Technology Section at ESTEC.

You are encouraged to visit the ESA website: <https://www.esa.int/>

Field(s) of activity/research for the traineeship

The European Space Agency is seeking a postdoctoral researcher to perform state-of-the-art research in blockchain and quality assurance. As a member of the Software Product Assurance Section located at ESTEC, your research will focus on identifying benefits of using blockchain-based technology for product assurance in order to further automate and digitalise the software development and quality assurance processes. For aerospace projects, it is desirable to have a tamper-proof way to handle configuration management, product baselines, source code, software tests, test results and documentation. One option can be to use blockchain, which is based on distributed ledger technology and immutable

records. Another key element might be the "smart contract", which can be stored on the blockchain and executed automatically if the predefined conditions are met. The general blockchain and distributed ledger technologies are standardised (ISO 22739, ISO 23257, etc.) and need to be adapted for our use case.

- You will need to study the open literature, scientific publications and standards dealing with blockchain and narrow the type (public, private, hybrid and sidechains) for further research to support our use case.
- You will need to familiarise yourself with available blockchain frameworks. You will also need to know and understand the relevant European space standards on software (ECSS-E-ST-40C) and software product assurance (ECSS-Q-ST-80C) to identify processes and requirements which can benefit from adopting blockchain. Our use case needs to be fully aligned with the software development lifecycle used for developing software for spacecraft and ground segment.
- You will need to design a software system based on blockchain technology and demonstrate the above-mentioned concept (proof of concept). This activity shall include:
 - collecting the requirements;
 - creating a software architecture;
 - implementing and testing of the pre-selected/most relevant functionalities.
- Your research will address product assurance aspects of developing blockchain software (for example: verification of performance, security, definition of test environment, etc.), and;
- You will also have the opportunity to propose improvements or alternative solutions; synergies and interfaces to already existing and commonly used software systems shall be taken into account. For example, source code management systems, code quality analysers, document management systems, non-conformance (record) management systems, etc.;
- You will also need to actively participate in conferences and meetings to disseminate your research findings and results.

Technical competencies

Ability to conduct research autonomously

Breadth of exposure coming from past and/or current research/activities

Research/publication record

Knowledge relevant to the field of research

General interest in space and space research

Ability to gather and share relevant information

Behavioural competencies

Result Orientation

Operational Efficiency

Fostering Cooperation

Relationship Management

Continuous Improvement

Forward Thinking

Education

You should have recently completed or be close to completing a PhD in computer science, (software) engineering. Preference will be given to candidates who have been awarded their doctorate within the past five years.

Additional requirements

In addition to your CV and your motivation letter, please add your proposal of no more than 5 pages outlining your proposed research in the "additional documents" field of the "application information" section.

The working languages of the Agency are English and French. A good knowledge of one of these is required. Knowledge of another Member State language would be an asset.

Other information

For behavioural competencies expected from ESA staff in general, please refer to the [ESA Competency Framework](#).

For further information on the Internal Research Fellowship Programme please visit: [Internal Research Fellowship](#)

The Agency may require applicants to undergo selection tests.

In addition to your CV and your motivation letter, please add your proposal of no more than 5 pages outlining your proposed research in the "additional documents" field of the "application information" section.

At the Agency we value diversity and we welcome people with disabilities. Whenever possible, we seek to accommodate individuals with disabilities by providing the necessary support at the workplace. The Human Resources Department can also provide assistance during the recruitment process. If you would like to discuss this further please contact us at contact.human.resources@esa.int.

Please note that applications are only considered from nationals of one of the following States: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, and the United Kingdom. Nationals from Latvia, Lithuania and Slovenia, as Associate Member States, or Canada as a Cooperating State, can apply as well as those from Bulgaria, Cyprus and Slovakia as European Cooperating States (ECS).

According to the ESA Convention, the recruitment of staff must take into account an adequate distribution of posts among nationals of the ESA Member States*. When short-listing for an interview, priority will first be given to candidates from under-represented or balanced Member States*.

(<https://esamultimedia.esa.int/docs/careers/NationalityTargets.pdf>)

In accordance with the European Space Agency's security procedures and as part of the selection process, successful candidates will be required to undergo basic screening before appointment conducted by an external background screening service.

*Member States, Associate Members or Cooperating States.