



2022-IPR-E3-FGIV-021290

**FG IV – Project Officer – Applied Quantum  
Computing for Internal Security**

**POSITION FOR:**

Member of the contract staff FGIV – art. 3b of the Conditions of Employment of Other Servants

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1962R0031:20110101:EN:PDF>

**WE ARE:**

As the science and knowledge service of the Commission, the mission of DG Joint Research Centre (JRC) is to support EU policies with independent evidence throughout the whole policy cycle.

The JRC is located in 5 Member States (Belgium, Germany, Italy, the Netherlands and Spain). Further information is available at: <https://ec.europa.eu/jrc/>

The current vacancy is in the Cyber and Digital Citizen Security Unit of the Space Security and Migration Directorate, located in Ispra, Italy. The mission of the Unit is to strengthen trust and security of the European Citizen in a sustainable and inclusive ICT-based European society by scientific research on how emerging Information and Communication Technologies will impact the security and privacy of citizens' daily life. The unit works on risk mitigation, cyber security, cybercrime, data protection, privacy and on the associated legal and regulatory frameworks.

**WE PROPOSE:**

A Contract Agent position FG IV as project officer to contribute to the research activities of the Cyber and Digital Citizens' Security Unit by exploring the prospects and impact of applied quantum computing for EU Internal Security and law enforcement activities.

This position offers a unique opportunity to conduct scientific and technical studies, using innovative new approaches in forensics, in the area of quantum computing applied to the fight against cyber-dependent crimes and Child Sexual Abuse online. This work will enhance EU law enforcement capabilities in criminal investigations and support the EU Security Union Strategy.

The selected candidate's main tasks will include:

- Study the landscape and capabilities of current quantum devices and contribute to the understanding of the likely impact of this developing field on EU Internal Security.
- Conduct explorative research on quantum machine learning for forensics on real, noisy quantum systems, addressing the challenge of encryption in criminal investigations.
- Study and develop prototype algorithms in applied quantum computing and in quantum machine learning using simulation tools or real quantum systems. The focus will be on understanding and preparing for the potential impact of fully operational quantum computers in forensics and law enforcement practices.
- Contribute to proof-of-concepts and prototype developments in related fields, such as encryption, post-quantum cryptography, quantum machine learning and quantum acceleration of artificial intelligence and data analysis.
- Contribute to the organisation of scientific workshops with industry, academic, and public stakeholders.
- Prepare scientific papers and technical reports.

**WE LOOK FOR:**

The successful candidate shall have a PhD degree - or a minimum of 5 years of full-time research or working experience after the first University degree giving access to doctoral (PhD) studies - in the field of applied mathematics, cryptography, computer science, quantum computing, information engineering, machine learning and deep learning techniques, or similar.

**Essential Skills:**

- Ability to work in a multilingual and multicultural environment
- English language, at least C1 level both oral and written
- Ability to learn new technologies and skills in a short period of time

Solid knowledge and experience are required in:

- Quantum computing
- Quantum programming languages and frameworks such as Qiskit, Cirq, Forest, Silq, Penny Lane or Q#, at least in simulation
- Machine learning and deep learning techniques, ideally with a focus on quantum computing applications

Relevant publications in peer-reviewed conferences and journals are also required.

The following knowledge or experience are an asset:

- Applied mathematics, specifically in cryptography
- Quantum assembly languages such as QASM, and programming of real quantum computing hardware
- Quantum annealing approaches and related software such as Ocean.
- Multimedia forensics and analysis
- Good knowledge of at least one of the following programming languages: C/C++/C#, Python, MATLAB

**INDICATIVE CONTRACT'S DURATION:**

36 months initial contract with possible renewals up to maximum 6 years.

**PLACE OF WORK:**

Ispra (IT)

**ELIGIBILITY CRITERIA:**

Candidates for this contract agent post shall:

– (i) have passed a valid EPSO CAST selection procedure;

or

– (ii) be registered in the EPSO Permanent CAST <https://epso.europa.eu/en/documents/call-expressions-interest-0>

or

– (iii) be registered in the specialised call for researchers [https://joint-research-centre.ec.europa.eu/working-us/jobs-jrc/temporary-positions/contract-staff-members/function-group-iv/job-opportunities-research-fellows-european-commission\\_en](https://joint-research-centre.ec.europa.eu/working-us/jobs-jrc/temporary-positions/contract-staff-members/function-group-iv/job-opportunities-research-fellows-european-commission_en) (used mainly by the JRC).

With a valid application number to one of the above, you may then apply for this specific vacancy at JRC through: <http://recruitment.jrc.ec.europa.eu/?type=AX>.

**RECRUITMENT POLICY:**

The Joint Research Centre

- Cultivates a workplace based on respect for other people and the environment.
- Embraces non-discriminatory practices and equality of opportunity. In case of equal merit, preference will be given to the gender in minority.