Polish Space Agency

Training Opportunity for Polish National Trainees

Reference	Title	Duty Station
PL-2023-SCI-SAA	**Cloud-Based Space Science Archives**	**ESAC, Madrid**

Overview of the mission:

The European Space Agency maintains a world-leading Science Programme with missions in heliophysics, planetary science, astrophysics and fundamental physics. The Science and Operations Department (SCI-S), within ESA's Directorate of Science, hosts the scientists and engineers that oversee the space missions from study to end of operations and legacy phase; it develops the science operation systems for the missions and operates the missions in space; it archives and curates their data during operations and beyond. Our main objective is to maximise the scientific output of the missions for the benefit of humankind.

The space science archives hosted at ESAC are a major research and discovery asset for the scientific community worldwide (see http://archives.esac.esa.int). They presently contain data from 27 missions in the domains of astronomy, heliophysics, and planetary science, including ESA missions (Cluster, ExoMars, EXOSAT, Gaia, Giotto, Herschel, Hipparcos, INTEGRAL, ISO, LISA Pathfinder, Mars Express, Planck, Proba-2, Rosetta, SMART-1, Venus Express, XMM- Newton), and missions operated in collaboration with or by partner agencies (AKARI, Bepi Colombo, Chandra, Double Star, HST, ISS solACES, IUE, SOHO, Suzaku, Ulysses). In the next few years, data from seven new missions will enter the archives (Euclid, ExoMars RSP, JUICE, JWST, Proba-3, SMILE, Solar Orbiter), with a significant increase of the assets.

Planning for activities associated with the ESA space science archives is based on three main pillars. These are:

1. Maximise the potential for the scientific exploitation of the data sets. To achieve this, we have to present, promote, and preserve high quality multi-mission, multi-wavelength, multi-epoch, multi instrument data in ways easily usable by scientists and in ways that fulfill the evolving research needs of our communities.
2. Ensure long-term preservation of data, knowledge, and associated access services. A robust technology-aware programme is thus needed to ensure that the archives remain at the leading edge.
3. Treat science archives as an integral part of mission development and operations, in order to enable data from all phases (development, operations, and post- operations) to be drawn together and preserved together at the lowest possible cost.

You are encouraged to visit the ESA website: http://www.esa.int

Overview of the field of activity proposed:

As a Polish National Trainee, you will support the ESAC Science Data Centre team of scientists and software engineers in the prototyping, designing and testing phases of a programme to develop cloud-based solutions for the hosting and processing of science data in the data centre.

In particular, you will contribute to the topic of technology transformation of the science archives by:

- assisting with research tasks related to the analysis of cloud-based technologies and their possible application to Space Science Archives, in particular in relationship to the application of cloud-native Artificial Intelligence services to Space Science Data;
- understanding and summarising the potential impacts and cost/benefits of cloud-based technologies in the provision of ESA Space Science data and services to the scientific community;
- enhancing the advanced data analitics ecosystem of scientific data from Science missions within ESA and its Member States.

Required education and skills:

- You should have just completed or be in the final year of your Master' s degree in software and/or computer systems engineering.
- Experience with private and/or public clouds is an asset, including experience in the European Open Science Cloud (EOSC) initiative.
- Good interpersonal and communication skills
- Ability to work in a multi-cultural environment, both independently and as part of a team
- Fluency in English and/or French, the working languages of the Agency