

Intern in the CAVES and PANGAEA Team

Job Req ID: 15841
Closing Date: 27 July 2022
Publication: External Only
Vacancy Type: Intern
Date Posted: 29 June 2022

Internship Opportunity in the Directorate of Human and Robotic Exploration Programmes.

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

Location

EAC, Porz-Wahn, Germany

Our team and mission

The CAVES and PANGAEA team specialises in training programmes that equip astronauts and mission developers with scientific, expeditionary and behavioural skills. The group's primary output is focused around two training programmes, CAVES, a course that uses natural cave systems for expeditionary and human behavioural and performance training, and PANGAEA, a course for geological and astrobiological field training. Complementary to their training goals, these programmes are used as research and development platforms to advance several of ESA's technological, scientific and operational areas.

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

Field(s) of activity/research for the traineeship

1) topic 1: Electronic Fieldbook (EFB) system development

The EFB is a tool supporting astronaut mission operations with technology for geolocation, cave mapping, scientific data gathering, sensors interaction and wireless data relay to mission control centres. You are sought to support the software or hardware development of this exploration tool to improve, extend and test its functionalities.

For detailed information on this internship position, please click here:

https://www.esa.int/About_Us/EAC/Space_training_team_Electronic_Field_Book_development

2) topic 2: Machine Learning for recognition of planetary materials from multispectral datasets

You are sought to continue the development of machine learning algorithms for recognition of planetary materials from multispectral datasets. This project focuses on combining several mineral characteristics to achieve automatic classification of minerals and rocks.

For detailed information on this internship position, please click here:

https://www.esa.int/About_Us/EAC/Space_training_team_Planetary_Mineral_Database_Development_and_Validation_of_Spectra_Classification

3) topic 3: Development of Analytical Toolset for recognition of Planetary Materials and Validation of Spectra Classification Methods

You are sought to continue enhancing and developing the PANGAEA analytical toolset consisting of multi-spectral archives and the Mineralogical Database, a curated collection of reference information on planetary analogue minerals and rocks. You will also help in the evaluating the most suitable spectral identification method for planetary materials with the custom ML classification software, collecting and analysing the analytical data, and help with the preparation of the PANGAEA training course.

For detailed information on this internship position, please click here:

https://www.esa.int/About_Us/EAC/Space_training_team_Planetary_Mineral_Database_Development_and_Validation_of_Spectra_Classification

Behavioural competencies

Result Orientation
Operational Efficiency
Fostering Cooperation
Relationship Management
Continuous Improvement
Forward Thinking

Education

You must be enrolled at university for the entire duration of the internship. You should preferably be in your final or second to last year of a University course at master's level in a technical or scientific discipline.

Additional requirements

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.

The topics listed in section 2 above respectively require such educational knowledge as:

Topic 1:

Depending on the chosen branch and profile (either software or hardware):

- Software development: academic or professional experience with at least one of the programming languages, frameworks or engines currently used in the project: JavaScript, AngularJS, Java, CouchDB, HTML, Ionic, Cordova. Experience on one or more of the following paradigms would be considered a plus: C++, C#, Qt, Python, REST, TensorFlow, Docker, user interface design. Previous experience in GIS systems would be a plus.
- Hardware, telecommunications, and prototyping: academic or professional experience in UNIX embedded boards or generic electronics (e.g. RaspberryPi, ESP32, Arduino), as well as having basics of OpenWRT, Wi-Fi and of routing and networking. Experience in hardware assembling and CAD 3D design-printing and prototyping. Familiarity with standards for ergonomics in terrestrial applications, and in ECSS for space utilisation would be a plus.

Topic 2:

Practical experience in Machine Learning based classifications (and/or data mining, data fusion, statistics, clustering, decomposition/unmixing, recommender systems or other alternative classification methods), or in the processing and analysis of data coming from analytical instrumentation, or with databases. Academic or professional experience with the programming languages and frameworks currently used in the project: Python, TensorFlow, Keras, Scikit-learn, Numpy, matplotlib. Additional experience in Jupiter notebook, JavaScript, analysis and visualisation of scientific data is considered a plus.

Topic 3:

Having a good knowledge of and practical experience in using, processing and analysing data of analytical methods and instrumentation, in particular of molecular and atomic spectroscopy (VNIR, Raman, LIBS, XRF), or working with and maintaining digital information catalogues and databases are a benefit.

Familiarisation with geochemistry, mineralogy and petrology, or attendance of courses related to planetary geology, astrobiology or planetology would be an asset.

Other information

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

If you require support with your application due to a disability, please email contact.human.resources@esa.int.

Internships can take place remotely, on-site or partially on-site depending on the pandemic situation, and in line with the relevant Establishment's policy (e.g. possible Green Pass requirement) applicable at the time of starting the internship.

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).