



## Marie-Skłodowska Curie Postdoctoral Fellowship at the AIR Centre

### Call for Expression of Interest (Eoi)

The Atlantic International Research Centre -AIR Centre- is looking for **experienced and highly motivated researchers** interested in developing collaborative applications for the next call of the Marie Skłodowska-Curie Actions Postdoctoral Fellowships (MSCA-PF), which is expected to be open soon (from May to September 2021).

#### What are MSCA Postdoctoral Fellowships?

The MSCA-PF (previously called Individual Fellowships) provide researchers from all over the world with the opportunity to acquire and transfer new knowledge by carrying out a research project in or outside Europe for 1-2 years. The aim is to support the career development of researchers for enhancing their individual competence diversification in terms of skills at a multidisciplinary level and intersectoral experience.

#### Who can apply?

- Promising researchers from anywhere in the world: all nationalities can apply.
- Cross-border mobility is a must. \*
- Experienced researchers only: PhD degree at the date of the call deadline.

*\*At the time of recruitment by the host organisation (AIR Centre), researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation (Portugal) for more than 12 months in the 3 years immediately prior to the reference date.*

**Location of work to be performed:** AIR Centre Headquarters, TERinov-Science and Technology Park (Terceira Island, Azores, Portugal).

#### What the AIR Centre offers you to develop your project?

The AIR Centre is an international collaborative organization that promotes an integrative approach to space, climate, ocean and energy in the Atlantic. The AIR Centre is driven by and at the same time supports emerging technological innovations and advances in data science.

The AIR Centre has a large [network](#) of partner governmental and non-governmental institutions, which can act as co-hosting organizations for the development of the proposed project.

#### Topics of Interest

These are a few examples only. We are interested to hear all about your non-conventional approach. We welcome projects that can contribute to open-source software development.



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- Explore uses of Synthetic Aperture Radar (SAR) data, including for monitoring volcanoes, oil spills, flooding and forestry.
- Machine learning to classify accelerometer data.
- Embedding in-situ data in Open Data Cubes (ODC).
- Explore new platforms for next-generation crowdsourced geo-data.
- Machine learning for spatial-temporal modelling.
- Deep learning for cloud removal of satellite data.
- Hyperspectral data.
- Classification of hyperspectral data.

### Data Availability

The AIR Centre is building a data portfolio of both remote-sensing and in-situ data for the Atlantic region.

#### *Satellite Data*

The AIR Centre has a Direct Receiving Station (DRS) installed in our office at TERinov - Science and Technology Park in Terceira Island, Azores. The DRS receives satellite data directly from several satellites (satellites and instruments are listed below). The data is ingested and processed in our own data-centre before it is catalogued/indexed and stored in a high-availability/high-performance object storage pool.

We add 300GB of data to our catalogue on a daily basis. In August 2021, we receive data directly from the following satellites: Terra, Aqua, Suomi-NPP, NOAA-20 and Feng Yun-3. More satellites shall be added soon. For an updated and comprehensive list of satellites and their more than fifty instruments, and products, please check our website <https://aircentre.io/app/apis/>. The record goes back to August 2021 only. However, if necessary, we can add earlier data to our collection.

#### *Data Cube*

Based on the Open Data Cube Standard, we have a data cube for the Azores complete with Sentinel-1 Synthetic Aperture Radar (SAR) going back to January 2017, on AWS.

#### *In-situ Data*

We have a high-availability MySQL database hosted on the cloud with meteorology data for the whole of Portugal, with over 300 stations, since May 2020, which is updated every 10 minutes.

#### *Other Data*

Access to Sentinel Hub EO Browser or other platforms for Copernicus historical data access and processing, such as Copernicus Open Access Hub, Sentinel-5P Pre-Operations Data Hub or Euro Data Cube.

### Data Acquisition - DRS Antenna

The AIR Centre has a Direct Receiving Station (DRS): Fully automated tracking station Dartcom 1.5 metre X-Band EOS Polar Orbiter Satellite Reception and Processing System. The system is complemented by a dedicated GPS antenna.

## Computing Infrastructure

### *Data-centre*

The AIR Centre has a dedicated data-centre on premises at our office in Terceira Island, Azores. The data-centre is cooled and dehumidified to ASHRAE standards, Class A1, and has a capacity for 36kW of computing power in six 42u racks, with a maximum capacity per rack of 12kW. All equipment has redundant power sources and is backed by Uninterruptible Power Supplies (UPS).

All computational infrastructure mentioned below is rack-mounted in the data-centre.

### *Network*

Between the data-centre and the two office rooms at the technology and Science Park, we have a 10GbE network per user. In the data-centre, in-between servers (including storage), the network is at 100GbE, with both double redundancy (storage and serial computing nodes), and single redundancy for the parallel processing server.

### *High-availability/high-performance Storage and Serial Computing*

The storage is based on a growing pool of nodes (Linux servers), with performance scaling linearly with growth. We use high-performance, software-defined object storage (S3 protocol), for high-availability. The pool started with 160 cores (320 threads), 768 GB memory and 70TB (SSD). With a 100GbE network across nodes with double-redundancy.

Irrespective of the volume of data stored, we normally keep an extra 15TB for unplanned research needs, but, with planning, may allocate any (easily up to 50TB) justified dedicated volume for specific needs.

### *General Purpose Computing*

- High rate demodulator
- Dartcom X/L Band receiver/control rack
- X-Band Ingester PC
- X-Band Processor PC
- Visualisation PC

### *Machine Learning, Artificial Intelligence - Parallel Computation (GPU-based)*

Beyond the machines described above, a Linux server dedicated to parallel workloads is planned for acquisition in the first semester of 2022: 2x AMD EPYC 7502 (32 cores at 2.5GHz, 128MB, PCIe 4.0), 768GB of system memory, and 8x Quadro RTX A5000 (NVLinked, 24GB VRAM per GPU), OS drive 1.84TB NVMe, and extra storage 3.84TB SSD (SATA). This machine has the Lamda Stack, with Ubuntu, nvidia CUDA, TensorFlow, Pytorch and Keras, always up to date.

### *How to apply?*

Submit by **Friday, June 11th 2021** to Natalia Ospina-Alvarez ([natalia.ospina \[at\] aircentre.org](mailto:natalia.ospina[at]aircentre.org)):

- A research proposal (see proposed content below) and,
- Short CV.

Only one proposal per individual researcher may be submitted to the MSCA-PF call. The call is not yet available, but it will be published on the [Funding and Tenders portal](#) of the European Commission.

More information about Marie Skłodowska-Curie Actions and types of fellowships can be found [here](#). Note that the Marie Skłodowska-Curie Actions Postdoctoral Fellowships were previously called Individual Fellowships.

### Research Proposal

The application should include the following

1. Provisional title.
2. Abstract + keywords.
3. Aims and goals.
4. Originality: briefly explain the current state of the art and which would be the contribution of the proposed research.
5. Methodology / approach.
6. Impact: explain the expected impact of your research.
7. Research outline: explain how you will address your question(s)/hypothesis.

**Document Length:** max 5 pages in a single pdf file (including CV).

**Clarifying note:** This is not a job application. The call is for an Expression of Interest to apply for an MSCA Postdoctoral Fellowship hosted by the AIR Centre.

If your EoI has been identified as one of those to be taken forward to a full application, you will be notified by email in late June 2021.