Training Opportunity for Swiss Trainees

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<th>Reference</th>
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<th>Duty Station</th>
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<td>CH-2017-TEC-SF(1)</td>
<td>Advanced concepts in neurobiology and neuro-informatics</td>
<td>ESTEC</td>
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Overview of the unit’s mission:
The Advanced Concepts and Studies Office is ensures the overall coordination, coherence and performance of program and corporate studies in support of the Agency’s future activities, in line with its long-term strategic objectives and priorities, manages the General Studies Programme (GSP, www.esa.int/gsp), in support of all the Agency’s programmes and in particular of the Director General and the Strategy Department (DG-S), supports the selection of activities; and manages the Advanced Concepts Team (ACT, www.esa.int/act), in charge of beyond the horizon multidisciplinary research for space, exploring new approaches to space related R&D (including competition, prizes, games), research for disruptive innovation, developing an expert network at academic level, and providing a capability for fast first look analysis of problems, challenges and opportunities. Within the European Space Agency, the ACT is engaging in collaborative research relations with university institutes and research centres, focusing on advanced research topics of potential strategic interest to the space sector and in experimenting with new forms of teamwork. In order to achieve this goal a multidisciplinary research environment is provided, in which young scientific and engineering post-doctoral and post-graduate researchers carry out work on emerging technologies and innovative concepts. Candidates are strongly encouraged to visit the website of the team to obtain more information about the team in preparation of their application and interview.

Overview of the field of activity proposed:
The successful candidate will develop most of his/her activity exploring the field of applied neurobiology and neuro-informatics with a view to explore both experimentally and theoretically models of the nervous system of biological organisms. The Advanced Concepts Team has been active in this general field with the objective to connect brain research to opportunities and requirements of human spaceflight, to get inspiration from the principles by which brains work for artificial systems. Projects in this field included brain machine interfaces for space applications, cyborg insect, neural analysis of images “curiosity cloning”, mirror neurons and robotic intelligence, neuromorphic computations principles for spacecraft on-board computing, deep learning for space application, immersive VR systems and their effect on training and learning, brain activities during sleep and hibernation, and cortical activities during repetitive exercises. The successful candidate will be encouraged to propose and carry out new projects in these fields based on own expertise, interest and insight. The following list contains examples of topics considered interesting:
- Biological clock synchronisation (isolated from natural light) and subjective time perception
- Sleep and gravity
- Architectures for flexible neuromorphic systems
- Exploratory neural platforms (memristive, phase-change, FPGA)

The successful candidate will likely work closely with experts at the European Astronaut Centre, different analogue facilities and depending on the nature of the project, this might also involve interfacing with the academic community in these fields. The successful candidate will be a member of the Advanced Concepts Team (www.esa.int/act) and is therefore expected to contribute to the development and the assessment of new concepts and technologies for space applications in close interaction with ACT researchers who work on a broad range of disciplines including, informatics, artificial intelligence, climate modelling, energy systems, fundamental physics, biomimetics, computational management science and mission analysis. Based on her/his detailed background and interests and needs of the team, the successful candidate will be involved in a number of other ACT initiatives (including studies conducted via the Ariadna scheme (www.esa.int/ariadna) and participate in reporting and communicating results of the team (internally and externally).

Required education:
Applicants should have just completed, or be in their final year of a university course at Masters level in biology, biomedical-engineering, Biomechatronics engineering or equivalent. Programming skills and interest in neuro-informatics or artificial intelligence are considered an asset. The candidates should have sound analytical skills, avid curiosity and the will to work in an interdisciplinary environment, where neuroscience is only one of several disciplines. Candidates need to be fluent in English or French, the official languages of the Agency. Candidates should have good interpersonal and communication skills and should be able to work in a multi-cultural environment, both independently and as part of a team.