

Assistant engineer: Developpement of a 3D Slicer python Extension for SEEG procedures

Position to be filled: 01/01/2024

Type of job: Fixed term contract

Type of activity: Scientific software development and Image Processing

We invite engineering students to join the CENIR STIM Platform and DYNAMICS OF EPILEPTIC NETWORKS AND NEURONAL EXCITABILITY Team at the Paris Brain Institute (ICM) to participate to the development of a 3D Slicer Extension dedicated to stereo-electroencephalography procedures (SEEG).

Intracerebral electrodes are used in the context of stereo-electroencephalography (SEEG) recordings in patients with pharmaco-resistant epilepsy. SEEG is an invasive method used to determine which anatomical structures of the brain generate epileptic seizures. SEEG is usually used when non-invasive explorations are inconclusive. A precise localization and 3D visualization of brain anatomy is crucial to precisely plan intracerebral electrode trajectories and then localize the origine and spreading of the seizures.

The DYNAMICS OF EPILEPTIC NETWORKS AND NEURONAL EXCITABILITY Team works on the mechanisms involved in the epileptic activities. In this context the detailed correlation of recorded electrophysiological signals with the anatomical structures by means of different neuroimaging tools represents a crucial step data interpretation and analysis.

As a partner of the research teams, the CENIR STIM platform develops software tools to assist clinicians and researchers in different stages of the sEEG procedure, from pre-surgical to post-surgical stages. Processed data for each patient are shared with many teams at ICM that perform analysis of the sEEG recordings acquired during the clinical investigation of the patients.

The CENIR STIM platform develops tools and integrates them into the 3D Slicer software as plug-ins or modules. 3D Slicer is a free, open-source software for visualization, processing, segmentation, registration, and analysis of 3D images and meshes. It can be used for planification and navigation through image-guided procedures. It is also a development platform that allows software engineers to quickly build and deploy custom solutions for research and commercial products, using free, open-source software.

If you are interested in software development for medical image processing and 3D data visualization, full of motivation, enthusiasm, and desire to learn, we invite you to consider joining our project.

Job description (mission)

The candidate will participate in the design, development of a 3D Slicer extension dedicated to SEEG procedures:

- *Reorganization, modularization and modification of the existing modules*
- *Coding of new python modules to share processed data with others*
- *Containerization of all the automatic processing*
- *Coding 3D Slicer interfaces that will drive the entire workflows of the project*

Technical environment

- *Python, VTK, ITK, Qt, 3D Slicer*
- *Stack DevOps: Docker, Git, Gitlab, Gitlab-CI*
- *Linux, VSCode, Jupyter*

Profile

Engineer student BAC+4 or Master Student.

Skills

- *Knowledge and experiences in Python programing*
- *Knowledge and experience in GUI Developpement*
- *Knowledge and experience in 3D medical image processing*
- Use of collaborative development tools (Jupyter, git, continuous integration, project management tools)
- Linux practice

Interpersonal skills

- Desire to work in a scientific / health / research context
- Team spirit, autonomy, curiosity

Please send your CV and letter of motivation and links to code repositories to sara.fernandezvidal@icm-institute.org