



MULTIMODAL ELECTRODE HUB FOR SEEG

NeuXelec brings every image of a SEEG patient into one space, reconstructs the implanted electrodes, names every contact against the patient's own anatomy, and exports coordinates the rest of your tools can read. One application, from the raw DICOM to the figure in the report.

From raw images to a labelled implantation

1 Import what you have

Pre and post-implantation MRI, CT, PET, ictal and inter-ictal SPECT, fMRI, FreeSurfer parcellations and pial surfaces, and the NeuroInspire plan. NIfTI, DICOM folders and FreeSurfer volumes, several files at a time.

2 Align on one reference

Coregistration is run with ANTs on MRI 1, rigid only for the CT so the geometry of the electrodes is never scaled. Every alignment is reviewed before it counts: the reference in green, the moving image in red, and a manual console to correct it by hand.

3 Reconstruct in two clicks

One electrode is two picks on the post-implantation CT: the deepest contact and a second point along the shaft. The DIXI reference places the rest. Custom electrodes are supported too, with unconnected contacts and variable spacing.

4 Let the plan do the labelling

With a NeuroInspire plan loaded, NeuXelec proposes the name, the hemisphere and the reference of the nearest planned trajectory, and tells you when the axis you drew does not match the planned one. The plan never moves your picks.

5 Read the anatomy of every contact

Each contact is labelled with the dominant region of the 3x3x3 voxel cube around it, every neighbour weighted by its distance, the way SEEG2parc does it. White matter is refined gyrus by gyrus with wmparc, and the regions a contact straddles are one hover away.

Two picks per electrode, every contact named in the patient's own anatomy.

6 Look at it properly

Oblique slices cut along the axis of an electrode show every contact of a shaft at once, and travel millimetre by millimetre beside it. The 3D scene puts electrodes, brain surface, slice planes and functional maps in one picture, and one click narrows it to the contacts sitting in grey matter.

7 Export to whatever comes next

Contact coordinates as TXT, CSV, TSV, JSON, Cartool ELS or iELVIS, in LPS or RAS, and a valid BIDS folder with the anatomical labels, in the patient space or in MNI152. Exported images can be defaced on the way out, and the brain is never touched. Screenshots and rotating GIFs come out on the colour of your slide.

Functional imaging where you need it

PET, ictal and inter-ictal SPECT, and the SISCOM computed inside the application once both SPECT are aligned. fMRI is read either as a statistical map or recovered from the colour fusion the scanner exports, so what the neurologist sends is what you display. Threshold, opacity, colour map, minimum cluster size in mm^3 , restriction to the cortical ribbon: as a blob in 3D, on the pial surface, or painted on the slice planes, next to the contacts that matter.

Made to be used in the clinic

Everything in the patient's own space. MNI is there when you ask for it, never behind your back.

Nothing is written without you. A validated coregistration lives in the session until you save it, and NeuXelec says so if you leave it behind.

A project reopens as you left it, on any machine. Images, electrodes, colours and display settings come back in one click, and a project moved to another computer finds its images again on its own. A read-only mode lets you hand the case over without any risk of changing it.

Nothing to configure, nothing to learn by heart. A Windows installer with the registration tools included, an update notice when a new version is out, a guided tour on the first launch and the whole user guide behind F1.

Free and open source. Released under the GNU General Public License v3: read it, cite it, improve it.

Where it comes from

NeuXelec is developed at the Human Neuron Lab, Hôpitaux Universitaires de Genève and Université de Genève, with the neurologists and neurosurgeons who use it on real implantations. It is a research tool and does not replace the judgement of the clinician in charge.