Restoration of the Connectome as a Measure for Brain Surgery Outcome

NICARA™ for Neurosurgery
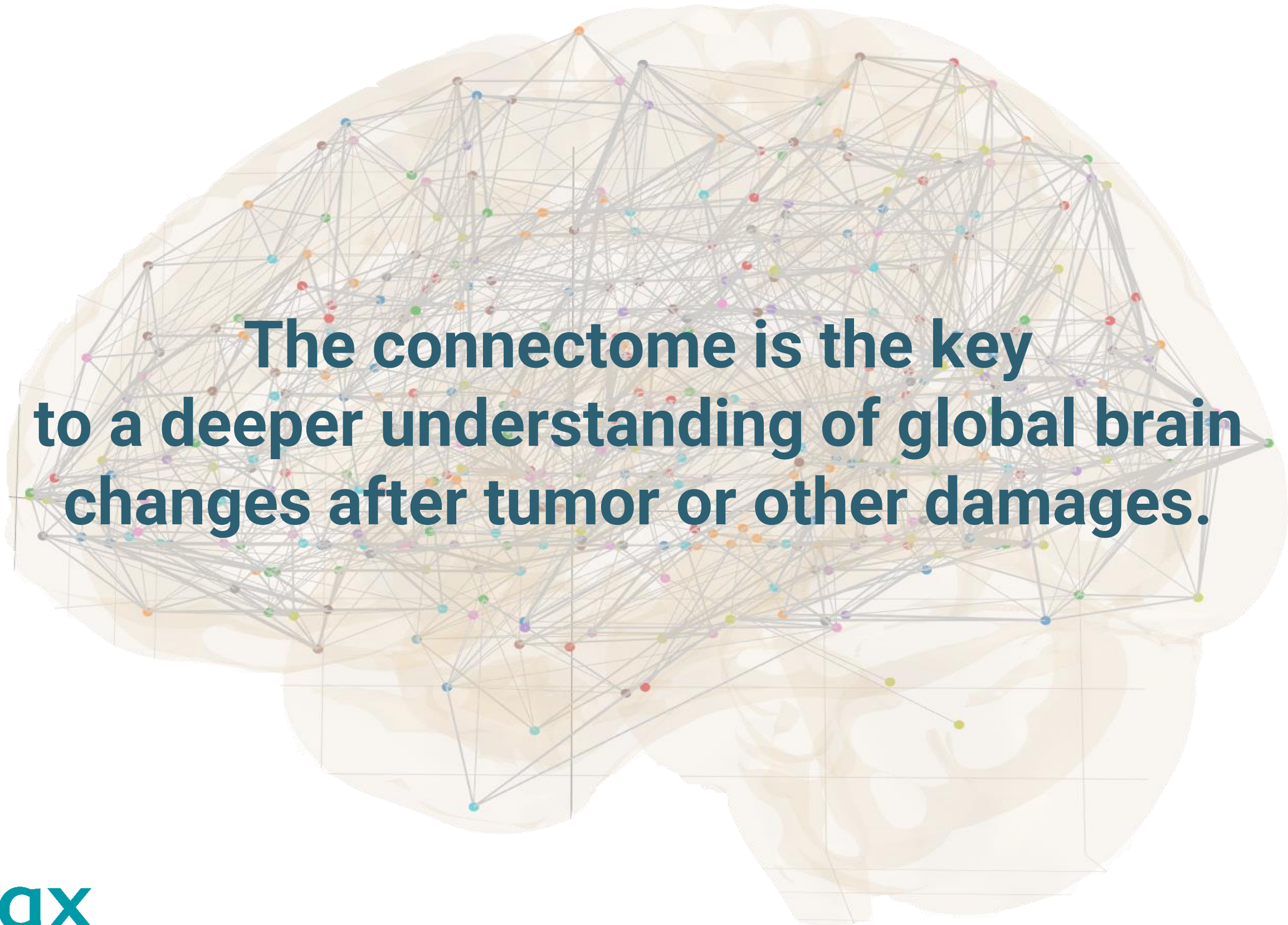
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Is conventional MRI enough to discover brain tumors?

> You think that conventional MRI does not tell you enough about your **tumor**, **TBI** or **pain disorder** patient?

> You want to know more about the remote effects of brain damages, tumor growth and brain surgery?

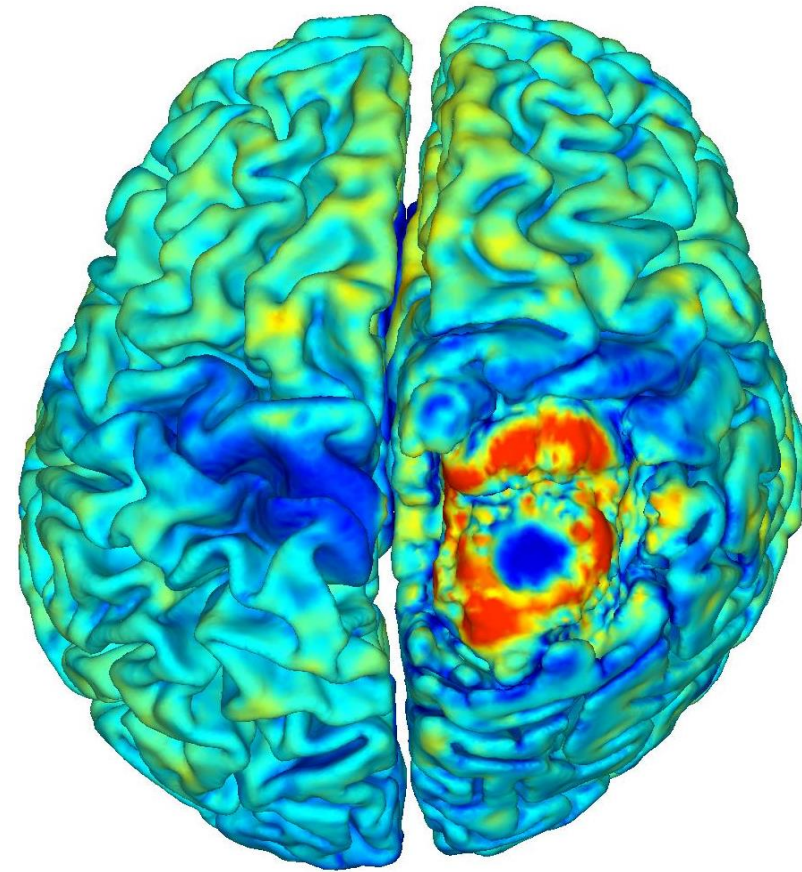> You think cMRI alone is a weak predictor for disease progression?
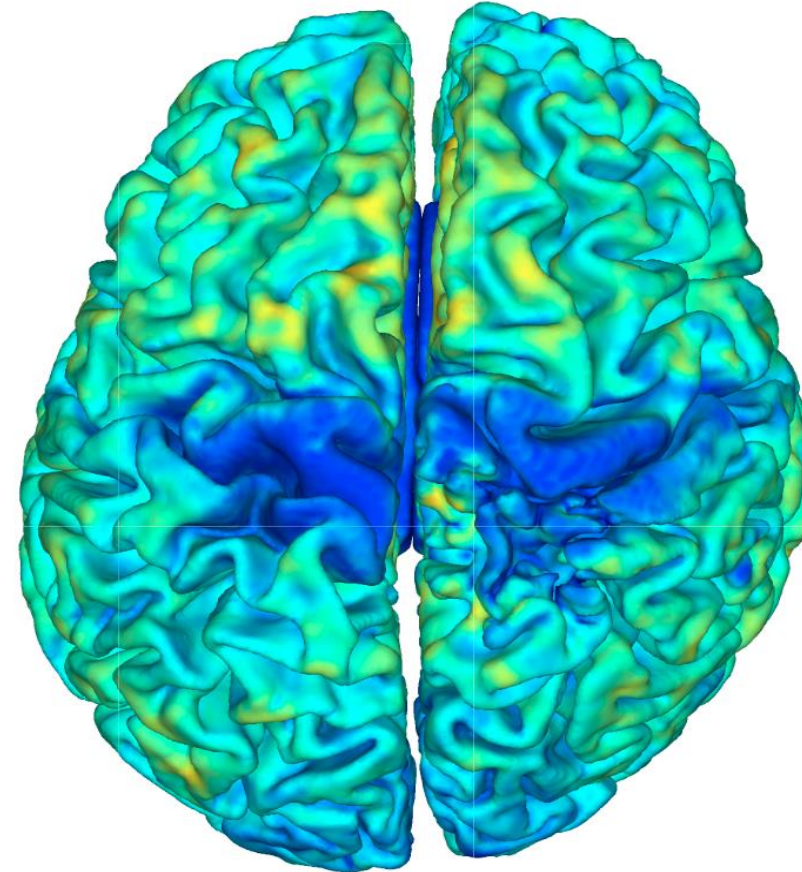
The analysis of the Connectome goes beyond…

The connectome is the key
to a deeper understanding of global brain
changes after tumor or other damages.

...and helps you answering clinically relevant questions
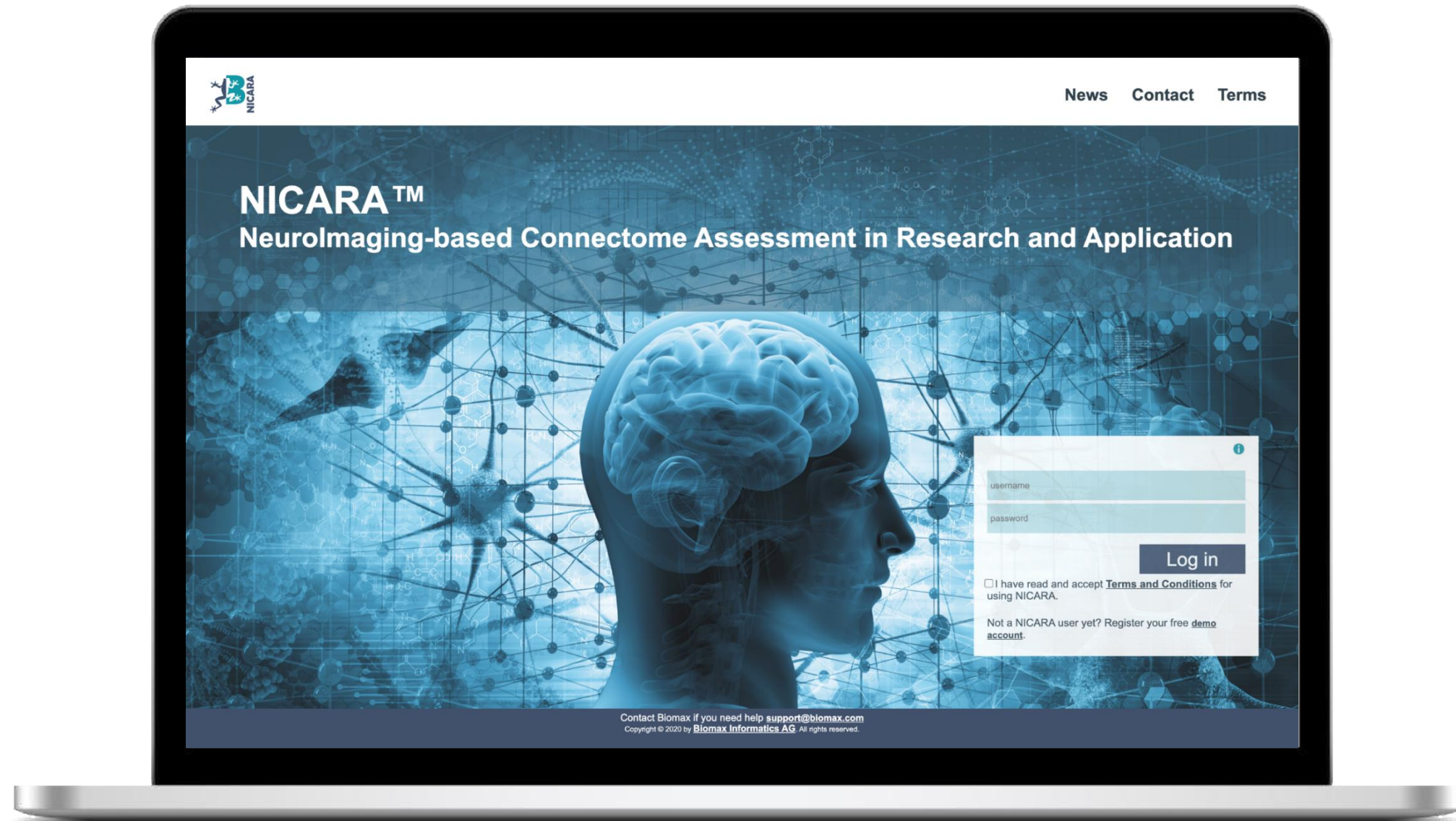
Pre-operation

Post-operation

0 1 2 3 4 5 6 mm

Cortical Thickness measured by NICARA
Connectome Builder

> How does brain rewire in response to brain tumor?

> How does the brain network change due to surgery?

> How to predict changes on surgery outcome?

> How does structural network associate to cognitive functions?

Our Solution for Connectomics: NICARA™

> NICARA provides fully automated processing routines for structural and functional connectome extraction

> NICARA allows fully integrated study management and catalog functions for connectome data

> NICARA enables visualization, exploration and comparisons of multimodal connectome information and morphometry.

NICARA offers you many advantages…
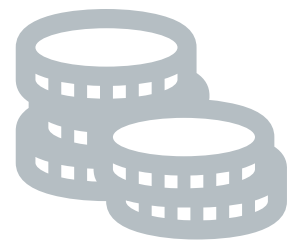
...save time and money

...be more efficient
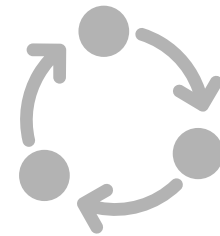
...profit from expert knowledge

...use our hardware resources

> **one tool** for both, morphometry assessments and connectomics

> running the most powerful **open source neuroimaging tools**

> **validated** as open source tools are cited by hundreds of peer-to-peer publications

> running **sophisticated pipelines** fully automatically

> neither **a neuroimaging team** nor **large hardware resources** are required from your site

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…and includes all computational anatomy tools

Cortical Thickness
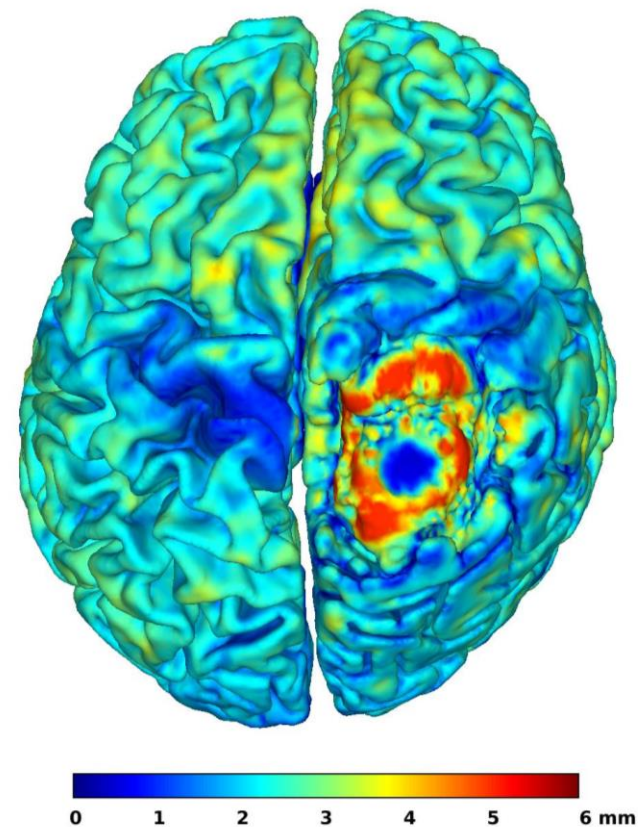
Skull-stripping
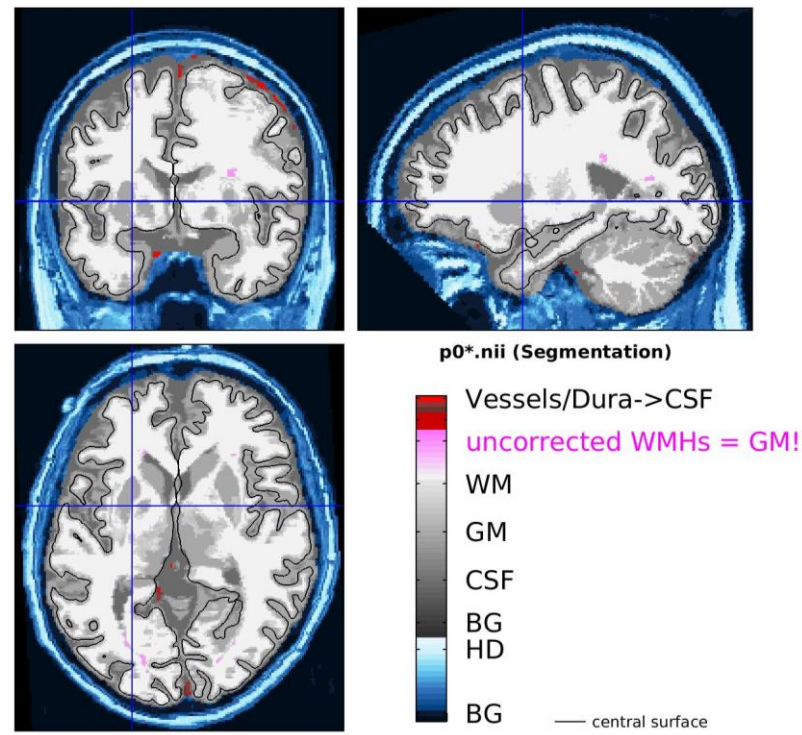
Segmentation
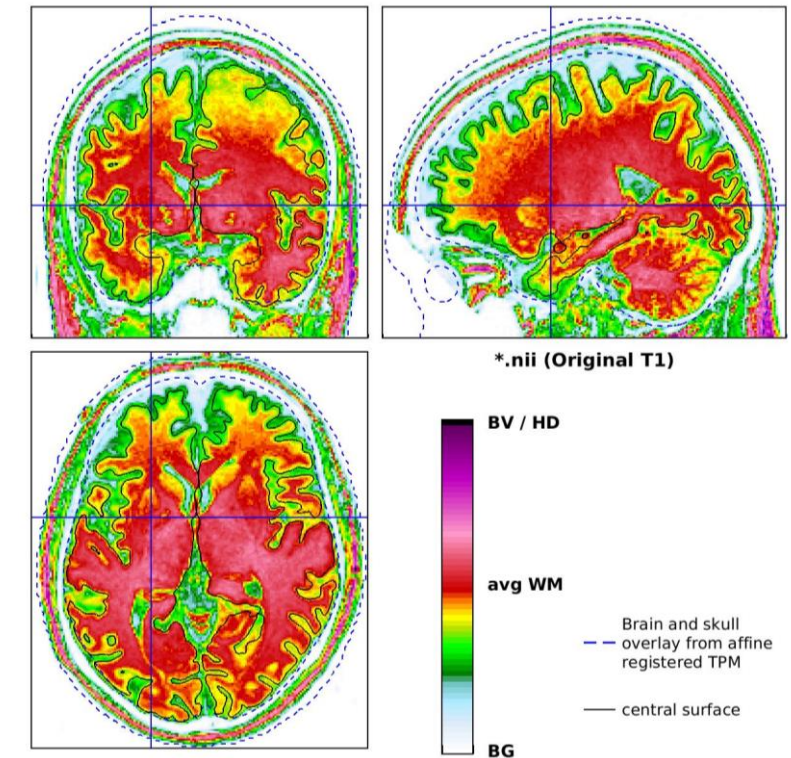
The Computational Anatomy Toolbox (CAT12: http://www.neuro.uni-jena.de/cat/) for SPM (Statistical Parametric Mapping software, http://www.fil.ion.ucl.ac.uk/spm/) is part of the automated processing pipeline executed by NICARA.

Look at the structural connectome pipeline at a glance
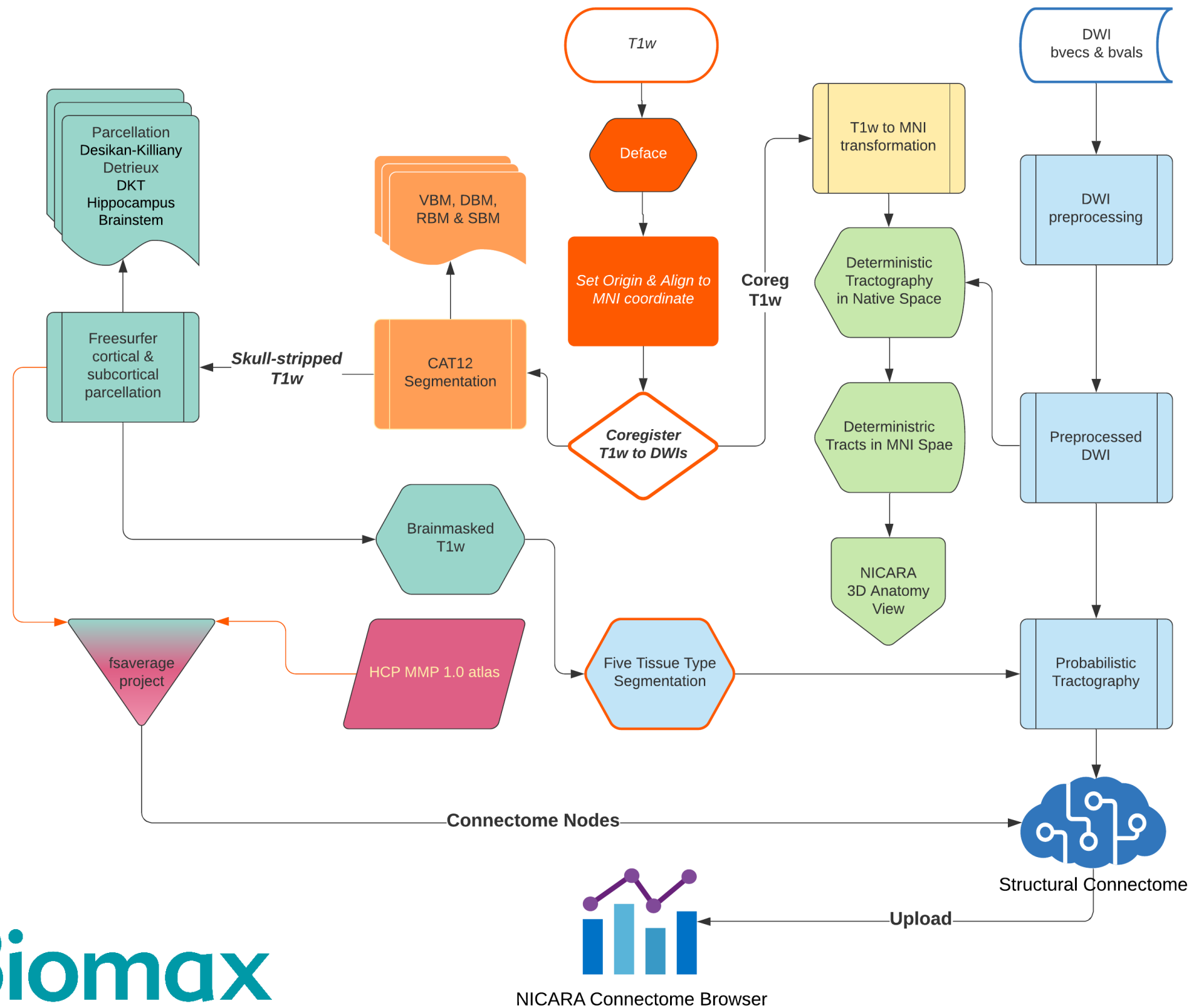
All pipeline tools executed by NICARA are…

> open source

> validated in hundreds of studies

> suggested as preferred neuroimaging method for AD drug development*.

*in Falcon C, et al. Neuroimaging Methods for MRI Analysis in CSF Biomarkers Studies. Methods Mol Biol. In Biomarkers for Alzheimer's Disease Drug Development edited by Robert Perneczky (2018)

You can explore brain morphometry and connectivity

ROIs related to cingulate white matter tracts according to HCP MMP 1.0 atlas

You can inspect tumor position and fiber densities

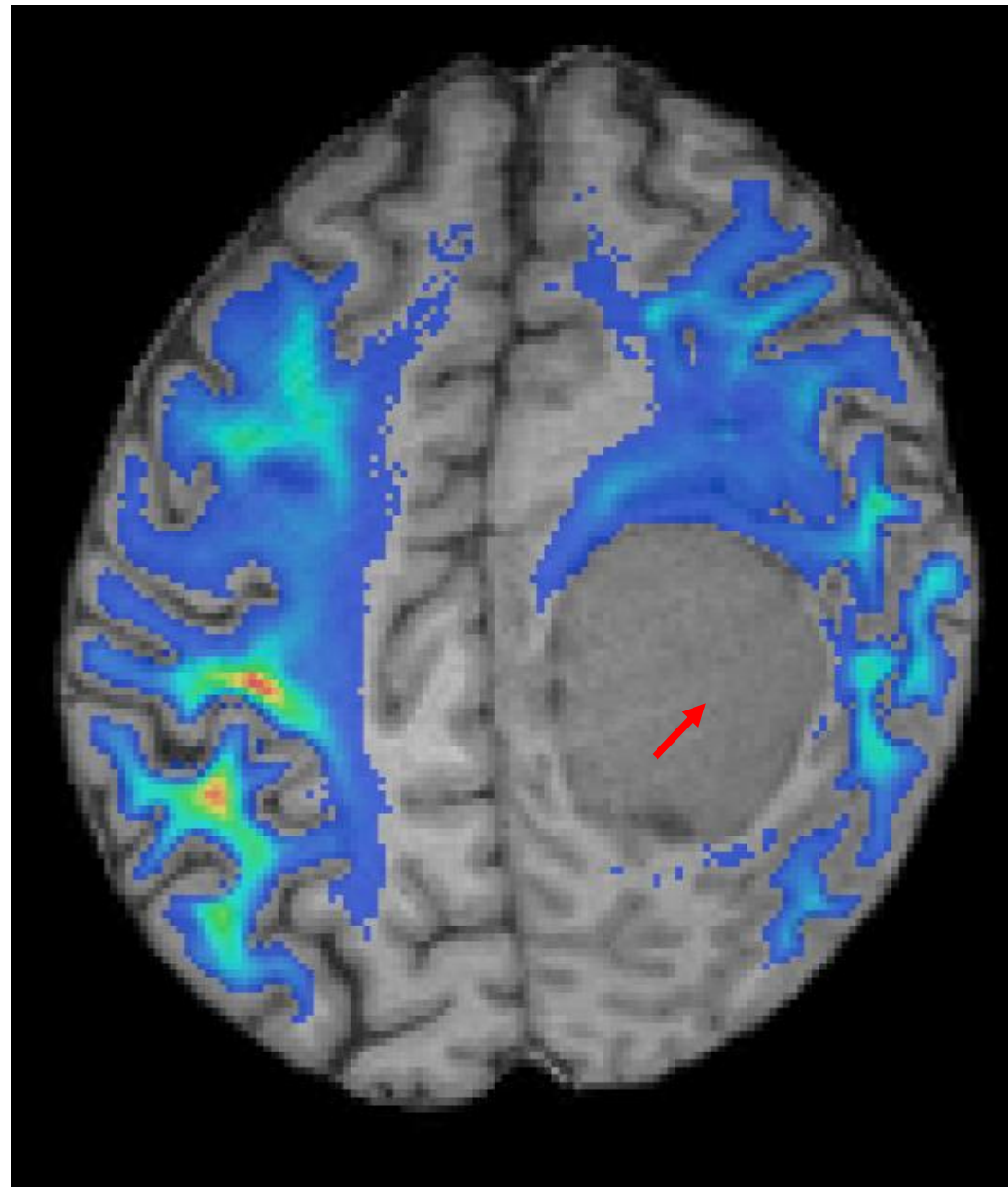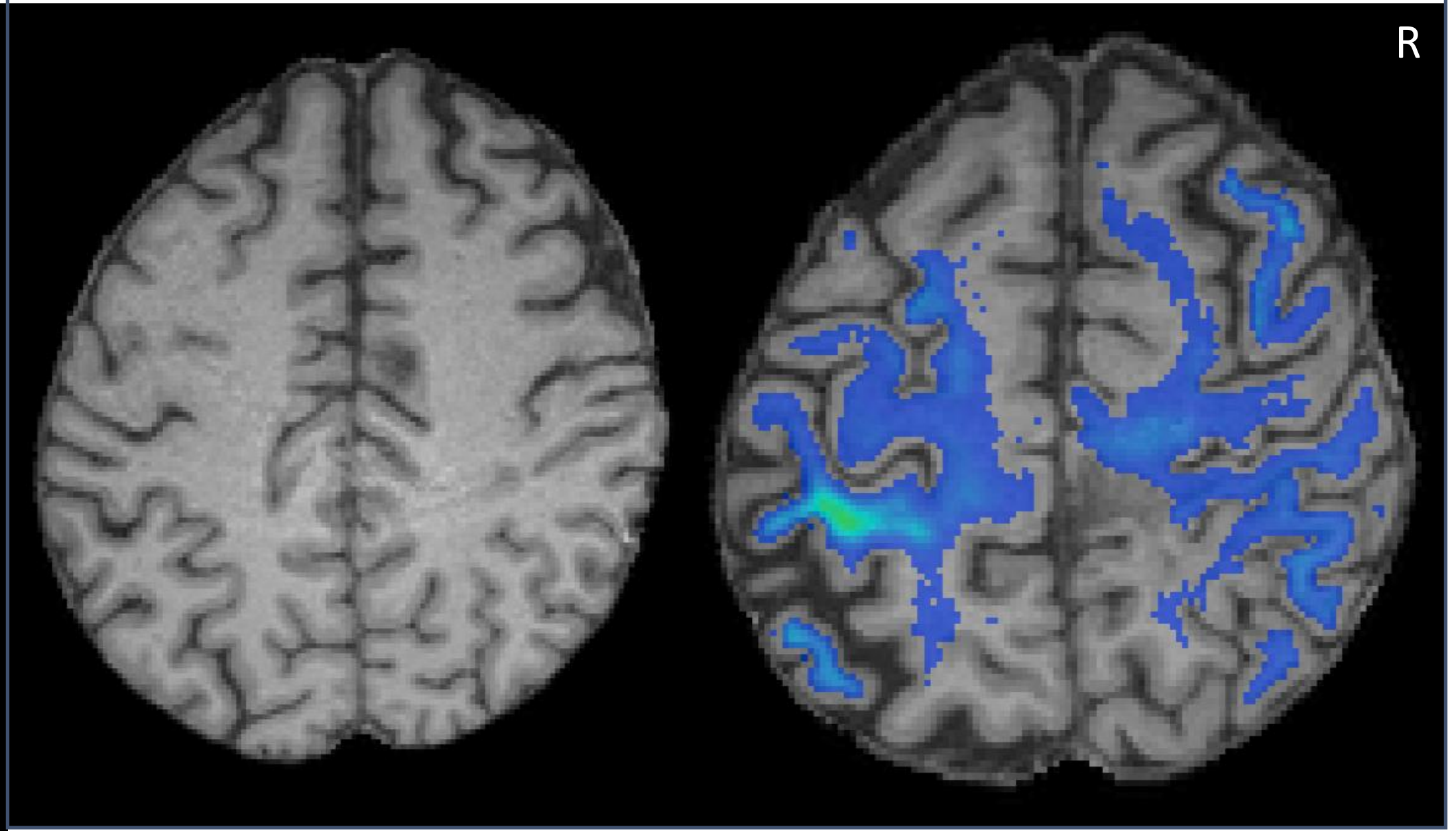*Probabilistic fiber density map of middle longitudinal fasciculus in tumor patient*
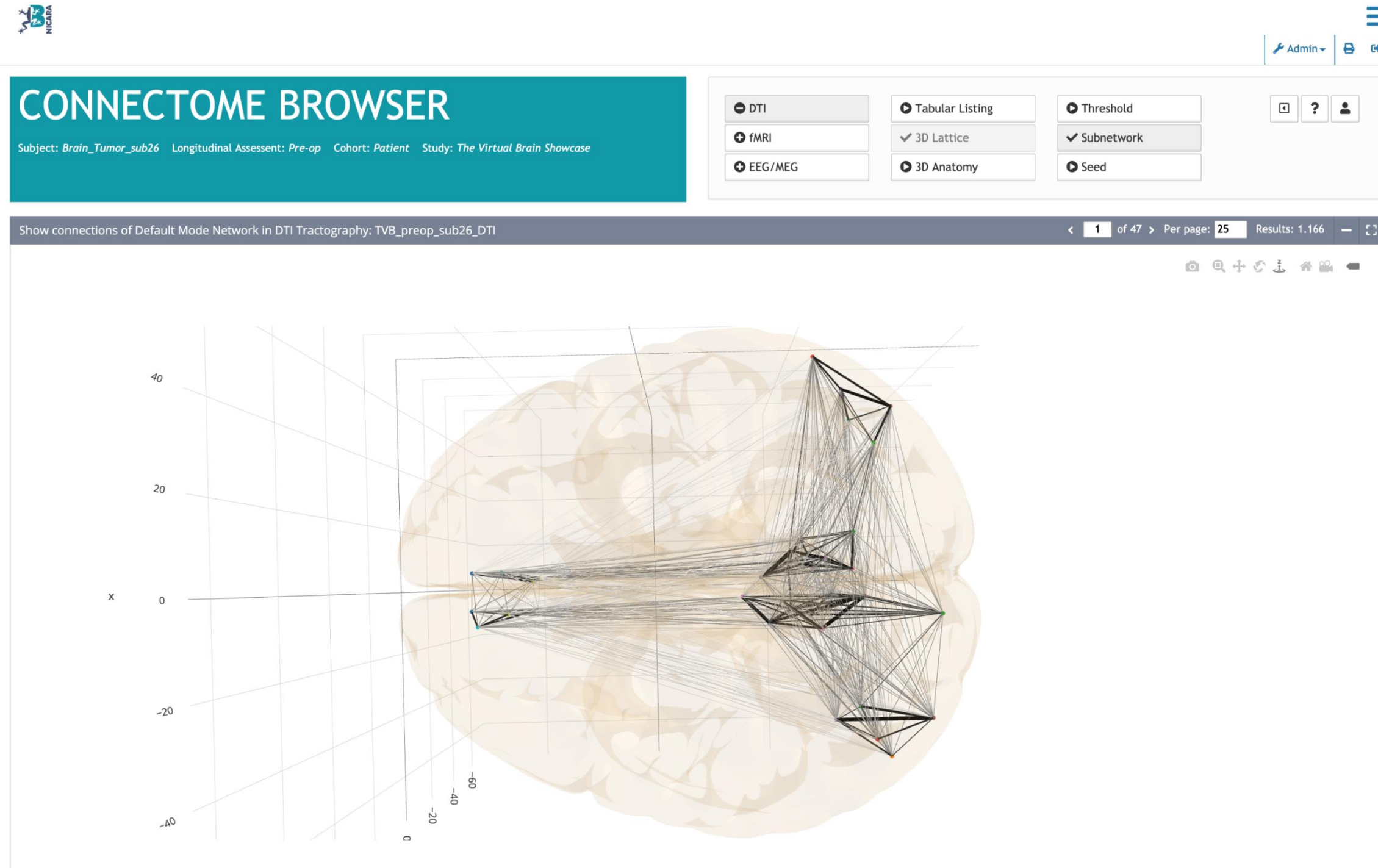
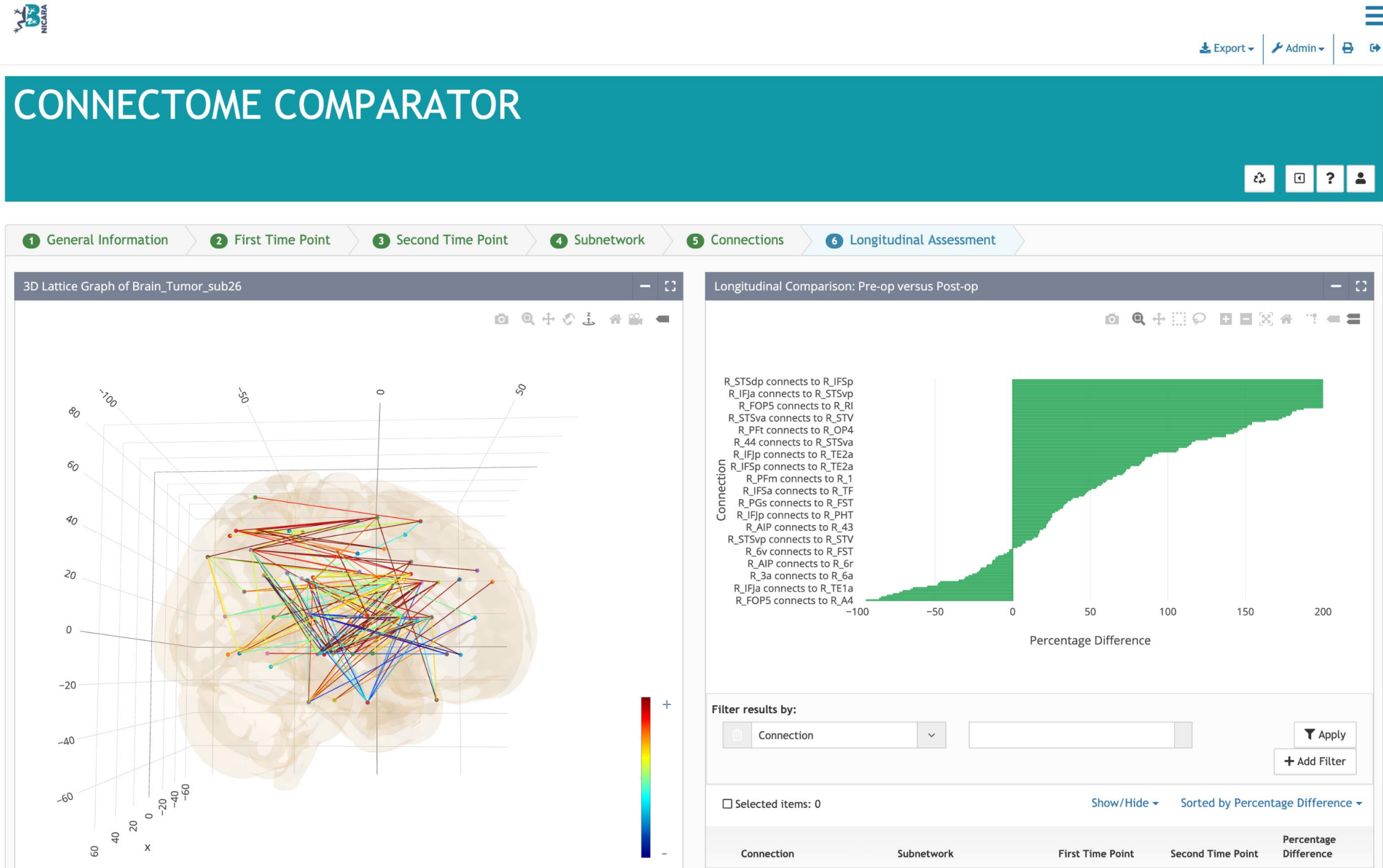# You can reveal brain rewiring in your patient

Fiber Density Maps: Superior Longitudinal Fasciculus before and after tumor resection

You can quantify brain connectivity

3D Lattice graphs: Structural connectivity of default mode network in a tumor patient

You can document your surgery outcome

Increase of superior longitudinal fasciculus connectivity six months after tumor resection

NICARA is…

> **The only tool you need** to do morphometry assessments and connectomics

> **The most advanced tool you can get** running the most powerful open source neuroimaging tools

> **Validated** as open source tools are cited by hundreds of peer-to-peer publications

> **Most convenient for you** as it runs sophisticated pipelines fully automatically.

> **Cost efficient** as you do not need a neuroimaging team nor large hardware resources to do connectomics

Take advantage from NICARA and test it today!
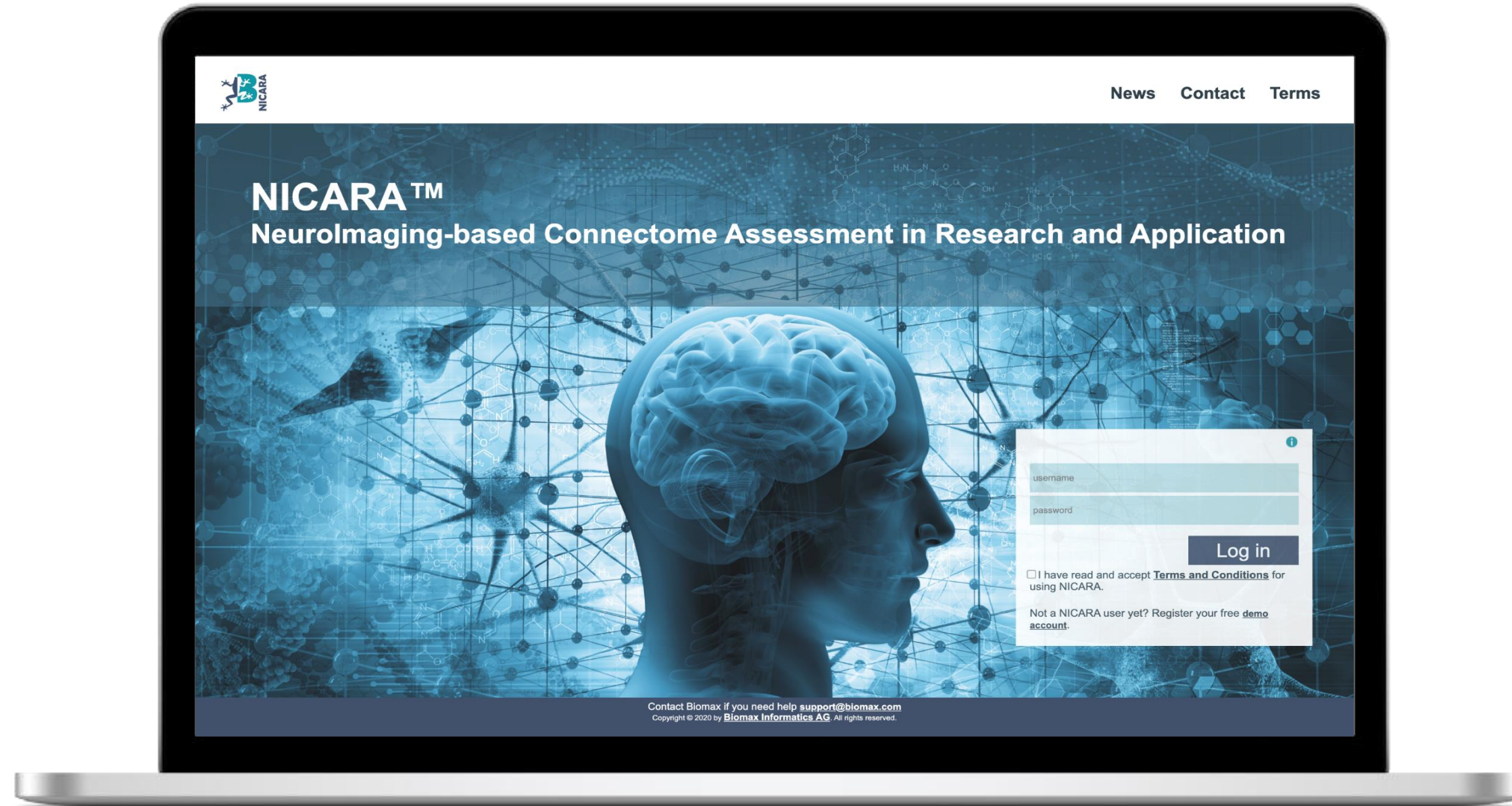
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or contact nicara@biomax.com for a free consultation!