In Silico testing of Deep Brain Stimulation therapy (DBS)

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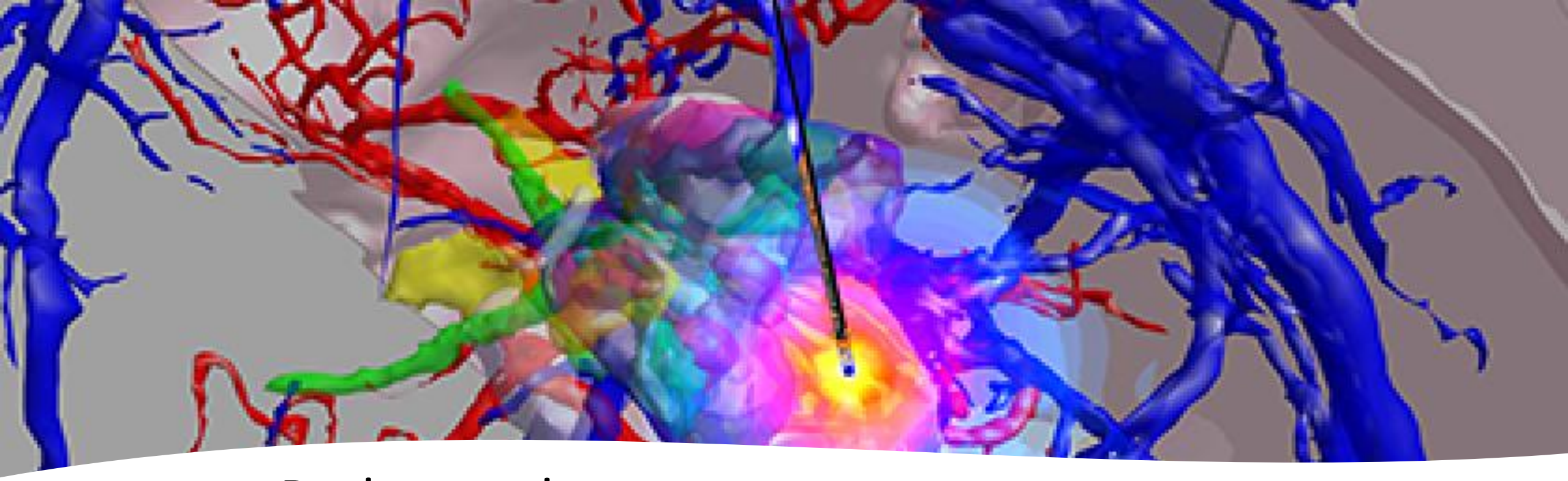

Background

- The practical session entails carrying out computer simulations of a *deep brain stimulation* (DBS) therapy, a neurostimulation technique used to treat medically refractory disorders like essential tremor, Parkinson's disease, dystonia, chronic pain, partial restoration of the vision, etc.
- The response of the brain to the electrical impulses emitted by an implanted pulse generator will be simulated, studying the possible effects of the electric field distribution over the surrounding tissues, possible heating effects, as well as the transmission of nerve impulses under different treatment conditions.

Instrumentation

Lab materials: SIM4LIFE

This package includes:

- SIM4LIFE simulation software temporary fully functional license provided by the manufacturer (ZurichMedTech;)
- Computable virtual phantoms containing more than 300 anatomical features
- Database of physical properties of tissues (from IT'IS Foundation)
- T-NEURO solver, based on the NEURON model from Yale University (https://neuron.yale.edu/neuron/), validated against published data and ex vivo and in vivo measurements