BRAINBOX

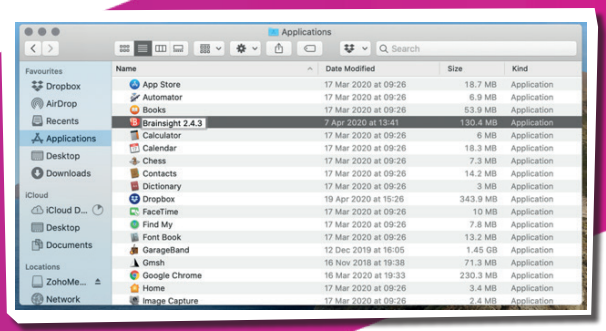
INSTALLING BRAINSIGHT: A QUICK GUIDE

Installing Beta Brainsight: A Quickstart Guide

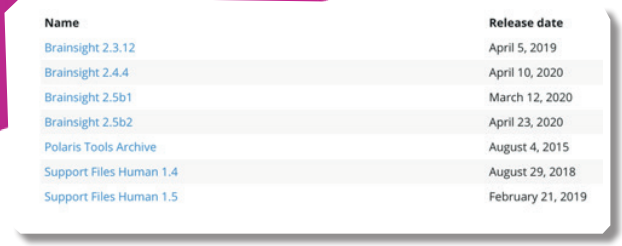
As you're hopefully aware, a new version of Brainsight is currently under Beta release. Hotly anticipated in the release of Brainsight Version 2.5.1b is the integration with open-source current modelling software SimNIBS. With this release, there'll be a little bit more to do in terms of installing softwares for the user to do to really make the most of the new version, so this handy guide will help you out.

Downloading Brainsight

Click Finder > Applications and locate Brainsight, change the name of the program to your current version (to avoid confusion later). In the instance of this demo, Version 2.4.3



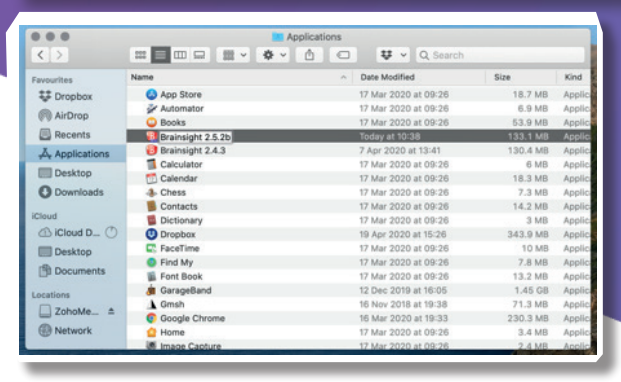
Then, head to www.rogue-research.com/downloads and enter your serial number where prompted. Doing so will generate the screen below, where you want to download the latest version - 2.5.2b.

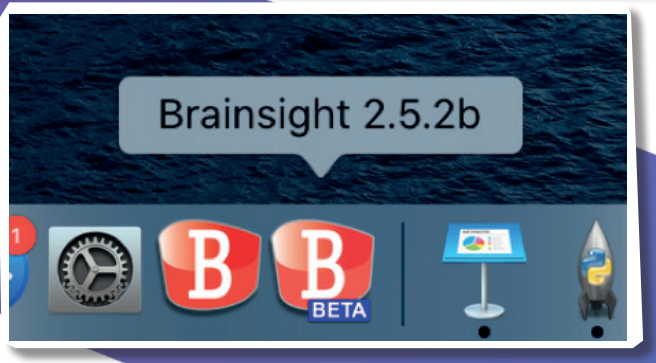


Name	Release date
Brainsight 2.3.12	April 5, 2019
Brainsight 2.4.4	April 10, 2020
Brainsight 2.5b1	March 12, 2020
Brainsight 2.5b2	April 23, 2020
Polaris Tools Archive	August 4, 2015
Support Files Human 1.4	August 29, 2018
Support Files Human 1.5	February 21, 2019

Once the download has completed, run the installer by Control+Click > Open on the .pgk file. Run through the installation as normal and navigate back to Finder > Applications once the installation is complete.

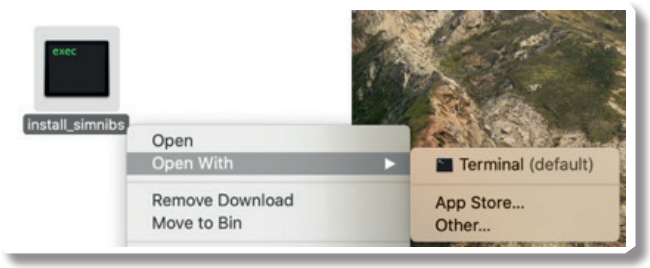
Finally, change the name of the new program from 'Brainsight' to 'Brainsight + Version number'. Doing so will remove any ambiguity of the program which you're due to open when they both appear in the dock.





Installing SimNIBS

Navigate to simnibs.drcmr.dk and create an account. SimNIBS cannot be downloaded without first creating an account. Once logged in, click 'SimNIBS Download, in the upper right hand side of the screen.



Once downloaded, open your downloads folder and uncompress the 'Install SimNIBS' file. Once uncompressed, right click and Open With > Terminal. Once terminal has been opened, a second window will then be opened.

Agree to the terms, click continue, and the installation will proceed, this may take a few minutes.

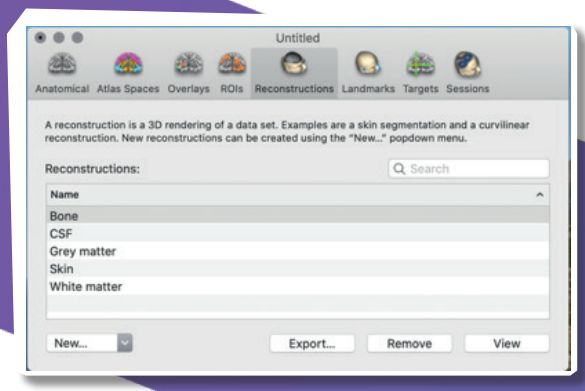
PLEASE NOTE

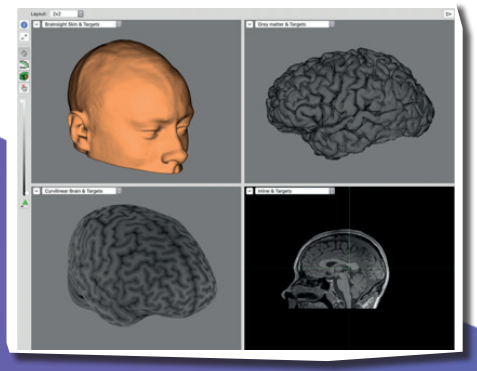
In order for Brainsight to be able to calculate electric field strengths from a TMS coil, we need to run a simulation in SimNIBS, and use the exported file from this as a basis for the Brainsight software. There are two functions that can be used to segment an MRI scan ready for a SimNIBS simulation in Brainsight. In SimNIBS, these are referred to as 'mri2mesh' and 'headreco'. Both of these functions can segment an MRI but rely on different external software packages. The mri2mesh function relies on Freesurfer & FSL, to conduct segmentation whereas headreco relies on SPM12 and CAT12 within MATLAB. This is a timely procedure (approx 4hrs) and beyond the scope of this document. Further resources are available via SimNIBS Github. These are far more thorough and complete than I would ever be able to provide. The result of an MRI segmentation is a .msh file as well as the original anatomical file, which can be read by Brainsight.

Creating the SimNIBS/Brainsight Project

Much of the Brainsight functionality remains, so this document will only look into the steps specific to the new SimNIBS functionality. Firstly, open your new Beta Brainsight and click 'New SimNIBS Project'. Load the .msh file from the folder generated after your segmentation.

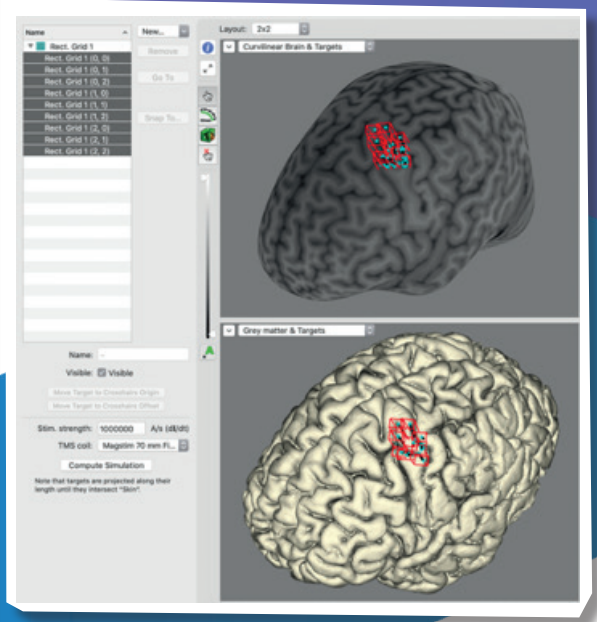
In the reconstructions step of Brainsight, you'll now see all of the segmented data has been loaded. It is recommended at this step to create a Full Brain Curvilinear and second Skin reconstruction within Brainsight, as the Skin reconstruction performed from the Brainsight data can be rather crude.



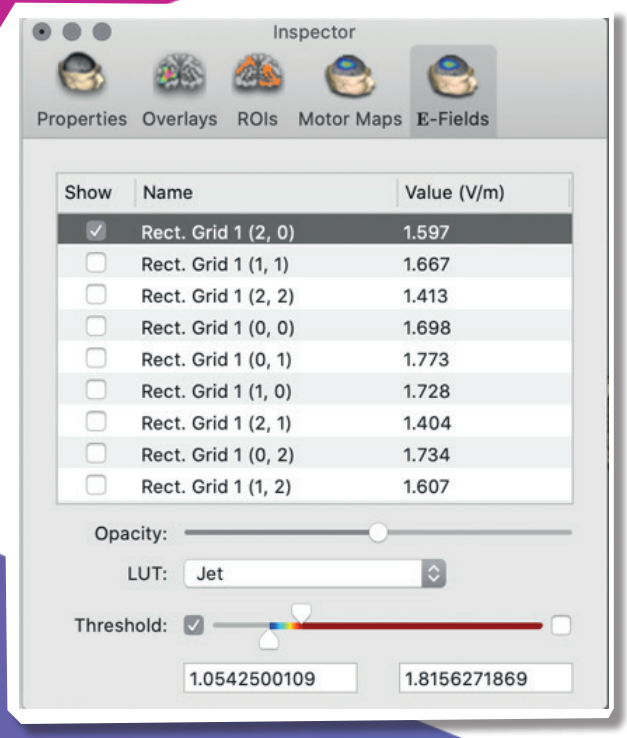


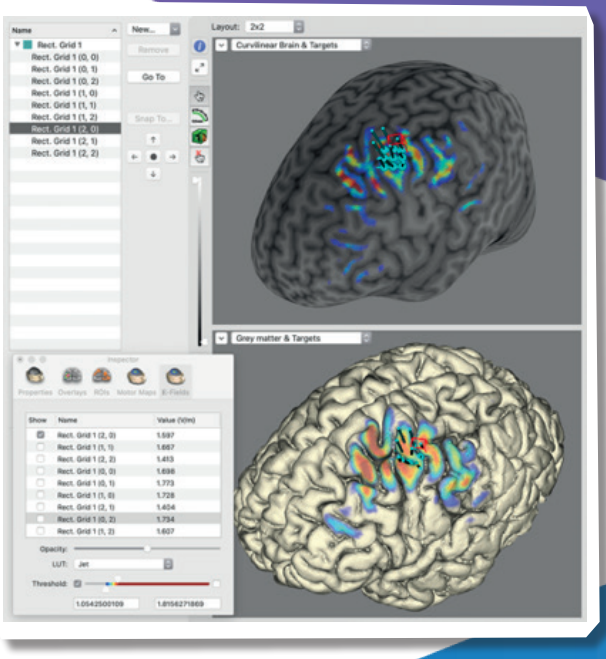
Open the Targets window, and organise the layout as per your preference, bearing in mind in this step particular attention will be paid to the curvilinear and grey matter windows.

With careful consideration to the direction of your markers, create a small grid of Targets on the Curvilinear Brain over your desired stimulation area. Expand the grid, and notice the new options appear in the bottom left of the window. Enter a value into the "Stim Strength' box and select your coil from the drop down of available coils. Supplementary data from Beynal et al (2019) serves as an excellent reference for calculating dI/dT values; finally, click 'Compute Simulation'. This may take several minutes, depending on the number of nodes in your grid.



Once completed, the resulting simulations will be able to appear as an overlay. Open the inspector window and click the new E-Field option. Select one grid node and configure the threshold sliders to visualise where the E-Field is greatest under that target. Copy the lower value, and paste it in the remaining grid nodes. Repeat this step for the upper threshold value.





Navigate through the grid, noticing how the E-Field changes for each grid reference. Moving the crosshairs around on any surface will enable you to see the E-Field strength at that given crosshairs location.