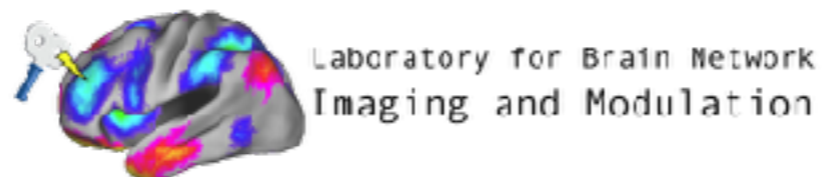
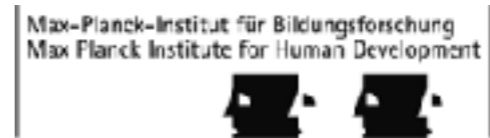
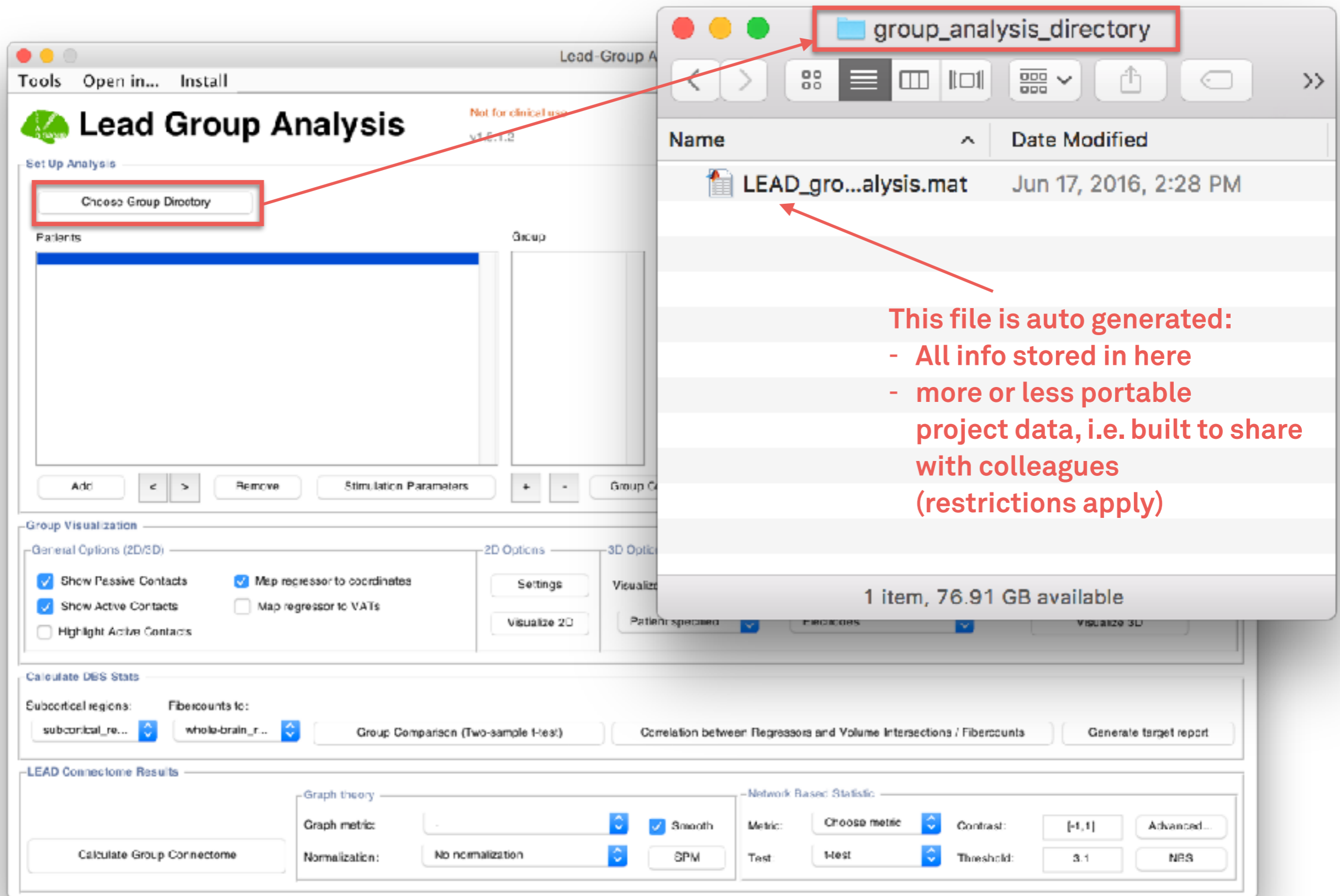


# *Group Analyses*

Lead-DBS workshop 2016 Berlin  
11/2016 | Andreas Horn



# Group analyses in Lead-DBS



1. Define an empty folder where to store the group analysis “model”

# Group analyses in Lead-DBS

The screenshot shows the 'Lead-Group Analysis' software window. The title bar includes 'Tools', 'Open in...', and 'Install'. The main header displays the 'Lead Group Analysis' logo, a 'Not for clinical use' warning, version 'v1.6.1.2', and a 'Detach from single Patient-Data' button. The interface is divided into several sections:

- Set Up Analysis:** Contains a 'Choose Group Directory' button and three empty list boxes for 'Patients', 'Group', and 'Regressors'. Below these lists are buttons for 'Add' (highlighted with a red box), '<', '>', 'Remove', 'Stimulation Parameters', '+', '-', 'Group Colors', '+', 'Review/Edit', and 'x'.
- General settings:** Includes dropdowns for 'Which subcortical atlas to use:' (set to 'STM-Subdivisions (Accolla 2014)') and 'Which brain parcellation to use:' (set to 'AICHA (Joliet 2015)').
- Prepare DBS stats:** Includes a dropdown for 'Which connectivity metric to use:' (set to 'Fibers') and a 'Prepare Stats' button.
- Group Visualization:** Contains 'General Options (2D/3D)' with checkboxes for 'Show Passive Contacts', 'Show Active Contacts', 'Highlight Active Contacts', 'Map regressor to coordinates', and 'Map regressor to VATs'. It also has '2D Options' (Settings, Visualize 2D) and '3D Options' (Visualize regressor as: Interpolated point mesh, Patient specified, Electrodes, Color Pointcloud by Regressor, Visualize 3D).
- Calculate DBS Stats:** Includes dropdowns for 'Subcortical regions:' (set to 'subcortical\_re...') and 'Fibercounts to:' (set to 'whole-brain\_r...'). It features buttons for 'Group Comparison (Two-sample t-test)', 'Correlation between Regressors and Volume Intersections / Fibercounts', and 'Generate target report'.
- LEAD Connectome Results:** Includes a 'Calculate Group Connectome' button, 'Graph theory' settings (Graph metric, Normalization: No normalization, Smooth, SPM), and 'Network Based Statistic' settings (Metric: Choose metric, Contrast: [-1,1], Test: t-test, Threshold: 3.1, Advanced..., NBS).

**Add patients to your group analysis**

# Group analyses in Lead-DBS

Lead-Group Analysis

Tools Open in... Install

Lead Group Analysis v1.5.1.2 Not for clinical use

Detach from single Patient-Data

Idle

Set Up Analysis

/Volumes/Neuro\_Charte/LeadDBS...

Patients

- /Volumes/Neuro\_Charte/fMRI/sub\_1
- /Volumes/Neuro\_Charte/fMRI/sub\_2
- /Volumes/Neuro\_Charte/fMRI/sub\_3
- /Volumes/Neuro\_Charte/fMRI/sub\_4

Group

Regressors

General settings

Which subcortical atlas to use:

ACPC\_Conversions (Horn 2016)

Which brain parcellation to use:

AICHA (Joliot 2015)

Prepare DBS stats

Which connectivity metric to use:

Groupconnect...

Prepare Stats

Group Visualization

General Options (2D/3D)

- ☒ Show Passive Contacts
- ☒ Show Active Contacts
- ☐ Highlight Active Contacts
- ☐ Map regressor to coordinates
- ☐ Map regressor to VATs

2D Options

Settings

Visualize 2D

3D Options

Visualize regressor as:

Interpolated point mesh

Color Pointcloud by Regressor

Electrodes

Visualize 3D

Calculate DBS Stats

Subcortical regions:

STN\_assoclat...

Fibercounts to:

Group Comparison (Two-sample t-test)

Correlation between Regressors and Volume Intersections / Fibercounts

Generate target report

LEAD Connectome Results

Calculate Group Connectome

Graph theory

Graph metric:

Smooth

Normalization:

No normalization

SPM

Network Based Statistic

Metric:

No data found.

Contrast:

[-1,1]

Advanced...

Test:

t-test

Threshold:

3.1

NBS

Add patients to your group analysis

# Group analyses in Lead-DBS

Lead-Group Analysis

Tools Open in... Install

Lead Group Analysis

Not for clinical use v1.6.1.2

Detach from single Patient-Data

Idle

Set Up Analysis

/volumes/Neuro\_Charte/LeadDBS...

Patients

/volumes/Neuro\_Charte/bg/MRI/sub\_1  
/volumes/Neuro\_Charte/bg/MRI/sub\_2  
/volumes/Neuro\_Charte/bg/MRI/sub\_3  
/volumes/Neuro\_Charte/bg/MRI/sub\_4

Group

1  
2  
2

Regressors

Stimulation Parameters

+

-

Group Colors

+

Review/Edit

x

General settings

Which subcortical atlas to use:  
ACPC\_Conversions (Horn 2016)

Which brain parcellation to use:  
AICHA (Joliot 2015)

Prepare DBS stats

Which connectivity metric to use:  
Groupconnect...

Prepare Stats

Group Visualization

General Options (2D/3D)

☒ Show Passive Contacts  
☒ Show Active Contacts  
☐ Highlight Active Contacts

☐ Map regressor to coordinates  
☐ Map regressor to VATs

2D Options

Settings

Visualize 2D

3D Options

Visualize regressor as:  
Interpolated point mesh  
Patient specified

☐ Color Pointcloud by Regressor

Electrodes

Visualize 3D

Calculate DBS Stats

Subcortical regions: STN\_assoclat...

Fibercounts to:  
Group Comparison (Two-sample t-test)  
Correlation between Regressors and Volume Intersections / Fibercounts  
Generate target report

LEAD Connectome Results

Calculate Group Connectome

Graph theory

Graph metric:  
Normalization: No normalization

☒ Smooth  
SPM

Network Based Statistic

Metric: No data found.  
Test: t-test

Contrast: [-1,1]  
Threshold: 3.1

Advanced...  
NBS

Assign subgroups if needed

# Group analyses in Lead-DBS

The screenshot displays the 'Lead-Group Analysis' software interface. At the top, the title bar reads 'Lead-Group Analysis'. Below it, the main window has a menu bar with 'Tools', 'Open in...', and 'Install'. The main title 'Lead Group Analysis' is prominently displayed, with a version number 'v1.5.1.3' and a note 'Not for clinical use'. A 'Detach from single Patient-Data' button is visible in the top right corner.

The interface is divided into several sections:

- Set Up Analysis:** Includes a text field for the data path: '/Volumes/Neuro\_Charite/LeadDBS\_...'. Below this is a 'Patients' list with four entries: '/Volumes/Neuro\_Charite/bg/fMRI/sub\_1', '/Volumes/Neuro\_Charite/bg/fMRI/sub\_2', '/Volumes/Neuro\_Charite/bg/fMRI/sub\_3', and '/Volumes/Neuro\_Charite/bg/fMRI/sub\_4'. To the right of the patients list is a 'Group' list with two entries: '1' and '2'.
- Buttons:** A row of buttons includes 'Add', '<', '>', 'Remove', 'Stimulation Parameters', 'Group Colors' (highlighted with a red box), 'Review/Edit', and a 'Prepare Stats' button in the 'General settings' section.
- Group Visualization:** This section contains 'General Options (2D/3D)' with checkboxes for 'Show Passive Contacts', 'Show Active Contacts', and 'Highlight Active Contacts'. It also has '2D Options' with 'Settings' and 'Visualize 2D' buttons, and '3D Options' with 'Visualize regressor as:' (set to 'Interpolated point mesh'), 'Patient specified', 'Electrodes', and 'Visualize 3D' button.
- Calculate DBS Stats:** Includes a dropdown for 'subcortical regions:' (set to 'STN\_assoc...') and a 'Fibercounts to:' field. Below these are buttons for 'Group Comparison (Two-sample t-test)', 'Correlation between Regressors and Volume Intersections / Fibercounts', and 'Generate target report'.
- LEAD Connectome Results:** This section has two main panels: 'Graph theory' and 'Network Based Statistic'. The 'Graph theory' panel includes 'Graph metric:' (dropdown), 'Normalization:' (dropdown, set to 'No normalization'), and a 'Smooth' checkbox. The 'Network Based Statistic' panel includes 'Metric:' (dropdown, set to 'No data found'), 'Contrast:' (dropdown, set to '[-1,1]'), 'Test:' (dropdown, set to 't-test'), and 'Threshold:' (dropdown, set to '3.1').

A 'Group 1:' color selection dialog box is open in the center, showing a grid of color swatches. A tooltip over one of the swatches displays the coordinates '0.95, 0.87, 0.73'. The dialog has 'More Colors...', 'Cancel', and 'OK' buttons.

Assign group colors if needed

# Group analyses in Lead-DBS

Lead-Group Analysis (busy...)

Tools Open in... Install

**Lead Group Analysis** Not for clinical use v1.5.1.3 Detach from single Patient-Data Busy

**Set Up Analysis**

/volumes/Neuro\_Charte/LeadDBS...

No normalization

Patients

- /Volumes/Neuro\_Charte/bg/MRI/sub\_1
- /Volumes/Neuro\_Charte/bg/MRI/sub\_2
- /Volumes/Neuro\_Charte/bg/MRI/sub\_3
- /Volumes/Neuro\_Charte/bg/MRI/sub\_4

Group

Regressors

Stimulation Parameters

Group Colors

Review/Edit

**General settings**

Which subcortical atlas to use:

DISTAL compound DBS (Ewert...)

Which brain parcellation to use:

AICHA (Joliot 2015)

**Prepare DBS stats**

Which connectivity metric to use:

Groupconnect...

Prepare Stats

**Group Visualization**

General Options (2D/3D)

- ☒ Show Passive Contacts
- ☒ Show Active Contacts
- ☐ Highlight Active Contacts
- ☐ Map regressor to coordinates
- ☐ Map regressor to VATs

2D Options

Settings

Visualize 2D

3D Options

Visualize regressor as:

Interpolated point mesh

Color Pointcloud by Regressor

Visualize 3D

**Calculate DBS Stats**

Subcortical regions: STN\_assoclat...

Fibercounts to:

Group Comparison (Two-sample t-test)

Correlation between Regressors and Volume Intersections / Fibercounts

Generate target report

**LEAD Connectome Results**

Graph theory

Graph metric:

Normalization: No normalization

Smooth

SPM

Network Based Statistic

Metric: No data found.

Contrast: [-1,1]

Test: t-test

Threshold: 3.1

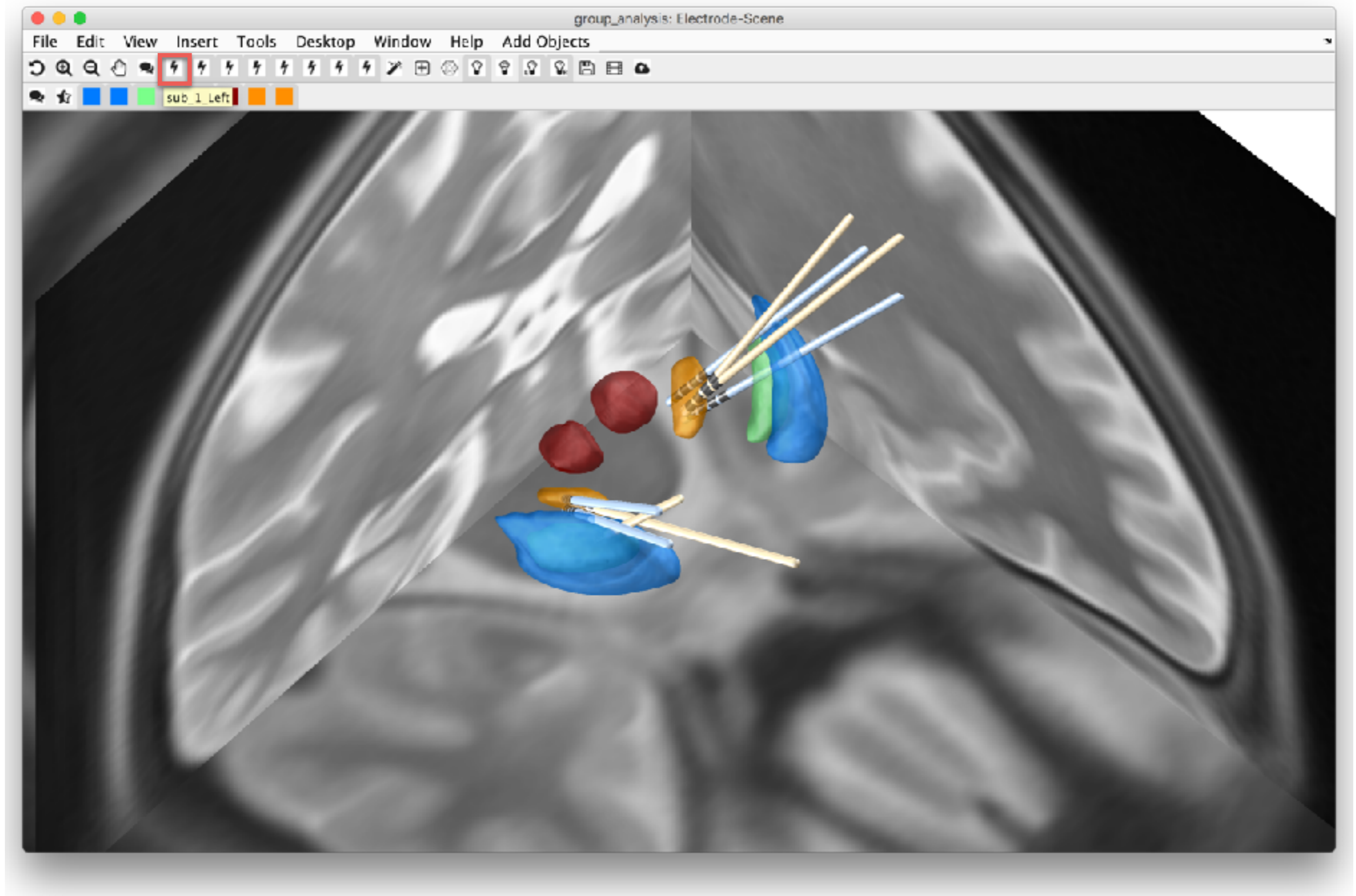
Advanced...

NBS

Calculate Group Connectome

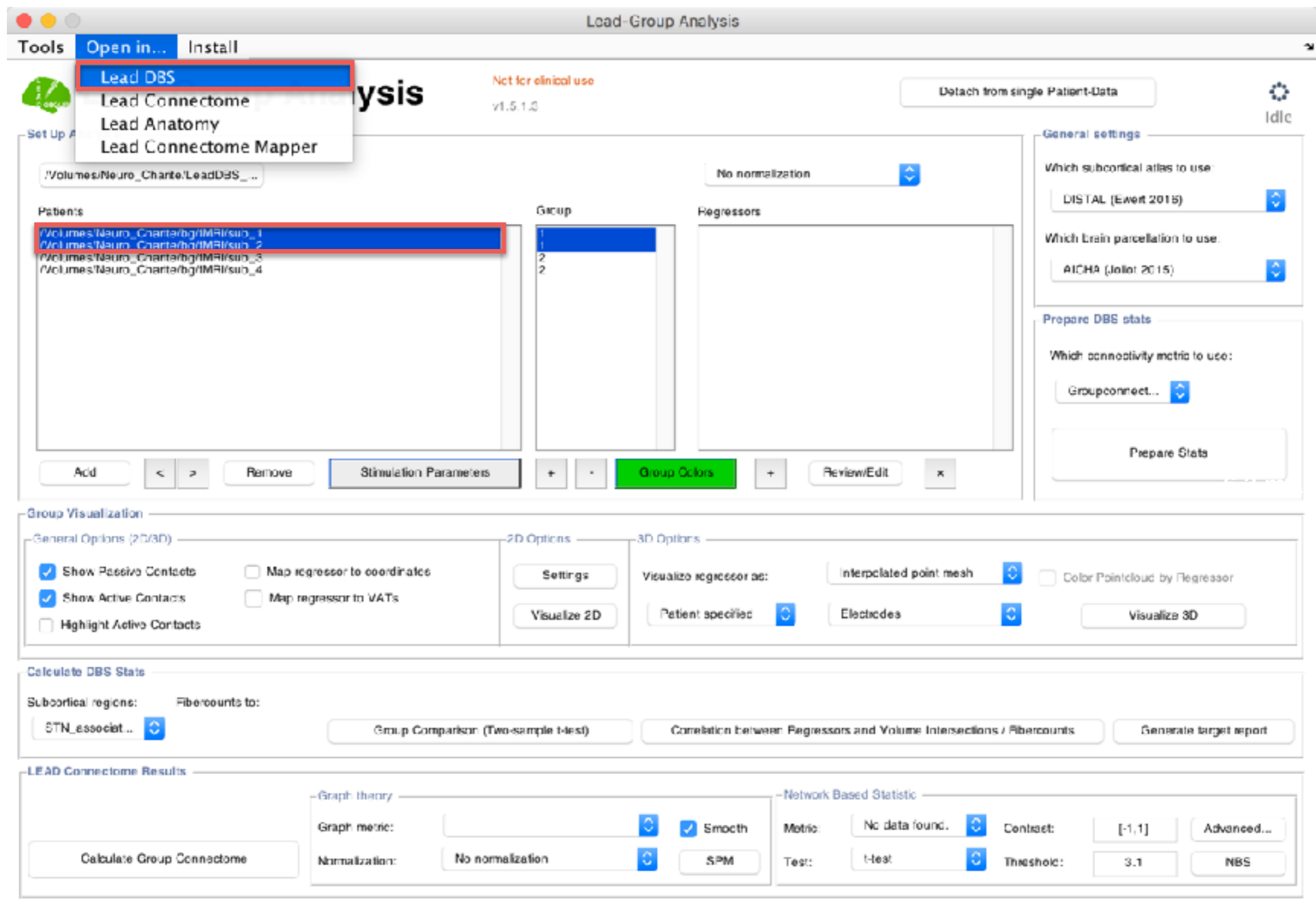
Select atlas and click “Visualize 3D”

# Group analyses in Lead-DBS



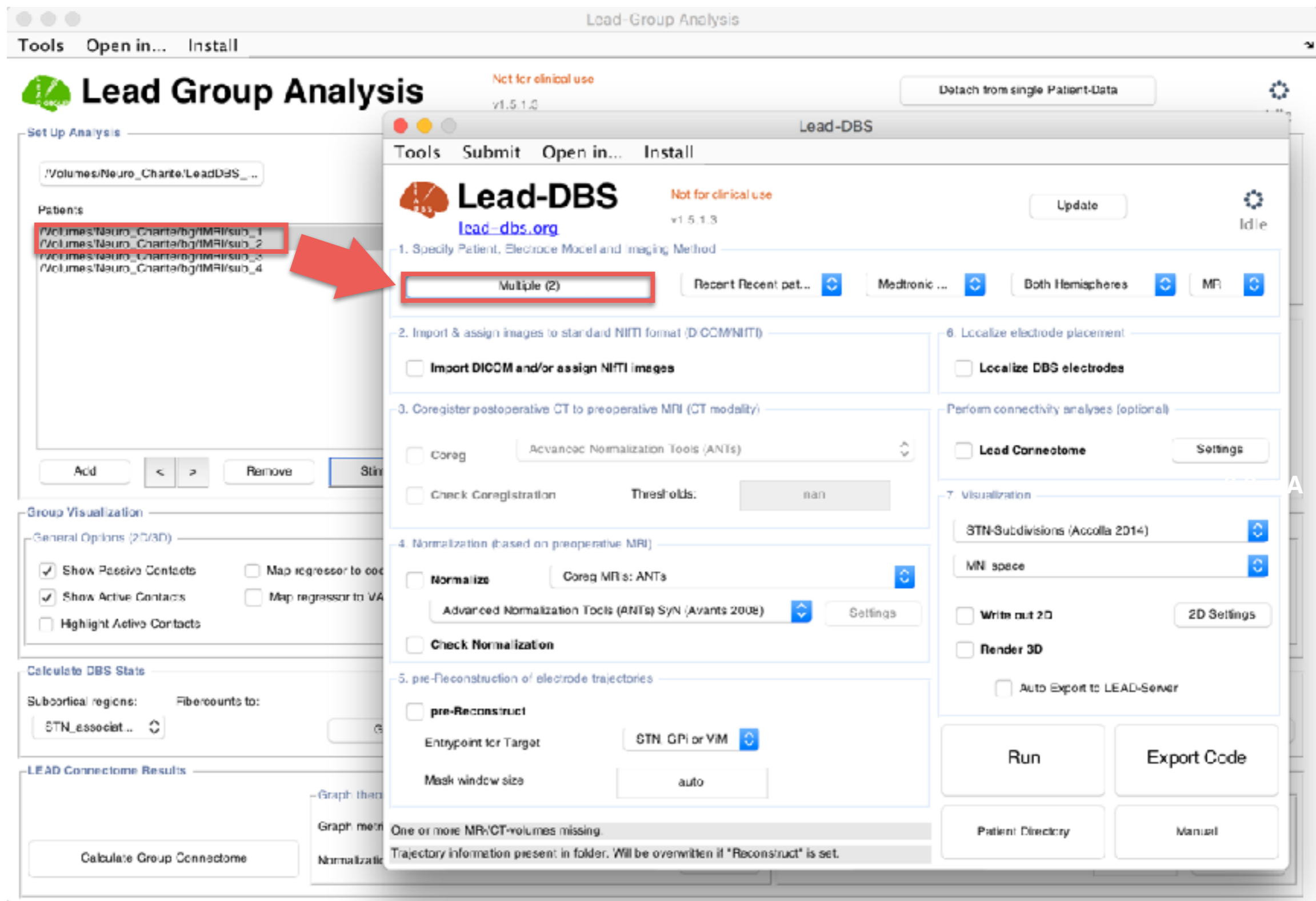
**Select/Deselect electrodes to visualize**

# Group analyses in Lead-DBS



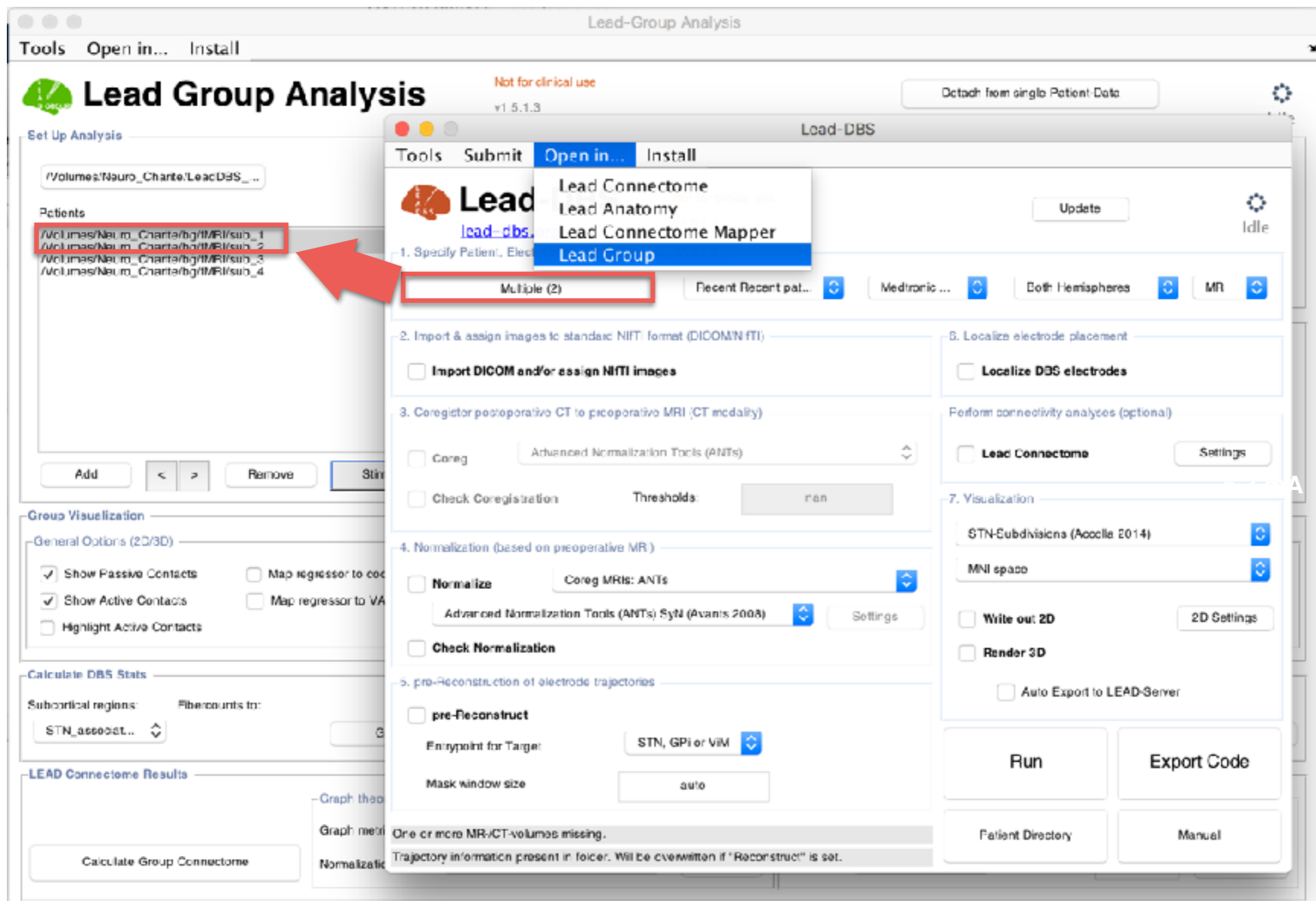
Select subjects to open them in Lead-DBS from group project

# Group analyses in Lead-DBS



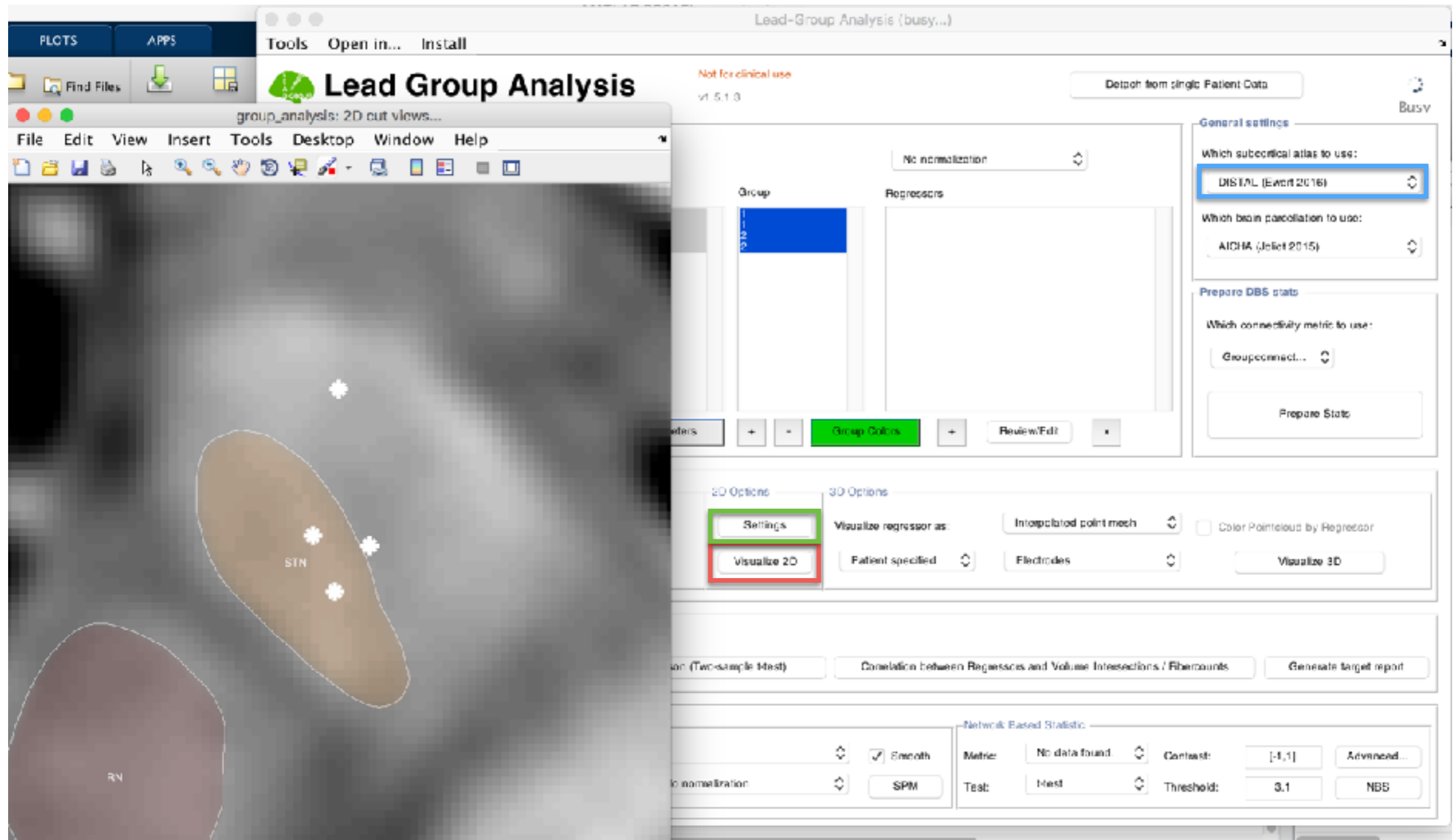
Select subjects to open them in Lead-DBS from group project

# Group analyses in Lead-DBS



(...the same would work vice versa e.g. to add subjects to group projects or to create new group projects)

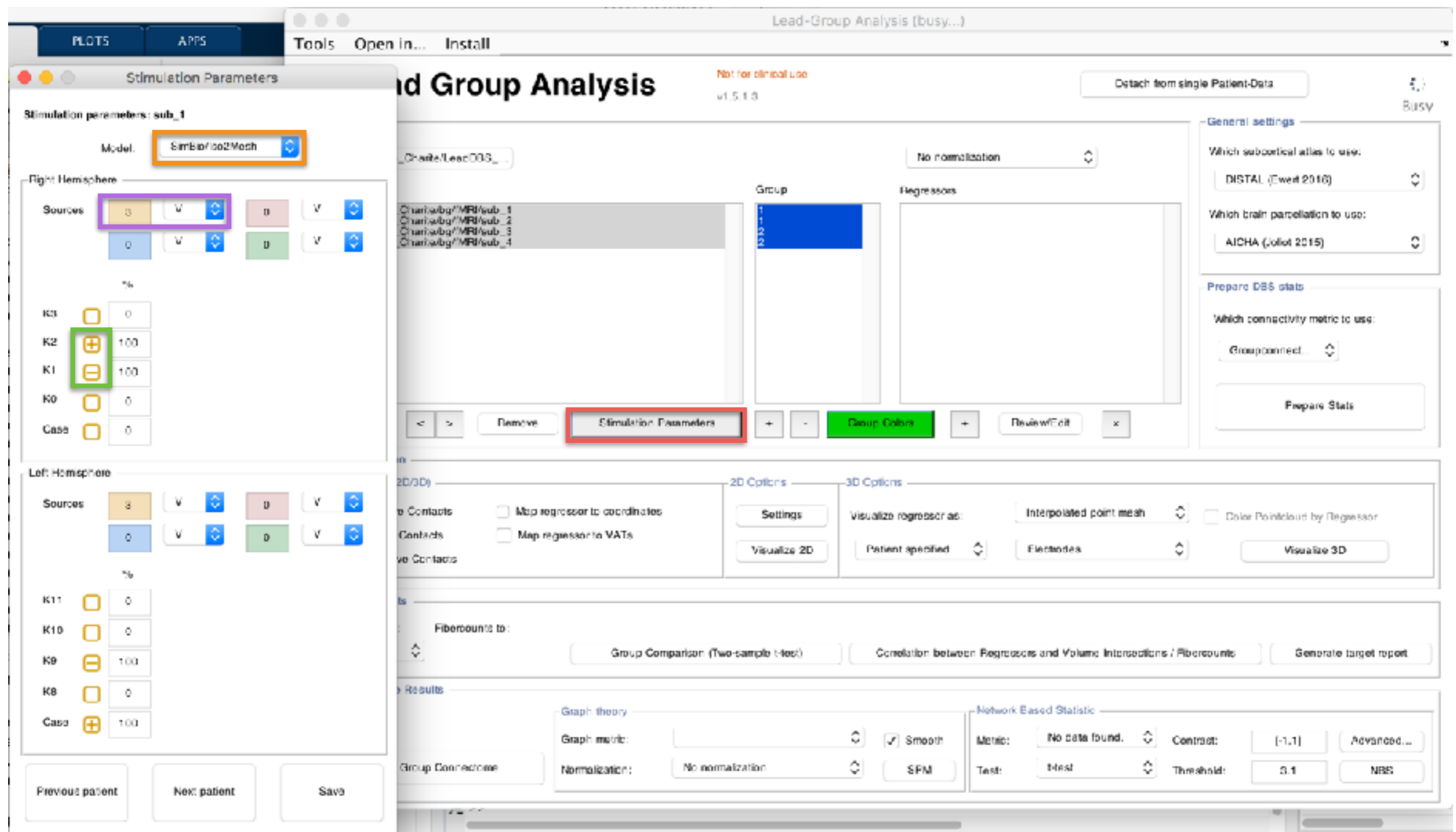
# Group analyses in Lead-DBS



Tune 2D visualization settings

Select atlas and click “Visualize 2D”

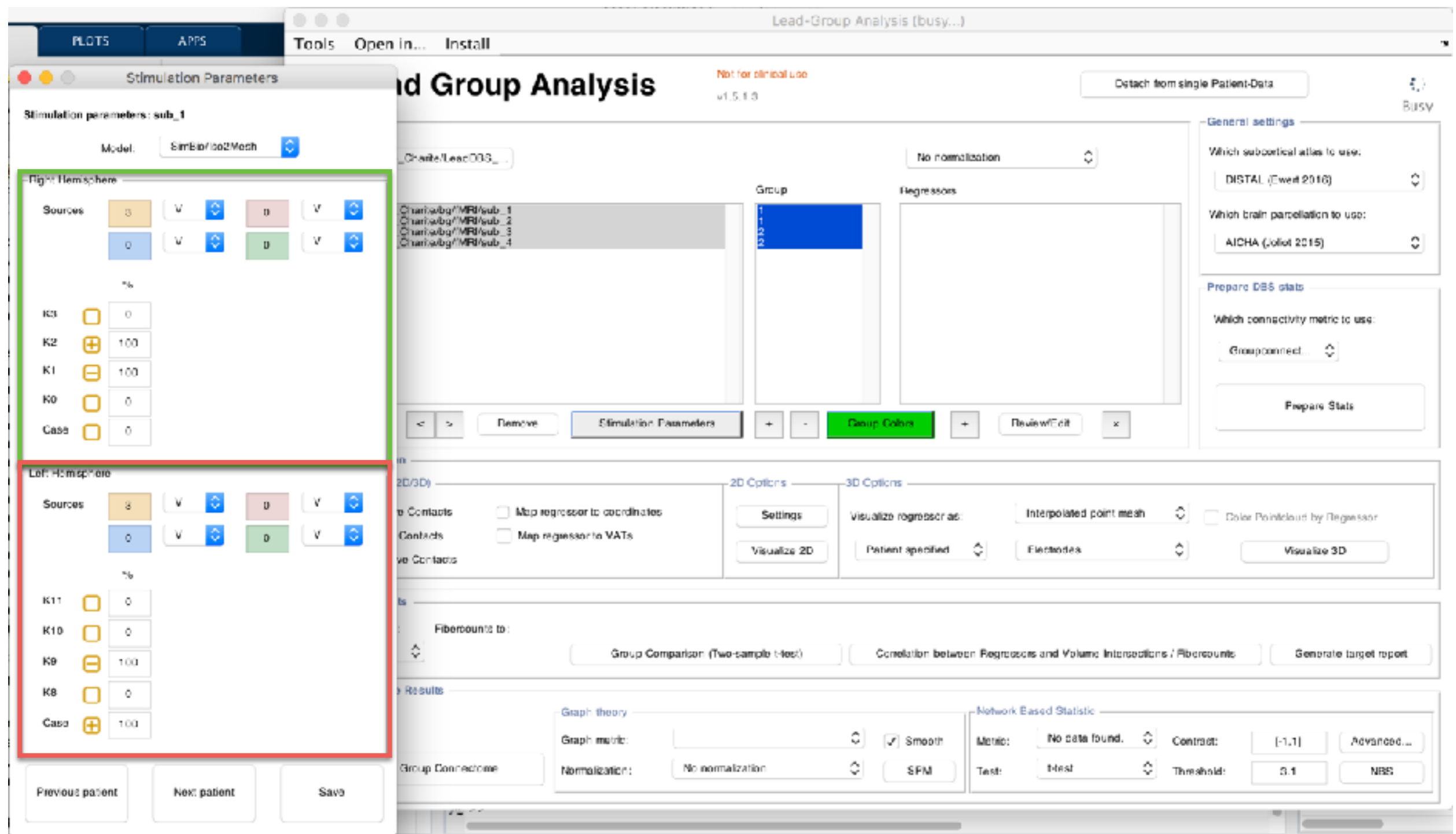
# Group analyses in Lead-DBS



Add Stimulation parameters by clicking on the **red button**

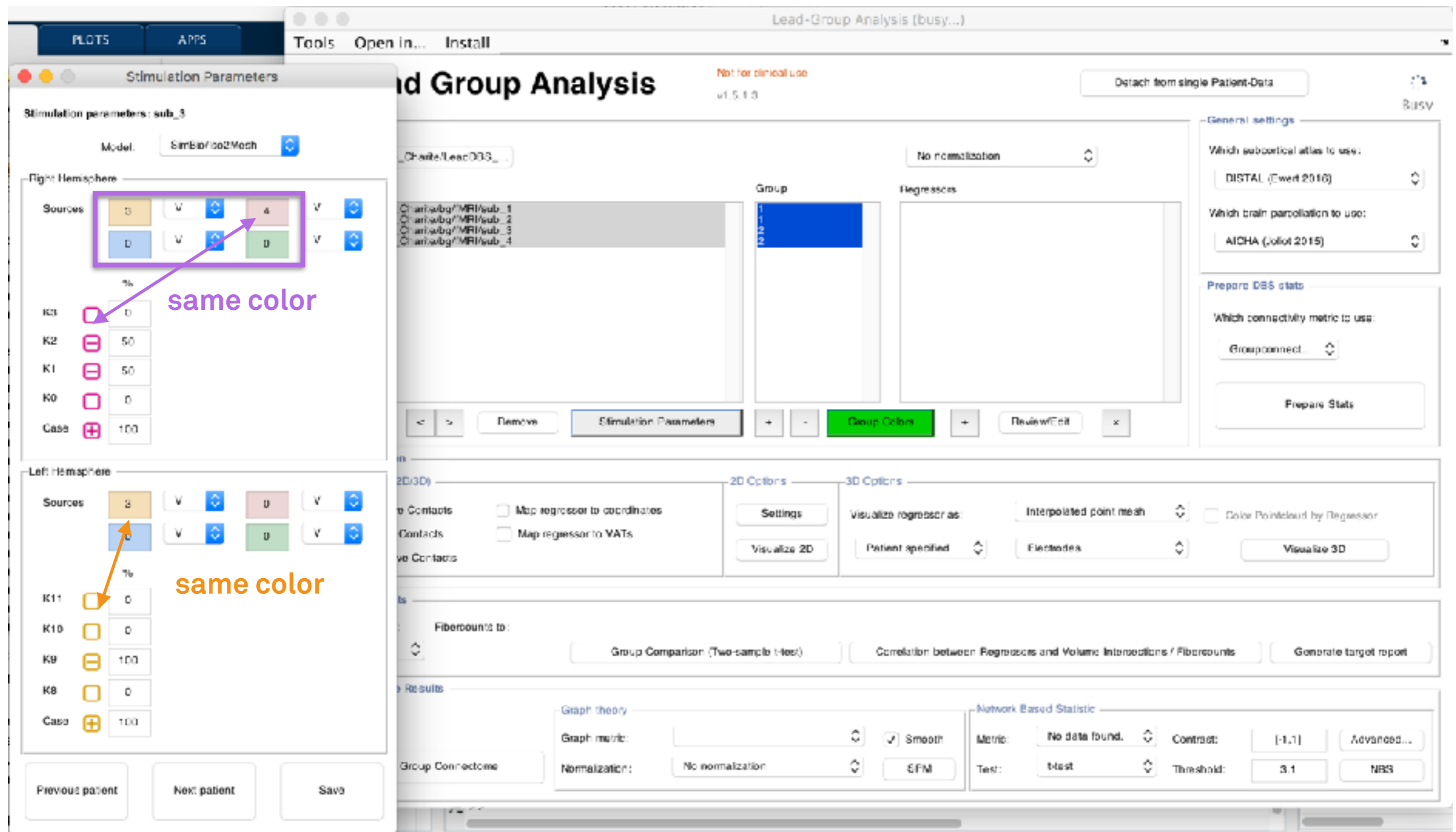
Select **VTA model approach**, add **amplitude** and **cathodal/anodal contacts**.

# Group analyses in Lead-DBS



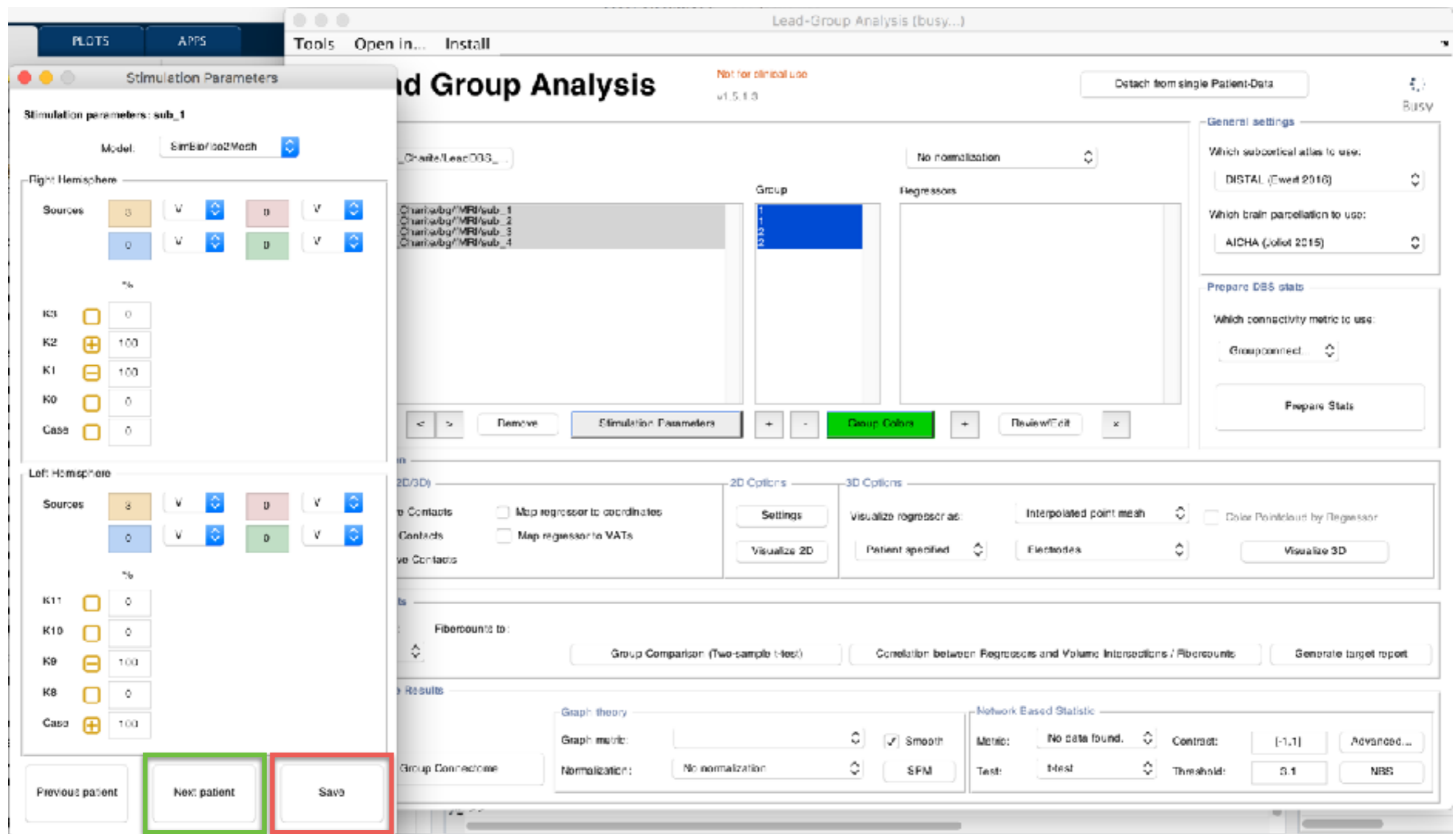
Do same for right and left electrode

# Group analyses in Lead-DBS



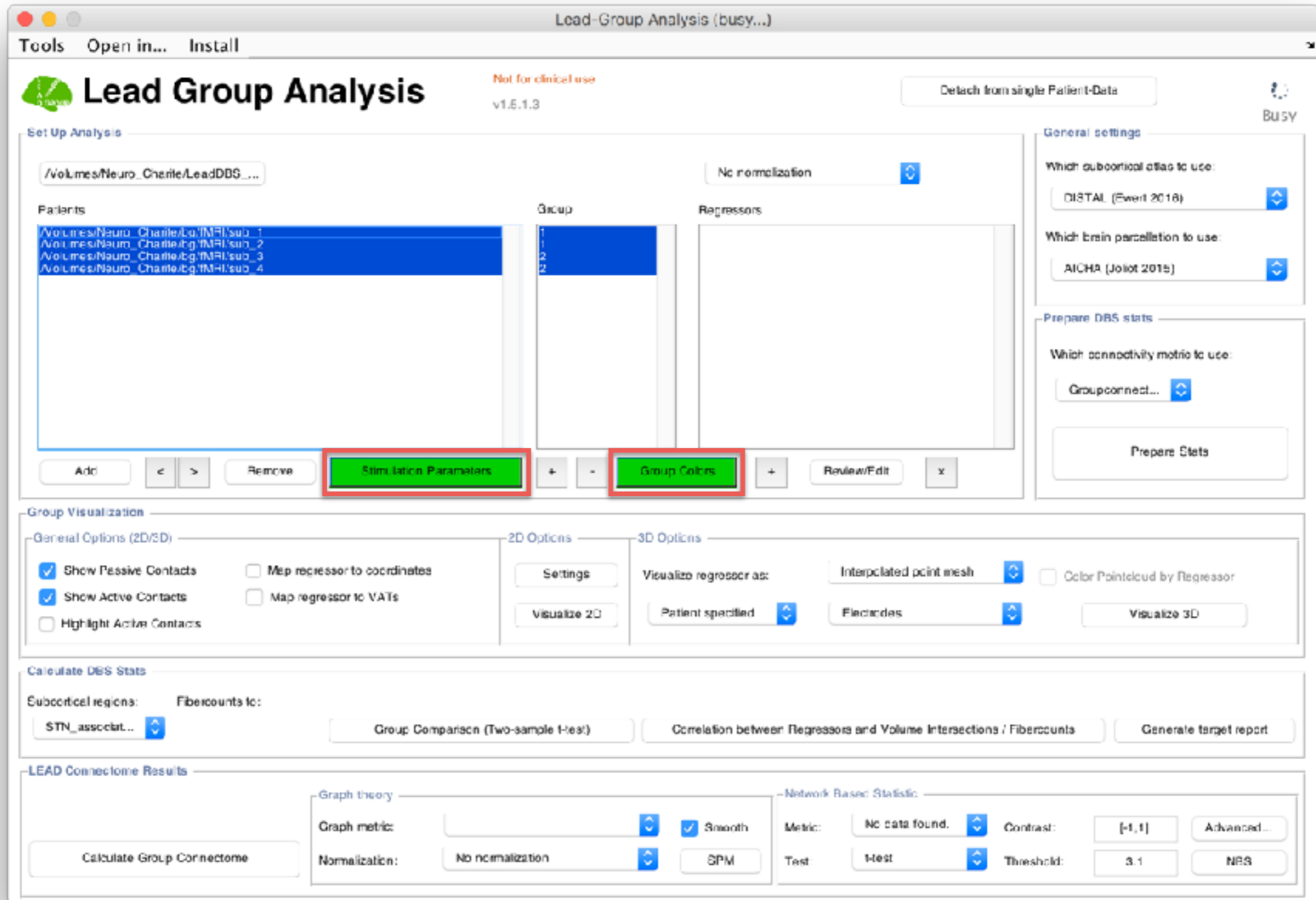
**You can enter up to 4 power sources each with different amplitudes/active contacts**  
**Color of contacts shows which source is currently being programmed**

# Group analyses in Lead-DBS



Jump to next patient and after adding parameters for all patients click save

# Group analyses in Lead-DBS



Stim params and Group colors buttons turn green if information has been stored in model

# Group analyses in Lead-DBS

Lead-Group Analysis (busy...)

Tools Open in... Install

**Lead Group Analysis** Not for clinical use v1.5.1.3 Detach from single Patient-Data Busy

**Set Up Analysis**

/Volumes/Neuro\_Charlie/LeadDBS\_...

Patients

- /Volumes/Neuro\_Charlie/bg/MRI/sub\_1
- /Volumes/Neuro\_Charlie/bg/MRI/sub\_2
- /Volumes/Neuro\_Charlie/bg/MRI/sub\_3
- /Volumes/Neuro\_Charlie/bg/MRI/sub\_4

Group

- 1
- 2
- 2

Regressors

Buttons: Add, <, >, Remove, Stimulation Parameters, +, -, Group Colors, +, Review/Edit, x

**General settings**

Which subcortical atlas to use: DISTAL (Ewert 2018)

Which brain parcellation to use: AICHA (Joliot 2015)

**Prepare DBS stats**

Which connectivity metric to use: Groupconnect...

Prepare Stats

**Group Visualization**

General Options (2D/3D)

- ☒ Show Passive Contacts
- ☒ Show Active Contacts
- ☒ Highlight Active Contacts
- ☐ Map regressor to coordinates
- ☐ Map regressor to VATs

2D Options

Settings

Visualize 2D

3D Options

Visualize regressor as: Interpolated point mesh

Color Pointcloud by Regressor

Patient specified

Electrodes

Visualize 3D

**Calculate DBS Stats**

Subcortical regions: STN\_assoclat...

Fibercounts to:

Group Comparison (Two-sample t-test)

Correlation between Regressors and Volume Intersections / Fibercounts

Generate target report

**LEAD Connectome Results**

Graph theory

Graph metric:

Normalization: No normalization

Smooth

SPM

Network Based Statistic

Metric: No data found.

Contrast: [-1,1]

Test: t-test

Threshold: 3.1

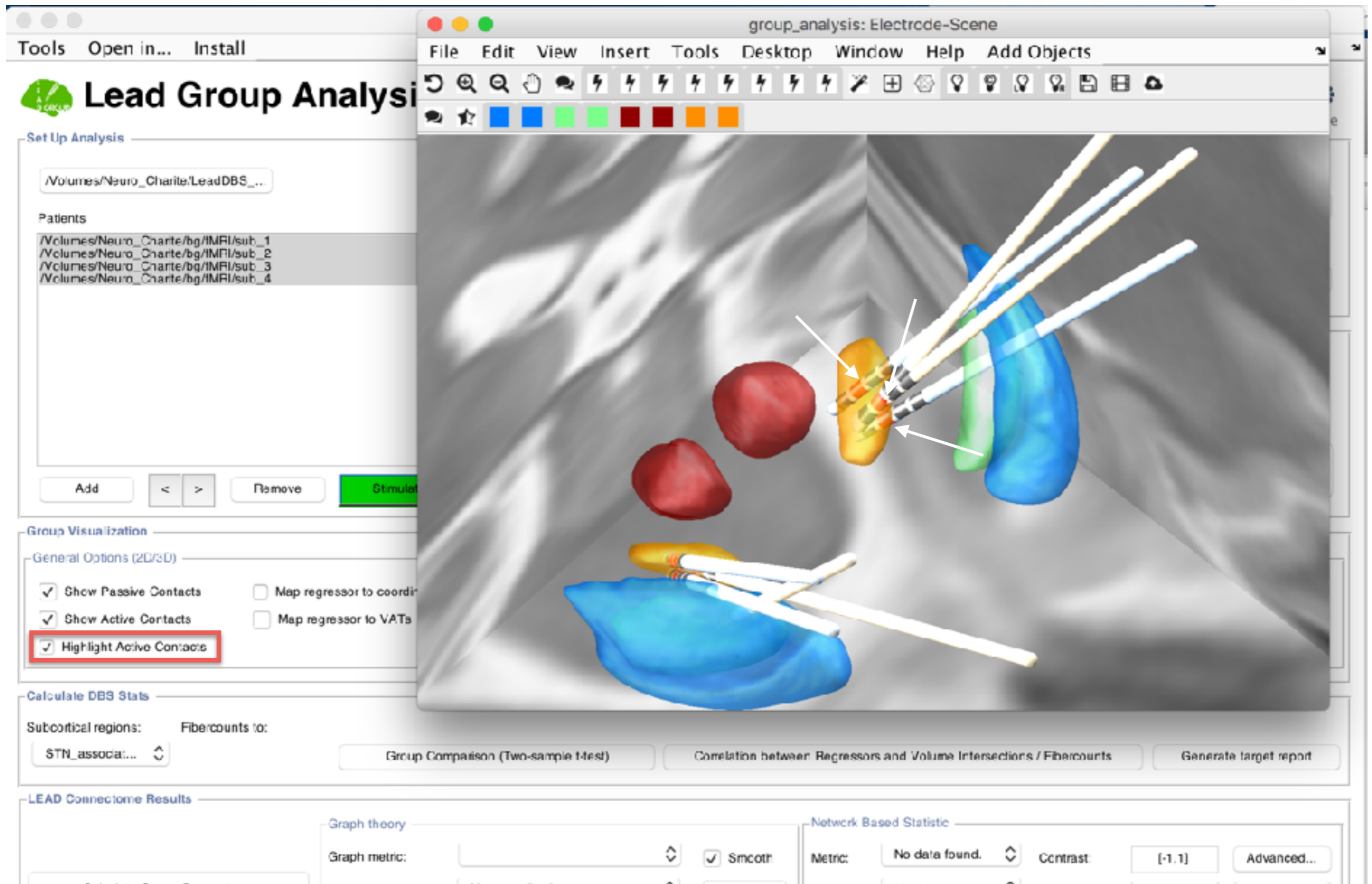
Advanced...

NBS

Calculate Group Connectome

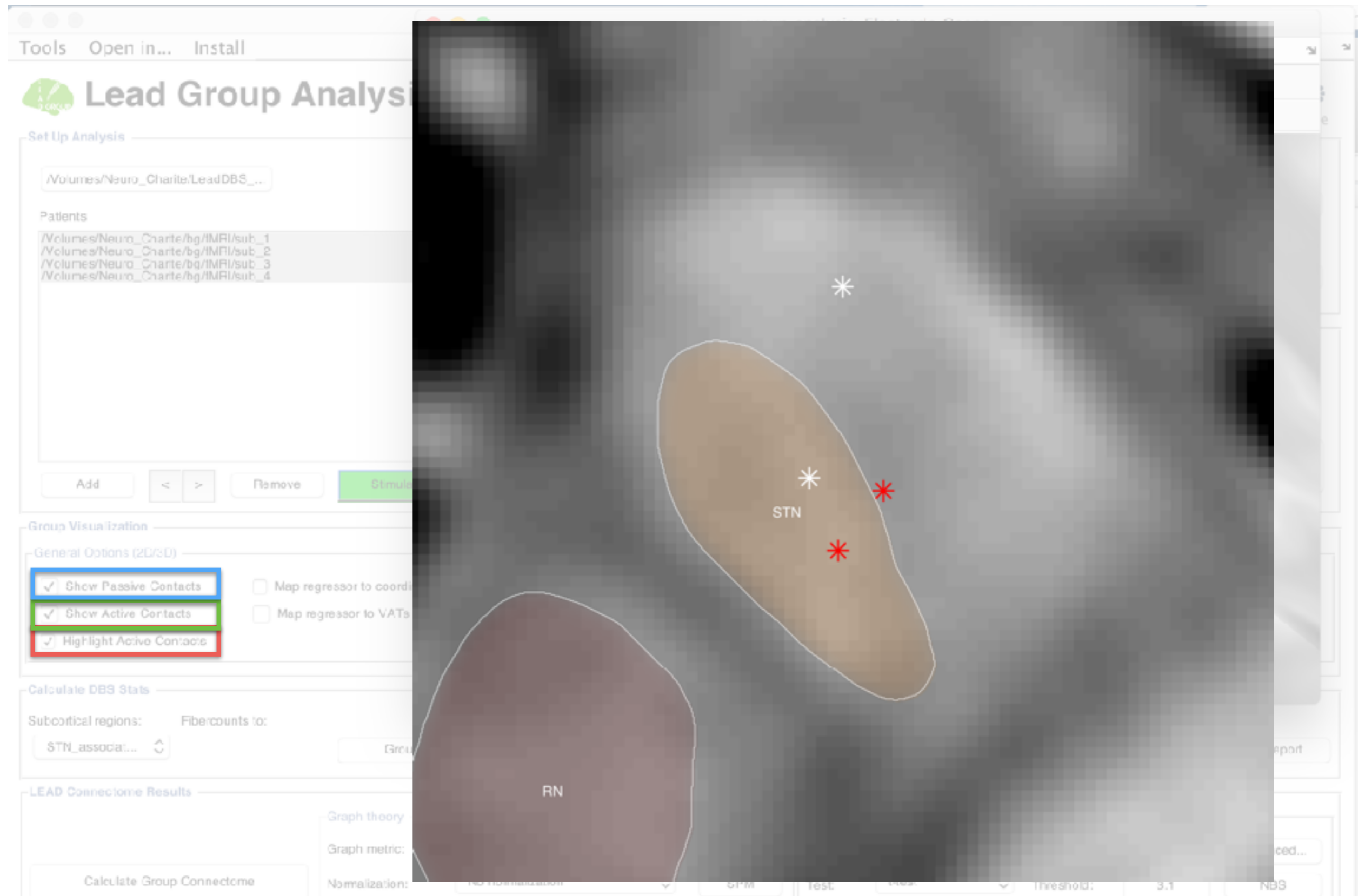
Select “Highlight Active Contacts” to mark active contacts in red

# Group analyses in Lead-DBS



Select “Highlight Active Contacts” to mark active contacts in red

# Group analyses in Lead-DBS



**2D result – here can also choose to show only active contacts and not show passive contacts**

# Group analyses in Lead-DBS

Lead-Group Analysis (busy...)

Tools Open in... Install

## Lead Group Analysis

Not for clinical use  
v1.5.1.3

Detach from single Patient-Data

Busy

### Set Up Analysis

/Volumes/Neuro\_Charite/LeadDBS\_...

No normalization

Patients

- /Volumes/Neuro\_Charite/bg/fMRI/sub\_1
- /Volumes/Neuro\_Charite/bg/fMRI/sub\_2
- /Volumes/Neuro\_Charite/bg/fMRI/sub\_3
- /Volumes/Neuro\_Charite/bg/fMRI/sub\_4

Group

- 1
- 1
- 2
- 2

Regressors

Add < > Remove Stimulation Parameters + - Group Colors + Review/Edit x

### General settings

Which subcortical atlas to use:  
DISTAL (Ewert 2018)

Which brain parcellation to use:  
AICHA (Joliot 2015)

### Prepare DBS stats

Which connectivity metric to use:  
Groupconnect...

Prepare Stats

### Group Visualization

General Options (2D/3D)

- ☒ Show Passive Contacts
- ☒ Show Active Contacts
- ☒ Highlight Active Contacts
- ☐ Map regressor to coordinates
- ☐ Map regressor to VATs

2D Options

Settings

Visualize 2D

3D Options

Visualize regressor as:

Patient specified

Electrodes  
Transparent Electrodes  
✓ Point-Clouds

Color Pointcloud by Regressor

Visualize 3D

### Calculate DBS Stats

Subcortical regions: STN\_associat...

Fibercounts to:

Group Comparison: (Two-sample t-test)

Correlation between Regressors and Volume Intersections / Fibercounts

Generate target report

### LEAD Connectome Results

Graph theory

Graph metric:

Normalization: No normalization

Smooth

SPM

Network Based Statistic

Metric: No data found.

Contrast: [-1,1]

Test: t-test

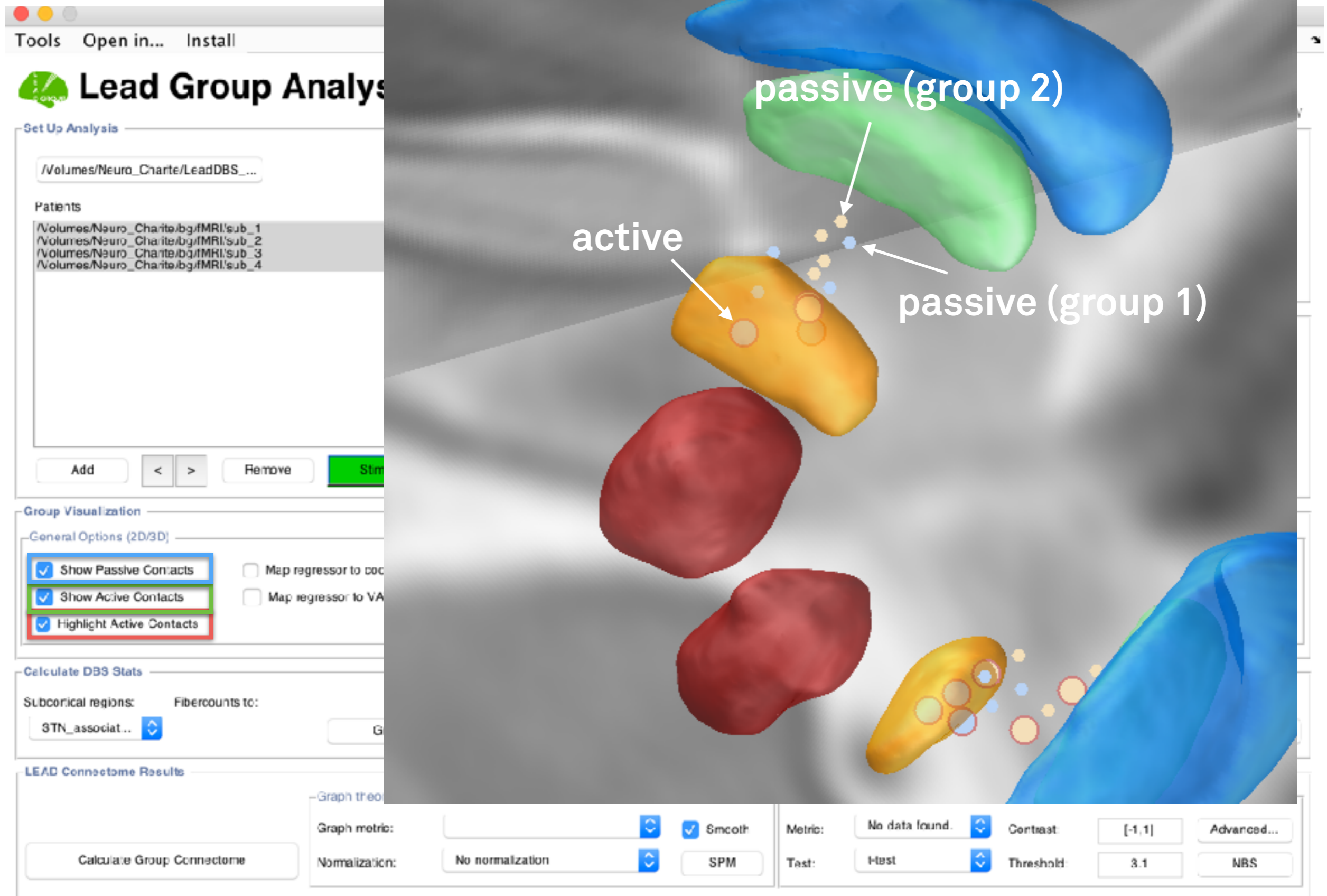
Threshold: 3.1

Advanced...

NBS

Calculate Group Connectome

Specify to show contacts as point clouds instead of electrodes



Now you can specify also in 3D whether to **show passive** and/or **active contacts** and whether **to highlight active ones**

# Group analyses in Lead-DBS

Lead-Group Analysis

Tools Open in... Install

Lead Group Analysis

Not for clinical use v1.5.1.3

Detach from single Patient-Data

Idle

Set Up Analysis

/Volumes/Neuro\_Charte/LeadDBS...

Patients

/Volumes/Neuro\_Charte/bg/MRI/sub\_1  
/Volumes/Neuro\_Charte/bg/MRI/sub\_2  
/Volumes/Neuro\_Charte/bg/MRI/sub\_3  
/Volumes/Neuro\_Charte/bg/MRI/sub\_4

Group

1  
2  
2

Regressors

Add < > Remove Stimulation Parameters + - Group Colors + Review/Edit x

General settings

Which subcortical atlas to use:  
DISTAL (Ewert 2018)

Which brain parcellation to use:  
AICHA (Joliot 2015)

Prepare DBS stats

Which connectivity metric to use:  
Groupconnect...

Prepare Stats

Group Visualization

General Options (2D/3D)

☒ Show Passive Contacts ☐ Map regressor to coordinates  
☒ Show Active Contacts ☐ Map regressor to VATs  
☒ Highlight Active Contacts

2D Options

Settings  
Visualize 2D

3D Options

Visualize regressor as: Interpolated point mesh ☐ Color Pointcloud by Regressor  
Patient specified ☐ Point-Clouds ☐ Visualize 3D

Calculate DBS Stats

Subcortical regions: STN\_assoclat... Fibercounts to:  
Group Comparison (Two-sample t-test) Correlation between Regressors and Volume Intersections / Fibercounts Generate target report

LEAD Connectome Results

Graph theory

Graph metric: ☐ Smooth ☒ Smooth  
Normalization: No normalization ☐ SPM

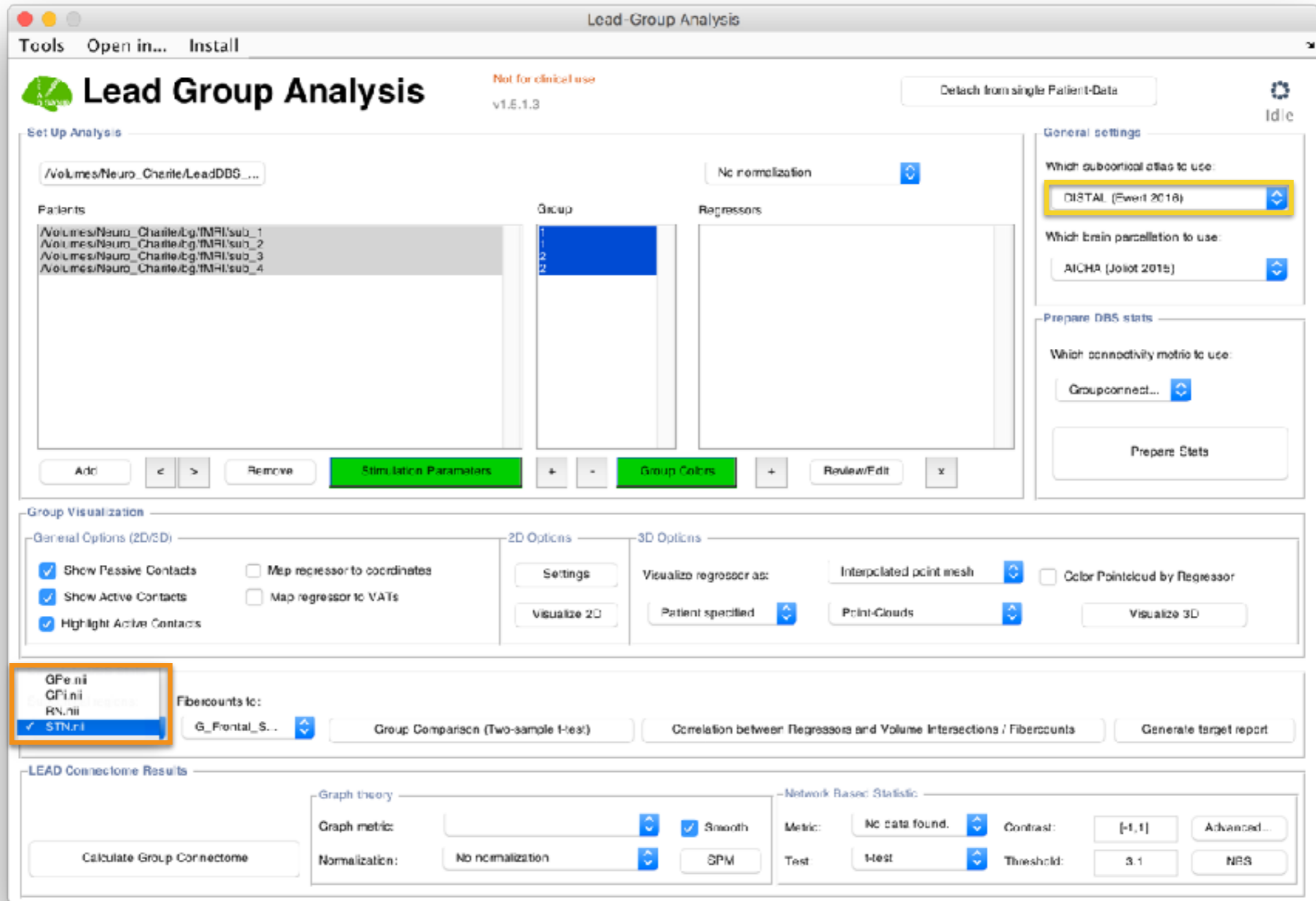
Network Based Statistic

Metric: No data found. ☐ Contrast: [-1,1] Advanced...  
Test: t-test ☐ Threshold: 3.1 NBS

Calculate Group Connectome

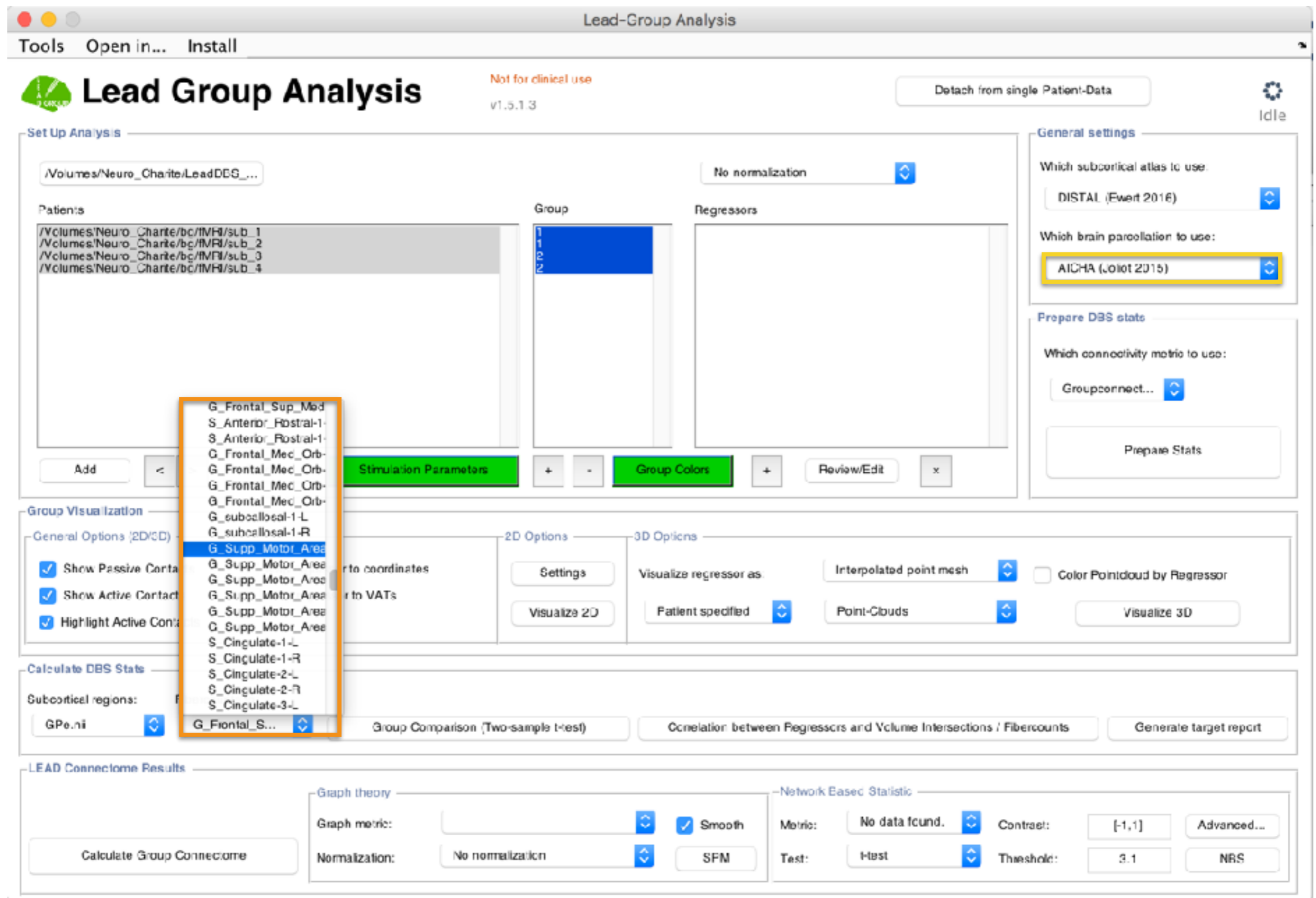
Select an atlas, a whole-brain parcellation, a fiberset and click “Prepare Stats”

# Group analyses in Lead-DBS



Now overlaps between each VTA and each atlas structure have been calculated based on selected atlas

# Group analyses in Lead-DBS



Now connectivity between VTA and each brain parcel has been calculated based on selected parcellation

# Group analyses in Lead-DBS

Compare overlaps / connectivity values in a two-sample t-test

# Group analyses in Lead-DBS

Lead-Group Analysis

Tools Open in... Install

Lead Group Analysis v1.5.1.3 Not for clinical use

Detach from single Patient-Data

Idle

Set Up Analysis

/Volumes/Neuro\_Charte/LeadDBS...

No normalization

Patients

/Volumes/Neuro\_Charte/bg/MRI/sub\_1  
/Volumes/Neuro\_Charte/bg/MRI/sub\_2  
/Volumes/Neuro\_Charte/bg/MRI/sub\_3  
/Volumes/Neuro\_Charte/bg/MRI/sub\_4

Group

Regressors

General settings

Which subcortical atlas to use:  
DISTAL (Ewert 2018)

Which brain parcellation to use:  
AICHA (Joliot 2015)

Prepare DBS stats

Which connectivity metric to use:  
Groupconnect...

Prepare Stats

Group Visualization

General Options (2D/3D)

☒ Show Passive Contacts ☐ Map regressor to coordinates  
☒ Show Active Contacts ☐ Map regressor to VATs  
☒ Highlight Active Contacts

2D Options

Settings  
Visualize 2D

3D Options

Visualize regressor as:  
Interpolated point mesh  
Patient specified  
Point-Clouds  
Color Pointcloud by Regressor  
Visualize 3D

Calculate DBS Stats

Subcortical regions: STN.ni  
Fibercounts to: G\_Frontal\_S...

Group Comparison (Two-sample t-test)  
Correlation between Regressors and Volume Intersections / Fibercounts

Generate target report

LEAD Connectome Results

Graph theory

Graph metric:  
Normalization: No normalization  
Smooth  
SPM

Network Based Statistics

Metric: No data found.  
Contrast: [-1,1]  
Test: t-test  
Threshold: 3.1  
Advanced...  
NBS

Calculate Group Connectome

Generate “target report” of which contact resides inside / outside atlas structure

# Group analyses in Lead-DBS

Distances between each contact center and nearest atlas voxel center

Thresholded values (by 0.5 mm)

Distances of electrode centers to nearest...				
File Edit View Inset Tool Desktop Window Help				
	sub_1	sub_2	sub_3	sub_4
K0	3.072	0.1295	0.2126	0.40595
K1	2.882	0.10915	0.11097	0.1584
K2	3.498	0.079554	0.07606	0.80567
K3	4.6642	1.5136	0.92819	2.3854
K8	0.099196	0.10635	0.78362	1.2952
K9	0.11454	0.078176	0.091772	0.67739
K10	1.2723	0.73248	0.11524	1.5624
K11	3.4617	2.3546	0.39097	3.1878

Electrode centers residing in STN.nii				
File Edit View Inset Tool Desktop Window Help				
	sub_1	sub_2	sub_3	sub_4
K0	0	1	1	1
K1	0	1	1	1
K2	0	1	1	0
K3	0	0	0	0
K8	1	1	0	0
K9	1	1	1	0
K10	0	0	1	0
K11	0	0	1	0

active contacts are marked in red

Generate “target report” of which contact resides inside / outside atlas structure

# Group analyses in Lead-DBS

The screenshot displays the Lead-DBS software interface. A dialog box titled 'Edit Regressor' is open, showing a table with patient data and a dropdown menu for selecting the number of variables per patient.

	Value
sub_1	0.2000
sub_2	0.5000
sub_3	0.3000
sub_4	0.1000

The dropdown menu is open, showing the following options:

- ✓ 1 variable per patient
- 1 variable per hemisphere
- 1 variable per contact
- 1 variable per contact pair

The main interface shows various settings for group analysis, including 'General settings', 'Prepare DBS stats', 'Group Visualization', 'Calculate DBS Stats', and 'LEAD Connectome Results'. A red box highlights the '+' button in the 'Group Visualization' section, indicating the action to add a new regressor.

Add new “regressor” to project

# Group analyses in Lead-DBS

The screenshot shows the 'Lead-DBS' software interface. A dialog box titled 'Edit Regressor' is open, displaying a table of 'Beta\_power' values for four subjects across six contact pairs (K1-2 to K10-11). The values are labeled as '(fake values)'. The dialog has 'Save' and 'Cancel' buttons. Below the dialog, the main interface shows various settings panels. A red box highlights a '+' button in the bottom toolbar. The 'General settings' panel on the right includes options for subcortical atlas (DISTAL) and brain parcellation (AICHA). The 'Prepare DBS stats' panel includes a 'Groupconnect...' button. The 'Group Visualization' panel has checkboxes for 'Show Passive Contacts', 'Show Active Contacts', and 'Highlight Active Contacts'. The 'Calculate DBS Stats' panel includes a 'Group Comparison (Two-sample t-test)' button. The 'LEAD Connectome Results' panel includes a 'Calculate Group Connectome' button.

**Edit Regressor**

Beta\_power 1 variable per contact pair

	K1-2	K2-3	K3-4	K8-9	K9-10	K10-11
sub_1	3	2	6	5	5	2
sub_2	2	3	5	4	6	3
sub_3	3	4	3	3	7	3
sub_4	5	1	2	2	4	4

(fake values)

Save Cancel

Detach from single Patient-Data Idle

General settings

Which subcortical atlas to use: DISTAL (Ewert 2016)

Which brain parcellation to use: AICHA (Joliot 2015)

Prepare DBS stats

Which connectivity metric to use: Groupconnect...

Prepare Stats

Group Visualization

General Options (2D/3D)

☒ Show Passive Contacts ☐ Map regressor to coordinates

☒ Show Active Contacts ☐ Map regressor to VATs

☒ Highlight Active Contacts

2D Options

Settings Visualize 2D

3D Options

Visualize regressor as: Interpolated point mesh

Patient specified Point-Clouds

Color Pointcloud by Regressor Visualize 3D

Calculate DBS Stats

Subcortical regions: STN.nil Fibercounts to: G\_Frontal\_S...

Group Comparison (Two-sample t-test) Correlation between Regressors and Volume Intersections / Fibercounts Generate target report

LEAD Connectome Results

Graph theory

Graph metric: Smooth

Normalization: No normalization SPM

Network Based Statistic

Metric: No data found. Contrast: [-1,1] Advanced...

Test: t-test Threshold: 3.1 NES

Calculate Group Connectome

Regressors can have various dimensions

# Group analyses in Lead-DBS

Lead-Group Analysis (busy...)

Tools Open in... Install

**Lead Group Analysis** Not for clinical use v1.5.1.3 Detach from single Patient-Data Busy

**Set Up Analysis**

/Volumes/Neuro\_Charite/LeadDBS\_...

**Patients**

/Volumes/Neuro\_Charite/bg/fMRI/sub\_1  
/Volumes/Neuro\_Charite/bg/fMRI/sub\_2  
/Volumes/Neuro\_Charite/bg/fMRI/sub\_3  
/Volumes/Neuro\_Charite/bg/fMRI/sub\_4

**Group**

1  
1  
2  
2

**Regressors**

UPDRS\_Improvement  
Beta\_power

**General settings**

Which subcortical atlas to use:  
DISTAL (Ewert 2016)

Which brain parcellation to use:  
AICHA (Joliot 2015)

**Prepare DBS stats**

Which connectivity metric to use:  
Groupconnect...

**Group Visualization**

**General Options (2D/3D)**

☒ Show Passive Contacts ☐ Map regressor to coordinates  
☒ Show Active Contacts ☐ Map regressor to VATs  
☒ Highlight Active Contacts

**2D Options**

Settings  
Visualize 2D

**3D Options**

Visualize regressor as:  
Interpolated point mesh  
Patient specified  
Point-Clouds  
Color Pointcloud by Regressor  
Visualize 3D

**Calculate DBS Stats**

Subcortical regions: STN.nil  
Fibercounts to: G\_Frontal\_S...

Group Comparison (Two-sample t-test) **Correlation between Regressors and Volume Intersections / Fibercounts** Generate target report

**LEAD Connectome Results**

**Graph theory**

Graph metric:   
Normalization: No normalization  
Smooth  
SPM

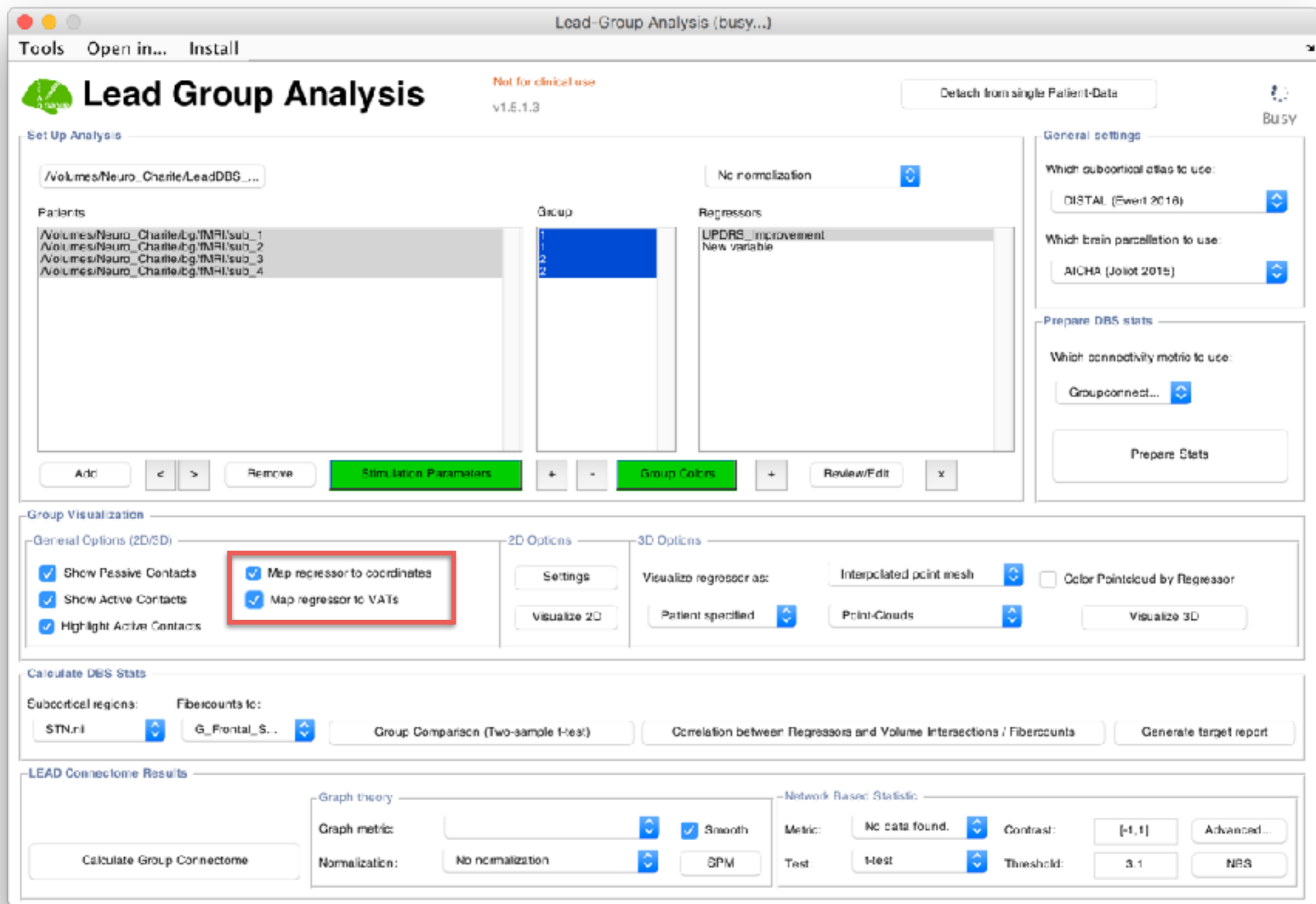
**Network Based Statistic**

Metric: No data found.  
Contrast: [-1,1]  
Test: t-test  
Threshold: 3.1  
Advanced...  
NES

Calculate Group Connectome

Calculate correlation between selected regressor and VAT/Atlas overlap or Connectivity between VAT/region

# Group analyses in Lead-DBS



Spatially map selected regressor to either coordinates or VATs