

BESA

Connectivity 1.0

From raw data to source connectivity in five steps

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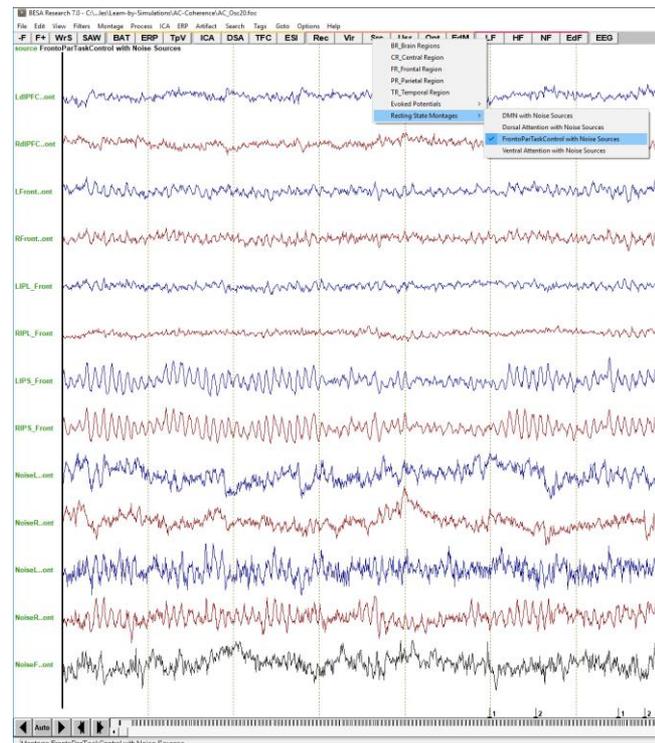
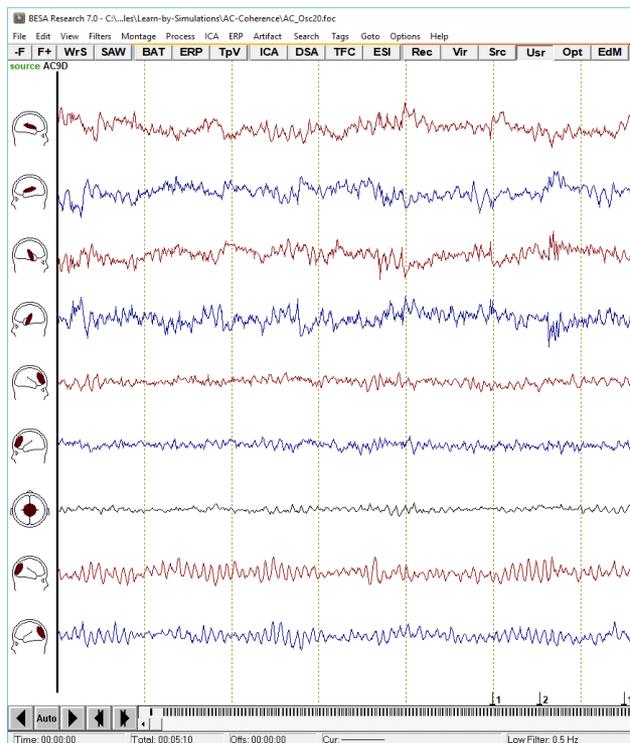


1) In BESA Research 7.0, choose a (source) montage

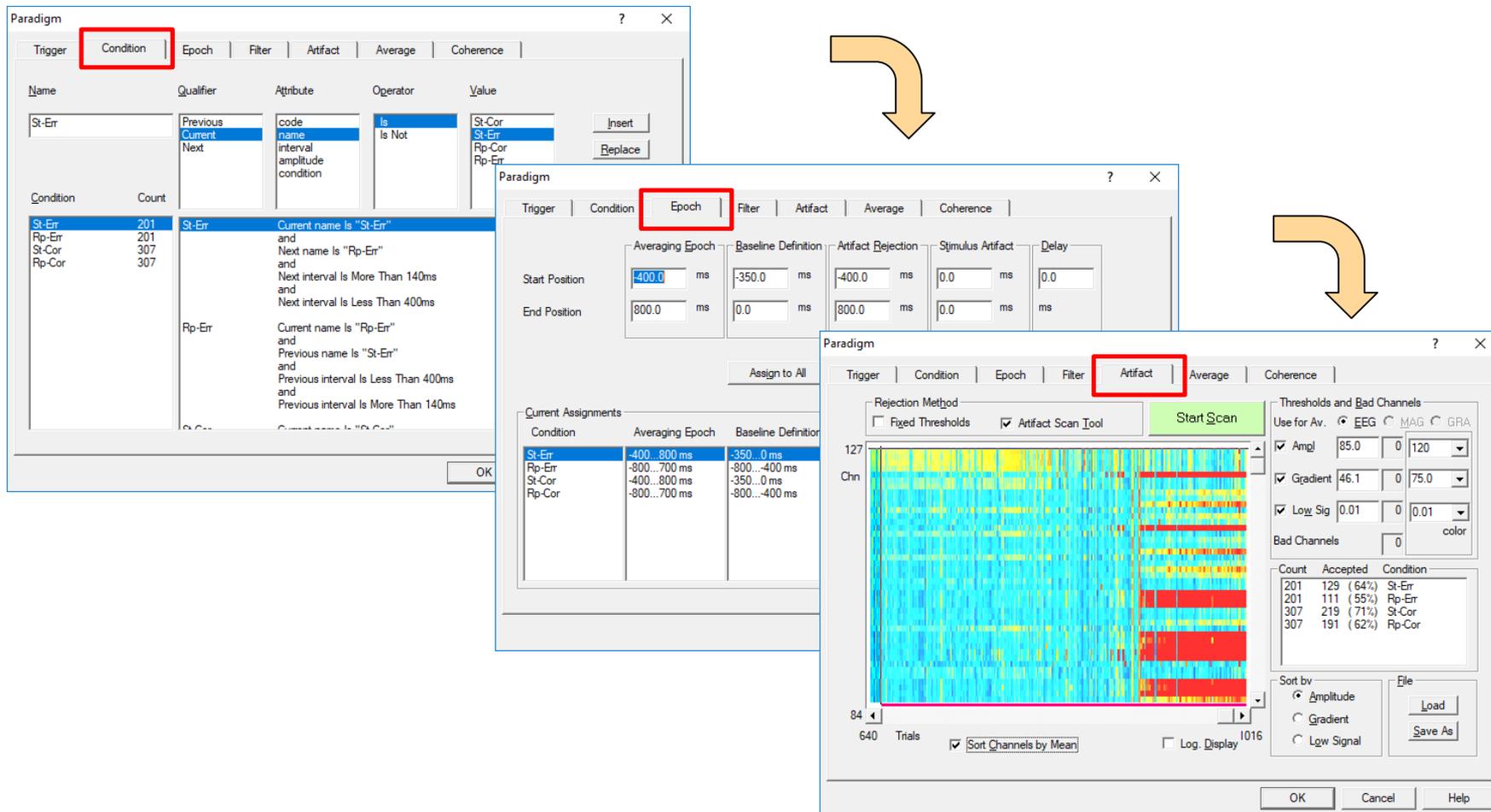
Define own source montage using
BESA Source Analysis

or

Use a pre-defined BESA (source)
montage



2) Define conditions and epochs of interest in the ERP module and reject artifacts



The image shows three overlapping screenshots of the BESA software interface, illustrating the process of defining conditions and epochs of interest in the ERP module and rejecting artifacts.

Top Screenshot (Condition): The 'Condition' tab is selected. The 'Name' column lists 'St-Er', 'Rp-Er', 'St-Cor', and 'Rp-Cor'. The 'Count' column shows 201, 201, 307, and 307 respectively. The 'Condition' column contains logical expressions such as 'Current name Is "St-Er" and Next name Is "Rp-Er" and Next interval Is More Than 140ms and Next interval Is Less Than 400ms'.

Middle Screenshot (Epoch): The 'Epoch' tab is selected. The 'Averaging Epoch' column shows time ranges: -400.0...800.0 ms, -800...700 ms, -400...800 ms, and -800...700 ms. The 'Baseline Definition' column shows: -350.0...0 ms, -800...-400 ms, -350...0 ms, and -800...-400 ms.

Bottom Screenshot (Artifact): The 'Artifact' tab is selected. The 'Rejection Method' is set to 'Artifact Scan Tool'. The 'Start Scan' button is highlighted. The 'Thresholds and Bad Channels' section shows: 'Use for Av.' set to 'EEG', 'Ampl' threshold at 85.0, 'Gradient' at 46.1, and 'Low Sig' at 0.01. The 'Bad Channels' section shows 0 bad channels. The 'Count Accepted Condition' table is shown below:

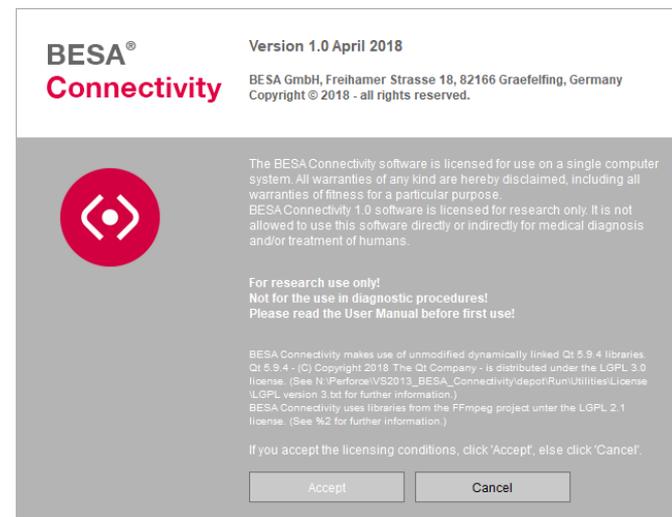
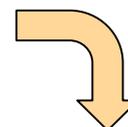
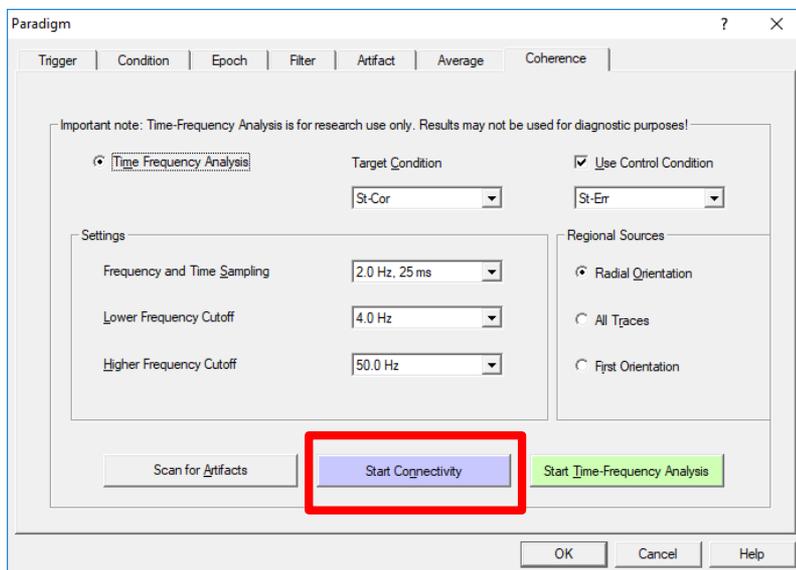
Count	Accepted	(%)	Condition
201	129	(64%)	St-Er
201	111	(55%)	Rp-Er
307	219	(71%)	St-Cor
307	191	(62%)	Rp-Cor

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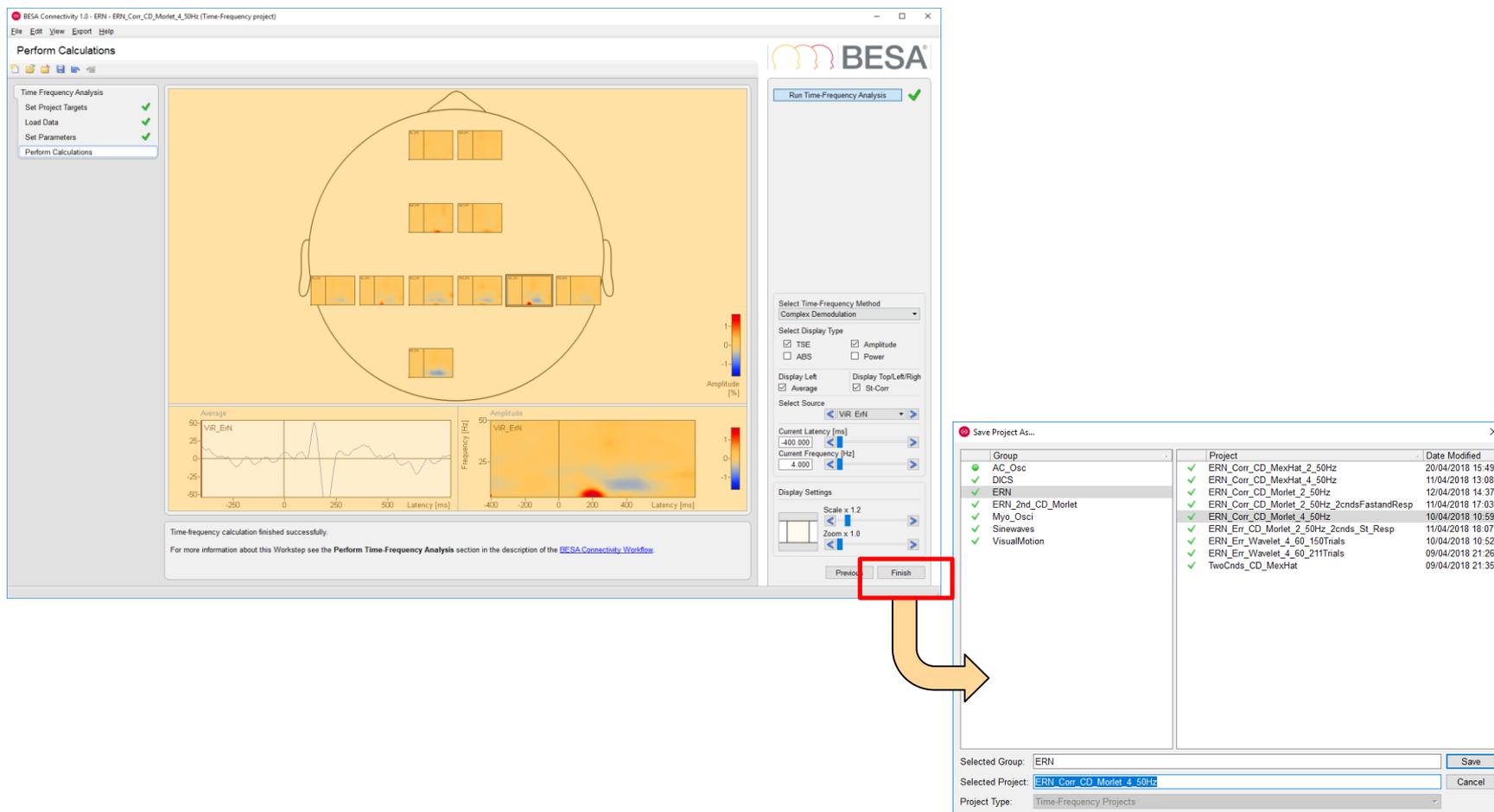
From raw data to source connectivity in five steps



3) Start **BESA Connectivity** in the Coherence tab



4) Follow the steps of the Time-Frequency workflow in BESA Connectivity

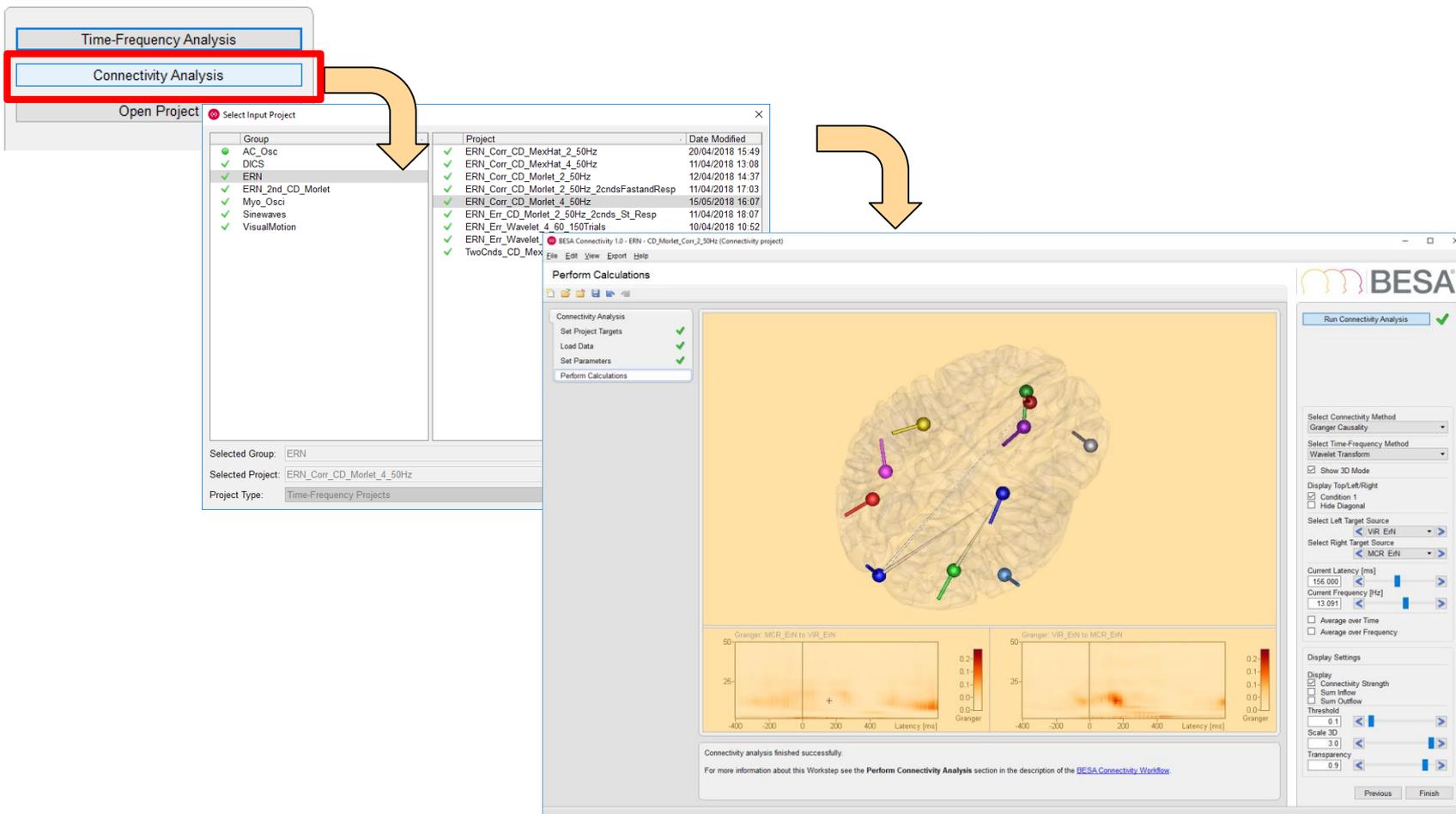


The screenshot shows the BESA Connectivity 1.0 interface during a Time-Frequency Analysis. The main window displays a topographic map of the head with electrode locations and a time-frequency plot. The 'Perform Calculations' panel on the left shows the 'Time Frequency Analysis' step selected. The 'Run Time-Frequency Analysis' button is highlighted with a red box. The 'Save Project As...' dialog box is open, showing a list of projects and the selected project 'ERN_Corr_CD_Morlet_4_50Hz'.

Time-frequency calculation finished successfully.
For more information about this Workstep see the [Perform Time-Frequency Analysis](#) section in the description of the [BESA Connectivity Workflow](#).

Group	Project	Date Modified
AC_Osc	ERN_Corr_CD_MexHat_2_50Hz	20/04/2018 15:49
DICS	ERN_Corr_CD_MexHat_4_50Hz	11/04/2018 13:08
ERN	ERN_Corr_CD_Morlet_2_50Hz	12/04/2018 14:37
ERN_2nd_CD_Morlet	ERN_Corr_CD_Morlet_2_50Hz_2cndsFastandResp	11/04/2018 17:03
Myo_Osc	ERN_Corr_CD_Morlet_4_50Hz	10/04/2018 10:59
Sinewaves	ERN_Err_CD_Morlet_2_50Hz_2cnds_St_Resp	11/04/2018 18:07
VisualMotion	ERN_Err_Wavelet_4_60_150Trials	10/04/2018 10:52
	ERN_Err_Wavelet_4_60_211Trials	09/04/2018 21:26
	TwoCnds_CD_MexHat	09/04/2018 21:35

5) Run the Connectivity workflow for the same input project



The screenshot illustrates the BESA software interface during the connectivity analysis workflow. The 'Open Project' dialog is shown on the left, with the 'Connectivity Analysis' step highlighted in red. An arrow points from this step to the 'Perform Calculations' window. The 'Perform Calculations' window displays a 3D brain model with source nodes and connectivity lines. Below the brain model are two Granger causality time-frequency plots. The right panel shows the 'Run Connectivity Analysis' settings, including connectivity method, time-frequency method, and display options.

Open Project - Select Input Project

Group	Project	Date Modified
AC_Osc	ERN_Corr_CD_MexiHat_2_50Hz	20/04/2018 15:49
DICS	ERN_Corr_CD_MexiHat_4_50Hz	11/04/2018 13:08
ERN	ERN_Corr_CD_Morlet_2_50Hz	12/04/2018 14:37
ERN_2nd_CD_Morlet	ERN_Corr_CD_Morlet_2_50Hz_2condsFastandResp	11/04/2018 17:03
Myo_Osc	ERN_Corr_CD_Morlet_4_50Hz	15/05/2018 16:07
Sinewaves	ERN_Err_CD_Morlet_2_50Hz_2conds_St_Resp	11/04/2018 18:07
VisualMotion	ERN_Err_Wavelet_4_60_150Trials	10/04/2018 10:52
	ERN_Err_Wavelet	
	TwoCnds_CD_Mex	

Perform Calculations

Connectivity Analysis

- Set Project Targets ✓
- Load Data ✓
- Set Parameters ✓
- Perform Calculations

Selected Group: ERN
Selected Project: ERN_Corr_CD_Morlet_4_50Hz
Project Type: Time-Frequency Projects

Connectivity analysis finished successfully.
For more information about this Workstep see the **Perform Connectivity Analysis** section in the description of the [BESA Connectivity Workflow](#).

Run Connectivity Analysis ✓

Select Connectivity Method: Granger Causality
Select Time-Frequency Method: Wavelet Transform
 Show 3D Mode
 Display Top/Left/Right
 Condition 1
 Hide Diagonal
Select Left Target Source: VR_ERN
Select Right Target Source: MCR_ERN
Current Latency [ms]: 156.000
Current Frequency [Hz]: 13.091
 Average over Time
 Average over Frequency

Display Settings
 Display Connectivity Strength
 Sum Inflow
 Sum Outflow
Threshold: 0.1
Scale 3D: 3.0
Transparency: 0.9