cEEGrid - the first commercially available near-the-ear EEG sensor system (Debener et al., 2015)

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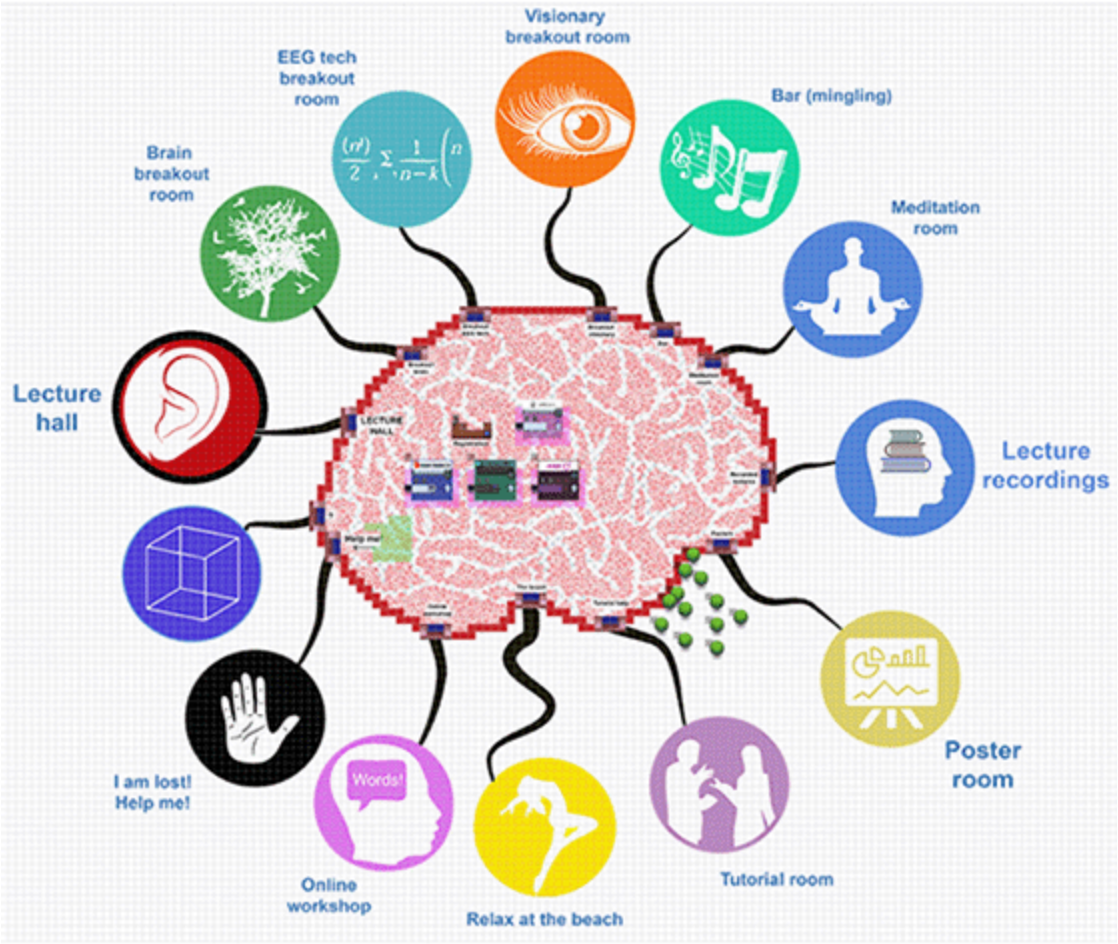
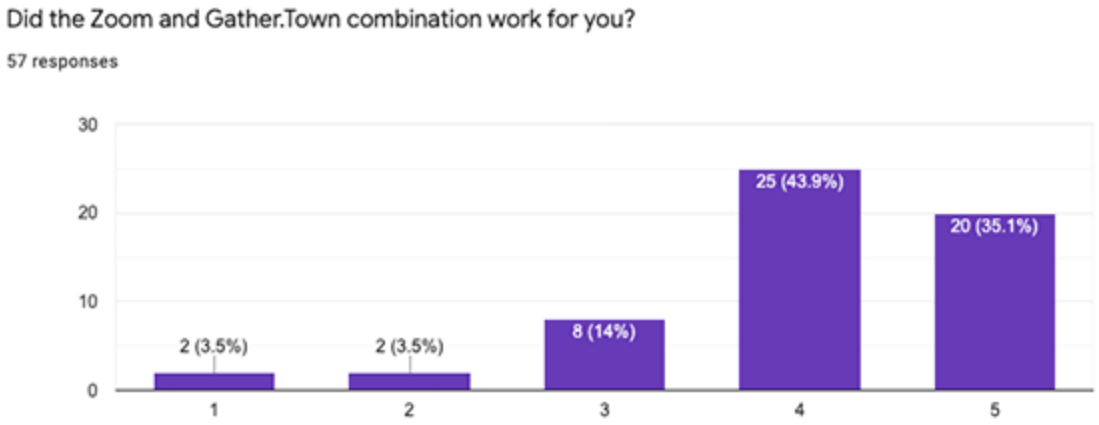
What's New

EEGLAB 2021.1 Release notes. EEGLAB 2021.1 has been released and is available for download here. It is also available from within EEGLAB 2021.0 (you should be notified when you start an EEGLAB session). Main new features of this version of EEGLAB are the ability to use parallelization in batch processing from the EEGLAB GUI (as illustrated in this tutorial video). Other improvement include further integration with LIMO, and the ability to process multiple sessions from the same participant(s). The list of all changes is available here. EEGLAB 2021.1 is available for Matlab, and in compiled form for Windows and Mac operating systems (the compiled versions do not require MATLAB to be installed).

Recap of the 2021 Online EEGLAB Workshop. The 2021 online EEGLAB workshop from June 14-18 was a big success. We had 1,017 registration for the free first day and 300 (capped) to the actual workshop. Twenty faculty and two admins made this workshop possible. We found that the combination of Zoom and Gather Town worked well for most people, and we were able to discuss with a large number of participants and address their problems and questions. Highlights from the workshop involved live demos of data collection with LSL under EEGLAB, the first demonstration of completely automated pipelines for BIDS EEG data, or the saturated chat for the ICLabel session where more people contributed than was possible to read. In Gather Town, Makoto's "pipeline" (a corridor in the form of a pipeline) was always full of participants. This workshop was tailored for American and European time zones. We plan to schedule another online workshop to serve those in Asia Pacific time zones, likely during the week of Nov. 29 - Dec. 3. We will release more news on this through the eeglablist mailing list and in the next Newsletter.





HED 3G. The new third-generation Hierarchical Event Descriptor (HED) system tools and base schema are about to be released. This latest generation of HED, originally created at SCCN in 2011 and now accepted in the BIDS data structure standards for all neuroimaging data modalities, closes a major gap in current standards for storing and sharing neuroimaging data -- namely a way to describe in detail the natures of the events marked or discovered in the data. Using HED-annotated data, researchers will be able to search through their own as well as publicly available data for data epochs time locked to events of any specific or more general category, enabling new within-study analyses and across-studies mega-analyses. The relatively easy-to-use HED (3G) annotation workflow begins with a written description of the experiment design including categories of events, time block structure, and task condition changes. Local names ('lab jargon' names such as 'Target1') are then associated with more precise HED definitions using standardized terminology (again, using mostly commonplace terms). HED tools map these 'short form' HED descriptors into formal 'long form' HED strings that can be used to analyze data patterns time-locked to events with specified common features. Work has begun to extend the HED base schema (list of allowed terms and meanings) by

adding HED library schemas, each organizing terms needed to describe experimental events and other metadata in a particular subfield (e.g., clinical EEG data reports, experiments using movie/animation stimuli, fMRI experiments, language studies, etc.). Anyone interested in learning more, or in building a library schema for a particular subfield, please visit github.com/hed-standard/hed-specification or email smakeig@ucsd.edu.

Plug-Ins

Here we highlight new EEGLAB plug-ins of possible wide interest to EEGLAB users. Please send descriptions of new plug-ins for consideration. These should have a brief lead introduction, and further text and images to be published on a continuation page.

DIPFIT 4.0 release. This new version of EEGLAB DIPFIT built on Fieldtrip functions allows you to compute leadfield matrices for applying four different source models, and/or to use a custom leadfield (physiological model source_space --> channel_space) matrix. Cortical surface and volume source models, and associated region atlases, are supported. New menu items have been added to perform source localization of ICA components and of ERP activities using eLoreta and LCMV beamforming.

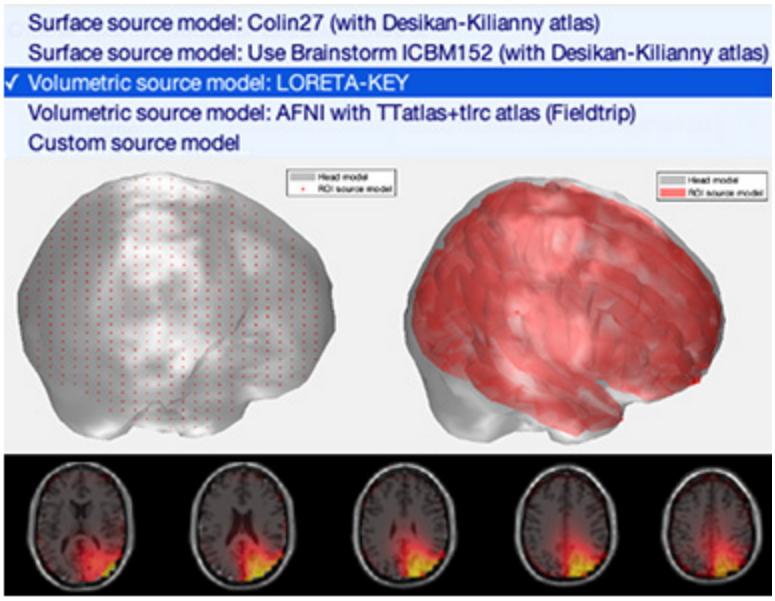
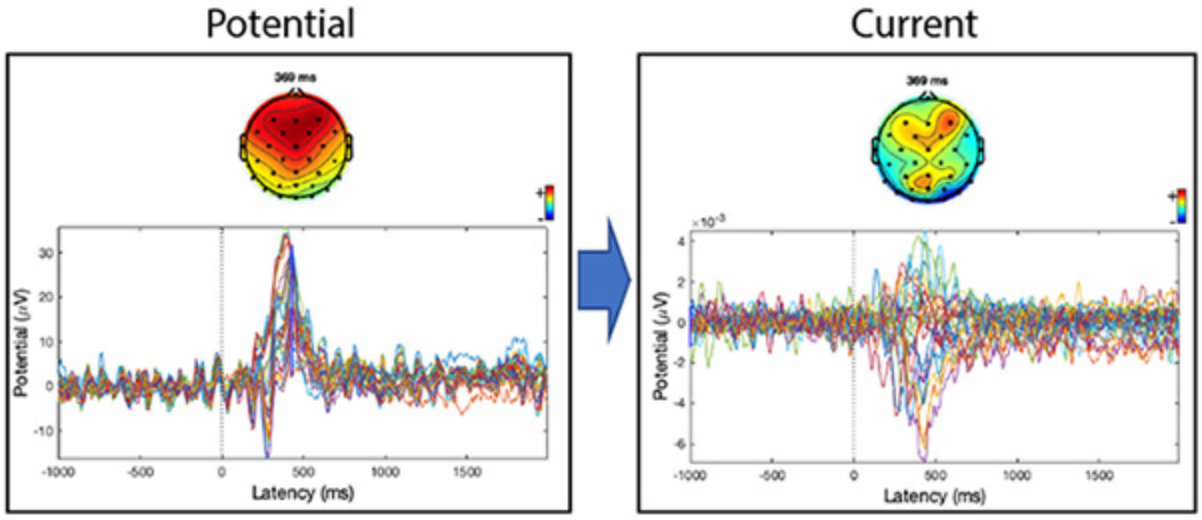


Figure to right: Top, selection of source models for computing leadfield matrices. Middle, example of a (template) volumetric source model (left) and a (template) cortical surface source model (right). Bottom, example of source localization for an ICA component scalp topography using a volumetric template source model.

SCD 1.0 plug-in: The SCD plug-in allows computing scalp current density (also sometimes referred to as surface Laplacian) using different methods finite-difference method, spherical spline method, and Hjorth approximation. An EEG topography's sign is directly related to the radial current directions underlying it. Positive values represent the current flow from the brain towards the scalp (called sources), and negative values representing current flow from the scalp to the brain. SDC estimates have a sharper topography, effectively reducing the negative impact of volume conduction. The plug-in allows replacing the EEG data with the SCD transformation and using all EEGLAB functions on the SCD estimates, including group analysis. The plug-in leverages the ft_scalpcurrentdensity function of Fieldtrip and has been tested against the eeg_laplac.m function of EEGLAB (command line only).



Profiles

This section contains personal profiles of EEGLAB developers and/or users, with a description of how they use EEGLAB in their research.

Stefan Debener, Ph.D.
Chair, Department of Psychology, Head of the Neuropsychology Lab, University of Oldenburg, Germany

"I measure my success in how well the people leaving my lab can advance their careers," shares Dr. Stefan Debener, Chair in Psychology and head of the Neuropsychology Lab at the University of Oldenburg, Germany. "Given the current situation with COVID-19," he adds, "there are not too many options. I have the great pleasure of working with many highly talented students and post-doctoral fellows, and I just hope they will get along well enough."

Dr. Debener is a prolific researcher who studies higher visual, auditory, and motor functions using mobile EEG technology, as well as clinical neuropsychology and neurorehabilitation. He has helped develop the first commercially available ear EEG sensor, as well as several EEGLAB plug-ins, and has organized many EEGLAB workshops. But in addition to these accomplishments, he considers his job as mentor to be important. Read more »

Upcoming Events

This section contains announcements of future events of possible interest to EEGLAB users. Please submit brief descriptions.

› **"Actionable event annotation in neuroimaging: HED-3G principles and practice."** Linking group of abstracts for the meeting of the Society for Neuroscience, Chicago, November, 2021.

› **The 32nd EEGLAB Workshop** will be held online later this year (most likely, Nov. 29 - Dec. 3), in a virtual conference center on Gather.Town. Registration will be announced soon (via the eeglablist and the EEGLAB home page). This workshop will be similar to the recent June EEGLAB workshop but scheduled to better fit Asia-Pacific time zones. In-person workshop events will resume in 2022, with a workshop scheduled for the fall in Poland.

The 33rd EEGLAB Workshop in Lublin, Poland, is postponed to 2022. The dates have not been set yet. For more information, contact Dariusz Zapała (d.zapala@gmail.com). More information »

From the eeglablist

(… the EEGLABLIST email list) *This section contains brief questions and answers from the eeglablist archives or elsewhere.*

Q: Cedric Cannard, Ph.D. Candidate, CerCo, Paul Sabatier University, Toulouse, France: *How Does Causal Filtering Work? What is a phase shift, and what is a group delay??*

A: Andreas Widmann, Scientific Lab Manager, University of Leipzig: Let's consider the simplest device possible, a piece of wire of length L where the signal can travel at the speed of light. Clearly, it takes L/c seconds for the signal to get through this device. The simple fact that time is required for a signal to pass from a device's input to its output means that it generates a phase shift (i.e., ordinary time delay). Compared to other electrical devices, filters have significant amounts of phase shift, and the longer the filter (i.e., the more poles or taps it has), the more delay it has. This delay is usually discussed in terms of samples (or seconds). More...

Q2: EEGLAB user: *How do you plot standard error shades on ERP?*

A2: Cédric Cannard, Ph.D, Arnaud Delorme, Ph.D., and Cyril Pernet, Ph.D.: Below is an example of plotting one subject's epoched data. You should adapt the script to use the output of the STUDY function as input data for plotting. More...

In Print

Here we list recent papers highlighting EEGLAB function and plug-in capabilities. Please submit suggested papers, with a brief summary description.

Robbins, K., Truong, D., Appelhoff, S., Delorme, A. and Makeig, S., 2021. Capturing the nature of events and event context using Hierarchical Event Descriptors (HED) (BioRxiv, June 14, 2021).

Miyakoshi M, Gehrke L, Gramann K, Makeig S, Iversen J (2021). The AudioMaze: An EEG and motion capture study of human spatial navigation in sparse augmented reality. European Journal of Neuroscience, 26 January 2021 https://doi.org/10.1111/ejn.15131.

Meyer K, Rostami HN, Ouyang G, Debener S, Sommer W, Hildebrandt A (2021). Mechanisms of face specificity – Differentiating speed and accuracy in face cognition by event-related potentials of central processing. Cortex, Volume 134, January 2021, Pages 114-133.

Cruzat J, Torralba M, Ruzzoli M, Fernández A, Deco G, Soto-Faraco S (2021). The phase of Theta oscillations modulates successful memory formation at encoding. Neuropsychologia, Volume 154, 16 April 2021, 107775

Jurgiel J, Miyakoshi M, Dillon A, Piacentini J, Makeig S, Loo SK (2021). Inhibitory control in children with tic disorder: aberrant fronto-parietal network activity and connectivity. Brain Communications, Volume 3, Issue 2, 2021, April 9, 2021, https://doi.org/10.1093/braincomms/fcab067

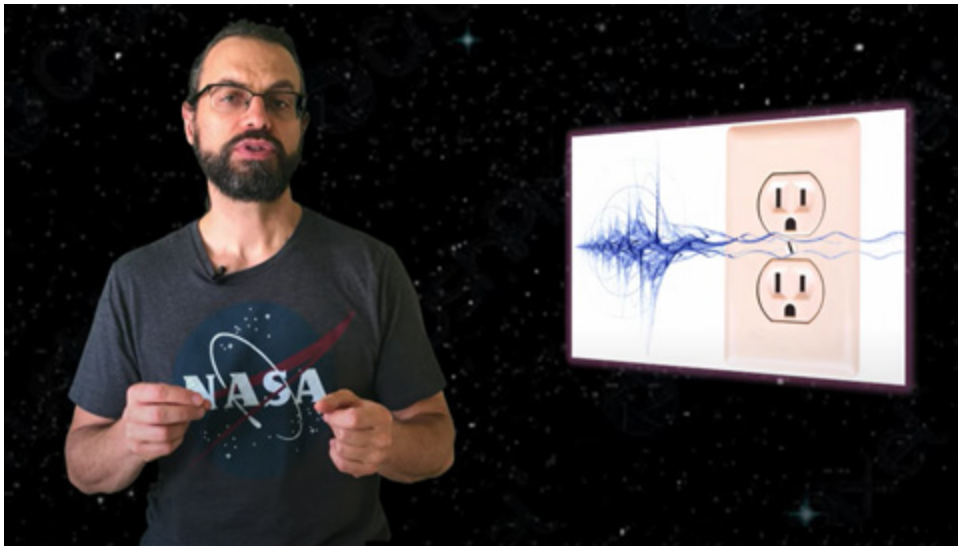
Holtze B, Jaeger M, Debener S, Adiloğlu K, Mirkovic B (2021). Are They Calling My Name? Attention Capture Is Reflected in the Neural Tracking of Attended and Ignored Speech. Front Neurosci. 2021; 15: 643705.

Zamm A, Debener S, Konvalinka I, Sebanz N, Knoblich G (2021). The sound of silence: an EEG study of how musicians time pauses in individual and joint music performance. Social Cognitive and Affective Neuroscience, Volume 16, Issue 1-2, January-February 2021, Pages 31–42, https://doi.org/10.1093/scan/nsaa096

Online

Some advice on collecting electroencephalographic (EEG) data

Arnaud Delorme - May 24, 2021

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