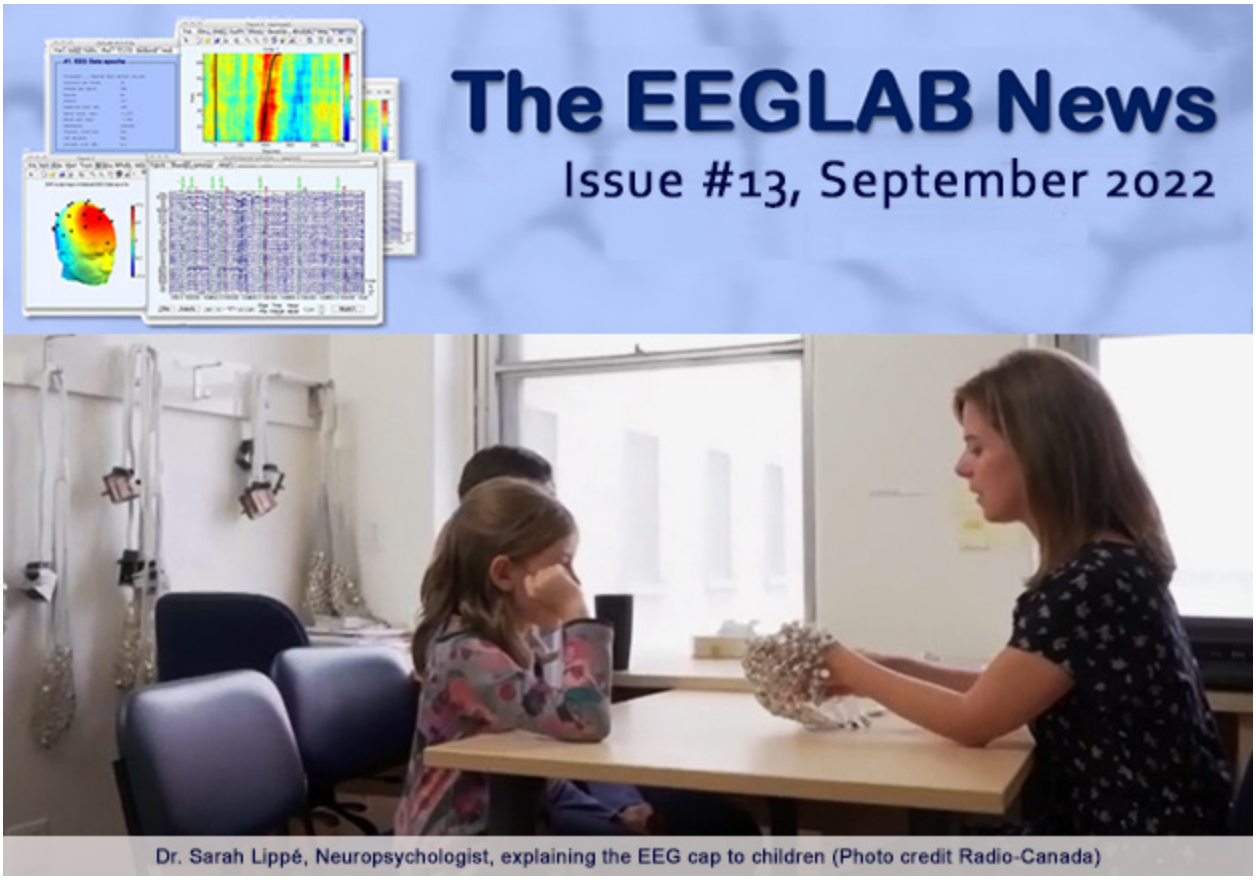

Dr. Sarah Lippé, Neuropsychologist, explaining the EEG cap to children (Photo credit Radio-Canada)

View this email in your browser

What's New

Building EEGLAB pipelines. There is new documentation on building simple EEGLAB pipelines from the command line. Click here to learn more! Running automated processing on data is becoming increasingly popular, and EEGLAB has unique and powerful data cleaning tools for it. The simple pipeline describes how to process a collection of raw data files. First, the data are imported, then cleaned using *clean_rawdata.* ICA decomposition is then run on all datasets, and *ICLabel* is used to flag non-brain components. A more complex pipeline also remains available here.

A new version, EEGLAB 2022.1, has been released. This revision features some bug fixes - bug reports always appreciated! - and increased interoperability with *ERPLAB* requiring a major change in how numerical events are processed in EEGLAB. This version also features increased interoperability with Fieldtrip, LIMO and Biosig (including better support for EDF data import), and better support for processing multiple datasets from either the MATLAB command line or the EEGLAB graphic interface (menu). Key plug-ins have also undergone important changes in the past few months. A full list of changes is available here.

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.

***Clean_rawdata*.** *Clean_rawdata* is the most popular plug-in for automated data cleaning in EEGLAB. Version 7.0 now allows fixing the set of rejected channels across two or more datasets from the same

participant.

ERPLAB. ERPLAB is a MATLAB based EEGLAB extension developed at UC Davis. ERPLAB uses numerical events, and, to define discontinuity, event type '*-99*'. This is different from EEGLAB, which uses the '*boundary*' event type instead. This difference prevented ERPLAB users from benefitting from using some EEGLAB functions to preprocess their data. As of EEGLAB version 2022.1, ERPLAB users can change their EEGLAB 'preferences' to use numerical event type '*-99*' to mark data discontinuities. More than 20 EEGLAB functions as well as the *Firfilt* plug-in were updated to accommodate this change, which is fully backward compatible.

Open Science

Here we highlight news of open EEG and related data, tools, and other resources.

Three landmark EEG datasets have been released on NEMAR.org **and** OpenNeuro.org**.** The Healthy Brain Network (HBN) BIDS data release contains eyes open and eyes closed resting data from 2,951 children. This release is based on a collaboration between the NEMAR and Dr. Michael Milham and colleagues of the Child Mind Institute in New York who acquired the data. Participant age and gender are provided; a wealth of additional clinical information may be available by individual arrangement with the Child Mind Institute. More BIDS-formated HBN data will be released in the coming months. Another large BIDS-format data release is resting EEG data from a 'First Episode Psychosis' study (143 participants). Here the NEMAR team collaborated with Dean Salisbury of the University of Pittsburgh to prepare and release the data. These data also include dozens of questionnaires (datasets here]. Finally, the NEMAR team also assisted with the release of EEG data from 118 female survivors of Childhood Sexual Abuse with problem drinking performing five psychophysical tasks. We are now working with Dr. Andrey Anokhin and his team at Washington University St Louis to improve the amount and quality of information about experiment events, recording the nature of the events using the Hierarchical Event Descriptors (HED) system. All these datasets were exported using the EEGLAB *bids-matlab-tools* plug-in of EEGLAB (dataset here). Data on NEMAR are available for free and immediate processing of your choice using a U.S. ACCESS high-performance compute network. Do not hesitate to contact us at nemardata@ucsd.edu if you need assistance in sharing your data on NEMAR/OpenNeuro.

New grant to develop and promote use of Hierarchical Event Descriptors. The HED Working Group has received a BRAIN Initiative grant from the U.S. NIMH neuroinformatics program to further develop, implement tools for, and promote use of HED annotation of neuroimaging time series data, particularly that shared via NEMAR, OpenNeuro, and other data archives using the Brain Imaging Data Structure (BIDS) formatting conventions. The new style of HED annotations of BIDS-formatted data will allow both stored and shared data to be analyzed simply and efficiently, critically re-examined, or mined to extract some of the wealth of information about brain dynamics inherent in the data but left unrevealed by now-standard analyses.

Profiles

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

Dr. Sarah Lippé
Full Professor, Psychology Department, University of Montreal
Director, Neuroscience of Early Development Lab (NED)
FRQ-S Senior Scientist, Sainte-Justine Hospital

"What happens at key moments in child development when pathologies sometimes occur that harm cerebral, cognitive, and emotional development?" Dr. Sarah Lippé, Full Professor of Psychology at the University of Montreal and FRQ-S Senior Scientist at Sainte-Justine Hospital, is determined to find answers. As Director of the multidisciplinary Neuroscience of Early Development Lab (NED) she studies the cerebral mechanisms involved in learning processes in infants and children. "I believe that many neurodevelopmental disorders exist because of an accumulation of prenatal and genetic risk factors," she shares. "My research focuses on many of these possible risk factors." She hopes the results of her studies will lead to the development of early screening methods and treatment options for children with neurodevelopmental disorders. Read more »

Upcoming Events

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

EEGLAB Poland, September 2022 (in person). An in person EEGLAB Workshop is scheduled for Sept. 12-16 at the Catholic University Lublin in Lublin, Poland. This site has detailed information.

Event and condition annotation of BIDS data using HED – from start to finish. On September 15, the HED Working Group will give an online half-day course on using the Hierarchical Event Descriptors (HED) system for event annotation of BIDS data within the Neuroinformatics Assembly of the International Neuroinformatics Coordinating Facility (INCF). See details here.

The 34th EEGLAB Workshop - UC San Diego, November 2022 (in person). The 34th EEGLAB Workshop will be held in person at the UC San Diego Supercomputer Center in La Jolla, California (Nov. 18 - 21), following the Society for Neuroscience Meeting (Nov. 12-16). The workshop will introduce and demonstrate the use of EEGLAB and EEGLAB plug-in tools for analysis of EEG and related data with overview talks on principles of EEG data analysis, detailed method expositions, and practical exercises. It will follow the format of previous workshops, with new material incorporated as need, time and opportunities permit, and will include a Lab-Streaming Layer (LSL) mini-symposium explaining how the LSL software framework enables and controls acquisition of multi-modal brain and behavioral imaging data. The workshop will be preceded on Thursday afternoon and evening (Nov. 17) by a **free symposium on Advanced EEG Signal Processing**, followed by an open-house reception and poster sharing session. See the workshop website for workshop program and registration information.

From the EEGLABLIST

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

Q: I expected some variation in ICA decomposition between repeated runs, but not results that differ to this extent. Am I missing something obvious?

Further explanation: **By chance I noticed that the results of the ICA decomposition and the subsequent classification with ICLabel varies considerably when run repeatedly on the same dataset** (e.g., from 5 to 11 components classified as eye and/or muscle artifacts with 90% probability for the exact same dataset). This is only the case when the data are FCz-referenced (i.e.,

the online reference is kept unchanged). If the data are instead re-referenced to average reference and then repeatedly run through ICA, the resulting decompositions and classifications appear more stable.

Regards,
Anna

A. Click here to read an extended discussion of this topic by Scott Makeig and Cedric Cannard.

In Print

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

Lalancette, E., Charlebois-Poirier, AR., Agbogba, K. *et al.* Steady-state visual evoked potentials in children with neurofibromatosis type 1: associations with behavioral rating scales and impact of psychostimulant medication. *J Neurodevelop Disord* **14,** 42 (2022). https://doi.org/10.1186/s11689-022-09452-y

Deguire F, López-Arango G, Knoth IS, MSc, Côté V, Agbogba K, Sarah Lippé S. (2022) Developmental course of the repetition effect and change detection responses from infancy through childhood: a longitudinal study. Cerebral Cortex (2022), bhac027, https://doi.org/10.1093/cercor/bhac027

López-Arango G, Deguire F, Côté V, Barlaam F, Agbogba K, Knoth IS, Lippé S. (2021) Infant repetition effects and change detection: Are they related to adaptive skills? Eur J Neurosci. 2021 Nov;54(9):7193-7213. doi: 10.1111/ejn.15475. Epub 2021 Oct 13. PMID: 34585451.

Côté V, Lalancette E, Knoth IS, Côté L, Agbogba K, Vannasing P, Major P, Barlaam F, Michaud J, Lippé S. (2021) Distinct patterns of repetition suppression in Fragile X syndrome, down syndrome, tuberous sclerosis complex and mutations in SYNGAP1. Brain Research, Volume 1751, 15 January 2021, 147205. https://doi.org/10.1016/j.brainres.2020.147205

Online

Robust statistics applied to EEG data