

Contents

- [1 NEMO Wiki](#)
 - ◆ [1.1 What is NEMO?](#)
 - ◆ [1.2 NEMO Data](#)
 - ◆ [1.3 NEMO Ontology](#)
 - ◆ [1.4 NEMO Database and Portal](#)
 - ◆ [1.5 MINEMO Checklist](#)
 - ◆ [1.6 Resources](#)

NEMO Wiki

Quick Links:

- [NEMO Portal](#) for collaboration and data analysis or ERP Data
- [NEMO Toolkit](#) for analysis and annotation of meta data
- [NEMO Ontology](#) used by NEMO Toolkit and Portal to define relationships of NEMO data

What is NEMO?

Neural ElectroMagnetic Ontologies (NEMO) is an [NIH funded](#) project that aims to create EEG and MEG ontologies and ontology based tools. These resources will be used to support representation, classification, and meta-analysis of brain electromagnetic data. The three pillars of NEMO are: [DATA](#), [ONTOLOGY](#), and [DATABASE](#). NEMO data consist of raw EEG, averaged EEG (ERPs), and ERP data analysis results. NEMO ontologies include concepts related to ERP data (including spatial and temporal features of ERP patterns), data provenance, and the cognitive and linguistic paradigms that were used to collect the data. The [NEMO database portal](#) is a large repository that stores NEMO consortium data, data analysis results, and data provenance.

- Also see [Project Aims](#).



NEMO Data

Quick Links:

[NEMO Wiki](#)

NEMO

- [SVN Repository](#) Download any version of NEMO ERP Analysis Toolkit
- Also see [ERP Analysis Tools](#).

The [NEMO ERP Analysis Toolkit](#) includes tools for EEG/ERP and MEG data decomposition, and ontology-based mark-up, annotation, and labeling of patterns in EEG and MEG data. These tools have been implemented in MATLAB by Robert Frank, a mathematician and data analyst for NEMO.

The current NEMO analysis pipeline has been designed with the aim to support cross-lab, cross-experiment meta-analysis of EEG and MEG data. The current proposed processing pipeline consists of the following steps:

- * Step 1: Decomposing ERP data (continuous data are transformed into discrete patterns for analysis)
 - o PCA/ ICA/Microstate
- * Step 2: Marking up the analysis results
 - o Each pattern is annotated with labels that relate pattern attributes to NEMO ontology concepts
- * Step 3: Clustering the observed patterns within and across experimental groups
- * Step 4: Labeling the cross-experiment clusters

Each item in the above list is a step/phase in the processing pipeline and is associated with a set of matlab scripts in our NEMO ERP Analysis Toolkit, which is implemented by a collection of MATLAB scripts.

The [NEMO research team](#) has carried out a pilot ERP meta-analysis using a prototype of our NEMO ERP Analysis Toolkit. Our [ERP Consortium](#) has provided data from 19 language experiments, involving over 400 participants (see [Contributors](#) tab for a complete list of EEG and MEG researchers who have contributed data to the NEMO project). The cognitive/behavioral and experiment parameters for these datasets were coded using a modified [BrainMap schema](#). Nine experiments from 3 different labs used similar (semantic priming) paradigms and were entered into our first cross-laboratory, cross-paradigm statistical meta-analysis. The results of this study are in-preparation (Frishkoff, Frank, Curran, Connolly, Kilborn, Molfese, Perfetti, Dien, Liu & Dou, 2010).

NEMO Ontology

Quick Links:

- [BioPortal Repository](#) Browse or Download Latest Release of NEMO.owl
- [SVN Repository](#) Download any version of NEMO owl files to View or Edit in Protege
- Haishan Liu's [Ont2SS tool](#)
- Also see [NEMO ERP ontologies](#).

A key goal for Neural ElectroMagnetic Ontologies (NEMO) is the development of a formal logic (or ?ontology?) to support data sharing, logic-based queries and mapping/integration of patterns across data from different labs, different experiment paradigms, and different modalities (EEG/MEG).

We are currently working on the specification and coding of an ERP ontology. A working version of the NEMO ontology has been submitted to the [National Center for Biomedical Ontologies](#), where it is freely available to [download or to browse online](#). NEMO ontologies and other resources have also been registered with the [International Neuroinformatics Coordinating Facility](#) (INCF), the [Neuroimaging Informatics Resource Clearinghouse](#) (NITRIC), and the [Neuroscience Information Framework](#) (NIF), which provide centralized access to a variety of neuroinformatics tools and technologies.

NEMO

In this process, we are working with Dr. Angela Laird (co-Investigator, [BrainMap project](#) and [cogPO project](#)), Dr. Jessica Turner (Project Scientist, [fBIRN project](#) and co-PI, cogPO project), Dr. Maryann Martone (Director, Neuroscience Information Framework), and Dr. Jeff Grethe (co-Investigator, Neuroscience Information Framework; Principal Investigator, [HeadIT](#)) to coordinate efforts in EEG, ERP, brain and cognitive ontology and database development.

NEMO Database and Portal

Quick Links:

- Browse production version of [NEMO portal](#)
- Also see [NEMO Database](#).
- Portal architectural and maintenance [documentation](#).

MINEMO Checklist

Quick Links:

- MINEMO has been registered with the [MIBBI Foundry](#).
- See working list of metadata [File:MINIerp Lex.xlsx](#)
- Also see [\[1\]](#) for metadata entry in NEMO portal.

Minimal Information for Neural ElectroMagnetic Ontologies (MINEMO; formerly "MIEME" or "MINIerp") is the minimal set of experiment meta-data that is required for datasets that are used in the NEMO project. It is modeled on [MINI](#) (Minimal Information about a Neuroscience Investigation), which was developed by Frank Gibson and colleagues for the [CARMEN](#) project.

Resources

- [NEMO ERP ontologies](#)
- [NEMO ERP analysis tools](#)
- [NEMO project documentation](#)