

Novel uses of natural viewing paradigms in EEG, fMRI and fcMRI.

Organizers:

Tamara Vanderwal, MD

Yale Child Study Center, New Haven, Connecticut, United States

Lucas Parra, PhD

The City College of the City University of New York, New York, United States

The last two years have seen a significant expansion in the scope of studies utilizing natural viewing paradigms. This symposium brings together emerging approaches from EEG, task-based fMRI and functional connectivity MRI (fcMRI) that use movies as stimuli. Natural viewing paradigms have multiple characteristics that facilitate unique approaches to data analysis. Movies have been shown to evoke patterns of neural activity that are synchronized across individuals, and even across species. In addition, time courses derived from features of the movie such as luminance and sound intensity can be used to interrogate different facets of neurofunctional systems with improved precision. Movies thus present a powerful and flexible medium with which to engage multiple networks in a concerted and dynamic fashion. From a clinical standpoint, the use of movies in the context of functional connectivity facilitates longer data collection times and decreases head movement in both adults and children. This workshop provides an overview of novel analytic methods being used to exploit these characteristics, including new approaches to fMRI and fcMRI temporal dynamics, work with movie-watching monkeys, links between neural synchrony and behaviors of large audiences, and a novel class of paradigm designed to decrease head movement in clinical groups. The strengths and limitations of these approaches and the ways that natural viewing paradigms might be usefully combined with existing methodologies for studies of functional connectivity will be discussed.

Learning objectives:

1. Participants will be able to list (at least) three unique features of natural viewing paradigms and how these features can be exploited in signal processing.
2. Participants will be able to define new concepts in the field, such as "temporal receptive windows" (Uri Hasson's talk) and provide an example of how neural responses during movies are being applied to predict behavior (Lucas Parra's talk).
3. Participants will be able to describe how natural viewing paradigms are being used to relate movie content to brain activity in humans and monkeys (Andreas Bartels' talk) and to tailor novel paradigms for work with young children (Tamara Vanderwal's talk).

Topographic mapping of temporal receptive windows using natural stimuli.

Uri Hasson, PhD, Department of Psychology and the Neuroscience Institute, Princeton University, Princeton, NJ, USA

Audience preferences are predicted by reliability of fast neural processing.

Lucas Parra, PhD, The City College of the City University of New York, New York, NY, USA

Mapping of multiple functionally specialized regions using natural stimuli.

Andreas Bartels, PhD, Centre for Integrative Neuroscience, Tübingen, Germany

A novel video paradigm for use in functional connectivity MRI.

Tamara Vanderwal, MD, Yale Child Study Center, New Haven, CT, USA