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Dynamic spatiotemporal brain analyses of automatic socio-cognitive processes of the healthy and disordered brain: Empirical evidence from the Chicago electrical neuroimaging analytics (CENA)

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The rapid growth of large-scale, high-spatial resolution neuroimaging technology has advanced our understanding of the neural underpinnings of various complex cognitive and social processes from the healthy and disordered brain. However, high-spatial resolution neuroimaging techniques such as functional magnetic resonance imaging (fMRI) have been limited in terms of the temporal information they provide in studies of brain function. A key theoretical objective in neuroscience and medicine is not only to specify what brain areas are recruited during a behavioral task but also to specify when and in what specific combinations they are activated. By providing detailed information about the relationship between neuronal activity and the temporal resolution (millisecond by millisecond) of each component information processing operation required for behavioral performance, high-density EEG recordings and event-related potentials (ERPs) have provided a useful additional tool in investigations of brain function. Whereas fMRI analyses are performed in source space, EEG/ERP analyses are performed in sensor space with high-density sensor recordings producing more detailed information about changes in brain activity measured across time and sensor space. Over the years, some have argued that measuring peaks and troughs was sufficient to the temporal processing of the brain, while others argued persuasively that another approach such as a statistical decomposition of the evoked brain states was necessary. In the current talk, I present a new method for identifying non-periodic brain state dynamics for the brain micro segmentation and analysis of averaged high-density ERPs and new research on the chronoarchitecture of brain microstates in health and psychiatric disorders.

Biography

Stephanie Cacioppo has received her PhD in 2004 from the University Medical School of Geneva & University of Savoy and Postdoctoral studies from Dartmouth College and UC Santa Barbara. She is an Assistant Professor in the Biological Science Division and the Director of the High Performance Electrical Neuroimaging Laboratory at the University of Chicago. She has published more than 80 papers in reputed peer-reviewed journals and has been serving as an Editorial Board Member of repute. She has received several awards including the APS Fellowship (2014), the APS Rising Star nomination (2011), the Annual ESSM Award of Excellence (2011), the Tom Slick Award from the Mind Science Foundation (2010) and the Geneva University Maurice Chalumeau Award (2007).

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