BCL 2023

Edition IV

Dipanjan Roy

Associate Professor,
Center of Brain Science and Application,
School of AI and Data Science,
IIT Jodhpur, India

13 Jan | 10:00 - 11:00

Electrophysiological and neuroimaging evidence of how the brain handles salient distraction, surprise, and uncertainty

Abstract: What fundamental property of our environment would be most valuable and optimal in characterizing the perceptual and emotional dynamics we experience in daily life? Empirical work has shown that an accurate uncertainty estimation is necessary for optimal perception, learning, and decision-making. However, the role of this uncertainty in governing our affective dynamics remains unexplored. Using Bayesian encoding, decoding, and computational modeling on a large-scale neuroimaging and behavioral data on a passive movie-watching task, we showed that emotions naturally arise due to ongoing uncertainty estimations about future outcomes in a hierarchical neural architecture. Several prefrontal subregions hierarchically encoded a lower-dimensional signal highly correlated with the evolving uncertainty.

Brief Bio: *Dipanjan Roy's Cognitive Brain Dynamics Lab studies neurodynamics of human memory, perception, attention, and emotion processing during typical and atypical brain development using behavior, EEG, MEG, and fMRI. His group has made seminal contributions in multiscale computational modeling, Age-associated alteration in neural communication and synchronization between brain areas, Multisensory speech processing and role of attention, Brain connectivity and neural flexibility in Autism, Emotion and perception dynamics in Aging and neurodevelopmental disorders. His lab is currently located at IIT Jodhpur Center for Brain Science & Applications under the School of Artificial Intelligence & Data Science and the National Brain Research Center Manesar Haryana.*