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The George Washington University
Mt. Vernon Campus
2100 Foxhall Road
Washington, DC

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Program & Abstract Booklet

Non-Linear, Dynamical and Other Advanced Visualization Techniques in EEG: Gabor and Adaptive Transforms

Valdeane Brown & Karl Pribram

Non-Linear, Dynamical Control Theory represents the cutting edge in many fields, including applied Neuroscience. This panel will present leading concepts in this field of application, including the latest research into the use of “Anti-Control of Chaos”, “Synchronization Through Chaos” and sophisticated data analysis techniques including Gabor and other Joint Time-Frequency Transformations to more accurately visualize emergent and off-line EEG patterns.

As the field of Neurofeedback continues to progress, it is incumbent upon us to continue to deepen our comprehension and appreciation of advances in digital signal processing and how these will affect what we see, what we do and how we understand the process of promoting transformation. Traditional time-based and frequency-based analyses have formed the essential foundation of our field; however, a whole new array of advanced analytic techniques have begun to emerge over the last decade: including, non-linear, dynamical techniques, Joint Time-Frequency Analyses and Wavelets.

Gabor and Adaptive Transforms have been an important basis of these new approaches and will be used to demonstrate aspects of EEG data that are difficult or impossible to see using other techniques. Non-linear, dynamical approaches offer another different perspective, allowing us to see how the overall functioning of the CNS has been "attracted" or over-controlled, so that its intrinsic healthy "chaos" is diminished. We can also use these techniques to visualize the process of anti-control of chaos and, thereby, releasing the CNS (central nervous system) to restore its own intrinsic healing powers through renormalization. Several different visualization techniques and their underlying rationale will be explored.