

# Swiss Center for Affective Sciences

## EXCEPTIONAL TALK

Monday,  
January 19<sup>th</sup>  
2015

17:00 - 18:30

### CISA Conference Room

Campus Biotech  
9, chemin des Mines  
Geneva

## Insights into Frontal Lobe Function from Intracranial Recording in Humans

**Robert T. Knight**

(University of California, Berkeley)

How do we control our behavior? In the last decade, direct cortical recordings obtained from humans have revealed that every cognitive process examined including language, attention, memory and motor control generates spatially restricted high frequency activity (60-250 Hz, high gamma; HG). HG activity has also been shown to be phase locked to the trough of lower cortical rhythms (phase-amplitude coupling; PAC) with different tasks eliciting unique PAC spatial patterns. This transient coupling between low- and high-frequency brain activity provides a mechanism for communication in distributed neural networks engaged in goal-directed behavior. We will review ECoG data on the role of human prefrontal cortex (PFC) in language, attention and decision-making. The results provide evidence that the cortical HG response and network coherence metrics support PFC dependent executive control of human behavior. The HG response also provides a powerful tool for brain machine interfaces and work on the development of an auditory speech prosthesis will also be reviewed ■



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