

**A dialogue for theoreticians and experimentalists:
What is phase response analysis, and what can it tell us about neurons and networks?**

In the computational neurosciences, phase response (PR) analysis is used to describe how neurons' responses to stimuli depend on the phase of stimulus delivery. At the interface of mathematics and neuroscience, PR analysis is increasingly popular among theoretical and experimental neuroscientists alike, because it offers insights into the relationship between the dynamics of individual neurons and of neuronal networks. This workshop provides a forum for computational neuroscientists from diverse specializations to consider the utility of PR analysis in the study of neural systems at multiple levels of complexity, e.g. cellular mechanisms underlying PR dynamics of single neurons and the prediction of population dynamics. Speakers will use experimental, modeling, and mathematical results to illustrate the application of phase response analysis to a variety of current neuroscientific questions of interest.

Note*

One of the major discussion topics at last year's CNS pre-meeting satellite was the tendency for computational neuroscientists to self-organize into experimental/biological and mathematical/theoretical camps. These camps are perpetuated in part by a language gap which can even exist between experts applying similar methods or addressing similar questions. Motivated by the belief that bridging this divide will strengthen and accelerate the field of Computational Neuroscience at large, those speakers who self-identify as theoreticians have been strongly encouraged to target the biological contingent of their audience and vice versa.

Speakers and Talk Titles:

Michiel Remme

Weakly coupled oscillators as a framework for ongoing dendritic activity

Tay Netoff

Multiscale effects of ion channels in epilepsy

Nathan W. Schultheiss

Phase response analysis of a morphologically realistic globus pallidus neuron model subjected to ongoing synaptic background inputs.

Farzan Nadim

Flattening the PRC: Inhibitory feedback to pacemaker neurons promotes oscillation stability

Ole Paulsen

Experimental phase response properties of hippocampal neurons during network oscillations

Tim Lewis

Phase response curves and phase locking in networks of neocortical inhibitory interneurons

Hugh Robinson

Studying synchronization amongst fast-spiking cortical interneurons using conductance injection and phase response analysis

Astrid Prinz

Predicting phase locking in circuits of bursting neurons from the phase response curve

Carmen Canavier

Clustering, harmonic locking, and delays in populations of pulse coupled oscillators

Sorinel Oprisan

From isolated neurons to networks with phase resetting

John White

Dynamical mechanisms of synchronization in the hippocampal formation