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*Thursday, October 10th, 2013  
13h30, Room SG 0213*

*Computational Neuroscience Seminar*

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**Causes and effects of noise correlations  
in neural populations**

Sensory neurons are "noisy": if one repeats the same stimulus, the neural responses differ from trial-to-trial. This noise is often correlated between groups of neurons, and much research has investigated how the noise correlations affect the ability of neural populations to encode information about the stimulus. Typical work in this area ignores the mechanistic origins of the noise correlations -- which include common input to multiple cells, and recurrent coupling between cells -- and instead focuses on how the response statistics themselves (variances, correlations, etc.) relate to coding performance. Arguably the more important (yet clearly related!) question is how the biophysical structure of the system affects its function. Naively, one might expect that common input, or recurrent coupling, help (hinder) coding performance, if the noise correlations that they generate help (hinder) coding performance. In my talk, I'll explain why this logic is flawed: recurrent coupling can improve coding performance while also creating deleterious noise correlations.

This work has implications for connecting structure to function with regards to noise correlations in neuronal circuits, and allows us to make testable predictions for comparative physiology experiments.

Finally, I will discuss our ongoing efforts to understand quantitatively the noise correlations in the mouse direction selective ganglion cell system.