ANNB and Neuroscience Graduate Student Journal Club 2009/2010

12:30pm Wednesdays (Fall '09), 12:00pm Wednesdays (Spring '10) HSRF Rm. 400

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Website: http://www.uvm.edu/~neurogp/?Page=journalclub.html

Instructions: This year, students will choose between two topics: **Neural Modeling** and **My Favorite Brain Region** (see descriptions below). However, we realize these topics are not mutually exclusive and students are highly encouraged to attempt to find papers that simultaneously engage both topics. Choice of journal article and a link to the full-text should be emailed to Emily McLaughlin no less than two weeks prior to the presentation.

Neural Modeling

An important trend in the field of neuroscience is the increasing use of computer and mathematical models as a complementary approach to classical experimentation. Such neural models and simulations grant investigators control over parameters typically difficult to access in the laboratory. Additionally, the advent of this technology permits researchers to explore the implications of their findings with greater objectivity, offering the potential to uncover novel mechanisms that were once unfathomed, unpublished or deemed counter-intuitive. Neural modeling is employed in many forms on physical scales ranging from the small (ie. determining the flow of ions through a single channel) to large (ie large multimodal networks, and behavior), and can support both ends of the research process; modeling may suggest experiments, while experimental data may be use to construct and refine models to better approximate nature.

Students will present one recent **(2007-2010)** paper that employs computational modeling to address a question in neuroscience that is outside their current research interests. Presenters should use the first 5-10 minutes to explain the development and past applications of the model system, ending on the research that spurred the current experiment. The next 10-15 minutes should describe the methods employed, followed by 5-15 minutes presentation of their results and figures and 5-15 minutes for conclusions and critical analysis. Special attention should be paid to the pros and cons of the particular model.

Example Papers:

Rowe et al. 2002. Attention to action in Parkinson's disease: impaired effective connectivity among frontal cortical regions. *Brain*. 125(Pt 2):276-89.

Rangan et al. 2005. Modeling the spatiotemporal cortical activity associated with the line-motion illusion in primary visual cortex. *PNAS*. 102(52):18793-800.

My Favorite Brain Region

With so much focus and funding directed at diseases of the brain, it's easy to overlook what we understand about the organ's most spectacular and mysterious feats that occur when it's not "going wrong". Students will present a primary journal article that sheds new light on the **normal function (not related to disease)** of a human brain region or the discrete connections/networks thereof. Although it is the intent to focus on the basic science of how the *human* brain normally operates, articles in which this is appropriately modeled in another species or by computer simulation are valid. Students may choose to focus on any discrete neural structure within the central nervous system. We realize parts of the brain possess function by virtue of their connectivity so there will always be some mention of regions other than one's own.

Students will present one recent **(2007-2010)** paper dealing with a topic outside of their current research interests. Student presenters should use the first 5-15 minutes to explain the origins of the contemporary understanding of their selected region, ending on the research that spurred the current experiment. The next 5-10 minutes should describe the methods employed to study the particular region, followed by 10-15 minutes presentation of their results and figures and 5-15 minutes for conclusions and critical analysis.

Example Papers:

Mukamel et al. 2005. Coupling between neuronal firing, field potentials, and FMRI in human auditory cortex. *Science*. 309(5736):951-954.

Todd and Morris. 2004. Capacity limit of visual short-term memory in human posterior parietal cortex. *Nature*. 428(6984):751-4.

Pantazopoulos et al. 2006. Subpopulations of neurons expressing parvalbumin in the human amygdala. *J Comp Neurol*. 496(5):706-22.