APPL 595B (1 unit) - Theoretical Neuroscience Journal Club - Fall 2010

Instructors: Jean-Marc Fellous and Kevin Lin

Place TBD – Office hours TBD

Ever wondered how your brain computes? What are the basic principles that make each and everyone of us the most adaptive and flexible computers on earth? Why is it so easy for us to perceive faces, but so difficult for a computer? On the other hand, why is it so hard for us to play chess, but so easy for a computer? All these questions are actively debated, and we will try to understand the nature of the issues through the reading of published journal articles and book chapters.

Course goals: Exchange of scholarly information and discussion of current literature in Computational Neuroscience in a small group setting.

Who is this for? Anyone willing to learn by presenting! Especially:

Neuroscience students / postdocs / faculty interested in modeling & theory.

AND

Students / postdocs / faculty from quantitative disciplines (e.g., math, physics, engineering, computer science) curious about neuroscience but haven't had a chance to learn

Graduate students are encouraged to register for credit (see below).
Undergraduate students are welcome to participate.

When? We will have an organizational meeting on Friday August 27th, 5:00pm in room MATH 402 to discuss content and to fix a permanent meeting day/time. Please plan to attend to make sure the class will fit with your schedule.

What topics will we cover?

We will begin with a brief introduction to neuroscience and classic computational models. The topics for the rest of the semester will be partly based on participant interest. They may include:

- Basics: Dynamics of single neurons, synapses, small and large networks.
- Some examples of neuronal computation.
- Interaction of modeling, theory, and experiments.
- V1 and receptive field properties. Self-organization.
- Higher levels of visual processing: Selectivity of face cells in temporal lobes
- Basic facts about place cells, grid cells and spatial navigation
- Attractor models, dynamical systems.

Grading policies: Students receiving credit will be required to present one or two papers and lead a discussion (40%). They will provide a 2-page summary of the main points of the paper and of the discussion (40%). In class participation will also be evaluated (20%).

Notes: If disability-related accommodations are necessary, please register with Disability Resources (621-3268; drc.arizona.edu) and notify the instructor of your eligibility for reasonable accommodations. We will make every effort to accommodate your needs.