

MCB 262: Systems Neuroscience

also listed as Neuroscience C262

Fall 2013

Instructors: Yang Dan & Dan Feldman

Guest lectures: Shaowen Bao, Mike DeWeese, Jon Wallis

Time: 3:30 – 5:00 PM

Place: 240 MULFORD

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This is a graduate-level course on advanced topics in circuit- and systems-level neuroscience. Topics include sensory coding, computation by neural circuits, plasticity and learning, hippocampal function, sleep, attention, and motor control. Each weekly unit consists of a didactic lecture by an instructor, followed by a discussion session in which students present recent papers from the primary research literature. Students are evaluated on their presentations and active class participation.

Student presentations. Students will consult with instructors to choose the paper(s) to present. Presentations will be ~ 30 min, journal club style, with slides of appropriate figures, background material, models and conclusions. For most units, papers will be selected or assigned at the end of the instructor lecture on Thursday, with presentation occurring the following Tuesday. In a few cases, scheduling constraints mandate that the lecture is on a Tuesday and the presentation is on that Thursday. In these cases, we strongly recommend that students contact the instructor a few days beforehand to get the presentation paper assignment.

We hope you enjoy the class!

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Date	Day	Unit	Theme	Format	Instructor	Topic
29-Aug	Th	1	Techniques	Lec	DF	Physiological and optical recording methods
3-Sep	T	2	Techniques	Lec	YD	Optogenetics & circuit tracing techniques
5-Sep	Th			Disc	YD	
10-Sep	T	3	Systems & Coding	Lec	DF	Tactile coding and perception
12-Sep	Th			Disc	DF	
17-Sep	T	4	Systems & Coding	Lec	YD	Visual system I
19-Sep	Th	5	Systems & Coding	Lec	YD	Visual system II
24-Sep	T			Disc	YD	
26-Sep	Th			Disc	YD	
1-Oct	T	6	Plasticity	Lec	Bao	Cortical maps & map plasticity
3-Oct	Th			Disc	Bao	
8-Oct	T	7	Attention	Lec	DeWeese	Neurobiology of attention
10-Oct	Th	8	Hippocampus	Lec	YD	Hippocampus I: Space
15-Oct	T			Disc	YD	
17-Oct	Th	9	Hippocampus	Lec	DF	Hippocampus II: Learning
22-Oct	T			Disc	DF	
24-Oct	Th	10	Systems & Coding	Lec	DF	Sparse coding in neocortex
29-Oct	T			Disc	DF	
31-Oct	Th	11	Circuits	Lec	DF	Cortical microcircuits and computation
5-Nov	T			Disc	YD	
7-Nov	Th	12	Sleep & rhythms	Lec	YD	Sleep & rhythms
12-Nov	T			Disc	YD	
14-Nov	Th	13	Circuits	Lec	DF	Rigid vs. flexible strategies for circuit computation
19-Nov	T			Disc	DF	
21-Nov	Th	14	Motor	Lec	YD	Motor cortex & basal ganglia
26-Nov	T			Disc	YD	
28-Nov	Th		THANKSGIVING - no class			
3-Dec	T	15	Prefrontal Cortex & Cognition	Lec	Wallis	Reinforcement Learning
5-Dec	Th	16	Motor	Lec	DF	Cerebellum: motor control and learning
10-Dec	T			Disc	DF	
12-Dec	Th	17	Systems	Disc	DF	Neural correlates of consciousness