

# GS14 1213: VISUAL NEUROSCIENCE

## Course Description: Visual Neuroscience – FALL 2019

### Course Directors: Christophe P. Ribelayga and John O'Brien

Lecturers: Christophe P. Ribelayga, John O'Brien, Chai-An Mao, Steven Wang, Ruth Heidelberger, Amir Mohsenin, Stephen C. Massey, David Marshak

Offering: Three semester hours. Fall bi-annually. 30 lecture/exam days – Letter grade

Pre-requisite: Instructor's approval.

Attendance < 15 students.

Possibility to audit the course: YES

Class meets on Tuesday and Thursday 10-11 am – MSB-7.037

## Spring Semester Academic Classes Begin on August 26<sup>th</sup>, 2019

### **Block I - Evolution and general plan of organization of the mammalian visual system (weeks 1-6)**

Week 1 (August 26-30)

Tu: Lecture: Light, optics, evolution of the eyes, photoreception and beyond

Th: Article discussion

Week 2 (September 4-6)

Tu: Lecture: Photoreceptors and phototransduction processes

Th: Article discussion

Week 3 (September 9-13)

Tu: Lecture: Excitatory pathways and the division in ON and OFF channels

Th: Article discussion

Week 4 (September 16-20)

Tu: Lecture: Modulatory pathways and development of receptive fields

Th: Article discussion

Week 5 (September 23-27)

Tu: Lecture: Ganglion cells and visual pathways

Th: Article discussion

Week 6 (September 30-October 4)

Tu: Lecture: A specific visual pathway: the non-image-forming visual system

Th: Article discussion

### **Week 7 (October 7-11)**

**Tu: REVIEW**

**Th: Midterm Exam**

### **Block II - Functional retinal circuits (weeks 8-11)**

Week 8 (October 14-18)

Tu: Lecture: Spatial resolution, contrast sensitivity

Th: Article discussion

Week 9 (October 21-25)

Tu: Lecture: Color vision, trichromacy, and opponent-color theory  
Th: Article discussion

Week 10 (October 28-November 1)

Tu: Lecture: Motion perception  
Th: Article discussion

Week 11 (November 4-8)

Tu: Lecture: Principles of adaptation and plasticity of retinal circuits  
Th: Article discussion

### **Block III - Retinal degenerative diseases and visual malfunctions (weeks 12-13)**

Week 12 (November 11-15)

Tu: Photoreceptors and retinal degeneration  
Th: Article discussion

Week 13 (November 18-22)

Tu: Ganglion cell loss and glaucoma  
Th: Article discussion

**Week 14 (November 25-29)**

**THANKSGIVING BREAK**-----

Week 15 (December 2-6)

Tu: extra topic  
Th: extra topic

**Week 16 (December 9-13)**

**Tu: REVIEW**  
**Th: Final Exam**

**Last Day of Classes: December 6, 2019; Final Exams: December 9-13, 2019**  
**End of Fall Semester: December 13, 2019**