Instructors:  
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Teaching Assistant:  
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Laboratory Times: Tuesday and Thursday, 2-5pm SEL 4068

**Course Description:** Elucidating the mind's inner workings is one of the remaining challenges facing neuroscientists today. Since Ramón y Cajal's first illustrations of neuronal structures, neuroscientists have benefited from new ways to visualize and understand the microscopic components within the brain. The implement of modern, advanced techniques holds the promise for elucidating a better understanding of the how the brain works. Already, many of these tools offer researchers novel methods for peering into the structure and function of the brain. This course (BioS 489) will explore the most recent neurotechniques and how these are being used to advance our knowledge of the brain.

During this course, the lecturers will:
- Provide an overview of new neurotechniques
- Present their research using these new technologies
- Shed light on how to use these new technologies to advance research


Additional reading materials can be found and announcements will be made on the following website(s): https://sites.google.com/site/uicbios489/Home

**Office Hours:** Drs. Chang and Chuang will hold office hours Tuesday right after the class, SEL 4068.

**Attendance:** Attendance is expected at all scheduled classes. Attendance is REQUIRED at all labs and scheduled exams, except in cases of illness, mandatory religious obligations, or official University activities. To be excused from attending an exam, an official medical certificate or an affidavit is required.

**Academic Dishonesty Policy:** Any student caught copying others' work on an assignment or exam or cheating in any other way will receive a zero for that assignment or exam and will be referred to the Student Judicial Affairs Committee, the Department Chair and/or Dean. Be sure to give proper attribution when using others' work in laboratory assignments.
Students with disabilities: Students with disabilities who require accommodations for access and participation in this course must be registered with the Office of Disability Services (ODS); they can be reached at 312-413-2103 (voice) or 312-413-0123 (TTY).

NOTE: We reserve the right to make changes in this syllabus. Any changes will be announced in lecture or posted on Website. Coming to class will be important for keeping current on if and how the syllabus changes.

GRADING:
Laboratory Reports = 50%
Oral Presentation = 30%
Final Essay = 20%

***NO MAKE-UP REPORTS OR MAKE-UP EXAMS ALLOWED FOR ANY REASON***

Week 1 (Jan. 12, 14)
Lecturers: Drs. Chang & Chuang
Overview of syllabus
Laboratory: Group assignments (No lab practice)

Week 2 (Jan. 19, 21)
Lectures: Drs. Chang & Chuang
Neuronal cell fate toolbox and neuronal structural markers
Laboratory: Stereo microscopy and high power fluorescence microscopy

Week 3 (Jan. 26, 28)
Lecture: Dr. Chuang
Neuronal asymmetry
Laboratory: Fluorescence microscopy of neuronal asymmetry in live animals

Week 4 (Feb. 2, 4)
Lecturer: Dr. Chang
Axon pathfinding
Laboratory: Fluorescence microscopy of axon guidance in live animals

NEURONAL ASYMMETRY LAB REPORT due on Feb. 4

Week 5 (Feb. 9, 11)
Lecturer: Dr. Chang
Neuronal regeneration
Laboratory: Imaging analysis of neuronal regeneration in live animals

Week 6 (Feb. 16, 18)
Lecture: Dr. Chang
Dendrite patterning
Laboratory: Fluorescence microscopy of dendrite patterning in live animals

**AXON GUIDANCE and AXON REGENERATION LAB REPORTS due on Feb. 18**

**Week 7 (Feb. 23, 25)**
Lecture: Dr. Chang and Chuang  
Temporal and spatial control of gene expression  
Laboratory: Heat-shock induction of gene expression

**Week 8 (March 1, 3)**
Lecture: Dr. Chang  
Emotional behaviors (courtship and aggression)  
Laboratory: Male mating behavior

**Week 9 (March 8, 10)**
Lecture: Dr. Chuang  
Navigation and social behaviors  
Laboratory: Social behaviors

DENDRITE PATTERNING, CONTROL OF GENE EXPRESSION, and MALE MATING LAB REPORTS due on March 10

**Week 10 (March 15, 17)**
Lecture: Dr. Chuang  
Neuronal fate switch  
Laboratory: Fluorescence microscopy of neuronal fate switch in live animals

SOCIAL BEHAVIOR LAB REPORT due on March 17

**Week 11 (March 22, 24)**
Spring break. NO class.

**Week 12 (March 29, 31)**
Lecture: Dr. Chuang  
SNP mapping and whole genome sequencing (WGS)  
Laboratory: Computational analysis of whole genome sequencing results

NEURONAL FATE SWITCH REPORT due on March 31

**Week 13 (April 5, 7)**
Dr. Chang and Chuang  
Charlie Rose: The Brain series on Aggression  
iBiology series: Genes, the brain and behavior

WHOLE GENOME SEQUENCING LAB REPORT due on April 7
Week 14 (April 12, 14)
Student Presentations

Week 15 (April 19, 21)
Student Presentations

Week 16 (April 26, 28)
Student Presentations and Final Essay