

## **NGG/CAMB 597 – Neural Development, Regeneration and Repair**

Wednesday and Friday 10:30 – 12:00, the only exception are 10/8 (Monday) and 10/22 (Monday).

**Location: BRB 1201**

**Mandatory Organizational Meeting: Aug 31,**  
**Location: 140 John Morgan, Barchi Library**

Course Directors:

Greg Bashaw (gbashaw@penmedicine.upenn.edu)  
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Additional Instructors:

Hongjun Song (shongjun@penmedicine.upenn.edu)  
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**General Description:** The goals of this course are to examine the principles underlying nervous system development and to learn how understanding developmental mechanisms can inform strategies to promote regeneration and repair. **This is not a survey course.** Rather, the course will focus on selected topics, for which we will discuss the genetic, molecular and cellular strategies employed to study these problems in different model organisms. Emphasis is on how to interpret and critically evaluate experimental data.

**Fall 2018 Topics:** Generation of Neuronal Diversity; Wiring the Olfactory System; Somatosensory Circuit Formation; Axon Guidance at the Midline; Axon Degeneration and Regeneration; Synapse Formation; Epigenetic mechanisms in neural development and regeneration.

**Textbooks:** No specific textbooks are required. The following texts are useful resources. *Developmental Biology* by Scott Gilbert; *Development of the Nervous System* by Sanes, Reh, and Harris; and *Molecular and Cellular Approaches to Neural Development* edited by Cowan, Jessell, and Zipursky.

**Format:** Each class is 1.5 hours in length. During the first hour, an assigned paper will be discussed in detail. During the last 20-30 minutes, faculty will introduce methods, concepts, and background information pertinent to the paper that will be discussed at the following meeting.

While faculty will provide guidance during the discussion, students will be primarily responsible for presenting and discussing the papers. So that every participant can contribute thoughtfully to the discussion, you should come prepared to answer these questions:

- 1) What was the main finding of the paper (2 sentences)?
- 2) What experiment produces the authors' most convincing data?
- 3) What experiment is the least convincing or weakest? Why?
- 4) What hypothesis derived from this paper would you set out to test next, and how (3-4 sentences)?

You will submit written answers to these questions at the beginning of each class- so do not try to read the paper just before class. We use these write-ups to help facilitate discussion.

**Grading:** A) Participation in paper presentation and discussion: 50%. During the semester, you will receive feedback on your participation by e-mail. B) Two 2-page research type proposals, 25% each. Each proposal will be on a topic of your choice that has already been discussed in the course. Guidelines on the proposal as well as some examples will be posted on the Blackboard

**Course Web page:** This course will use Penn's Canvas website. Papers, reviews and lecture notes will be posted in the Modules section.

## Syllabus: Neural Development, Regeneration and Repair (Fall 2018)

Wednesday and Friday, 10:30 – 12:00; 140 John Morgan, Barchi Library

Date	Topic	Faculty	Second Faculty
Fri 8/31 11:00 AM	ORGANIZATIONAL MEETING Introduction to first paper	Greg Bashaw/Wenqin Luo	
Wed 9/5 Fri 9/7 Wed 9/12	GENERATION OF NEURAL DIVERSITY <i>Spatial, Target and Temporal influences on Neuronal Identity</i>	Greg Bashaw	Wenqin Luo
Fri 9/14 Wed 9/19 Fri 9/21 Wed 9/26	WIRING THE OLFACTORY SYSTEM <i>Axon Targeting in the Olfactory Bulb</i>	Jonathan Raper	Greg Bashaw
Fri 9/28 Wed 10/3 Mon 10/8	SOMATOSENSORY CIRCUIT FORMATION	Wenqin Luo	Jon Raper & Greg Bashaw
<b>First written proposal due November 1st</b>			
Wed 10/10 Fri 10/12 Wed 10/17	AXON GUIDANCE at the CNS Midline	Greg Bashaw	Wenqin Luo
Fri 10/19	SYNAPTIC DEVELOPMENT: <i>Relationships between specification, maintenance and plasticity</i>	Marc Fuccillo	Greg Bashaw
Mon 10/22	Proposal Writing	Greg Bashaw/Wenqin Luo	
Wed 10/24 Fri 10/26	SYNAPTIC DEVELOPMENT	Marc Fuccillo	Greg Bashaw
Wed 10/31 Fri 11/9 Wed 11/14	AXON DE- and REGENERATION	Yuanquan Song	Wenqin Luo

Fri 11/16			
Wed 11/28 Frid 11/30 Wed 12/5	EPIGENETIC MECHANISMS IN NEURON DEVELOPMENT AND REGENERATION	Hongjun Song & Guoli Ming	Greg Bashaw
<b>2nd written proposal due December 15th</b>			