INSC/CAMB 597 – Neural Development, Regeneration and Repair

Wednesday and Friday 11:00 – 12:30, the only exception are 10/8 (Monday) and 10/22 (Monday).

Location: BRB 1201

Mandatory Organizational Meeting: Aug 31,
Location: BRB 1201

Course Directors:
Greg Bashaw (gbashaw@pennmedicine.upenn.edu)
Wenqin Luo (luow@pennmedicine.upenn.edu)

Additional Instructors:
Hongjun Song (shongjun@pennmedicine.upenn.edu)
Guoli Ming (gming@pennmedicine.upenn.edu)
Jonathan Raper (raperj@pennmedicine.upenn.edu)
Marc Fuccillo (fuscillo@pennmedicine.upenn.edu)
Yuanquan Song (songy2@email.chop.edu)

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, 11:00 – 12:30; BRB 1201

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<tr>
<th>Date</th>
<th>Topic</th>
<th>Faculty</th>
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| Fri 8/31 11:00 AM | ORGANIZATIONAL MEETING
Introduction to first paper | Greg Bashaw/Wenqin Luo |                  |
| Wed 9/5 | GENERATION OF NEURAL DIVERSITY
Spatial, Target and Temporal influences on Neuronal Identity | Greg Bashaw | Wenqin Luo |
| Fri 9/7  Wed 9/12 | WIRING THE OLFATORY SYSTEM
Axon Targeting in the Olfactory Bulb | Jonathan Raper | Greg Bashaw |
<p>| Fri 9/14  Wed 9/19  Fri 9/21  Wed 9/26 | SOMATOSENSORY CIRCUIT FORMATION | Wenqin Luo | Jon Raper &amp; Greg Bashaw |
| Fri 9/28  Wed 10/3  Mon 10/8 | | | |
| First written proposal due November 1st | | | |
| Wed 10/10  Fri 10/12  Wed 10/17 | AXON GUIDANCE at the CNS Midline | Greg Bashaw | Wenqin Luo |
| Fri 10/19 | SYNAPTIC DEVELOPMENT: Relationships between specification, maintenance and plasticity | 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  Fri 11/16 | AXON DE- and REGENERATION | Yuanquan Song | Wenqin Luo |</p>
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<th>Date</th>
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<tbody>
<tr>
<td>Wed 11/28</td>
<td>EPIGENETIC MECHANISMS IN NEURON DEVELOPMENT AND REGENERATION</td>
<td>Hongjun Song &amp; Guoli Ming</td>
<td>Greg Bashaw</td>
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2nd written proposal due December 15th