### Instructors:

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<table>
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<tbody>
<tr>
<td>Dr. Mark Plummer</td>
<td>Dr. Shu-Chan Hsu</td>
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<td>Office hours by appointment</td>
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<tr>
<td>Dr. David Margolis</td>
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<tr>
<td>Office hours by appointment</td>
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### Date | Subject
---|---
| Sept. 7 | Movement of ions in solution
| Sept. 11 | Voltage-gated ion channels
| Sept. 14 | The action potential
| Sept. 18 | Synaptic transmission
| Sept. 21 | Short-term synaptic plasticity
| Sept. 25 | Long-term synaptic plasticity
| Sept. 28 | Module 1 exam

### Module 1 – Electrical signaling (Plummer)

| Date | Subject
---|---
| Oct. 2 | Neural induction: the beginning of the nervous system
| Oct. 5 | Neuronal protein trafficking: how to make a neuron
| Oct. 9 | Neuronal vesicle trafficking pathways: to fuse or not to fuse
| Oct. 12 | Neuronal cytoskeletal systems: not just mechanical support
| Oct. 16 | Neuronal migration and pathfinding: forming a network
| Oct. 19 | Neuronal network refinement: balance is the key
| Oct. 23 | Module 2 exam

### Module 2 – Construction of the neuronal network (Hsu)

| Date | Subject
---|---
| Oct. 26 | Introduction
| Oct. 30 | Neurotransmitters
| Nov. 2 | Postsynaptic density
| Nov. 6 | Protein-protein interaction domains
| Nov. 9 | Second messengers I
| Nov. 13 | **NO CLASS – SFN Meeting**
| Nov. 16 | Second messengers II
| Nov. 20 | Module 3 exam

### Module 3 – Organization of the synapse (Firestein)

| Date | Subject
---|---
| Nov. 26 | Introduction
| Nov. 30 | Neurotransmitters
| Nov. 6 | Postsynaptic density
| Nov. 16 | Protein-protein interaction domains
| Nov. 9 | Second messengers I
| NO. 13 | **NO CLASS – SFN Meeting**
| Nov. 16 | Second messengers II
| Nov. 20 | Module 3 exam
### Module 4 – Neural Circuits (Margolis)

<table>
<thead>
<tr>
<th>Date</th>
<th>Subject</th>
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<tbody>
<tr>
<td>Nov. 21</td>
<td><strong>THURS CLASS ON TUES</strong> – Neural circuit diversity</td>
</tr>
<tr>
<td>Nov. 23</td>
<td><strong>NO CLASS</strong> – Thanksgiving Recess</td>
</tr>
<tr>
<td>Nov. 27</td>
<td>Methods for study</td>
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<tr>
<td>Nov. 30</td>
<td>Pyramidal neurons and dendritic integration</td>
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<tr>
<td>Dec. 4</td>
<td>Inhibition, gating and disinhibition</td>
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<tr>
<td>Dec. 7</td>
<td><em>In vivo</em> imaging of structure, function and plasticity I</td>
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<tr>
<td>Dec. 11</td>
<td><em>In vivo</em> imaging of structure, function and plasticity II</td>
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<tr>
<td>Dec.</td>
<td><strong>Module 4 exam (TBD)</strong></td>
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**Grading:** One third from each of the three highest exam scores. Lowest score will be dropped.

**Web page:** Sakai

**Supplementary Texts:**
- Principles of Neural Science. Kandel et al. *(Not required)*
- From Neuron to Brain. Nicholls et al. *(Not required)*
- The Neuron. Levitan and Kaczmarek. *(Not required)*
- Synapses. Cowan et al. *(Not required)*

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