

## NGG 573: Neuroscience Core III 2025

### Course Directors:

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### Teaching Assistant:

**Time:** MWF, 10:00am-12:00pm

**Location:** John Morgan Building 62' Auditorium. Anatomy labs meet in 210 Stemmler.

**Text :** *The Human Brain* (John Nolte [N]; any version) and *Principles of Neural Science* (Kandel & Schwartz [K&S]; 5th Edition). Copies of [K&S] are on reserve in the Biomedical Library, see "Course Materials@Penn Libraries" on the Canvas course page (only 3 persons can watch the book at a time). In addition, K&S is available as pdf on the Canvas course page. Nolte [N] is available through Penn Library's subscription to ClinicalKey; see also "Course Materials@Penn Libraries" on Canvas. In addition, N is available as pdf on the Canvas page. Additional readings can be found in the "Readings" folder on the Canvas website.

### Goals of Core III

- (1) Learn the basics of neuroanatomy through a targeted series of lectures and dissections.
- (2) Learn about the foundations of systems neuroscience.
- (3) Learn about the applications of systems neuroscience.

**Grading:** Homework (HW) assignments (90% total) and class participation (10%).

HWs will be distributed electronically via Canvas and will be returned electronically to the designated folder on Canvas. Each HW will contain 1 question provided by a lecturer from the previous week or that Monday. You should expect to spend about 2-3 hours to answer the question, including researching relevant information. HW will need to be returned on Canvas within 7 days.

| <b>Day</b> | <b>Date</b> | <b>General Topic</b> | <b>Topic</b>  | <b>Reading</b> | <b>Lecturer</b>  | <b>Assignment</b> | <b>Director</b> |
|------------|-------------|----------------------|---------------|----------------|------------------|-------------------|-----------------|
| W          | Jan 14      | Course overview      |               | K&S 1, 2, 15   | Course directors |                   |                 |
| F          | Jan 16      | Anatomy              | Anatomy/Lab 1 | N 1,3          | Yale Cohen       |                   | Cohen           |
| M          | Jan 19      |                      | <b>MLK</b>    |                |                  |                   |                 |
| W          | Jan 21      |                      | Pathology     | N 4-6          | Edward Lee       |                   | Weber           |
| F          | Jan 23      |                      | Brainstem     | N 11           | Sonia Ajmera     |                   | Weber           |
| M          | Jan 26      |                      | Lab 2         | N 16,19,20,22  | Cohen            |                   | Cohen           |
| W          | Jan 28      |                      | Lab 3         |                | Cohen            |                   | Cohen           |
| F          | Jan 30      |                      | Lab 4         |                | Cohen            |                   | Cohen           |
| M          | Feb 2       |                      | Lab 5         |                | Cohen            |                   | Cohen           |
| W          | Feb 4       |                      | Lab 6         |                | Cohen            |                   |                 |
| F          | Feb 6       |                      | Practical     |                | Cohen            | <b>Practical</b>  | Cohen           |

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|---|--------|----------------------------------|----------------------------------|-----------------|--------------------|-------------|-----------|
| M | Feb 9  | Approaches & Computation         | Social Neuroscience              |                 | Michael Platt      |             | Weber     |
| W | Feb 11 | Development                      | Development 1                    | N 2; K&S 52-56  | Jonathan Raper     |             |           |
| F | Feb 13 |                                  | Development 2                    | K&S 52-56       | Jonathan Raper     |             | Weber     |
| M | Feb 16 | Approaches & Computation         | 2P imaging                       |                 | Tim Machado        | <b>HW 1</b> | Weber     |
| W | Feb 18 |                                  | Neuro AI                         | K&S 21          | Konrad Körding     |             | Weber     |
| F | Feb 20 | Sensory Systems                  | Vision 1                         | N 17; K&S 25-29 | Diego Contreras    |             | Chung     |
| M | Feb 23 |                                  | Vision 2                         | K&S 25-29       | Michael Arcaro     | <b>HW 2</b> | Chung     |
| W | Feb 25 |                                  | Olfactory System 1               | N 13; K&S 25-29 | Kevin Bolding      |             | Chung     |
| F | Feb 27 |                                  | Olfactory System 2               | K&S 25-29       | Joel Mainland      |             | Chung     |
| M | Mar 2  |                                  | Auditory System                  | N 14; K&S 30,31 | Audrey Drotos      | <b>HW 3</b> | Chung     |
| W | Mar 4  |                                  | Daedalus Quartet                 | K&S 22          | Maria Geffen       |             | Chung     |
| F | Mar 6  |                                  | Nociceptive System               |                 | Greg Corder        |             | Chung     |
| M | Mar 9  | <i>Spring Break</i>              |                                  |                 |                    |             |           |
| W | Mar 11 | <i>Spring Break</i>              |                                  |                 |                    |             |           |
| F | Mar 13 | <i>Spring Break</i>              |                                  |                 |                    |             |           |
| M | Mar 16 |                                  | Somatosensory system             | K&S 25-29       | Wenqing Luo        | <b>HW4</b>  | Chung     |
| W | Mar 18 | Motor Systems & Innate Behaviors | Motor System                     | N 18            | Bijan Pesaran      |             | Ding      |
| F | Mar 20 |                                  | Eye Movements                    | N 21; K&S 38,39 | Long Ding          |             | Ding      |
| M | Mar 23 |                                  | Striatum                         |                 | Marc Fuccillo      | <b>HW 5</b> | Ding      |
| W | Mar 25 |                                  | Decision Making                  |                 | Josh Gold          |             | Ding      |
| F | Mar 27 |                                  | Value-based decision making      |                 | Joe Kable          |             | Ding      |
| M | Mar 30 |                                  | Addiction                        |                 | TBD                | <b>HW 6</b> | Ding      |
| W | Apr 1  | Limbic systems                   | Hippocampus, Plasticity, and TBI | K&S 55,56       | Akiva Cohen        |             | Jiang-Xie |
| F | Apr 3  |                                  | Hippocampus & Neurogenesis       |                 | Hongjun Song       |             | Jiang-Xie |
| M | Apr 6  |                                  | Hippocampus & Learning           | K&S 65          | Kimberly Christian | <b>HW 7</b> | Jiang-Xie |
| W | Apr 8  | Sleep & Circadian Rhythms        | Sleep and Development            |                 | Matthew Kayser     |             | Jiang-Xie |
| F | Apr 10 |                                  | Daedalus Quartet                 |                 |                    |             | Jiang-Xie |
| M | Apr 13 |                                  | Neural Circuits of Sleep         | K&S 51          | Franz Weber        | <b>HW 8</b> | Jiang-Xie |

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|---|--------|----------------------------|---------------------------|--|-------------------|--------------|-----------|
| W | Apr 15 |                            | Sleep and Neuromodulation |  | Shinjae Chung     |              | Jiang-Xie |
| F | Apr 17 |                            | Glymphatics               |  | Li-Feng Jiang-Xie |              | Jiang-Xie |
| M | Apr 20 | Human Systems Neuroscience | Neuroimaging              |  | David Roalf       | <b>HW 9</b>  | Roalf     |
| W | Apr 22 |                            | fMRI/TMS                  |  | David Oathes      |              | Roalf     |
| F | Apr 24 |                            | BMI                       |  | Flavia Vitale     |              | Roalf     |
| M | Apr 27 |                            | DBS                       |  | TBD               | <b>HW 10</b> | Roalf     |
| W | Apr 29 |                            | TMS / Lab tour            |  | Hamilton lab      |              | Roalf     |
|   |        |                            |                           |  |                   |              |           |
|   |        |                            |                           |  |                   |              |           |