## *Welcome to Neurobio II!*

Course email: cuneurobio2tas2023@gmail.com

## *Recitation Sections*

Recitations are required, so please make sure that you are registered for one!

**001**: Monday, 6:00PM, Fairchild 1000, Abhi

**002**: Tuesday, 5:00PM, Fairchild 1000, Claire

**003**: Tuesday, 6:00PM, Fairchild 800, Bovey

**004**: Wednesday, 5:30PM, Fairchild 900, Jessie

**005**: Wednesday, 6:00PM, Fairchild 1000, Kayla

**006**: Thursday, 1:00PM, Fairchild 1000, Eli

## *Instructor*

Professor Darcy Kelley: dbk3@columbia.edu

Office hours by appointment.

## *Teaching Assistants*

**Head TAs:**

Abhi Shah (he/him), as5460@columbia.edu

Bovey Rao (he/him), byr2104@columbia.edu

**TAs:**

Eli Gumnit (he/him), eg2092@columbia.edu

Kayla Pauers (they/them), mmp2238@cumc.columbia.edu

Claire Everett (she/her), cpe2108@cumc.columbia.edu

Jessica Burke (she/her), jb4554@columbia.edu

## *Syllabus with Readings*

*Note that these are **not** the papers you will be reading in recitations*

| Date + Topic | Textbook | Misc. Readings |
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| **Lecture 1** Jan- 17 The organization of vertebrate nervous systems | Text: A1 - 11 | |
| **Lecture 2** Jan- 19. How nervous systems form and develop | Chapter 22, p.491 - 498 | |
| **Lecture 3** Jan- 24 Animal model systems in Neuroscience | Text: Box 1A p.17 | |
| **Lecture 4** Jan – 26 Assessing human brain organoids as model systems | Text Box 22A | |
| **Lecture 5** Jan- 31 Discovering neural circuits and systems | Text Chapter 1 | |
| Feb- 02 First test | | |
| *Sensory systems* | | |
| **Lecture 6** Feb- 07 Making sense of scents: smell, taste and canine perception | Text Chapter 15 | Canine olfaction paper (uploaded to CW Resources) |
| **Lecture 7** Feb- 09 Neural coding for temperature , pain and itch | Text Chapter 9 | |
| **Lecture 8** Feb-14 Vi to ? FUSI | | |
| **Lecture 9** Feb-16 Retina to primary visual cortex: dorsal and ventral processing | Text Chapter 12 | |
| **Lecture 10** Feb -21 Auditory processing | Text Chapter 13 | |
| **Lecture 11** Feb- 23 Active sensing:star nosed moles and bats; SuperHuman: sensing stimuli beyond the human range | | |
| Feb-28 Second test (lectures 2/7 - 2/21) | | |
| *Motor systems* | | |
| **Lecture 12** Mar- 02 Organization of muscle effector systems | | |

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| **Lecture 13** Mar -07 From spinal circuits to motor cortex | Text Chapter 17 | |
| **Lecture 14** Mar-09 The basal ganglia | Text Chapter 18 | Arber and Costa review (Paper uploaded to Files ) |
| Mar-13-17 Spring break | | |
| **Lecture 15** Mar-21 Cerebellum | Text Chapter 19 | |
| **Lecture 16** Mar-23 Vocal communication | Kelley, 2022 | |
| **Lecture 17** Mar-28 Speech and language | Text Chapter 33 | |
| *Complex neural systems* | | |
| **Lecture 18** Mar-30 Guest lecture - Vikram Gadagkar [in-person] | Text Chapter 28 | |
| **Lecture 19** Apr-4 Hippocampus: time, space and memory (Bovey and Abhi) [in-person] | Text Chapter 33 pp 689 - 703 | |
| **Lecture 20** Apr-6 The emotional brain | Text Chapter 31 | |
| **Lecture 21** Apr-11 The social brain | Text Chapter 34 | |
| Apr-13 Third test (lectures 3/2 - 3/23) [in-person] | | |
| **Lecture 22** Apr- 18 Guest lecture - Larry Abbott [in-person] | | |

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| **Lecture 23** Apr- 20 Brain states | Text Chapter 28 | |
| **Lecture 24** Apr - 25 Guest lecture: Maria Tosches [in-person] | | |
| Apr-27 Final test (papers assigned Apr 13) [in-person] | | |
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## *Recitation Papers*

| **Week** | **Paper** |
|---|---|
| Jan 23 | Cell-type profiling in salamanders identifies innovations in vertebrate forebrain evolution<br>Actions |
| Feb 6 | Touch Neurons underlying dopaminergic pleasurable touch and sexual receptivity<br>Actions |
| Feb 13 | Whole-Brain Functional Ultrasound Imaging Reveals Brain Modules for Visuomotor Integration<br>Actions |
| Feb 20 | Segregation of stimulus phase and intensity coding in the cochlear nucleus of the barn owl<br>Actions |
| Mar 6 | The Neural Circuits and Synaptic Mechanisms Underlying Initiation in C. elegans |

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| | Actions |
| Mar 20 | Dopamine neurons encode performance error in singing birds<br>Actions |
| Mar 27 | A speech planning network for interactive language use<br>Actions |
| April 4 | Tachykinin-expressing neurons control male-specific aggressive arousal in *Drosophila* |

### *Grading*

There will be 3 midterm exams and 1 final exam.

Top 2 midterm exams will count for 30% each. (Your lowest midterm grade will be dropped).

Final exam will count for 40%.

Recitation grading is + = -; not attending recitation consistently is grounds for failure.

### *Feedback*

If you'd like to give the teaching team anonymous feedback (positive, negative, or neutral!) at any point, please use this formLinks to an external site..

# Course Summary:

| Date | Details | Due |
|---|---|---|
| | Assignment Exam 1 | |
| | Assignment Exam 2 | |
| | Assignment Exam 3 | |
| | Assignment Final Exam | |