

NEUS 639

Topics in the Auditory System, Winter term 2023

Tuesdays and Thursdays from 1:30-3 pm

Hybrid: Hatfield Research Center Rm 405 (via Elevator G) and Microsoft Teams

Students and instructors will attend in person; others can attend virtually.

Course director(s): Lina Reiss
Tianying Ren
Laurence Trussell

Course administrator: Jessica Parks

The class has two components, a main lecture/journal paper discussion component and an optional independent study (critical essay review) component:

- 1) NEUS 639A: Lecture/journal paper discussion: 3 credits
- 2) NEUS 639B: Optional independent study (critical essay review): 1 credit

Course Description

Auditory scientists need to understand the field in breadth from basic to translational science, and from periphery to central function. The ability to communicate and collaborate with a broad range of auditory scientists is necessary to be successful in research and to obtain funding. The goal of the course is to provide an overview of emerging topics in the auditory system and the associated disorders, and provide students with these skills. This course can be used to document training in the auditory system for NRSA proposals, especially important for trainees coming from non-auditory fields.

Format:

Each topic consist of 1-2 lectures and 1 journal paper presentation (selected by lecturer). The guideline for lectures will be to have the first half of lecture on normal function to provide background, and the second half on dysfunction. A minimum of two faculty will assigned to moderate journal paper discussions along with course directors.

Grading policy:

NEUS 639A (3 credits): Grading will be based on class participation (60%) and journal paper presentation (40%). Background reading will also be assigned.

NEUS 639B (1 credit): Grading will be based on a critical essay review of the literature. Students will be assigned a faculty mentor from the course (not their advisor) for the critical essay and choose an essay topic on the auditory system, and can submit a draft for feedback from the mentor. The final essay will be due the last day of class and will be graded by the mentor and course directors.

Open to graduate students for credit, also postdocs and research staff who are interested in auditing.

Full schedule of topics below:

| Date | Lecturer | Topic |
|---------------|-----------------------------|--|
| Tues. Jan. 10 | Reiss, Ren and Trussell | Course introduction: impact of hearing loss, structure of Hybrid course – 30 min |
| | Garinis | The outer and middle ear – 1 hour |
| Thur. Jan. 12 | Ren/ Nuttall | Inner ear: Cochlear mechanics and the travelling wave |
| Tues. Jan. 17 | Barr-Gillespie | Inner ear: Hair cells and sound transduction |
| Thur. Jan. 19 | Ren/Nuttall, Barr-Gillespie | Journal paper discussion – 2 papers, 40 min each student or postdoc |
| Tues. Jan. 24 | Brigande | Inner ear development and regeneration |
| Thur. Jan. 26 | von Gersdorff | Auditory nerve and afferent synapses |
| Tues. Jan. 31 | von Gersdorff, Brigande | Journal paper discussion |
| Thur. Feb. 2 | Burwood | OCT to visualize cochlear blood flow and mechanics |
| Tues. Feb. 7 | Trussell | Brainstem processing, sound localization, and efferent feedback |
| Thur. Feb. 9 | David | Auditory cortex and beyond |
| Tues. Feb. 14 | BREAK FOR ARO CONFERENCE | |
| Thur. Feb. 16 | Trussell, David | Journal paper discussion |
| Tues. Feb. 21 | Molis | Speech perception and encoding in humans and animals |
| Thur. Feb. 23 | Gallun | Psychoacoustics, sound localization and the cocktail party effect |
| Tues. Feb. 28 | Gallun, Molis | Journal paper discussion |
| Thur. Mar. 2 | Mello | Songbird vocalization |
| Tues. Mar. 7 | Garinis | Human clinical measures of peripheral and central auditory function |
| Thur. Mar. 9 | Reiss | Cochlear implants and other auditory prostheses |
| Tues. Mar. 14 | Reiss, Garinis | Journal paper discussion |
| Thur. Mar. 16 | Dan Tollin | OHRC seminar; followed by meeting with students |
| Tues. Mar. 21 | Bramhall, Buran | Cochlear deafferentation in humans and animals |
| Thur. Mar. 23 | Peterka | Vestibular system and multisensory integration |