



Modeling Hearing and Balance Disorders in Mice: The Hear@JAX Workshop

Oct 18-22, 2021

Schedule, lab session descriptions, organizers, faculty & participants

Sunday, Oct 17

- 5:00 pm **Registration** at Highseas Conference Center
Highseas 3rd floor
- 6:00 pm **Welcome and introductions**
Basile Tarchini, Matt Kelley, Mike Bowl, Guy Richardson, Ronna Hertzano, Cat Weisz
- 6:30 pm **Dinner** at Highseas
- 7:30 pm **The approach to the patient with hearing loss - an otolaryngologist's perspective**
Ronna Hertzano
- 8:15 pm **Components of the auditory system reflected by deafness genes**
Uli Mueller
- 9:00 pm **Opening mixer & dessert**

Monday, Oct 18

- 7:30 am **Breakfast and late registration** - Highseas 1st floor
Highseas 3rd floor
- 9:00 am **Mouse genetics, nomenclature, MGI &**
Leona Gagnon
- 9:30 am **ARRIVE guidelines**
Mike Bowl
- 9:45 am **Surveying the genetic landscape of auditory function: mouse models of hearing loss**
Uli Mueller
- 10:30 am **Coffee break**
- 10:45 am **Introduction to inner ear development -**
Vidhya Munnamalai
- 11:30 am **Hair cell development**
Matt Kelley
- 12:15 pm **Lunch** - Highseas 1st floor
- 1:00pm **Transportation to GRB Training Laboratory** -Meet in Highseas 1st floor lobby

- 1:15 pm **Biomethods Training** -GRB 3245
Kristin Cough
- 2:30 pm **Laboratory Session:** Dissection and culturing of the inner ear / microscopy/
immunohistochemistry, calcium imaging - *Matt Kelley, Guy Richardson, Basile
Tarchini, Ronna Hertzano, Cat Weisz*
- 6:00 pm **Transportation** to Highseas
- 6:30 pm **Dinner** - Highseas 1st floor
- 7:30 pm **Poster session**

Tuesday, Oct 19

- 7:30 am **Breakfast** - Highseas 1st floor
Highseas 3rd floor
- 8:30 am **Planar cell polarity in the mouse inner ear**
Basile Tarchini
- 9:15 am **Hair cells and mechanotransduction**
Guy Richardson
- 10:00 am **Coffee break**
- 10:30 am **Afferent & efferent innervation of the inner ear**
Cat Weisz
- 11:15 am **The vestibular periphery**
Ruth Anne Eatock
- 12:00 pm **Transportation to GRB Training Laboratory** - Meet in Highseas 1st floor lobby
- 12:15 pm **Lunch** - Jackson Labs
- 1:00 pm **Microscopy in inner ear research**
Betsy Driver
- 1:45 pm **Laboratory Session:** Dissection and culturing of the inner ear,
immunohistochemistry, paint fill and MET channel function - *Matt Kelley, Guy
Richardson, Basile Tarchini, Ronna Hertzano, Cat Weisz*
- 6:00 pm **Transportation to Highseas**
- 6:30 pm **Dinner** - Highseas 1st floor
- 7:15 pm **Free evening**

Wednesday, Oct 20

- 7:30 am **Breakfast** - Highseas 1st floor
- 8:30 am **Fast and powerful communication in the auditory brainstem**
Cat Weisz
- 9:15 am **The mouse as a model for human hereditary hearing loss**
Uli Mueller
- 10:00 am **Epigenetics in the auditory system**
Angelika Doestzelhofer
- 10:45 am **Coffee break**
- 11:00 am **Cell type-specific analysis of the inner ear**
Ronna Hertzano
- 11:45 am **Single cell transcriptomics in the inner ear**
Matt Kelley

- 12:15 pm **Lunch** - Highseas 1st floor
Free afternoon
- 1:00 pm **Optional Microscopy session**
Basile Tarchini
- 6:00 pm **Dinner** - Highseas 1st floor
- 7:00 pm **gEAR workshop**
Ronna Hertzano
- 8:00-8:45 pm **Optogenetics** - Highseas 3rd floor
Cat Weisz

Thursday, Oct 21

- 7:30 am **Breakfast** (Highseas 1st floor)
- 8:30 am **NIHL, ototoxicity & synaptopathy**
Kevin Ohlemiller
- 9:15 am **Regeneration**
Marc Warchol
- 10:00 am **Coffee break**
- 10:15 am **Viral gene therapy**
Wade Chien
- 11:00 am **CRISPR-Cas – primer and models for deafness**
Michael Bowl
- 11:45 am **The other side: The culture of deafness & the future for hearing research**
Ronna Hertzano
- 12:30 pm **Lunch** - Highseas 1st floor
- 1:15 pm **Transportation to GRB Training Laboratory** (Meet in Highseas 1st floor lobby)
Split group to 2; each group attends both sessions
- 1:30 pm **Laboratory session 1:** Microscopy, injection for gene therapy - *Wade Chien, Matt Kelley, Guy Richardson, Cat Weisz*
- 3:30 pm **Laboratory session 2:** ABR, DPOAE, CAP, endocochlear potential, VsEP - *Basile Tarchini, Ronna Hertzano*
- 6:00 pm **Transportation to Highseas**
- 6:30 pm **Lobster Dinner** - Highseas 1st floor

Friday, Oct 22

- 7:30 am **Breakfast** (Highseas 1st floor)
- 7:30 am **Organizers' meeting**
- 9:00 am **Room check-out and departures**

Details on lab sessions

Monday, Oct 18

2:30 pm **Laboratory Session: Dissection and culturing of the inner ear**, microscopy and immunohistochemistry, calcium imaging

Matt Kelley, Guy Richardson, Basile Tarchini, Ronna Hertzano, Cat Weisz

Participants will learn how to dissect the cochlea and the vestibular organs from neonate wild-type mice. Some tissues will be fixed and processed for whole-mount immunofluorescence using various typical antibodies to label hair cells, supporting cells and neuron projections. Other tissues will be placed in culture. A tutorial will be presented on Auditory brainstem response (ABR) and Distortion product otoacoustic emission recordings (DPOAE), with explanations on sound and sound perception.

Details: Dissection and culturing of the inner ear / microscopy/ immunohistochemistry – basic staining with 2-3 antibodies – allow students the following day to finish staining, learn to mount slides and then will have slides for imaging later in the week

Tuesday, Oct 19

1:45 pm **Laboratory Session: Dissection and culturing of the inner ear, demonstration of paint fill and MET channel function**

Matt Kelley, Guy Richardson, Basile Tarchini, Ronna Hertzano, Cat Weisz

Cochlear and vestibular wild-type samples collected by participants the previous day will be mounted on slides and observed using confocal microscopy in small groups. Mutant samples prepared in advance will enable participants to observe phenotypes leading to congenital hearing loss and circling behavior using confocal and scanning electron microscopy. Cultures set up the previous day will be used to perform dye uptake and show aminoglycoside toxicity in hair cells, and inner ear paint-fill will be demonstrated.

Laboratory Session: Dissection and culturing of the inner ear, immunohistochemistry, paint fill and MET channel function

Wednesday, Oct 20

1:00 pm **Optional Microscopy session** (participant's samples and mutant samples prepared in advance)

Basile Tarchini

Thursday, Oct 21

1:15 pm **Transportation to GRB Training Laboratory** (Meet in Highseas 1st floor lobby)
Split group to 2; each group attends both sessions

1:30 pm **Laboratory session 1:** Microscopy, injection for gene therapy - *Wade Chien, Matt Kelley, Guy Richardson, Cat Weisz*

3:30 pm **Laboratory session 2:** ABR, DPOAE, CAP, endocochlear potential (EP), VsEP - *Basile Tarchini, Ronna Hertzano*

Observation of wild-type and mutant samples with confocal and scanning electron microscopy will be continued in small groups. Posterior canal injection will be demonstrated as a powerful method for gene therapy in the inner ear. Detailed review with provided protocols and videos +

sample traces for ABR (latency, wave I amplitude, threshold), DPOAE, EP, VsEP; Goal is to understand goal, limitations, setup and how to interpret each of these tests; Make sure to mention sex differences in auditory research

