

Hanse-Wissenschaftskolleg  
Institute for Advanced Study

Workshop

# Auditory Efferents: *Closing the Loop(s)*

Delmenhorst, 04.-06. November 2024

**OrganisatorInnen/ Organizers:**

Prof. Dr. Laurel H. Carney, University of Rochester, New York, USA  
Prof. Dr. Christine Köppl, Carl von Ossietzky Universität, Oldenburg  
Dr. Go Ashida, Carl von Ossietzky Universität, Oldenburg

**Gefördert durch/ Funded by:**



**Venue:**

Hanse-Wissenschaftskolleg  
Institute for Advanced Study

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Program

# Monday, 04. November 2024

09:30 – 09:45            **Introduction to the Auditory Efferent Workshop**  
*Laurel Carney, University of Rochester (Rochester NY, USA)*

## **Session 1: Setting the stage**

09:45 – 10:30            **Evolutionary history of olivocochlear efferents**  
*Christine Köppl, Carl von Ossietzky Universität (Oldenburg, DE)*

10:30 – 11:15            **Behavioral, physiological, and anatomical investigations of some possible effects of the olivocochlear pathways in hearing across the lifespan**  
*Amanda Lauer, Johns Hopkins University (Baltimore, MD, USA)*

11:15 – 11.45            *COFFEE BREAK WITH POSTERS*

11:45 – 12:30            **Does the medial olivocochlear reflex really help hearing in noise?**  
*Enrique Lopez-Poveda, University of Salamanca (Salamanca, ES)*

12:30 – 13:15            **Efferent system and protection from noise-induced hearing loss**  
*Ana Belén Elgoyhen, University of Buenos Aires (Buenos Aires, AR)*

13:15 – 14:15            *LUNCH*

14:15 – 15:15            Poster Session

## **Session 2: Cochlear efferent circuitry, physiology and function**

15:15 – 16:00            **Efferent synaptic mechanisms in the inner ear**  
*Sonja Pyott, University Medical Center Groningen (Groningen, NL)*

16:00 – 16:30            *COFFEE BREAK WITH POSTERS*

16:30 – 17:15            **Lateral efferent modulation of afferent activity**  
*Elisabeth Glowatzki, Johns Hopkins University (Baltimore, MD, USA)*

17:15 ff                    **Discussion Round - Summary of Day 1:**  
What important questions did we identify?

18:30 – 20:00            *DINNER + DESSERT WITH POSTERS*

## Tuesday, 05. November 2024

09:30 – 10:15            **Lateral olivocochlear flexibility**  
*Lisa Goodrich, Harvard University (Cambridge, MA, USA)*

### **Session 3: Brainstem efferent circuitry, physiology and function**

10:15 – 11:00            **Central auditory pathways and the efferent system**  
*Brett Schofield, Northeast Ohio Medical University (Rootstown, OH, USA)*

11:00 – 11:30            *COFFEE BREAK WITH POSTERS*

11:30 – 12:15            **Ion channel determinants of firing patterns in lateral olivocochlear efferent neurons**  
*Lawrence Trussell, Oregon Health Science University (Portland, OR, USA)*

12:15 – 13:00            **Inhibitory circuits in the medial olivocochlear system**  
*Catherine Weisz, NIH-NIDCD (Bethesda, MD, USA)*

13:00 – 14:00            *LUNCH*

14:00 – 15:00            Poster Session

### **Session 4: Systems-level physiology and perception**

15:00 – 15:45            **How the brain connects with the ear: corticofugal oscillatory modulation of cochlear responses**  
*Paul Delano, Universidad de Chile (Santiago, CL)*

15:45 – 16:15            *COFFEE BREAK*

16:15 – 17:00            **Assessment of the medial olivocochlear reflex using electrocochleography in humans**  
*Skyler Jennings, University of Utah (Salt Lake City, UT, USA)*

17:00 ff                    **Discussion Round - Summary of Day 2:**  
What important questions did we identify?

18:30 – 20:00            *DINNER + DESSERT WITH POSTERS*

## Wednesday, 06. November 2024

- 9:30 – 10:15      **On the inclusion of phase in peripheral measures of efferent activity**  
*Shawn Goodman, University of Iowa (Iowa City, IA, USA)*
- 10:15 – 11:00      **Effects of preceding sound on psychoacoustic measures of frequency selectivity**  
*Elizabeth Strickland, Purdue University (West Lafayette, IN, USA)*
- 11:00 – 11:30      *COFFEE BREAK WITH POSTERS*

### **Session 5: Incorporating efferents into auditory models**

- 11:30 – 12:15      **Efferent effects in the Meddis model of the auditory periphery**  
*Tim Jürgens, Technische Hochschule Lübeck (Lübeck, DE)*
- 12:15 – 13:00      **A model for AN responses with dynamic efferent gain control**  
*Laurel Carney, University of Rochester (Rochester NY, USA)*
- 13:00 – 14:30      *LUNCH*
- 14:30 – 15:15      **Wrap-Up - Challenges in modeling auditory afferents and efferents**  
*Go Ashida, Carl von Ossietzky Universität (Oldenburg, DE)*
- 15:15 ff              **Summary of workshop:**  
What is next for the Study Group?

## Poster Presentations

- [1] **A Stereo-typical medial olivo-cochlear reflex**  
*Sriram Boothalingam, Jason Mikiel-Hunter, Lilly A. Leaver, David McAlpine*  
(Macquarie University, Sydney, Australia)
- [2] **Modification of the acoustic reflex pathway of the MATLAB Auditory Periphery (MAP) model**  
*John Culling*  
(Cardiff University, Cardiff, UK)
- [3] **The role of subcortical-cortical interactions in learning sound statistics**  
*Irene Onorato, David McAlpine, Livia de Hoz*  
(Charité - Universitätsmedizin Berlin, Berlin, DE)
- [4] **Understanding the physiological roles of MOC efferent pathways for hearing in noise**  
*Afagh Farhadi*  
(Purdue University, West Lafayette, IN, USA)
- [5] **Modulation of transverse viscoelastic damping through deformation in the outer hair cell region: a second mechanism for active cochlear mechanics?**  
*François Deloche, M. Thienpont, A. Moleti, R. Sisto, S. Verhulst*  
(Ghent University, Ghent, Belgium)
- [6] **Simulating effects of contralateral acoustic stimulation using an auditory efferent model**  
*Daniel Guest, Laurel Carney*  
(University of Rochester, Rochester, NY, USA)
- [7] **Nonlinear outer hair cell model: temporal modulation**  
*Sebastian Handel*  
(TU Graz, Graz, Austria)
- [8] **Olivocochlear and middle ear muscle effects on the cochlear microphonic evoked by swept tones**  
*Sarah Haysley, Skyler Jennings*  
(University of Utah, Salt Lake City, UT, USA)
- [9] **Who's listening? Identification of candidate cell-types for cochlear efferent neuropeptide signaling**  
*Mariah Hazlett*  
(Harvard University, Cambridge, MA, USA)
- [10] **The impact of chloride homeostasis on development of LOC and LSO neurons**  
*Jin-Rong He, Tamara Radulovic, Nicole Ahrens, Anna-Maria Hartmann, Christian Keine, Ivan Milenkovic*  
(Carl von Ossietzky Universität, Oldenburg, DE)

- [11] **Perceptual adaptation and meta-adaptation in human listeners under transcranial magnetic stimulation**  
*Heivet Hernandez-Perez*  
(Macquarie University, Sydney, Australia)
- [12]  **$\alpha 9$  HA and  $\alpha 10$  HA nAChR mouse models to study the efferent system in the inner ear**  
*Hakim Hiel*  
(Johns Hopkins University, Baltimore, MD, USA)
- [13] **Deciphering auditory hyperexcitability in Otogl mutant mice unravels an auditory neuropathy mechanism**  
*Nicolas Michalski*  
(Institut Pasteur, Paris, FR)
- [14] **Dynamics of noise-induced dopamine upregulation in lateral olivocochlear neurons**  
*Jane Mondul*  
(Johns Hopkins University, Baltimore, MD, USA)
- [15] **Contralateral suppression of human hearing sensitivity in single-sided deaf cochlear implant users through psychoacoustic and otoacoustic emissions**  
*Waldo Nogueira*  
(Hannover Medical School, Hannover, DE)
- [16] **Tuning into feedback: lateral olivocochlear neurons respond to auditory stimuli**  
*Gabriel Romero*  
(Harvard University, Cambridge, MA, USA)
- [17] **Cochlear efferent gene therapy for protection against acoustic damage**  
*Eleftheria Slika*  
(Johns Hopkins University, Baltimore, MD, USA)
- [18] **Lateral olivocochlear efferent inputs contribute to setting auditory nerve fiber spontaneous firing rates in vitro**  
*Philippe Vincent*  
(Johns Hopkins University, Baltimore, MD, USA)
- [19] **Investigating effects of contralateral noise on ipsilateral speech-evoked envelope following responses**  
*Tan Ze Wang*  
(Western University, London, ON, Canada)
- [20] **Towards international priorities for hearing research**  
*Robert C. MacKinnon, A. Heinrich, C. Sumner, F. Gallun*  
(Anglia Ruskin University, Cambridge, UK / University of Manchester, Manchester, UK / Oregon Health & Science University, Portland, OR, USA)