

SOUND MINDS

UCI Center for Hearing Research (CHR): Providing an intellectually stimulating and interactive home to advance collaborative and multidisciplinary research, training, and service in hearing loss and other communication disorders.

Dear Colleagues and Friends,

After rapid growth in the last several years, the CHR has stabilized with 36 members and over 100 associate researchers from 10 departments at 5 different UCI schools, UC Riverside, Loma Linda University and VA Loma Linda Healthcare System. Our annual symposia and seminar series (page 2) continue to draw distinguished scholars to the campus. In addition, the CHR co-sponsors *So Cal* Hearing Conferences and relevant seminars with other units on campus. The CHR not only provides funding but also helps recruit outstanding doctoral students and post-doctoral scholars from all over the world (page 3). Finally, the CHR conducts fun and educational outreach activities for both local communities, such as the Lions Club, Rotary Club, churches and retirement centers, and statewide programs for K-12 students (page 4). I would like to highlight several achievements below.

- Karina Cramer and John Middlebrooks successfully renewed their RO1 grants; Fan-Gang Zeng, Hamid Djalian and Harrison Lin obtained an RO1 grant to seek the effective treatment of tinnitus with electric stimulation; Greg Hickok and Kouros Saberi were awarded a multi-site grant to study auditory brain functions in human stroke patients. With the recent NIDCD payline hovering in the low teens, these awards attest to the innovation and quality of research going at the CHR.
- Raju Metherate, joined by Khaleel Razak at Riverside, Michael Silver at Berkeley and Fan-Gang Zeng at Irvine, won a highly competitive award in *The 2017 UC Multicampus Research Programs and Initiatives competition*. These researchers will take a multi-disciplinary approach towards finding a nicotine therapy for age-related hearing disorders.
- The CHR members in Loma Linda have been conducting significant translational research. Hongzhe Li has received funding from the Department of Defense to study inner ear protection, damage and repair from ototoxic insults, such as noise, antibiotics and chemotherapy drugs. Brenda Lonsbury-Martin is working on a VA-funded project translating intracochlear protocols into clinical tests for veterans suffering from noise-induced hearing loss.
- Retired but still productive, Arnold Starr co-authored three articles on auditory neuropathy (*Nature Reviews Neurology, Brain, Hearing Research*) and recently gave a keynote speech in China.
- Virginia Richards spearheaded a [Minor in Hearing and Speech Sciences](#) to provide in-depth training for undergraduates interested in research or career opportunities in audiology, speech-language pathology, psychology, neuroscience, biomedical engineering, medicine and other allied areas.

I would also like to take this opportunity to reflect on challenges and opportunities ahead. We continue to face uncertain funding situations. The P30 grant will end in Spring 2017 with no chance of renewal as NIDCD has terminated this funding mechanism. Per university policy, the center has reached its "sunset" year and will need a new venue, e.g., philanthropy, to support its status and operation. However, opportunities accompany challenges. This old saying is especially true for hearing touches all aspects of our lives. There are basic research opportunities in brain mechanisms and machine learning, translational opportunities in clinical trials and industrial collaborations, educational opportunities such as training future Audiology Doctors.

We will thrive and appreciate your support for CHR.

Happy holidays,

Fan-Gang Zeng, CHR Director



CHR Annual Symposia

The annual symposium is our flagship event, attracting over 100 participants, including UCI faculty, post-docs and students as well as community researchers, physicians, special education teachers and even patients. We provide continuing medical education credits for both physicians and audiologists.



The 10th Annual Symposium "Hidden Hearing Loss and Beyond" on May 30, 2015, co-sponsored with Providence Speech and Hearing Center. From left, Harrison Lin, Brenda Lonsbury-Martin, Roberro Cueva, Laura Dretsbach-Hawe, Peter Torre, Donna Gelnert, Sharon Kujawa, Fan-Gang Zeng, and Rene Gifford.



The 11th Annual Symposium "From Sound to Comprehension: How we make use of Acoustic Information to Understand Speech" on May 28, 2016. From left, Zeng, Lucas Baltzell, Jonathan Peelle, Lori Holt and Wei Dong; Tourios, Sorensen, Broussard, Rosenblum, Leonard & Venezia (not shown) also presented.

CHR Seminar Series

Since launching the CHR Seminar Series in 2014, John Middlebrooks and a team of CHR trainees have continued to invite distinguished scholars to the UCI campus. To encourage students' participation, a designated student hosts the speaker throughout his or her visit. A graduate student luncheon is also provided on the day of the seminar for students to interact with the speakers.

The 2015 speakers included:

- Edward Chang (UCSF)
- Donna Fekete (Purdue)
- Christophe Micheyl (Starkey)
- Jim D'Amour (New York Univ)
- Dan Polley (Harvard Univ)
- Deda Gillespie (McMaster Univ)
- Barbara Shinn-Cunningham (Boston Univ)
- Sarah Bottjer (Univ Southern California)

The 2016 speakers included:

- Sarah London (Univ Chicago)
- Mitch Sutter (UC Davis)
- Charlie Schroeder (Columbia U)
- Lee Miller (UC Davis)
- Frédéric Theunissen (UC Berkeley)
- Laurel Carney (Univ of Rochester)
- Mike Wehr (Univ of Oregon)
- Blake Wilson (Duke Univ)

The series also highlighted the work of our own researchers, including Khaleel Razak, Greg Hickok, Harrison Lin, Raju Metherate, and Ron Frostig. A full schedule of speakers and seminar titles can be found at hearing.uci.edu. Email Sahara George (georgese@uci.edu) to be added to the mailing list.

CHR Training Spotlight (Program Director: Raju Metherate)

An NIH training grant supports graduate students for up to two years, typically in the 2nd and 3rd year of a doctoral program. Support is also available for postdoctoral researchers, including medical residents for up to two years. These trainees audit the course Auditory Neuroscience (N260), present at the CHR Journal Club, select and host outside speakers to broaden exposure to hearing research and enhance their professional development. During its first four years the program supported 12 individuals, including 8 predoctoral and 4 postdoctoral fellows. Current CHR trainees are highlighted below.



Alessandro (Alex) Presacco obtained his PhD in Jonathan Simon's lab at the University of Maryland, where he did MEG studies of auditory cortical mechanisms in elderly people. As a postdoc in John Middlebrook's lab, he will be working on new methods of auditory prosthesis, particularly the penetrating auditory nerve electrode.

Gabe Elias is a post-doc working with Dr. Norbert Fortin in the Center for Neurobiology of Learning and Memory. His research focuses on behavioral factors regulating learning induced plasticity within the auditory system and the influence that plasticity has on how other brain regions represent and process auditory information.



Sierra Broussard is a doctoral student working with Kourosh Saberi and Greg Hickok in the Auditory and Language Neuroscience Lab. She uses EEG and behavioral tools to study speech and music processing and hearing impairments.

Solena Mednicoff is a second year PhD student working with Charlie Chubb and Greg Hickok in Cognitive Sciences. Having studied classical piano since the age of five, Solena has a strong passion for music and wants to answer questions about potential common processes in music and speech perception.



Maria Montchal is a second year PhD student in Michael Yassa's Translational Neurobiology Lab. Her research aims to elucidate how auditory information is represented in auditory cortex both when a sound is actually heard and when an auditory memory is reactivated.

Katie Turner is a third year PhD student in Fan-Gang Zeng's Hearing and Speech Lab. She is investigating how hidden hearing loss is related to tinnitus, hyperacusis and other perceptual deficits such as difficulty in hearing in noise.



Outstanding Graduate Student and Post-Doctoral Scholar Award Winners



Luke Baltzell worked with Curtis Billings at the National Center for Rehabilitative Auditory Research in Portland, OR before entering the PhD program in Cognitive Science at UCI. Luke's current research focuses on the relationship between oscillatory activity in the brain and speech perception. He published a paper with his co-mentors Virginia Richards and Ramesh Srinivasan "*Attention selectively modulates cortical entrainment in different regions of the speech spectrum*" (Brain Research, 2016).

Sarah Rotchafer received her PhD from UC Riverside, where she trained with a CHR member Khaleel Razak. She joined Karina Cramer's laboratory in 2013 and published a paper on "*Deletion of Fmr1 alters function and synaptic inputs in the auditory brainstem*" (PLoS One, 2015). Her finding suggests a relationship of Fragile X syndrome to hyperacusis. Sarah also found a novel function of a molecule traditionally associated with programmed cell death in setting up auditory brainstem circuitry. She is currently following up on these exciting studies and plans to pursue an independent career in academia.



“Oto-reach” by Carol Q. Pham, Ph.D. (successfully defended on July 14, 2016)

This past summer marked the 10th year that we hosted workshops for the California State Summer School for Math & Science (COSMOS) and Summer Premed Program, which brought high school students from across the nation to participate in scientific and biomedical research at UCI. Students learned ear anatomy, hearing, speech and language disorders, and even audiological diagnostics. This July, we hit a record of 100 enrollees.



We have worked to transform outreach workshops into more fun and educational experience each year. A hearing science rendition of Jeopardy has become a popular interactive activity among the students as they get to exercise newly acquired knowledge about decibel levels of everyday sounds and challenge each other on auditory neuroscience questions. Simulations of hearing loss broaden their perspectives on deafness and cochlear implants. Laboratory experience allows exploration of both fundamental and clinical aspects of hearing science while playing with auditory illusions, measuring an audiogram, and recording "echoes" (otoacoustic emissions) from the inner ear. In an effort to promote healthy listening practice, we distributed complimentary earplugs to all participants.

This summer turned out to be particularly memorable because the students had in their hands a rare clinical case. One brave COSMOS student candidly shared with the group how she grew up with single-sided deafness and how her immigrant parents did not know to seek intervention when she was younger due to limited understanding about hearing impairments. This story stirred many thought-provoking questions about auditory brain development and differences between the "patient's" good and bad ears. Indeed, the students found high audiometric thresholds and nonexistent "echoes" in the bad ear, compared with low thresholds and clear echoes in the good ear.

We also hosted the Tech Trek, a science and math camp for eighth grade girls, for a day to play "audiologist and



patient". By the sound of laughter, heated debates, and enthusiastic conversations, students do enjoy learning about science and medicine. Participating in outreach has helped the CHR stay connected with today's younger generation. Dr. Behnoosh Afghani, Director of the Center for Future Health Professionals, attests to the impact of our outreach by simply saying, "The students loved the hearing and speech lab."



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CHR Executive Committee:

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- Raju Metharate
- John Middlebrooks
- Virginia Richards
- Fan-Gang Zeng

Sound Minds Editors:

- Fan-Gang Zeng and Sahara George

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