

### New Scientific Advisors

We are excited to welcome two new Scientific Advisors to Hyperacusis Research, Dr. Amanda Lauer and Dr. Fan-Geng Zeng!



*Dr. Amanda Lauer*



*Dr. Fan-Gang Zeng*

Dr. Lauer is an Assistant Professor of Otolaryngology at Johns Hopkins University. Her laboratory seeks to understand how auditory input from the ear affects the brain, and how the brain in turn affects the ear through efferent feedback loops, especially in the areas of hyperacusis and tinnitus.

Dr. Zeng is a Professor of Otolaryngology, Anatomy & Neurobiology at the University of California, Irvine School of Medicine. His laboratory conducts research to understand mechanisms that underlie normal and pathological hearing, improve hearing-aid and cochlear implant performance, and find a safe and effective treatment for tinnitus and hyperacusis.

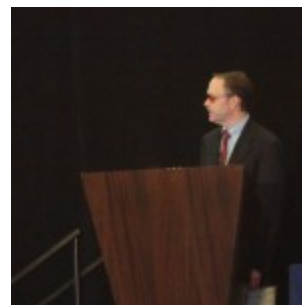
### 2016 ARO Symposium

On April 21, 2016, the Association for Research in Otolaryngology (ARO) held a symposium on auditory nociception (the hearing system's responses to harmful stimuli), focusing on pain in hyperacusis. The session convened researchers, clinicians, educators and – importantly - the voice

of the patient, to coordinate our expanding knowledge of this disabling condition. The symposium was exciting because researchers are finally recognizing the existence and importance of pain in hyperacusis, and are moving toward the understanding required for treatment.

Bryan Pollard, president of Hyperacusis Research, introduced the well-received symposium, which was entitled “Auditory Nociception and Pain Hyperacusis.” He began with a key slide from his first ARO presentation, in 2013, showing a knife in the ear. That’s how so many people describe their hyperacusis: Sound is not just heard, but is felt as a knifelike stabbing pain.

He explained that the concept of noise-induced pain has long been a mystery to researchers, doctors and audiologists. Hyperacusis Research has worked diligently to assimilate ideas and research in order to identify the biological mechanisms that cause this pain.



*Bryan Pollard introducing the symposium on auditory nociception at the 2016 ARO.*

He also emphasized the most important motivation for research: The people suffering so tremendously. His slide presentation, “Faces of Hyperacusis,” showed people from around the world who suffer from hyperacusis, many of whom were wearing protective earmuffs, without which they would have difficulty navigating the world.



*Two “Faces of Hyperacusis”*

He ended the introduction with examples of how sufferers themselves are having an impact by writing media stories (most recently on the medical news site StatNews) and by assimilating scientific knowledge into everyday language that helps patients understand the research (as in the website [www.hyperacusisfocus.org](http://www.hyperacusisfocus.org)).

After the introduction, six presentations discussed various—yet importantly overlapping—facets of the biology of pain hyperacusis, including auditory nociception (the nervous system’s response to harmful stimuli). In brief:

- **Rich Tyler** (University of Iowa) overviewed hyperacusis and its treatment from the patient’s and clinician’s perspective. A key point he noted was that while sound therapy and counseling can be helpful for some patients, at present there are no cures.
- **M. Charles Liberman** (Harvard Medical School) described the two types of “afferent” neurons that transmit signals from the cochlea: Type I neurons transmit information about sound; Type II neurons may be nociceptive (transmitters of pain signals). Type II dysfunction may underlie hyperacusis with pain, while differences in the Type I pathway may underlie differences in loudness discomfort.
- **Jaime Garcia-Añoveros** (Northwestern University) led us further into the topic of auditory nociception and the biological research that has added to the theory that Type II cochlear neurons are pain receptors. He proposed that the auditory nociceptive system

may trigger the pain sensation often associated with trauma-induced hyperacusis, since pain hyperacusis represents a pathological sensation akin to neuropathic pain.

- **Paul Fuchs** (Johns Hopkins University School of Medicine) showed us that damaged Type II neurons do not require an extremely loud sound stimulus to transmit “this hurts!” information to the central nervous system. Because these neurons are strongly activated when the outer hair cells are damaged, they may serve as the cochlea’s nociceptors.
- **Ulf Baumgaertner** (Heidelberg University, Germany) illuminated where in the brain sound and sound-related pain are processed, suggesting a way to visualize through fMRI what transpires in the brain during painful hyperacusis. When exposed to a painful auditory stimulus, the regions activated were those considered to be part of the nociceptive network in the brain.
- **Allan Basbaum** (University of California, San Francisco) suggested the pain of hyperacusis may be in part neuropathic. If true, this may allow us to tap into emerging major discoveries in treating this type of pain in patients with severe and disabling chronic pain. Some currently available pharmacological agents could be tested with hyperacusis patients.

## Hearing Health Foundation Partnership

Hyperacusis Research has a valuable partnership with the Hearing Health Foundation (HHF), which has been vital for the research we have sponsored. At the 2016 ARO conference, Bryan Pollard met the new CEO of the HHF, Nadine Dehgan. Also present were Professor Peter Steyger of Oregon Health & Science University, one of the HHF’s scientific advisors, and two board members: Dr. Elizabeth Keithley and Dr. Judy Dubno.

The discussion centered around the upcoming Emerging Research Grant cycle, which will include a grant focused on hyperacusis. Bryan also explored ways to expand the HHF partnership.



*Breakfast with the Hearing Health Foundation. From left: Dr. Peter Steyger, Dr. Elizabeth Keithley, Nadine Dehgan, Dr. Judy Dubno, and Bryan Pollard.*

A meeting with Dr. Anil Lalwani of Columbia University, one of the nation's leading ear surgeons and chairman of the HHF's Council of Scientific Trustees, gave Bryan an opportunity to explain the real-life difficulties of patients living with hyperacusis with pain. As the Council of Scientific Trustees continues to expand its understanding of hyperacusis, it will enhance its evaluation process for potential hyperacusis-related grants.



*Dr. Anil Lalwani, Dr. Hirobumi Watanabe, and Bryan Pollard.*

Dr. Hirobumi Watanabe, a research scientist at Columbia, has performed modeling work of the round window response to sound. Bryan discussed the round/oval window reinforcement surgery performed by Dr. Herbert Silverstein on a limited number of hyperacusis patients. The patients have seen improvement with this surgery. Bryan proposed that Dr. Hirobumi consider modeling this

reinforcement procedure to learn more about the possible patient impacts.

## Would You Host a Fundraiser?

We are looking for people to host fundraisers. We have found this to be the most effective means of increasing donations. They can be small and informal or larger and more organized. In addition, those not in a position to tolerate the sound associated with an in-person event can help from home by creating an online fundraiser. You can see more on how our funds are used in the section below, "Our Progress." If you would like to consider hosting a fundraiser, please contact Bryan Pollard at [bryan@hyperacusisresearch.org](mailto:bryan@hyperacusisresearch.org).

## Our Progress

The first grant by Hyperacusis Research was for a Literature Review designed to communicate the current and inadequate state of understanding of hyperacusis. Since publication in 2014, the report has been cited 14 times by other researchers in published works, an impressive number in a short amount of time, and a demonstration of how our report is providing a foundation for further research.

The second and third grants, which were discussed in our last newsletter, funded research that is currently underway. This research involves pain mechanisms in the inner ear. We look forward to the results.

As knowledge and awareness of hyperacusis has grown, many medical researchers have developed an interest in including hyperacusis in their auditory-research work. The list includes those who presented at our ARO symposium, researchers from the Hearing Health Foundation, our new Scientific Advisors, and more.

Thanks to your support, we have been able to make these strides toward a much-needed cure for hyperacusis. We look forward to sharing future progress updates with you. Our work depends on you, our generous donors. We are grateful for all contributions, big and small, that help us advance the research.

Hyperacusis Research Limited, Inc.  
P.O. Box 1295  
Marlboro, MA 01752

Non-Profit  
U.S. Postage  
PAID  
Permit No. 2782  
Merrifield, VA



Hyperacusis Research is a 501(c)(3) non-profit organization devoted to finding a cure for hyperacusis through accelerating research by connecting patients to researchers. Contributions are fully tax-deductible as allowed by law and are gratefully welcomed by credit card online at [www.hyperacusisresearch.org](http://www.hyperacusisresearch.org) or by check to our mailing address printed above.

In addition to our website, follow us on Facebook and Twitter:



[Facebook.com/hyperacusisresearch](https://www.facebook.com/hyperacusisresearch)



[Twitter.com/hyperacusiscure](https://www.twitter.com/hyperacusiscure)