Your guide to supporting innovative hearing research and care

Oregon Hearing Research Center
OHSU Department of Otolaryngology/Head & Neck Surgery
As chairman of the Oregon Health & Science University Department of Otolaryngology/Head & Neck Surgery, I have the distinct honor of helping to build one of the world’s top teams devoted to improving life for those affected by hearing loss and other hearing related problems.

Hearing loss is one of the most prevalent sensory deficits, and continues to be one of the most common injuries of men and women serving in the military. We are committed to developing a better understanding of how hearing works and bringing better solutions to everyone affected by hearing loss.

Philanthropic support is vital to advancing our goals and:
- Advance the research of new hearing treatments
- Recruit and keep talented researchers
- Sustain state-of-the-art laboratories
- Train the next generation of scientists
- Enhance outreach and prevention projects

As you read further, I hope you will gain an understanding of the dreams and motivations of our scientists and caregivers. I think you’ll recognize why investing in talented people is an important priority for the future.

Sincerely,

Paul W. Flint, M.D.
Professor and Chair
Department of Otolaryngology/Head & Neck Surgery
Oregon Health & Science University
At OHSU’s Oregon Hearing Research Center, we engage in advanced hearing research to provide our clinicians with the latest scientific developments to diagnose and treat patients. Our discoveries on inner ear disease, including those from genetic disorders, provide a path of hope, healing and relief for people with hearing loss and tinnitus.

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Our faculty sets us apart.

The Oregon Hearing Research Center is one of the largest and most prominent hearing centers in the world. We have leading scientists exploring every possible cause and solution to hearing loss. As director, I am fortunate to work with world-class scientists. Their expertise ranges from research of the inner ear to the auditory cortex in the brain.

Continuing the legacy of early leaders like Dr. Bob Brummett and Dr. Jack Vernon, our team of scientists are driven to find new cures and treatments. A number of them personally live with hearing loss. I believe this motivates them to unlock the secrets of how we hear and develop new solutions to help others.

Often philanthropic gifts are the essential catalyst for advancing research to a point where it is sustainable through grants, such as our funding from the National Institute of Health. We simply couldn’t do this important work without the generosity of others.

Sincerely,

Alfred L. Nuttall, Ph.D.
Director, Oregon Hearing Research Center
Professor and Vice Chair for Research
Department of Otolaryngology/Head & Neck Surgery
Oregon Health & Science University
Our scientists are continually making unique discoveries that help our patients in their quest for better health and hearing. This graphic illustrates a sampling of the areas our researchers are currently studying.
Regenerative medicine seeks to define strategies that restore auditory and vestibular function in the diseased or damaged inner ear. Dr. Brigande’s research is focused on defining gene and cell-based strategies to restore inner ear function using experimental embryology, a collection of techniques that provides access to the mammalian inner ear in utero. The overarching goal of his work is to translate efficacious therapies in mouse models of congenital hearing loss to patients affected by inner ear disease.

Human and animal brains are exquisitely adept at making sense of the complex patterns of sound and other stimuli that continuously bombard the senses. A number of clinical conditions, both neurological and in the peripheral auditory system, interfere with how the brain processes sounds. Dr. David’s research is focused on understanding the circuitry that underlies the remarkable computational abilities of the auditory brain, with an aim of improving engineered systems for treating hearing-related disorders.
By understanding how the sensory hair cells work in a normal ear we can better devise strategies for preventing or ameliorating hearing loss. Dr. Barr-Gillespie's lab is determining how the stereocilia, the hairs of the sensory hair cells, detect sound and how to identify the protein components of the stereocilia and measure how abundant each is using highly sensitive mass spectrometry. Damage to some of these protein components can lead to genetic or environmentally-caused hearing loss. Understanding how all protein components work together is essential for understanding how normal hearing works.

Sound sensation relies on its transduction into nervous activity in inner ear (cochlea), which consumes a tremendous amount of energy and is thus very sensitive to blood flow deficiency. Cochlear blood flow deficiency contributes to many clinical hearing conditions including the hearing loss caused by aging, loud sound/noise and ototoxic drugs. Dr. Jiang’s laboratory investigates the unique pathophysiology mechanisms of inner ear vascular cells and the drug effects. Dr. Jiang is working to develop effective strategies for prevention and treatment of these conditions.
Geneticists have made remarkable progress in identifying genes responsible for deafness in humans, yet in many cases, we do not clearly understand either the function of these genes or the pathology caused by the mutations. The goal of Dr. Nicolson’s research is to understand the role of these genes in the auditory/vestibular system and how the mutations lead to hearing loss. In Dr. Nicolson’s research, she has established zebrafish as an animal model to study human deafness.
The inner ear is amazingly sensitive and extremely delicate. Our ability to hear faint noises and to understand complex sounds such as speech and music is easily lost by exposure to loud sound and by the consequences of aging. Dr. Nuttall’s research on how the sensory cells process and react to sound and how the blood flow that nourishes the cells is controlled.

Dr. Ren’s research examines how the ear can process and detect sounds. To hear soft sounds, the ear can amplify sound-induced tiny vibrations in the cochlea, which allow the sensory hair cells to convert vibrations into neural activities. Loss of the cochlear amplification often results in hearing loss. To prevent and diagnose hearing loss we have studied the auditory amplification mechanism for many years using innovative optical, acoustical, and electrophysiological methods.
Age-related and noise-induced hearing loss makes life difficult for millions of people. Normal hearing depends on well-regulated blood flow. The blood flow brings oxygen, nutrients, and hormones to our ears, and removes toxins and waste products of cell metabolism. Insufficient blood supply to the ear is among the primary causes of hearing loss. Dr. Shi’s focus is to better understand the mechanisms by which blood flow to the ear is regulated and compromised blood flow is repaired and restored. Dr. Shi seeks to improve the quality of life for people over 65 and with noise-induced hearing loss by developing new treatments to reduce hearing loss and rescue hearing from noise-induced damage.

Ototoxic drugs like gentamicin or cisplatin are essential life-saving drugs for pre-mature babies, and patients with meningitis or cancer. Yet, they also severely damage our sense of hearing, preventing spoken language development and social intimacy. Dr. Steyger’s research is to identify and block the mechanisms by which these drugs are brought into the inner ear to kill auditory sensory cells, and preserve auditory sensation.
Inflammation is a common cause of hearing loss that is treated with steroids, but little is known about how the ear is affected by either the disease or the treatment. Dr. Trune’s research strives to better understand the inner ear processes impacted by inflammation, how these are ultimately restored by current therapeutic steroids, and develop alternative treatments that have fewer side effects.

The brain performs remarkable transformations on the information coming from our ears, enabling us to identify, locate and remember sounds. Dr. Trussell’s research seeks to understand how this happens, and what can go wrong with injury, disease and with age. This research is leading to a better understanding of how to lessen or even correct deficits in the neurological processing of sound.
Dangerous Decibels

Noise induced hearing loss and tinnitus (ringing in the ears) are growing problems that can be prevented with simple measures. The Dangerous Decibels program started out as a public health campaign to educate school age children about the dangers of noise to our hearing. A generous donation made it possible to pilot the Dangerous Decibels program in Oregon schools. The program has expanded tremendously and it is now flourishing nationally and internationally with materials in all 50 US states and 35 countries. New Zealand is implementing the Dangerous Decibels program into every school in the country and requires all new military, police and railway workers to go through the program. Work is now underway to bring the program to the Native American tribal communities in the Pacific Northwest. To date, the Dangerous Decibels program has made an impact on an estimated 7 million individuals.

The program was launched through philanthropic gifts from Oregonians in 2000. Since then, it has received funding from the National Institutes of Health and the Centers for Disease Control and Prevention.
My cochlear implant gave me my life back. Bilateral Meniere’s Disease had gradually destroyed my hearing and speech comprehension and I was withdrawing from the vibrant world I had lived and worked in. Hearing aids no longer helped. All of the physicians and audiologists guided me through the implant journey with knowledge and compassion and I am a staunch advocate and supporter of this amazing facility and research center.

– Evi Miller, cochlear implant recipient and grateful patient
Tinnitus is the perception of sound in the ears or head where no external sound is present. Some describe it as “ringing in the ears.” In the mid-1970s, OHSU researcher Jack Vernon, Ph.D., made great advances in helping people find relief from tinnitus. The Tinnitus Clinic started soon thereafter, and quickly grew into a trusted resource.

The vision of the Tinnitus Clinic is to continue and expand the excellent work begun by Jack Vernon and Mary Meikle. This is accomplished by seeking to understand every aspect of tinnitus - its care, mechanisms and prevention. The Clinic’s programs approach the devastating condition of tinnitus from three directions:

- **Research** – understanding the brain’s important role in tinnitus to develop effective tinnitus treatments
- **Clinical care** – providing the highest level of tinnitus evaluation and care for individuals from all over the world
- **Prevention** – taking simple measures to prevent tinnitus and noise-induced hearing loss

The Tinnitus Clinic team: William Martin, Ph.D., Jennifer Martin, Au.D., CCC-A, Yongbing Shi, M.D., Ph.D. and JoAnn Percic, Au.D. Jennifer and JoAnn are the clinic’s audiologists.
“Before coming to the Tinnitus Clinic at OHSU, I was scared and devastated with the tinnitus diagnosis and treatment options. From my first visit, Dr. Martin and Dr. Shi filled me with hope and provided such amazing, well-rounded care. I am eternally grateful - what an incredible resource we have in our area!”
– Cheri Benson
Grateful patient

Yongbing Shi, M.D., Ph.D.
Clinic Physician, Tinnitus Clinic

Dr. Shi’s focus is on improving management of chronic tinnitus. This generally involves evaluating existing treatments, developing management strategies that combine various treatment approaches, and individualizing management plans for each patient. His research is identifying and improving safe and effective pharmacological treatments for tinnitus and developing new ways to treat resistant tinnitus, including deep brain stimulation and transcranial magnetic stimulation.
Lina Reiss, Ph.D.
Dr. Reiss’ goal is to improve speech and music perception for patients with cochlear implants. Her research focuses on two promising research areas:

• **Combination of Electric and Acoustic Stimulation**
  For many patients, a cochlear implant combined with a hearing aid improves noise and music perception. We are investigating how to optimize the programming of these devices so that they work better together and improve these benefits for all patients.

• **Brain Plasticity**
  We have recently found that pitch perception through a cochlear implant can change by up to two octaves as a result of brain plasticity. We are investigating how these changes affect speech and music perception, and whether these changes can be directly controlled to improve outcome.
“My cochlear implant has been a life changer for me, after several years of declining hearing, and the frustration and isolation that experience can bring with it. Hopefully this research, and my support, will assist in improving and bringing this technology and service to others in need.”

– Tom Collins
Cochlear implant recipient, research participant and grateful supporter

SoundSource, LLC: Hearing Aid Services

New technologies and a greater understanding of how the auditory system and the human brain function in hearing are being put to use by audiologists and physicians.

In addition to our implant program and auditory services, OHSU offers hearing aid products and hearing testing services through SoundSource, LLC.

Proceeds from SoundSource fund hearing research and other vital research at OHSU.

Vestibular (Balance) Program

The OHSU Vestibular Clinic cares for patients suffering from vestibular (inner ear balance) disorders. People with vestibular disorders suffer from dizziness, vertigo, spinning sensations, floating or rocking sensations, and/or loss of balance. Because of its connection to balance in the inner ear, many people have hearing loss, tinnitus, or sensations of pressure in the ear. Anh Nguyen-Huynh, M.D., Ph.D. (Dr. Anh to most of his patients), leads this program and his expertise offers medical and surgical treatments as needed. His team collaborates with other specialists to make sure each patient receives a holistic approach to their entire balance system.
Tribute to Jack Vernon and Mary Meikle

Jack Vernon, Ph.D. and Mary Meikle, Ph.D. were visionaries in hearing research. While no longer with us, their passion endures through the dedicated faculty members who continue the research Jack and Mary started. As Jack’s fellow colleague once said, “The real pleasure of working for Jack was that he was motivated by one thing only, helping people hear better.”
Please consider making a gift. You may designate your gift in memory of or in honor of someone.

**Mail:** Mail your gift payable by check or credit card to the OHSU Foundation, 1121 SW Salmon Street, Suite 100, Portland, OR 97205.

**Online:** Make a secure online gift at www.supportohsu.org. You can find the Oregon Hearing Research Center in the scroll down menu of giving options.

**Telephone:** Please call 503 494-9989 to make a gift by credit card, or if you have additional questions about giving.

**Email:** Contact us by email at givetohearing@ohsu.edu.

A gift of any size made through your will or trust, retirement account or life insurance, supports breakthrough research and compassionate care. If you have included or would like to include the OHSU Foundation in your estate plans, please let us know.

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Facts about Hearing Loss

- Twelve percent of the U.S. population or 38 million Americans experience hearing loss
- Children account for 3 million (half are under 3 years old) of the total
- The number of hearing impaired Americans is predicted to double by 2030
- Noise induced hearing loss and aging are leading causes
- Fifty million Americans experience tinnitus to some degree
- Approximately 22 million U.S. workers are exposed to hazardous noise levels at work
- Hearing loss occurs in 5 out of every 1,000 newborns
- Hearing loss in children results in delayed speech and poor classroom performance
- Hearing loss is the number one reported injury in soldiers returning from Iraq and Afghanistan

Together we can make a difference.

Make a Gift Today

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