Solutions Come in Many Sizes.

INCLUDED IN THIS ISSUE:
What IS a Safe Noise Level? Page 12
Barriers to Habituation Page 15
New ATA-Funded Research Page 24

Visit us Online at ATA.org
How to Access ATA Member Webinars

You might have heard that ATA has a brand new webinar series as one of your ATA member benefits. If you have heard about these webinars but haven’t yet taken the opportunity to watch one, you can log on to ATA.org and access your Member User Account and view any ATA webinar anytime!

Once you log into the Members Section finding the webinars is as easy as clicking a button. On the far right hand side of your screen, you will see a blue menu and the second one from the top under “Welcome ATA Members” is “ATA Webinars.” Simply click on that menu item (pictured below) to bring you to the page on our website that has all of our recorded webinars.

And we’ve also included the PowerPoint presentations and webinar script so that you can easily follow along at home with the speakers on the video. We hope that you are enjoying this new ATA member benefit. If you have questions about this or any of your other ATA member benefits, don’t hesitate to contact us at anytime at tinnitus@ata.org.
ASSOCIATION UPDATES

4 A Multitude of Solutions
Melanie West, Chair, ATA Board of Directors

6 Letters to the Editor

8 Questions and Answers
James Henry, Ph.D., Guest Health Professional

21 Make a Difference, Leave a Legacy

22 University of Iowa Conference 2016 – An Attendee’s Perspective
Jodi Asmus, ATA Communications Assistant

PATIENT & MEMBER STORIES

9 Hyperacusis: A Journey of Discovery
Bryan Pollard, ATA Board Member, President, Hyperacusis Research, LLC

ADVOCACY

12 What IS a Safe Noise Level?
Bryan Pollard & Daniel Fink, M.D., ATA Board Members

SCIENCE & RESEARCH

15 Barriers to Habituation
Stephen M. Nagler, M.D.

18 Research Review: A Summary of Recently Published Tinnitus Studies

23 How Grants Are Funded at ATA: Our Process and Why it Works

24 New ATA-Funded Research

27 Meniere’s Disease – Otonomy Seeking Patients to Enroll in Study to Treat Vertigo-Inducing Disease

RECOGNITION

28 ATA Professional Members

29 ATA Corporate Members

30 Special Donors and Tributes

The opinions expressed by contributors to Tinnitus Today are not necessarily those of the publishers or the American Tinnitus Association. This publication provides, for information purposes only, a variety of topics related to tinnitus. ATA’s publication of any advertisement in any kind of media does not, in any way or manner, constitute or imply ATA’s approval or endorsement of any advertised product or service. ATA does not favor or endorse any commercial product or service.

Editorial and advertising office:
American Tinnitus Association
P.O. Box 5, Portland, OR 97207
(503) 248-9985 • editor@ata.org • ATA.org
A Multitude of Solutions

Melanie West, Chair, ATA Board of Directors

Recently, I was invited to attend and present at the 24th annual “Management of Tinnitus and Hyperacusis Patient” conference hosted by the University of Iowa and led by Richard Tyler, Ph.D. My focus was to inform patients, professionals and other industry leaders as to why ATA added hyperacusis to our mission statement. While there, I was struck by how many device companies were attending the conference to represent their products as tinnitus, and in some cases hyperacusis, management solutions. Each company displayed credible research citing why their device shows promise as a management tool for tinnitus.

Why was I struck by this observation? Because I remember when there were no solutions, no devices and no management tools. At one point, there wasn’t even a diagnostic code for tinnitus for professionals to utilize. The take-home is that researchers have provided viable information to push forward the progress toward cures. Yes, I said cures. Plural.

The fact is that research has trended toward demonstrating that there will be a multitude of solutions rather than one singular cure. You see, every person’s tinnitus is different. And, there may be comorbid symptoms such as hyperacusis or hearing loss. Correlations between tinnitus and hyperacusis as well as tinnitus and hearing loss have been proven. There are also designated populations of people with tinnitus, for instance, those who have cochlear implants, deafness, hyperacusis, acute hearing loss, Meniere’s disease and others. These small populations may be studied separately. The conclusions reached by research into these unique groups may provide new answers or lead to new evidence for tinnitus solutions.

So, my point is that whether our donations are given toward one research study or another – they all help. If a subpopulation finds a cure, it is likely that a biotech company, university or venture capital group will want to bring the product or solution to market. If they do, that is good for all of us because if that product is successful, other companies in turn may fund further research and focus on reaching a larger market share; hence, the possibility of tinnitus and hyperacusis solutions for the greater good.

In the same way, it is important for various types of studies to be conducted. Whether the investigation is an animal study, a human study or clinical trial, they can all guide the process of discovery toward cures. That is one of the reasons why ATA funds seed grants. A full research grant for $50,000 or $10,000 for a student grant allows the researcher to prove the efficacy of their study. ATA-funded investigators can then go on to apply for and receive grants from larger funding entities like the National Health Institute (NIH), Department of Defense (DoD) and Department of Veterans Affairs (VA).

Grant applications are submitted to ATA and the Scientific Advisory Committee (SAC) review the submissions, rate them and make recommendations to the ATA Board of Directors based on their compliance to our Roadmap to a Cure paths and potential to advance science. SAC looks at the research, the pathways it fulfills, the researcher, the mentors and what can be learned about tinnitus and hyperacusis from the study. They are quite thorough in making sure that donation money is put to good use. You can read more about this exciting process and the grants the Board recently funded on pages 23 and 24 of this issue.

In April when I attended the American Academy of Audiology (AAA) in Phoenix, AZ, I was also struck by how many companies had purchased booths in the civic center hall for the purpose of presenting products for tinnitus management. There was a time when there might have only been one company. And, the presentations on tinnitus at AAA were plentiful. There was a time when people couldn’t pronounce the word tinnitus. Now, there is a multitude of solutions. And work is being done in laboratories and clinics around the globe to find further solutions.
Your donations to ATA have significantly impacted the advancements toward cures for tinnitus and hyperacusis. ATA is the premier organization offering education about tinnitus and hyperacusis management solutions and prevention techniques. One of the latest ways we are doing this is by bringing the researchers into your homes through our bimonthly webinars. During these broadcasts, you can interact and ask questions of researchers and clinicians about their area of study and presentation topic. While ATA does not endorse or recommend any particular product, treatment strategy or company, we do recommend scientifically-based therapies, proven treatments and management tools. We are getting closer to cures for all types of tinnitus, but rather than a single cure, more likely than not, there will be a multitude of solutions.

Warm regards,
Melanie F. West
ATA Chair/CEO

1 For more information on hyperacusis see Hyperacusis: When Normal Sound Can Hurt. May 17, 2016 webinar in the Members section at ATA.org.
2 For more information on cochlear implants see: Cochlear Implants/Electrical Stimulation; The Relationship to Tinnitus & Hyperacusis July 12, 2016 webinar in the Members section at ATA.org.
Noise Canceling Headphones

I have been reading *Tinnitus Today* for decades. In each publication, I pray there will be an article to help deal with my tinnitus. For 29 years I could not attend wedding receptions, indoor sports and musical plays. White noise no longer helps and I can’t afford expensive sound therapy devices.

In searching for hearing protection that would allow me to attend social functions, I found that typical headsets did not totally block out loud noise with the added problem that I could not hear people speaking or singing. Well, I finally found a headset device that permits me to attend these functions and still hear conversations, singing, and other wanted sounds.

Unlike other expensive headsets that electronically block out noise, this headset only cost me $14.99, and I believe works better than most. It is called “Noise Canceling Electronic Ear Muffs,” and I found it at a chain store called Harbor Freight and it is made by Western Safety (visit Harborfreight.com and search for product number 92851).

These ear muffs screen out noise over 85 decibels (dB) and blocks out only the sound that exceeds 85 dB. At the same time, you can hear and adjust the volume of conversations and music. I sincerely hope this information can help some of the folks that suffer from this debilitating disorder. Thank you ATA for your commitment to help tinnitus sufferers – without you we would not have an organization to turn to.

Patrick Granowski
ATA Member

Cyclical Tinnitus

I have been an ATA member for many years. Over that time, I have seen many expensive studies that never seem to find a cure. I have an idea that maybe someone can do some research on. My tinnitus seems to be on a four day cycle. On my good days my tinnitus is gone (inaudible). My suggestion is to do a brain scan on me during my cycle to see any differences that might determine why my tinnitus comes and goes. It does not make sense that a brain, ear or hearing problem like tinnitus can disappear and then appear.

Norm Leeman
ATA Member

Thank you Norm for your long term support of ATA and thank you for sharing a little bit about your tinnitus experience. While it may seem like any one particular research study has yet to find a cure, I can tell you that every single study that ATA has funded – and those funded by other organizations and agencies – are all helping the scientific community to better understand tinnitus and get closer to those seemingly elusive cures. As Melanie West noted in her column on page 4 in this issue, research has demonstrated that there will likely be a multitude of cures for tinnitus and hyperacusis – not just one.

Another important point that you make in your letter is that you have noticed a four day cycle. Your experience is actually not that unusual – in fact many people with tinnitus report changes in their tinnitus from day to day and even within a few hours. So many factors can modulate tinnitus perception and researchers are definitely in tune with this phenomenon.
I also appreciate your willingness to be a study participant – as this type of volunteerism is essential for the research community to find eventual cures for tinnitus. One way you can participate in clinical trials is to frequent ClinicalTrials.gov and type in “tinnitus.” This will bring up all the tinnitus research studies that are ongoing and you may just find one in your area or elsewhere that you are a candidate for participation.

Thank you for sharing your experience and thank you again for being an ATA member. Without you, we could not continue our important work toward a multitude of solutions for everyone with tinnitus and hyperacusis.

The Battle Within

I don’t know if this is a positive or negative story at this point – maybe it’s a little of both – but I wanted to share it in the hopes it may help others.

I am a 59-year old male who is about one month into my tinnitus, which came on suddenly and is a steady noise. The one aspect of my personality that I treasured was peace of mind – this helped me frame the world and my relationship to God and people. With the tinnitus, I felt that this was wrenched from me and undermined my whole core.

I am by nature, an introvert. Any introvert under stress is probably doubly impacted since all the negative energy and thoughts are lasered inwards with no escape route. The body, brain and central nervous system go into overdrive and frantically look for ways out (or more insidiously, ways IN). I’ve read articles, looked at supplements, seen doctors, worked with a cognitive therapist, taken sleep meds with varying degrees of success. I’ve written affirmations on my white board (patience, trust, discipline, acceptance) one day, then modified them the next day.

Sleep deprivation does very strange things to your body chemistry and a lot of bizarre, terrifying and unnerving thoughts drift in and out of consciousness. On more than one occasion, I’ve felt hopeless – or on the verge of losing it. Every positive was counteracted with a negative thought – all of the bad things (or perceived bad things) that I’ve done in my life come back to me. It’s like a tug-of-war is going on in my head and it builds and builds throughout the day to the point of wearing me down to the breaking point of raw anger or raw sorrow.

But I am evolving and learning.

I’m learning that my body is in an unusual state of stress at the moment and that this will change through cognitive and medicinal intervention. The cognitive work is foundational and may not bear fruit immediately. It’s hard to tell someone to relax and focus on breathing and positive thoughts when the body and brain are over-extended. The tinnitus acclimation period is still going on and intense, however there are fleeting moments during the day and at night where it doesn’t occupy the entirety of my conscious. This is a natural psychological and physiological progression at whatever pace my body and brain is dictating. I think it’s important to recognize that the body is in flux as is the mind’s reaction to it. Good moments count for something.

I’m also learning that things will eventually return to some form of steady state. And if I do my due diligence in therapeutic counseling by taking care of my body, being mindfully busy (not just looking for distractions), and – most importantly believing in myself then I’ll settle into that new steady state. Because of my acute awareness of mind and body – this state may actually be at a higher level of functioning than before, or maybe it will be a notch below it – but eventually the residue will be sifted out and I’ll be left with something I can manage.

I decided to send this to you now because this may be helpful for others who are just starting their tinnitus journey and may be looking for the answer a bit prematurely. Given my psychological and physiological reaction to tinnitus, I am probably one of the hardest cases – but I feel like things are happening and I want others to know it can for them too.

Pete Dillman
ATA Member

To share your own story or comment, write to editor@ata.org or Tinnitus Today Editor, ATA, P.O. Box 5, Portland, OR 97207.
A Cochlear implants (CIs) involve surgery to insert electrodes into the cochlea (inner ear). A CI can restore a fair amount of hearing to an ear with hearing loss that does not benefit from a hearing aid. CIs have been reported to reduce tinnitus, so it is natural to be curious about receiving a CI just for this purpose. Unfortunately, CIs are not an option for tinnitus management, unless the hearing loss criterion is met. They involve fairly extensive surgery, which in effect would destroy an ear’s normal functioning. It is thought that the electrical current generated by a CI is what suppresses tinnitus. Research is underway to try to discover a non-destructive method of targeting the cochlea with current for tinnitus suppression.

Q I have tinnitus but also have hyperacusis. Are there treatments for tinnitus that also work for those that have hyperacusis?

A Generally, the use of sound as a therapy for tinnitus is also helpful for hyperacusis (defined as decreased tolerance to sound that is easily tolerated by most other people). In fact, the use of sound is currently the primary means of treating hyperacusis, so “sound therapy” does double-duty for people who have both tinnitus and hyperacusis. To treat hyperacusis, the use of sound should be near-continuous and comfortable to listen to. It is also important not to wear hearing protection any more than absolutely necessary because overuse can actually make the ears less tolerant to sound.

Q I recently got hearing aids and after wearing them for two weeks I developed tinnitus. Everything I read talks about hearing aids helping to quiet tinnitus – not cause it. What’s going on here?

A Hearing aids raise the level of sound going into the ear, which reduces the contrast between tinnitus and the sound environment. For this reason, hearing aids are generally helpful for making tinnitus less prominent and, consequently, less noticeable. It would be rare, but not inconceivable, for a person who does not have tinnitus and receives new hearing aids to develop tinnitus after wearing the hearing aids for two weeks. Possible reasons? (1) The emergence of tinnitus during hearing aid use was a coincidence. (2) The hearing aids provided so much amplification that temporary tinnitus was induced, same as for exposure to loud noise. (3) Tinnitus was already present at a very low level, and the amplified sound exacerbated the low-level tinnitus, making it louder.

Q I read about Mindfulness Based Tinnitus Stress Reduction therapy in the last issue of Tinnitus Today. Does it really work to help people lower their tinnitus? Or does it just act as a stress reliever?

A The three basic methods for reducing reactions to tinnitus are the use of (1) sound as therapy, (2) self-help (coping) skills, and (3) stress reduction techniques. Mindfulness therapy teaches coping skills and stress reduction techniques, so it would seem logical that it would be helpful for tinnitus management. This is a promising method that does not yet have strong research evidence. The guidelines published by the American Academy of Otolaryngology – Head and Neck Surgery should be considered the standard that guides clinical tinnitus management (see the Spring 2015 issue of Tinnitus Today for more information on these clinical guidelines).
With more than a foot of snow on the ground in early February 2008, it was an unlikely day for getting a tree removed at our home. That year, there had been many bad storms taking down nearby trees and I had a growing concern about a big Oak tree in our yard that could fall and damage our house during a subsequent storm. I came home from work for a few hours to monitor the cutting process which involved tying various segments of the tree off by ropes and then cutting them with a chainsaw one at a time – allowing them to swing in the direction of the house but narrowly missing the roof. After about an hour, the core part of the tree was down and I could relax and have lunch with my wife while the final removal was completed. Little did I realize that the most dangerous component of the work was just beginning. I had wrongly assumed that the large sections of the tree would be cut into firewood and carried away by the tree removal company. Instead their approach was to chip up the entire tree including huge sections of the trunk. This required an industrial size wood chipper. To simplify their work, they placed the wood chipper about a foot from our house and began chipping up the tree. I remember looking out the window and thinking how incredibly loud the chipper was. After a little more than an hour I headed back to work, walking right by the wood chipper. Several hours later, my wife also headed out, passing right by it.

Diagnosing and Treating Hyperacusis

That night my wife told me her ears were in pain. At the time, mine were seemingly fine. We had no idea the extent of the damage that the exposure to the wood chipper had done or how life altering this event would turn out to be. She, like most every other noise-induced hyperacusis case, started down a confusing medical maze finding very little help. First, a basic clinical screening led her to an audiologist (Au.D.), where her audiogram and several other tests were ‘normal.’ Then she was referred to one of the best Otolaryngologists (ENT) within our health plan who basically concluded that her ears were fine. My wife determined that the ear pain would subside if she was in quiet environments and that it was mostly noise that induced new rounds of pain. Meanwhile, like many with this strange affliction, we were only able to learn about hyperacusis from internet searches for loud noise and ear pain.

About two weeks later, after visiting a children’s museum and going swimming, my ears felt an unusual burning sensation. They also felt like they had water in them – especially my right ear. While I had just barely begun to uncover that my wife’s diagnosis was hyperacusis, I began my own medical pursuit for what seemed like normal ‘swimmer’s ear.’ But after getting similar screenings as my wife, and everything appearing ‘normal’, I realized that my ears were starting to hurt from loud noises as well. After getting little help from other ENTs, we decided to try the only Au.D., who listed hyperacusis as a focus on her website. The audiologist’s approach was a modified version of Tinnitus Retraining Therapy with white noise generator devices to be used as many hours a day as we could tolerate.

After many months of 90 mile round trip follow-up visits, I continued with sound therapy while my wife didn’t see much benefit. A year later my Loudness Discomfort Levels (LDLs) were basically equivalent to where I started. Life was definitely different, but we could go many places with ear protection – just not loud places with music and we couldn’t be near landscapers using leaf blowers, lawn mowers or other similar sources of loud noise.

Unfortunately the real challenges were just beginning. We heard much about the need to not be anxious about loud sounds because ‘everyday sounds can’t hurt your ears.’ Unfortunately following this advice led to a traumatic setback for my wife when she was exposed to a new loud noise making her hyperacusis significantly worse. This event was incredibly life altering and we had already pursued the only known path for possible improvement.
Hyperacusis: A Journey of Discovery

Searching for Real Answers

I began to seek better answers. With a degree in Electrical Engineering, I was not well equipped to understand much about the auditory system beyond the basic mechanical and electrical components. So while I had a lot to learn, it was easy at that time to read literally every published document on hyperacusis very quickly since there was so little. As an Engineer focused on problem solving, I had one key focus – what is the suspected mechanism? In particular, what is the mechanism of the pain associated with hyperacusis? The sum of every peer reviewed research paper that had any in-depth discussion of the mechanism of hyperacusis was miniscule. Much of it was confusingly lumped in with the possible mechanism(s) of tinnitus. Most of it was completely theoretical with little evidence to support the ideas. For me getting answers was not a theoretical concern – it was a life concern.

So, as I studied research papers, I began emailing the researchers. Surprisingly, many emailed me back. As I dug deeper I was surprised to learn how much about the details of how the ear works is still unknown. Most all basic ear research was focused on ways the ears can be damaged to cause hearing loss. Very little has been done to investigate why sounds may suddenly seem too loud. I quickly moved beyond the few people who were actively researching hyperacusis mechanisms to the broader ear and hearing research community. Soon, I connected with a renowned ear researcher – Professor David Mountain, Ph.D., at Boston University. His background originated in Electrical Engineering so we had a lot in common in the way we viewed problems. He had barely ever considered hyperacusis as his work focused on basic fundamentals of ear function. But he was eager to help and he invited me to his Boston office which literally had papers stacked from the floor to well above his desk (like the classic TV professor). We spent many hours reviewing not only what little was known about hyperacusis but also attempting to connect many dots in other people’s research that could be applicable to hyperacusis. He strongly supported the idea that hyperacusis needed to be investigated independently from tinnitus even though the two are frequently co-morbid conditions.

While my wife was recovering from the big setback, I was getting more knowledge about possible mechanisms – with a focus to understand why new noise exposures could be damaging. While many doctors were stating that ‘no damage had occurred’ with the setback, it didn’t really fit with what I was learning. Over the next year or so, I connected with dozens of researchers. I was amazed at the time that they would take to answer all my questions. I started to try to assimilate what I had learned into a cohesive flow of information. I decided that the best way to keep engaging researchers was to put all this information onto a website for reference. Naturally, along the way I had connected with many other hyperacusis sufferers and the website was also helpful for discussions with them. By the time I was ready to register the domain, I knew that someday it would be ideal to have a nonprofit for this effort so I chose the name Hyperacusisresearch.org, which launched in 2010.

This led to a big increase in connections with patients and many were relaying similar stories. Some had studied the research in a more in-depth way and some natural collaboration was started. A few key hyperacusis sufferers joined in the work to find a current auditory nonprofit which would possibly pick up hyperacusis as a focus area. But it soon was evident that the best approach would be a purpose-built nonprofit solely focused on finding the cause and ultimately a cure for hyperacusis. So Hyperacusis Research was officially incorporated in Massachusetts in May of 2011.

Charting the Course for Hyperacusis Patients Through Research

Since the start it has been an amazing journey of discovery. Of course, the real discoveries are new groundbreaking scientific findings that seemed decades away just a few years ago. But what made this possible in such a short time was the connection with researchers who formed strong partnerships with common goals even before we could fund their projects. The other discovery is the people who are willing to give so much of their time to help because they are living a very challenging life with severe hyperacusis.

By 2012 we were starting to get enough donations to fund our first small grant. It became evident that the first step was to formally assimilate all of the published literature on hyperacusis into one review paper. However, we didn’t have a large enough presence within the research community yet to ensure the best grant proposals. We were able to form a partnership with the Hearing Health Foundation (HHF) so the grant was administered through their grant program based on our support. Richard Tyler, Ph.D., from the University of Iowa was awarded the funds and he along with a strong academic team completed a very comprehensive literature review. The paper was published in the December 2014 *American Journal of Audiology*.

While this start was helpful, I knew it was vital to get the critical need for in-depth hyperacusis research into the broader ear and hearing research community.
Professor Mountain pointed us to the Association for Research in Otolaryngology (ARO) as the premier forum for basic ear scientists. With the help of Peter Steyger, Ph.D., at Oregon Health & Science University, we drafted a proposal for the first ever hyperacusis workshop at the ARO meeting. While the topic of tinnitus had been growing at the ARO meetings, hyperacusis had only a few previous presentations dedicated to the topic. Our proposal was accepted for the 2013 ARO Midwinter Meeting and four speakers covered key fundamentals of hyperacusis. The session was well attended and many new connections were made including my first meeting with Richard Salvi, Ph.D., from the State University of New York at Buffalo.1

Meanwhile, fundraising to fund more research was needed. This seemed a much more daunting task compared with the relative ease of making research connections. So we held a small fundraiser at a local miniature golf site. We raised only a small amount of money, but it helped create more awareness of hyperacusis and our nonprofit. Two key media breakthroughs came in 2014 when the ABC News program 20/20 featured a hyperacusis story titled, “On the Quest for Silence: Living With Hyperacusis.” The New York Times also featured an article called “When Everyday Noise Is Unbearable.” This resulted in a flurry of new contacts and soon to be supporters. Many said that until seeing one of these stories they never knew that the condition that they (or a loved one) had was a medically labeled condition with a name and real research being done to better understand and treat it.

Fundraising continued to grow and we were able to be a major sponsor of a $30,000 Emerging Research Grant (ERG) focused on hyperacusis mechanisms via HHF. We also saw an increase in funded grants at the National Institutes of Health for hyperacusis and an overall growth in the number of hyperacusis projects at other academic research institutions. At the 2015 ARO Midwinter Meeting, we sponsored a Roadmap to a Cure dinner with about 30 researchers and supporters. At this special meeting we outlined a hyperacusis specific roadmap modeling ATA’s own Roadmap to a Cure.

In 2015, additional media attention helped with the forward progress of fundraising and awareness. Hyperacusis Research was featured in a syndicated news story: “Hyperacusis: When Hearing Hurts,” which appeared on a number of CBS affiliates and Yahoo News. Hyperacusis Research was also able to sponsor a second HHF Emerging Research grant on hyperacusis pain mechanisms.

The most exciting research news came this year with some breakthrough findings that were presented at the 2016 ARO Midwinter Meeting. I was able to introduce a forum on “Auditory Nociception and Pain Hyperacusis.” M. Charles Liberman, Ph.D., Professor of Otolaryngology at Harvard Medical School, described the differences of Type I versus Type II nerve fibers in the cochlea. Jaime García-Áñoveros, Ph.D., Associate Professor at Northwestern University, described a new term called auditory nociception which is a scientific way of saying these Type II nerve fibers appear to signal pain. Pulling all the concepts together, Allan Basbaum, Ph.D., Professor of Anatomy at the University of California, San Francisco, linked concepts from his work in the biology of neuropathic pain to hyperacusis with pain. Upon reading our summary of this important research milestone, many sufferers expressed gratitude to finally have a meaningful path of research for the pain component of hyperacusis. Of course, it is only a start to the work of uncovering exactly why this pain is triggered in hyperacusis patients with ‘everyday noise.’ While many theoretical paths exist, especially when you consider what is being uncovered in pain research, each path will take time and research money to pursue.

As an Engineer, I’m more hopeful than ever because now a solid research foundation exists for moving forward. There are of course other important paths related to hyperacusis mechanisms being pursued beyond what is described in this article. Some of these have been funded by ATA or by NIH grants. And ATA’s decision to revise its mission in 2016 to include hyperacusis will undoubtedly continue to help propel this condition forward through awareness, education and research. It will take all of us partnering together to conclude this journey of discovery with the cures that will restore quality of life back to those with even the most severe hyperacusis.

1 View ATA’s May 2016 webinar on Hyperacusis featuring Bryan Pollard and Dr. Salvi in the Members section at ATA.org.
Many sources state or imply that sounds as loud as 85 decibels (dB) are safe and are “unlikely to cause damage.” This is wrong. The only evidence-based safe noise level for hearing is a surprisingly low 70 dB average noise exposure for 24 hours. An 85 dB sound is 15 times (1500%) louder than a 70 dB sound, not just 21% louder as one might think if one doesn’t understand the science of sound. And the medical science of sound is clear, too: loud noise causes deafness. It also contributes to the onset or worsening of conditions like tinnitus and hyperacusis.

Many sources state or imply that sounds as loud as 85 decibels (dB) are safe and are “unlikely to cause damage.” This is wrong. The only evidence-based safe noise level for hearing is a surprisingly low 70 dB average noise exposure for 24 hours. An 85 dB sound is 15 times (1500%) louder than a 70 dB sound, not just 21% louder as one might think if one doesn’t understand the science of sound. And the medical science of sound is clear, too: loud noise causes deafness. It also contributes to the onset or worsening of conditions like tinnitus and hyperacusis.

Many sources state or imply that sounds as loud as 85 decibels (dB) are safe and are “unlikely to cause damage.” This is wrong. The only evidence-based safe noise level for hearing is a surprisingly low 70 dB average noise exposure for 24 hours. An 85 dB sound is 15 times (1500%) louder than a 70 dB sound, not just 21% louder as one might think if one doesn’t understand the science of sound. And the medical science of sound is clear, too: loud noise causes deafness. It also contributes to the onset or worsening of conditions like tinnitus and hyperacusis.

How Does Sound Work?

Sound energy travels in waves which if strong enough, damage the sensory organ of hearing, the cochlear hair cells. When these hair cells are damaged hearing loss begins to occur. Absolute sound intensity measures how much sound energy passes a given area in a given amount of time. Intensity is dependent upon the amplitude of the sound wave squared. Sound energy is similar to electrical energy in that we can utilize a unit of watts for describing it. So why have you never heard of 100 watts (per meter²) of sound intensity? Long ago it was decided that the main interest in sound energy measurements related solely to the perception capabilities of the human ear. Rather than using a raw ‘watt’ of sound energy measurement, all sounds are compared to the

What Does “Loud” Mean?

The loudness of sound is measured in decibels (dB). The following chart demonstrates examples of common sounds and their associated approximate sound levels.

<table>
<thead>
<tr>
<th>Decibels</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 dB</td>
<td>Ticking watch</td>
</tr>
<tr>
<td>30 dB</td>
<td>Quiet whisper</td>
</tr>
<tr>
<td>40 dB</td>
<td>Refrigerator hum</td>
</tr>
<tr>
<td>50 dB</td>
<td>Rainfall</td>
</tr>
<tr>
<td>60 dB</td>
<td>Sewing machine</td>
</tr>
<tr>
<td>70 dB</td>
<td>Washing machine</td>
</tr>
<tr>
<td>80 dB</td>
<td>Alarm clock (two feet away)</td>
</tr>
<tr>
<td>85 dB</td>
<td>Average traffic</td>
</tr>
</tbody>
</table>
threshold of human hearing which is $10^{-12}$ watts/m². A measure of sound pressure is more useful than raw sound intensity, since microphones can only `measure' sound pressure. Sound intensity is proportional to the sound pressure squared so the threshold of human hearing in pressure units is $2 \times 10^{-5}$ Newtons/m. A sound meter measures the sound pressure and divides it by the threshold of hearing to give a ratio called the “decibel,” named in honor of Alexander Graham Bell.

Because the human ear can perceive such a broad range of sound intensity a logarithmic scale is used. So 10 dB represents a sound that is 10 times louder than the threshold of hearing. Fifty dB represents a sound that is 100,000 times ($10^5$) louder than the threshold of hearing. An 80 dB sound is ten times louder (ten times more energy) than a 70 dB sound. But the human ear adapts to loud noise, so the 80 dB sound is only perceived as twice as loud as the 70 dB sound. Unfortunately, hearing damage is based on the real sound energy and not the perceived loudness.

To further complicate things, scientists determined that the human ear does not perceive low frequency sounds as loud as higher frequency sounds so they created a weighted decibel scale. The industry standard became the A weighted scale (dBA) which significantly reduces the sound pressure levels below 1000 Hz for the total sound pressure calculation (see “What Does Loud Mean” graphic). In measuring sound levels, the A weighting is typically used.

**How Loud is Too Loud?**

An internet search for “safe noise level” first finds several links giving 85 dB. These sites do not come right out and state, “85 decibels is a safe noise exposure level for your ears,” but imply that with statements such as “exposure to noise above 85 decibels can cause hearing loss.” No time limit is given, but we would not blame someone for thinking, “Gee, any sound up to 85 decibels is safe.” The 85 dB number is also found in a recent World Health Organization (WHO) publication, although at least WHO gave an eight hour exposure limit.

A search for “safe noise level in Europe” finds 80 dB, again without a time limit for the public. A 1990 National Institutes of Health Consensus Development Conference on Noise and Hearing Loss states, “Sound levels of less than 75 dB(A) are unlikely to cause permanent hearing loss, while sound levels about 85 dB(A) with exposures of 8 hours per day will produce permanent hearing loss.”

<table>
<thead>
<tr>
<th>dB</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>MRI</td>
</tr>
<tr>
<td>100</td>
<td>Blow dryer, subway train</td>
</tr>
<tr>
<td>105</td>
<td>Power mower, chainsaw</td>
</tr>
<tr>
<td>110</td>
<td>Screaming child</td>
</tr>
<tr>
<td>120</td>
<td>Rock concert, thunderclap</td>
</tr>
<tr>
<td>130</td>
<td>Jackhammer, jet plane (100 feet away)</td>
</tr>
</tbody>
</table>
loss after many years.” No source other than expert opinion is given for this statement.

It took a year to find out why people thought such a loud sound level was safe for environmental noise exposure for the public, but as recently explained in the National Institute on Occupational Safety and Health (NIOSH) science blog, 85 dB is a recommended occupational noise exposure level, not a safe general environmental noise exposure level. The Occupational Safety and Health Administration sets an even higher noise exposure level, 90 decibels for eight hours, as the maximum permissible exposure level for occupational noise for all workers for an eight hour day, but mandates that employers institute a hearing conservation program at 85 dB. Hearing Conservation Programs require employers to measure workplace noise levels, provide free annual hearing exams and free hearing protection, provide training, and conduct evaluations of the adequacy of the hearing protectors in use unless changes to tools, equipment and schedules are made so that they are less noisy and worker exposure to noise is less than the 85 dBA.1

At 85 decibels occupational noise exposure, eight percent of workers will develop significant hearing loss. When the NIOSH recommended occupational noise exposure standard was developed, it was assumed that workers would go home to a quiet environment. That assumption is no longer true for many, if not most, Americans.

The public is exposed to noise 24 hours a day, 365 days a year, for an average life span of 78 years. The Environmental Protection Agency adjusted the workplace noise exposure level for the greater time the public is exposed to noise, added a safety factor, and determined that a noise exposure level of 70 decibels average for 24 hours will protect the hearing of 96 percent of the public. This is the only evidence-based safe noise exposure level.

Returning to the question in the title, the only evidence-based safe noise level for the public is an average of 70 dB over 24 hours.

Keep Your Ears Protected

The availability of sound meter apps for smart phones allows one to easily measure and keep track of their environmental noise levels. Eight-five dB is very loud, 80 dB is still too loud, 75 dB is tolerable but would be uncomfortable after a while. Seventy dB is comfortable. But you really don’t need a sound meter or app on your phone to tell if it’s too loud. Using common sense can be an effective tool too. If you have to strain to speak or to be heard in a normal conversation with someone about three feet away, the ambient noise level is louder than 70 dB and your hearing may be damaged.

We want to add a caution about impulse noise too. Impulse noise is brief in time but extremely loud. The effect of impulse noise on hearing is hard to study, even for workers, and there are no studies of impulse noise on hearing for the public. But anecdotal reports of hearing loss, tinnitus, and/or hyperacusis from a one-time exposure to loud noise make it prudent to avoid impulse noise, and if unavoidable (e.g., an emergency vehicle passes while you are standing on a street corner) don’t be embarrassed to stick your fingers in your ears to muffle the noise.

Returning to the question in the title, the only evidence-based safe noise level for the public is an average of 70 dB over 24 hours. It has been difficult to advocate for quiet when 85 dB appeared to be an acceptable sound level for the public on many credible websites and sources. Now we know better. Noise-induced hearing loss is entirely preventable. Protect your ears. Ask for quiet. Advocate for quiet. Together we can make the world a quieter place. A safer place for our ears. A place in which those with or without hearing loss, with or without the use of hearing aids, can converse with each other without shouting.

It’s worth the fight!

1 Osha.gov/SLTC/noisehearingconservation/.
Habituation of tinnitus, the process whereby over time you tend to become less and less bothered by your tinnitus and whereby as a consequence you tend to become less and less aware of your tinnitus, is a completely natural phenomenon. It happens automatically unless there are barriers blocking your way. Habituation certainly does not happen overnight, but it does happen. Eliminate the barriers and habituation of tinnitus will happen as assuredly as sunrise follows sunset.

Barriers to Habituation

Stephen M. Nagler, M.D.

The problem comes down to identifying your barriers, removing the barriers that are under your direct control, and (when needed) adopting a strategy for facilitating the removal of those barriers that are not under your direct control.

The challenge lies in the fact that sometimes it is not so easy to identify all of your barriers to habituation. Moreover, since you are (obviously) not in control of the barriers you do not control, through no fault of your own even a best effort can fall short.

What follows is not some sort of scientific treatise. Rather, it is the way I personally have come to view things after more than 20 years in the trenches, both as a tinnitus patient and a tinnitus clinician.

The barriers to habituation of tinnitus fall into two main categories: external barriers and internal barriers.

External Barriers

The external barriers to habituation are those factors that are largely under your own control and result in your attending to your tinnitus more than is absolutely necessary. I cannot give a comprehensive listing, and certainly every tinnitus sufferer has his or her own external barriers. But here are some examples:

- **Keeping tinnitus diaries.** Most everybody does it at first in order to try to “figure out” his or her tinnitus. But once you have figured out that you cannot figure out your tinnitus, which takes a week or two at most, then why continue the diary? Indeed continuing to keep a tinnitus diary serves only to force you to think about your tinnitus more instead of less.

- **Talking about your tinnitus** once, twice, three times or more a day with your spouse or partner. Fortunately it is very rare that tinnitus presents a true emergency. It is more typical that there are non-emergent swings in tinnitus-related distress, and whenever you are having a bad time of it, you naturally want to discuss it with your spouse or partner, a person who has a vested interest in your well-being. Bad idea, in my opinion. Because when you are discussing your tinnitus, you are attending to it, which is precisely what you do not want to be doing. My suggestion would be to make “tinnitus dates” with your spouse or partner. Every Monday and Thursday from 6 to 7 PM (for instance), your spouse or partner agrees to be unconditionally available to you to discuss your tinnitus should you wish to do so. This system has the added advantage that he or she will not be blind-sided by your wanting to talk about it at other times, times when he or she might have other important things to do. In a similar vein, your spouse or partner agrees never to bring the subject of your tinnitus up to you. The time for discussing your tinnitus is during your tinnitus dates, and then only if you bring up the subject.
Barriers to Habituation

- **Internet tinnitus support boards.** Tinnitus support boards can be a very good thing. They can provide information. They can provide understanding and reassurance. And they can provide camaraderie. But they can also potentially serve as huge external barriers to habituation. So participation on such boards, regardless of how well they are moderated, can be a real balancing act. Some of the possible barriers of using these forums include:

1. **Bad information.** While tinnitus support boards do provide information, not all of it is good information. And just because a piece of information makes good sense, it does not make it good information. If your goal is habituation, I respectfully suggest that unrecognized bad information is not going to be your greatest ally.

2. **The company you are keeping.** Tinnitus support boards tend to be dominated by individuals who have not yet overcome their tinnitus or they wouldn’t be there in the first place. So you need to ask yourself how healthy it is to be continually exposed to postings from those who have not yet managed to figure out how to achieve for themselves precisely that which you desire to achieve for yourself. More than that, many are absolutely convinced that for one reason or another it cannot be achieved at all! To me, this self-defeating mindset can make for a particularly toxic environment given your goal.

3. **Making the wrong kind of friends.** The camaraderie can be addicting. It is natural to want to be around folks who are all “in the same boat” as you. But your goal is to get out of that boat – so perhaps you might be better off spending time with individuals with whom you share a bond that has absolutely nothing to do with tinnitus.

If your ultimate goal is habituation, then in my opinion you should strictly limit the amount of time you unnecessarily attend to your tinnitus. It is you and only you who can determine where that limit lies.

Internal Barriers

Which brings us to the internal barriers to habituation, those factors over which you have little, if any, direct control. As with the external barriers, I cannot offer a comprehensive list. But that said, the internal barriers tend to fall into two main categories: the limbic and the autonomic.

**Limbic factors.** The limbic system is a major emotional seat of the brain, but the limbic consequences of tinnitus go far beyond fearing your tinnitus or viewing it as a threat. Frustration due to the loss of control, sadness because of the loss of silence, concern regarding the future, and resentment over what has happened to you are but some of the ways the limbic system commonly finds expression in the daily lives of tinnitus sufferers. And simply telling yourself over and over again not to be so viscerally upset about such a cataclysmic course of events? Well that strategy is counterproductive and simply will not work.

**Autonomic factors.** As profound as the limbic factors might be, they are dwarfed by the autonomic factors – and by the interplay between the limbic and autonomic factors. Your autonomic nervous system
plays a vital role in protecting you from danger, and (as is the case with your limbic system) you have little, if any, direct control over it. For instance, in a dark room the pupils of your eyes will dilate to let in as much light as possible in order to protect you from what might be lurking in the shadows. You do not tell your pupils to dilate; that function is controlled by your autonomic nervous system. And try as you might, you simply cannot make your pupils constrict in a dark room. Well, as a tinnitus sufferer you have the guest from hell in your head, the uncle who invited himself and simply will not leave. So what does your autonomic nervous system do in response to this omnipresent amorphous intruder? It does exactly what it is supposed to do – it continually monitors your tinnitus. In other words, your autonomic nervous system is acting in powerful opposition to your goal (which is to stop monitoring your tinnitus), and there is nothing you can directly do to change that state of affairs, not unless you can figure out a way to cause your pupils to constrict in a dark room!

So where does that leave us? Surely we need to do our very best to recognize our external barriers to habituation and eliminate them. These barriers are indeed largely within our direct control as noted earlier. In some instances we might benefit from the assistance of an experienced and objective eye in identifying them, but we can do much of it on our own. It is the internal barriers to habituation, the ones over which we have no direct control, that present the real problem. If identifying and directly addressing your external barriers to habituation does not get you where you need to go, then you might want to consider indirectly addressing your internal barriers to habituation, those limbic and autonomic factors over which you have no direct control, through approaches such as cognitive behavioral therapy (CBT), Tinnitus Retraining Therapy (TRT), or other habituation-based protocols.

Dr. Stephen Nagler is a former Chairman of the Board of Directors of the American Tinnitus Association. He is the Director of Atlanta Tinnitus Consultants, LLC and runs a Q & A tinnitus site on the Internet at www.tinn.com.
Scientists around the world are studying tinnitus, to better understand the condition, and to find new treatments and cures. Below is a summary of just some of the research that has been published over the last few months.

Full abstracts for all research papers are available at PubMed.gov, an online service of the U.S. National Library of Medicine, National Institutes of Health.

Research Review

The Occlusal Imaging and Analysis System by T-scan III in Tinnitus Patients

Biomedical Journal (April 2016)
Di Berardino F, Filipponi E, Schiappadori M, Forti S, Zanetti D, Cesarani A

Although several studies have demonstrated that the prevalence of temporomandibular disorders (TMDs) in tinnitus patients ranges from 7% to 95%, and it is reported in literature that idiopathic tinnitus patients should be referred to a dentist to define whether or not the tinnitus is associated with TMD, the possible pathophysiological relation between TMDs and tinnitus is not generally investigated in clinical practice. This study aimed to help define a clinical tool that could help dentists better understand the possible relationship between TMDs and tinnitus.

The patterns and forces of occlusal contacts (the grinding or biting surface of a tooth) were studied by means of T-scan III in 47 tinnitus patients. The center of force target was offset in the opposite direction in 15/23 idiopathic tinnitus patients and in 7/24 Meniere’s disease patients. No significant variation was found in the occlusal force. These findings suggest that a diagnostic screening method for occlusal stability in the intercuspidal position might be clinically useful in idiopathic tinnitus patients.

A Proof-of-Concept Study on the Combination of Repetitive Transcranial Magnetic Stimulation and Relaxation Techniques in Chronic Tinnitus

Journal of Neural Transmission (June 2016)
Kreuzer PM, Poeppl TB, Bulla J, Schlee W, Lehner A, Langguth B, Schecklmann M

This study combined repetitive transcranial magnetic stimulation (rTMS) and relaxation techniques to improve rTMS outcomes for tinnitus patients. Forty-two patients were enrolled in this study to receive ten sessions of rTMS applied to the left dorsolateral prefrontal cortex and temporo-parietal cortex. During stimulation, patients listened to five different kinds of relaxation audio tracks. Variables of interest that were measured included tinnitus questionnaires, tinnitus numeric rating scales, changes in reported depression, and quality of life. Results were compared to results of historical control groups having received the same rTMS protocol (active control) and sham treatment (placebo) without relaxation techniques like the audio. Thirty-eight patients completed the treatment and drop-out rates and adverse events were low. Responder rates which were defined by reduction in tinnitus questionnaire (TQ) score ≥5 points 10 weeks after treatment, were 44.7% in the study, 27.8% in the active control group, and 21.7% in the placebo group. For the tinnitus handicap inventory (THI), the main effect of the group was not significant. However, linear mixed model analyses showed that the relaxation/rTMS group differed significantly from the active control group showing steeper negative THI trend (meaning they had less of a tinnitus handicap after treatment) indicating better amelioration of tinnitus over the course of the trial. Deepness of relaxation during rTMS and selection of active relaxation vs. passive listening to...
music predicted larger changes in the TQ scores. This combined treatment proved to be a safe, feasible and promising approach to enhance rTMS treatment in chronic tinnitus.

An Investigation of Feasibility and Safety of Bi-Modal Stimulation for the Treatment of Tinnitus: An Open-Label Pilot Study

Neuromodulation (June 2016)
Hamilton C, D’Arcy S, Pearlmutter BA, Crispino G, Lalor EC, Conlon BJ

It is widely believed that tinnitus, in patients with associated hearing loss, is a neurological phenomenon primarily affecting the central auditory structures in the brain. However, there is growing evidence for the involvement of the somatosensory (touch) system in this form of tinnitus. For this reason it has been suggested that the condition may be amenable to bi-modal stimulation of the auditory and somatosensory systems. We conducted a pilot study to investigate the feasibility and safety of a device that delivers simultaneous auditory and somatosensory stimulation to treat the symptoms of chronic tinnitus.

Fifty-four patients used the stimulation device for 10 weeks. Auditory stimulation was delivered via headphones and somatosensory stimulation was delivered via electrical stimulation of the tongue. Patient usage, logged by the device, was used to classify patients as compliant or noncompliant. Safety was assessed by reported adverse events and changes in tinnitus outcome measures. Response to treatment was assessed using tinnitus outcome measures: Minimum Masking Level (MML), Tinnitus Loudness Matching (TLM), and Tinnitus Handicap Inventory (THI).

The results indicated that the device was well tolerated by patients and no adverse events or serious difficulties using the device were reported. Overall, 68% of patients met the defined compliance threshold. Compliant patients (N=30) demonstrated statistically significant improvements in mean outcome measures after 10 weeks of treatment: THI (-11.7 pts), TLM (-7.5dB), and MML (-9.7dB). The noncompliant group (N=14) demonstrated no statistical improvements.

This study demonstrates the feasibility and safety of a new bi-modal stimulation device and supports the potential efficacy of this new treatment for tinnitus.

Tinnitus is Associated with Reduced Sound Level Tolerance in Adolescents with Normal Audiograms and Otoacoustic Emissions

Scientific Reports (June 2016)
Sanchez TG, Moraes F, Casseb J, Cota J, Freire K, Roberts LE

Recent neuroscience research suggests that tinnitus may reflect synaptic loss in the cochlea that does not express in the audiogram but leads to neural changes in auditory pathways that reduce sound level tolerance (SLT). Adolescents (N=170) completed a questionnaire addressing their prior experience with tinnitus, potentially risky listening habits, and sensitivity to ordinary sounds, followed by psychoacoustic measurements in a sound booth. Among all adolescents 54.7% reported by questionnaire that they had previously experienced tinnitus, while 28.8% heard tinnitus in the booth. Psychoacoustic properties of tinnitus measured in the sound booth corresponded with those of chronic adult tinnitus sufferers. Neither hearing thresholds (≤15 dB HL to 16 kHz) nor otoacoustic emissions discriminated between adolescents reporting or not reporting tinnitus in the sound booth, but loudness discomfort levels (a psychoacoustic measure of SLT) did so, averaging 11.3 dB lower in adolescents experiencing tinnitus in the acoustic chamber. Although risky listening habits were near universal, the teenagers experiencing tinnitus and reduced SLT tended to be more protective of their hearing. Tinnitus and reduced SLT could be early indications of a vulnerability to hidden synaptic injury that is prevalent among adolescents and expressed following exposure to high level environmental sounds.
Prevalence of Tinnitus and Hyperacusis in Children and Adolescents: A Systematic Review

*BMJ Open* (June 2016)
Rosing SN, Schmidt JH, Wedderkopp N, Baguley DM

This study aimed to systematically review studies of the epidemiology of tinnitus and hyperacusis in children and young people, in order to determine the methodological differences implicated in the variability of prevalence estimates and the influence of population characteristics on childhood tinnitus and hyperacusis.

Studies addressing childhood prevalence, for example, children and young people aged 5-19 years were utilized in this analysis. Two reviewers independently assessed the studies for eligibility, extracted data and assessed study consistency.

One thousand thirty-two publications were identified and of those, 131 articles were selected. Of those, 25 articles met the full inclusion criteria and had sufficient methodological consistency to be part of the review. Prevalence estimates of tinnitus range from 4.7% to 46% in the general pediatric population and among children with normal hearing, and from 23.5% to 62.2% of population of children with hearing loss. Reported prevalence ranged from 6% to 41.9% when children with hearing loss and normal hearing were both included. The prevalence of hyperacusis varied from 3.2% to 17.1%.

Data on prevalence vary considerably according to the study design, study population and the research question posed. The age range of children studied was varied and a marked degree of variation between definitions (tinnitus, hyperacusis) and measures (severity, perception, annoyance) was observed. The lack of consistency among studies indicates the necessity of examining the epidemiology of tinnitus and hyperacusis in children and adolescents with a set of standardized criteria to better understand how it manifests in this population.

Neural Substrates Predicting Short-Term Improvement of Tinnitus Loudness and Distress after Modified Tinnitus Retraining Therapy

*Scientific Reports* (July 2016)

Although tinnitus retraining therapy (TRT) is efficacious in most patients, the exact mechanism is unclear and no predictor of improvement is available. This study correlated the extent of improvement with pre-TRT quantitative electroencephalography (qEEG) findings to identify neural predictors of improvement after TRT. Thirty-two patients with debilitating tinnitus were prospectively enrolled, and qEEG data were recorded before their initial TRT sessions. Three months later, these qEEG findings were correlated with the percent-age improvements in the Tinnitus Handicap Inventory (THI) scores, and numeric rating scale (NRS) scores of tinnitus loudness and tinnitus perception. The THI score improvement was positively correlated with the pre-treatment activities of the left insula and the left rostral and pregenual anterior cingulate cortices (rACC/pgACC), which control parasympathetic nervous system activity. Additionally, the activities of the right auditory cortices and the parahippocampus, areas that generate tinnitus, negatively correlated with improvements in loudness. Improvements in the NRS scores of tinnitus perception correlated positively with the pre-TRT activities of the bilateral rACC/pgACC, areas suggested to form the core of the noise-canceling system. This study supports both the classical neuro-physiological and integrative models of tinnitus, and serve as a milestone in the development of targeted and individualized therapies in the context of TRT.
How can your life make a difference to future generations? Include the American Tinnitus Association in your estate giving. Provide hope to others who have tinnitus and hyperacusis.

By including ATA in your will or trust, you can help support ATA programs like advancing research toward novel management techniques, pharmacological solutions or other state-of-the-art findings that might lead to cures for these conditions.

You will make a difference – ATA improves the lives of people with tinnitus and hyperacusis by providing hope of a quieter future through education, advocacy and research toward a cure. Like Jack Vernon, you can impact the lives of many.

Your benevolent gift can ensure:

- Your life changes the course of others’ lives who are less fortunate by providing educational opportunities and support through ATA programs;
- Your bequest in your will can represent something meaningful to you;
- Your experience or a loved one’s experience with tinnitus and hyperacusis leaves a legacy of hope for future generations with these conditions.

If you lose a loved one you can donate to ATA in their memory or request that people donate to ATA “in lieu of flowers”. You can honor your loved one and help others to understand tinnitus and hyperacusis and the challenges faced by those who suffer.

If there was a time when ATA helped you, either by providing dependable information about tinnitus, providing resources to find a proper health care professional to show you how to manage your tinnitus, or by just giving you hope that you were not alone in your journey with tinnitus and hyperacusis, then this is your chance to pay it forward through your estate planning. We ask each member and donor to add ATA as a beneficiary in your will by contacting your lawyer or other estate planning professional, and explore the ways such a bequest can reduce your taxes.

If you’ve joined the Jack Vernon Legacy Society by making arrangements for ATA in your estate plans, thank you. If you would like more information, please contact us. Clip and send us the slip below. Like Jack Vernon, you too can leave a legacy to create a quieter world free of tinnitus and hyperacusis.

**The Jack Vernon Legacy Society**

Jack Vernon, Ph.D., created a legacy for all individuals who are challenged with tinnitus and hyperacusis. He was a vanguard in the quest to research tinnitus and hyperacusis. As a forefather he founded the American Tinnitus Association in 1971. Jack made a difference in helping people who suffer from tinnitus and you can too. By naming ATA in your estate plans and sharing with us that you have done so, you can become a member of the esteemed Jack Vernon Legacy Society.

Look for The Jack Vernon Legacy Society members in *Tinnitus Today*. You can add your name to this exclusive list to let your family, friends and all ATA members know you care about others who have these symptoms; that you understand how challenging tinnitus and hyperacusis can be. This is a way to make some noise in a quiet sort of way. Or, if you’d like to stay anonymous, you certainly may. It’s your choice.

For more information, complete and send this slip to: American Tinnitus Association, P.O. Box 5, Portland, OR 97207

- I want to make a difference, please contact me to discuss the Jack Vernon Legacy Society and estate giving opportunities to support ATA.
- I have already made arrangements for supporting ATA in my estate plans. Please enroll me as a member of the Jack Vernon Legacy Society.

**For more information please contact Melanie West, CEO at 503-248-9985 or email melanie@ata.org.**
University of Iowa Conference 2016 – An Attendee’s Perspective

Jodi Asmus, ATA Communications Assistant

The 24th Annual Conference on the Management of the Tinnitus & Hyperacusis Patient was held at the University of Iowa in Iowa City from June 16-17, 2016. Rich Tyler, Ph.D., together with the Department of Otolaryngology – Head and Neck Surgery and Department of Communication Sciences and Disorders, hosted the two-day conference intended for professionals and patients to provide a review of current evaluation and management strategies for the treatment of tinnitus and hyperacusis. Jennifer Melcher, Ph.D., Massachusetts Eye and Ear Infirmary Harvard, was the Guest of Honor and gave two fascinating presentations on her research in the area of imaging tinnitus patients and the perspective of the basic scientist as it relates to tinnitus treatment in patients. Both Dr. Tyler and Dr. Melcher are former members of ATA’s Scientific Advisory Committee.

I was lucky enough to attend this conference on behalf of ATA along with the Chair of our Board of Directors and acting Executive Director Melanie F. West, who was a featured guest speaker. ATA was a Diamond Sponsor of the event and was there to showcase our new mission statement, which now includes hyperacusis. This was particularly relevant during this year’s conference as there was an increased inclusion of hyperacusis in the presentations given by clinicians and industry representatives who were attending. Melanie gave an informative presentation that was well-received about ATA, its history and current programmatic activities, including our brand new webinar series and the research we have recently funded.

In addition, ATA collaborated with Dr. Tyler and his department to facilitate the video recording of the conference in exchange for permission to include the recorded materials on ATA’s website. ATA knows that not everyone can attend these types of conferences but wanted to make the material in the presentations available to its members as part of your ATA member benefits. We are working to produce this valuable content currently and hope to be able to share it with our members in the Members section at ATA.org in the coming months. Keep an eye out to your email inbox for a message from us when it is available.

ATA wants to thank Dr. Tyler and the University of Iowa for this valuable collaboration and is excited to offer these recordings on ATA.org soon.

Make sure ATA has your email address!

Email is one way you can make sure you receive the most up-to-date tinnitus and hyperacusis research information delivered right to your inbox in real-time.

If you have never given ATA an email address or if you have recently changed it – make sure we have it on file.

ATA never sells, shares, or rents personal data.

Email us at tinnitus@ata.org with your current email address.
How Grants Are Funded at ATA: Our Process and Why it Works

ATA's research grant program is perhaps one of our most important programs. Our research grant program consists of funding awarded to both established researchers and student researchers under the supervision of a mentor. Since 1980 when ATA awarded its very first research grant to Mary Meikle, Ph.D., we have awarded over $6 million in “seed” funding to investigators around the globe. That may not seem like a lot in 35 years – but when you consider that all of the research funds ATA awards comes from the generosity of individuals (mostly our members), coupled with the fact that many of these researchers have then gone on to receive much larger grants from federal agencies like the National institutes of Health and the Department of Defense, to continue the work they started with their ATA grant, you can begin to see where ATA’s investment in this area has really paid off.

In March, ATA’s Scientific Advisory Committee (SAC), the body of researchers and medical professionals who volunteer their time and expertise to review grant proposals that are received at ATA, met to discuss the applications under consideration for this year’s funding cycle. The results of that review and their funding recommendations were presented to the ATA Board of Directors at their April meeting and you can read all about the grants we funded this year on page 24. But before you read about that, we wanted to share a little more insight to this essential function of ATA and why we truly rely upon and appreciate the dedication and leadership of these world-class researchers who give their time and talents towards better understanding tinnitus and hyperacusis thereby advancing research toward cures.

Each grant proposal received is evaluated through a set of criteria to determine its merits and ability to push science forward. In 2005, ATA adopted its Roadmap to a Cure, a document created by a subgroup of SAC, and adopted by its whole, that each proposal must also address. The Roadmap (pictured on page 24) includes four paths of research, two basic and two clinical, that are designed to lead to new treatments and cures for tinnitus.

In addition to the Roadmap, each proposal is initially reviewed by three different members of SAC. They are matched with the proposals based on their own body of work, medical and clinical experience. During the review, each proposal is scored and those applications that receive scores of 70 or higher are the ones that are discussed during the actual SAC meeting. After the SAC meeting, the members are asked to score, or in some cases rescoring, all of the proposals that were discussed. These scores are then compiled and funding recommendations are made to the Board of Directors.

It is fascinating to watch the research grant proposal review process unfold. We appreciate your support of our research over the years and look forward to continuing to provide you with research that is scientifically grounded and conducted by only the most talented researchers around the globe who are working on understanding these complex disorders.

To learn more about who’s who on our Scientific Advisory Committee and Board of Directors, visit: ATA.org/about-us/leadership.

To learn more about the research ATA has funded, visit: ATA.org/research-toward-cure.
New ATA-Funded Research

Each year, the ATA Board of Directors is given the tough task of deciding which grants, recommended to them by our Scientific Advisory Committee (SAC), will be funded. Our SAC reviews each grant application that ATA receives through a rigorous peer-review process and then, together as a group discusses each grant's merits and opportunity to advance science. The grants are each given a score and only the highest ranked proposals are forwarded to the ATA Board of Directors for funding consideration.

One of the most important criteria that each grant is considered against is ATA’s Roadmap to a Cure – a document created by SAC that outlines four paths of research that are designed to help lead to new treatments and ultimately, as its name suggests, a cure.

**ATA’s Roadmap to a Cure**

Scientific progress doesn’t work on a set timeline, but it generally does follow a certain cumulative progression. ATA’s Roadmap to a Cure is a framework for understanding the incremental research process that will lead us to a definitive cure for tinnitus. The Roadmap identifies general investigatory paths and highlights specific research questions and objectives within each pathway.

<table>
<thead>
<tr>
<th>Roadmap Paths</th>
<th>Roadmap Path Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Path A</strong></td>
<td></td>
</tr>
<tr>
<td>IDENTIFICATION OF TINNITUS GENERATOR(S):</td>
<td>A1. Identify areas in the auditory system exhibiting tinnitus-related abnormality.</td>
</tr>
<tr>
<td>Determine sites in the ear or brain where tinnitus-producing signals arise.</td>
<td>A2a. Measure the changes in activity identified in A1.</td>
</tr>
<tr>
<td>A2b. Use or develop scientific metrics to assess tinnitus percepts in human or animal subjects with abnormalities identified in A1.</td>
<td></td>
</tr>
<tr>
<td><strong>Path B</strong></td>
<td></td>
</tr>
<tr>
<td>ELUCIDATION OF MECHANISMS OF TINNITUS GENERATION:</td>
<td>B1. Identify neural or cellular populations giving rise to tinnitus-generating signals.</td>
</tr>
<tr>
<td>B3. Define the cellular triggers that induce the alterations identified in B2.</td>
<td></td>
</tr>
<tr>
<td><strong>Path C</strong></td>
<td></td>
</tr>
<tr>
<td>DEVELOPMENT OF THERAPY:</td>
<td>C1. Test therapeutic approaches to suppress tinnitus (electric/magnetic stimulation, drugs, surgery, acoustic stimulation).</td>
</tr>
<tr>
<td>Assess the potential of intervention, manipulation, or treatment as a means of suppressing tinnitus.</td>
<td>C2. Use these approaches to target tinnitus generation sites defined in Path A.</td>
</tr>
<tr>
<td>C3A. Determine magnitude of therapeutic benefit of tinnitus treatment.</td>
<td></td>
</tr>
<tr>
<td>C3B. Assess side effects or risks associated with treatment.</td>
<td></td>
</tr>
<tr>
<td><strong>Path D</strong></td>
<td></td>
</tr>
<tr>
<td>OPTIMIZATION OF THERAPY:</td>
<td>D1. Refine therapeutic approaches to target specific tinnitus generators identified in Path B.</td>
</tr>
<tr>
<td>Define parameters of treatment that optimize suppression of tinnitus and minimize side effects.</td>
<td>D2. Improve model(s) of treatment delivery to reduce any side effects identified in Path C.</td>
</tr>
<tr>
<td>D3A. Establish dose/response relationships to maximize benefit and minimize side effects of treatment.</td>
<td></td>
</tr>
<tr>
<td>D4. Customize treatment to individual.</td>
<td></td>
</tr>
</tbody>
</table>

We have two categories of research. Regular grants are awarded to academic researchers who are eligible to receive up to $50,000 per year and student grants where the maximum award is $10,000. The regular grants we award are often "seed grants" which allow investigators to obtain data that will then help in securing larger grants from entities like the National Institutes of Health or the Department of Defense. In some cases, ATA is the primary funder of multi-year grants, although in order to receive consecutive years of funds, a researcher must come back and demonstrate that real progress is being made.

All of the research ATA is able to fund comes from the generosity of its donors and members. Because of your generosity, ATA was able to fund three new grants at ATA’s April 2016 Board of Directors meeting.
The Role of Genetically Defined Cell Populations in Generating and Suppressing Tinnitus

Richardson Leão, Ph.D., Brain Institute, Federal University of Rio Grande, Brazil
$50,000, first year
Roadmap paths A, B, C

It is not known what areas and groups of neurons are primarily involved in tinnitus generation. A deeper understanding of cell types may be important for improving electrical stimulation therapies. Establishing genetic markers for specific groups of neurons involved in tinnitus can be the key for the development of treatments targeting the problematic neuronal populations. In this project, using state-of-the-art genetic tools, electrophysiology and behavior techniques, we will dissect specific nerve cell assemblies involved in the generation and persistence of tinnitus. This study will also shed light on the changes in the dorsal cochlear nucleus (DCN) and auditory cortex that could be use as targets for pharmacotherapy.

As Dr. Leão noted, “This project’s long-term objective is to find strategic points in the auditory system for disrupting tinnitus perception. The specific aims are to 1) investigate the neuronal origin of tinnitus and 2) to differentiate the role of genetically defined cell populations in tinnitus generation and perception.” Dr. Leao and his team will use a model of noise-induced tinnitus, known to cause chronic tinnitus perception in both humans and animal models, to induce tinnitus in the subjects and then use the gap-detection test to verify the presence of tinnitus. Once established, normal and transgenic animals will be used for targeting specific cell populations, at two critical levels of the auditory system, the DCN and the primary auditory cortex. The DCN is a key structure for the generation of tinnitus, while the latter may be important for the maintenance of tinnitus. Genetically targeted groups of cells will be hyperexcited or semi-silenced both during tinnitus induction as well as during investigation of tinnitus perception, with the main goal of eradicating tinnitus.

More research next page >
Validating the Gap-Startle Model of Tinnitus Detection Using Behavioral and Electrophysiological Tests in Humans
Sylvie Hébert, Ph.D., University of Montréal, Canada
$50,000, first year.

Roadmap paths C, D

Currently the diagnosis of tinnitus relies exclusively on self-report and subjective questionnaires, and there is no objective test to prove—or disprove—the presence of tinnitus. This situation precludes not only research progress in both humans and animals, but also the ability of health care professionals to quantitatively track the tinnitus percept across time or therapeutic intervention.

According to Dr. Hébert, “Solving the problem of tinnitus relies on collecting scientific data not only from humans, but also animal models that permit a controlled examination of tinnitus as low as cellular and molecular levels. Unlike humans that can simply report what they experience, one cannot be certain an animal “hears” tinnitus. To that end researchers developed tests to determine if animals can involuntarily respond in a manner that suggests they perceive sounds that are not present externally. One current test is founded on the idea that the perception of tinnitus “fills in” silent gaps in sounds so that gaps cannot be detected. However recent studies in both humans and animals challenge this notion. As a result, key findings derived from this animal model of tinnitus in the last decade are now in question.”

The goal of this study is to properly validate the gap model in humans. To accomplish this, Dr. Hébert and her team developed a novel approach that uses each person’s exact tinnitus sound as a test stimulus. They will use behavioral tests to see if people can hear silent gaps within their own tinnitus sound, but we will also employ a new measure of brain activity to discover if sensory brain networks affected by tinnitus are also able to detect gaps. As a control, they will also compare tinnitus cases to a carefully-matched sample with the same hearing loss, so that findings will result only from the presence of tinnitus. The hope is to find human validation for a common animal model of tinnitus, but more importantly create a basis or a new objective neurological marker of tinnitus that relies on simple electrophysiology which can be used in the clinic.
According to the American Hearing Research Foundation, Meniere’s disease affects roughly 0.2% of the population, which is more than 600,000 people in the U.S. Meniere’s disease is a disorder of the inner ear, which can ultimately affect an individual’s balance and hearing in a progressive manner. Patients with Meniere’s disease suffer from vertigo attacks (a feeling that the patient’s surroundings are moving), dizziness, nausea, hearing loss, and ringing in the ears. Currently, there is no known cure for Meniere’s disease.

One of the locations being used for the 16-week research study is Piedmont Ear, Nose & Throat, the premier otolaryngology group in the Triad, specifically located in Winston-Salem, North Carolina. Leading the site’s efforts is Kenneth Maxwell, M.D., an ENT-neurologist with over 20 years’ experience as a physician.

Dr. Kenneth Maxwell explained that in the past, one way they treated patients with Meniere’s disease was with a diuretic and a sodium restricted diet.

“We think there is an imbalance of sodium in the inner ear fluid,” he said. “In a research study, it was estimated that one in three Meniere’s patients are not controlled well, so the medications that we are putting people on, if they are not controlled well, are drugs like Valium and Prednisone, which both have side effects.”

Maxwell explained that about 20 years ago, they began putting Prednisone into the ear.

“It’s a good treatment, but because it is a liquid it doesn’t stay in the ear for very long, so it doesn’t really have a long-lasting effect,” he shared. “Otonomy wanted to improve upon this particular method and looked further into how they could prolong the effects, with focus on a gelatin-like treatment. Theoretically, you could put the steroid in the gelatin-based substance, in hopes of potentially prolonging the effect in the inner ear.”

Additionally, Maxwell shared that Piedmont Ear Nose & Throat has participated in several other Otonomy-related clinical trials over the years. “There were phase one and two trials, which were completed and published. However, this particular trial is still ongoing, but we are hoping for positive results,” he said.

Maxwell mentioned that patients participating in the study are asked to keep track of their symptoms daily, which allows Otonomy to collect and analyze more accurate information on symptom changes from beginning to end.

“We see the patients in the office as frequently as every month. It’s a fairly easy study to conduct,” he said. “This is the third study in the United States that has been carried out by the Otonomy team that utilizes the same experimental medication used during previous trials.”

Otonomy is currently seeking patients between the ages of 18 and 85, who have been diagnosed with unilateral (one ear only) Meniere’s disease and have documented hearing loss to participate in the research study. There are approximately 65 Otonomy study sites throughout the country. Study participants will receive study-related exams, lab tests, and investigational medication at no charge. For more information about this study and to see if you may qualify, call 888-205-5801 or visit OtonomyResearch.com.

Editor’s Note: Valium is a benzodiazepine that produces a calming effect and Prednisone is a corticosteroid that is effective as an immunosuppressant.

ATA does not endorse or recommend any product or treatment.
Professional Members

ATA thanks the following healthcare professionals and researchers for their participation and support as ATA Professional Members. For more information on ATA Professional Membership, visit ATA.org.

Current ATA Gold Level Professional Members:

Gold Level Professional Members
Susan Adams, Center for Hearing & Communication
Jennifer Auer, Au.D., F-AAA, CCC-A, Audiology by the Sound
Carol Bass, All Ears Audiology
Granville Y. Brady Jr. Au.D., FAAA
Gail B. Brenner, Au.D., Tinnitus & Sound Sensitivity Treatment Center of Philadelphia, PA
Anne Carter Ph.D., Pasadena Hearing Care
Central Oregon Audiology and Hearing Aid Clinic
Lois N. Cohen, LCSW, ACSW, BCD
Ali Danesh, BSc, M.S., Ph.D., Florida Atlantic University
Ann DePaolo, The Audiology Offices LLC
Stelios G. Dokianakis, Au.D., Holland Doctors of Audiology
Janice Dungan, Au.D., Appalachian Audiology
Lisa Fox-Thomas, Ph.D., CCC-A, F-AAA, UNCG Speech & Hearing Center
Timothy Frantz, The Hear Doc, LLC
Nicole Hawk Au.D., Ear, Nose & Throat Consultants of East Tennessee
Bruce Hubbard, Ph.D., Cognitive Health Group
Michael Iliff, Au.D., Hearing Consultants of Colorado Springs, LLC
Marsha Johnson, Au.D., Oregon Tinnitus-Hyacusis Clinic
Jeannie Karlovitz, Au.D., CCC-A, FAAA, Advanced Hearing Solutions
Edward W. Keels, M.A., CCC-A, Hear Now Hearing Aid Center,
Deborah Lain, M.S., Hope for Tinnitus
Ha-Sheng Li-Korotky, Au.D., Ph.D., M.D., Pacific Northwest Audiology, LLC
Suzanne MacLaren, MA, R.Aud, Calgary Ear Centre
Robert Mario, Ph.D., Mario Hearing and Tinnitus
Diane Markva Au.D., Fauquier Hearing Services
Norma R. Mraz, Au.D., Mraz Audiology Consulting, Inc.
Sally Muhlbach, Au.D., Audiological Services
Stephen M. Nagler, M.D., FACS
Andrea Pernick, Au.D., CCC-A, South Miami Audiology Consultants
Julie Prutsman, Au.D., Sound Relief Hearing Center
Ann Rhoten, Au.D., Kentucky Audiology & Tinnitus Services
Michael J. A. Robb, M.D., Robb Oto-Neurology Clinic
Samantha Sikorski, Sikorski Hearing Aid Center
Cindy Ann Simon, Au.D., CCC-A, South Miami Audiology Consultants
Randall Solomon, M.D., Long Island Mental Health
Judith Sonner, LICSW, Newton Biofeedback
William Stubbeman, M.D., TMS Psychiatry
Alison Whittle Au.D., Ear, Nose & Throat Consultants of East Tennessee
Diane E. Williams, Au.D., Better Sound Audiology

Direct Sound
Set Yourself Apart.

Experience total protection.

Serious about sound and easy on the ears. Direct Sound® YourTones™ headphones provide hearing protection inside and out.

33.4 dB of passive isolation from the outside. 85 dB of patented maximum volume clarity on the inside. And zero batteries required.

Buy online at www.extremeheadphones.com.
U.S. Pat. No. 9,167,340

Advertisement — ATA does not endorse or recommend any tinnitus products or treatments.
ATA Corporate Members

ATA thanks the following organizations for their ongoing support of the association and the tinnitus community.

Gold Level Corporate Members

Auris Medical
Cochlear therapies
aurismedical.com

Neuromonics
The Tinnitus Company™
neuromonics.com

OTONYM™
Targeted Medicine for the Ear
otonomy.com

Starkey
Hearing Technologies
starkey.com

Restored Hearing™
restoredhearing.com

Silver Level Corporate Members

SOUND CURE®

Desyncra™

Bronze Level Corporate Members

Audiology Systems | Otometrics

TruDenta

For more information on ATA’s Corporate Members and ATA’s Corporate Membership program, visit ATA.org

Treatment for Tinnitus Relief
Mindfulness Based Tinnitus Stress Reduction

The first ever, self-administered, online skill-building course of its kind for learning how to live comfortably with tinnitus.

MBTSR is a cloud-based program - available anywhere, any time from your home computer, laptop, tablet or smartphone.

Benefits
- Decrease tinnitus bother/severity
- Reduce anxiety, fear, and feelings of panic
- Reduce depression and sleep difficulty
- Reduce stress, tension, and irritability
- Improve communication with loved ones
- Increase relaxation and concentration

Purchase online at MindfulTinnitusRelief.com

Use coupon code ATA25 to save $25

With each purchase, MindfulTinnitusRelief.com will donate $25 to American Tinnitus Association.

Advertisement — ATA does not endorse or recommend any tinnitus products or treatments.
Special Donors and Tributes

ATA thanks all of our donors whose generosity helps fund ATA's research and support programs. In the Fall edition of Tinnitus Today we recognize all donors who contributed $301+ or more in the previous year.

The list below includes donations made from July 1, 2015 - June 30, 2016. If you contributed to ATA during that time, and do not see your name we want to hear from you. Also, if your name does not appear correctly, please contact us and we will make sure that it is corrected for all future contributions and publications. You can call us at (800) 634-8978 or email us at editor@ata.org.

Donations to ATA are tax-deductible to the extent provided by law.

$100,000+  
| Estate of Roy A. Gummersheimer  
| Estate of Ruth E. Ochs  

$50,000 - $99,999  
| Estate of Virginia Havermale  
| Patrick J. and Carol Welsh  

$20,000 - $49,999  
| Gumpertz Charitable Gift Fund  
| Jim L. Schiller  

$10,000-$19,999  
| Anonymous  
| John L. and Adelaide W. Zabriskie Fund  

$5,000-$9,999  
| Mary F. Florsheim  
| Christopher L. Foote  
| D. Scott Johnson  
| Willis and Jane Fletcher Family Fund II at the San Diego Foundation  
| Wolf Creek Charitable Foundation  
| James Richard Yourtee  

$1,000 - $4,999  
| Anonymous (2)  
| John R. and Linda Bates  
| Virginia Bergmann  
| Peter D. Bonanno  
| Clay S. Coleman  
| Thomas C. Crane, USN, Ret  
| John A. D’Angelo  
| Charles Robert Davis  
| Stephen W. DeFilippis  
| John T. Dillard  
| James and Donna Fijolek  
| Daniel Fink, M.D.  

$301 - $499  
| Fog House Fund  
| Jeanna L. French  
| James S. and Sandra Granberry  
| Ronald K. and Donna Mae Granger  
| Josephine K. Gump  
| Halls Family Foundation  
| William H. Hurt, WWH Foundation  
| David M. Isquith  
| James L Everett, Jr., M.D., Bay Health  
| Ken Lin Fund of the New York Community Trust  
| Edwin L. and Mildred A. Kunkel  
| Thomas Lobi, Ph. D.  
| Joe Luoma  
| John Malcolm  
| Don W. Mathews  
| Scott C. Mitchell, J.D., C.P.A.  
| Roger M. Moak, Esq  
| Norma R. Mraz, Au.D., Mraz Audiology Consulting, Inc.  
| Olson Family Foundation  
| Warren Palmer  
| Portland General Electric Co.  
| Gary P. Reul, Ed.D. and Barbara T. Reul  
| Carol L. Rieske  
| William L. Ritchie, Jr.  
| Robert W. Roper  
| Karl and Karen Schmidt  
| Martin E. Segal  
| Anna M. Shorkozy  
| Lorna Stafford  
| The Herman Foundation  
| F. Helmut and Caroline Weymar, Twin Chimney, Inc.  
| Thomas R. Warren  
| Melanie F. West  
| William H. Hurt, WWH Foundation  
| Ronald S. and Kathryn K. Zagel  
| Jinyu Zhang, Ph.D.  

$500 - $999  
| Anonymous  
| Gary A. Bleiberg  
| Frank K. Boland  
| Sharon E. Bowyer  
| Gill B. Brenner, Au.D., Tinnitus & Sound Sensitivity Treatment Center of Philadelphia, PA  
| Joel N. Bryan  
| Kenneth R. Cherry  
| Lee and Kristine Clement  
| George Crandall, Jr.  
| Larry R. Crockett  
| David Daniel  
| Gregory F. Donahue  
| Janice Dungan, Au.D., Audiological Services  
| Frederick R. Entwistle, M.D.  
| Dwight W. and Anne L. Fawcett  
| John W. Finger  
| Joseph J. Fisch Fund of the Jewish Community Foundation  
| D. Jeanne Frantz  
| Evelyn Teune  
| Karol Christine Niederfringer  
| Philippines  
| William W. Walters  
| William G. Warner  
| John W. Wunderlich  

$301 - $499  
| Kent E. Backlund  
| Richard L. Behr  
| Joyce Bettencourt  
| Lois M. Clark  
| Theodore J. Eckberg, M.D.  
| Eduardo Gonzalez Fiol  
| Dan Hamelberg  
| Kyle Harris  
| Col. Horace Humphries, Jr.  
| William J. Kennedy  
| Dennis S. and Phyllis Krison Malinger  
| Gary W. Maler  
| Jill B. Meltzer, Au.D. North Shore Audio-Vestibular Lab  
| Cameron R and Marcia H. Murray of The Barbara Murray Charitable Gift Fund  
| Thomas Panno  
| Enrico Regazzoni  
| Edward M. Resovsky  
| Michael J. A. Robb, M.D., Robb Oto-Neurology Clinic  
| Jose L. Ruiz  
| Stephen Secrist  
| Dave Simpson  
| Virginia Farm Bureau Mutual Insurance Co.  
| Daniel H. Walker  
| Fred Werber, M.D.  
| Willa L. and Raymond D. Young  

Donations Made In Memory Of  
| Herb Borman  
| James Corbin  
| Robert G. Diener Ph.D.  
| John David Dudack  
| James Hess  
| Michael F. Haar  
| Edward and Nellie Koslosky  
| Mary Meikle, Ph.D.  
| Linda Newell  
| Karol Christine Niederfringer  
| David Nowak  
| Florence B. Raasch  
| Andrzej Szadkowski  
| Anton Talsma  
| Evelyn Teune  
| Jack Vernon, Ph.D.  
| Donald Webb  
| Irvin Zwick  

Donations Made In Honor Of  
| Micah Cambre  
| Paul Catherwood  
| Jason Chaves  
| Jason Cohen  
| John DeAtley  
| John Diss  
| Everyone Fighting Tinnitus  
| Frank D. Hillman  
| David Hjortland  
| Gregory B. Jones  
| Stacey Kupersmith  
| Sharon Lemke  
| Loretta Marsh  
| Jim McLeod  
| Dr. Stephen Nagler  
| Alan Niederfringer  
| Norman Roberts  

Donations Made
ANONYMOUS (3)
Paul A. Bauml
Monte Beilharz
Virginia Beilharz
Gerald L. Bray, LCSW
John U. Buchman, M.D.
G. Cheston Carey, III
Carl L. Cochrane, Jr.
Simon D. Couvier
Jules H. Drucker
Joy A. Fogarty
Drs. Norman and Gilda Greenberg
Marcene M. Herron
Richard and Estella Hoag Charitable Fund
Ginger L. Hoiland
Richard Iannacone
Ben L. Jones
Harold M. Kahn, Jr.
Clifford L. Kohler
Scott C. Mitchell, J.D.
Gary P. Reul, Ed.D. and Barbara T. Reul
Edward P. Rosenberg
James W. and Virginia Soudriette
Neil D. Valentino
Delmer D. and Wanda Weisz
Melanie F. West
Don’t Miss ATA’s Brand New Webinar Series!

2016’s Exciting Line-Up:

Vagus Nerve Stimulation

September 13, 2016
Michael Kilgard, Ph.D., and Dirk De Ridder, M.D., Ph.D.
How it works for tinnitus; Results of animal and human trials.

A Salute to Veterans

November 15, 2016
LaGuinn Sherlock, Au.D., James Henry, Ph.D.
Why are veterans disproportionately impacted by tinnitus?
Programs developed by the Department of Veterans Affairs for tinnitus and related conditions.

All webinars are on Tuesday nights (U.S.) at 8 PM Eastern, 7 PM Central, 6 PM Mountain and 5 PM Pacific.