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Hearing What He Has to Say: Elliott Berger Retirement Interview

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John G. Casali, PhD, CPE

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John Casali (left) with Elliott Berger (right)

This month we say goodbye to one of our esteemed Division Scientists, Elliott Berger, as he retires from 3M. Elliott has been involved in hearing protection for over 40 years. We recently caught up with Elliott at his St. Paul retirement party to learn a little about his background, his work and what he is planning to do next.

Tell us a little about yourself

I first studied physics and earned my undergraduate degree at Rensselaer Polytechnic Institute. Following that, I went to North Carolina State University, where I initially received funding from NASA to study the effects of noise on sleep. I got to stay up all night long and “torture” subjects, by repeatedly assaulting them with sounds while they slept in our laboratory so that I could test their performance on tasks in the morning to determine how the noise affected their sleep.

Then I had the good fortune to receive a Rockefeller Grant to study occupational noise exposure in the textile industry and at the same time, this work became part of my master’s thesis and degree. I was subsequently able to publish one of the important studies of the 1970s on occupational noise exposure and permanent hearing loss. I completed my master’s degree from the mechanical

engineering department in 1976, with a major in acoustics.

I am passionate about the sound of the world – listening to all its aspects, from the sounds of rain on a pane of glass to a zephyr from the west passing thru a grove of saguaros. I enjoy opening peoples' ears to the importance of the sounds around them. I'm also a wilderness lover, standards writer, researcher, logophile, scientist, environmentalist, husband and father. And my new love, that I share with my wife, is pickleball.

How did you get into this field?

I saw an ad in a trade magazine and decided to apply for a job. I started with E-A-R, which at that time was a small subsidiary of Cabot Corporation. They were looking for an acoustical engineer to lead their noise control research and to work with their line of damping materials designed to reduce the contribution of structural vibration to the generation of sound. Quickly, however, it became clear that they needed my assistance with their primary product, the yellow Classic™ foam earplug, and thus my attention turned in that direction.

Talk a little bit about your career...

I have essentially had the same job for nearly 42 years, in that I developed and subsequently managed an acoustical lab and staff, been empowered to conduct both basic and product development research, and become prominent in the acoustical and especially hearing conservation communities. I've been involved with numerous professional organizations and committees, and produced an extensive list of publications – so it has been a fantastic ride.

I've also had the pleasure of being the past-president of the National Hearing Conservation Association, Chair of the American Industrial Hygiene Association (AIHA) Committee on Noise, a Board Member of the of the Council for Accreditation in Occupational Hearing Conservation (CAOHC), a Fellow of the Acoustical Society of America (ASA) and of the AIHA, and a member of the American Speech-Language-Hearing Association (ASHA), and as well as being the Chair for over 30 years of the American National Standards Institute (ANSI) working group on standards for hearing protection devices. I have also served on a National Academy of Science committee investigating hearing loss in the military and was honored with the Lifetime Achievement Award of the National Hearing Conservation Association.

One of my substantial accomplishments has been in the area of education, having taught hundreds of seminars for E-A-R and then 3M to over 10,000 attendees in North America, Europe, China, Africa, Australia, and New Zealand. And in recent years I have developed a lecture on the art of presentation that has been taught for 3M and also at a national conference, where it has been highly acclaimed.

At the same time that I have furthered the science, another area of my focus has been on developing tools and ideas to demonstrate the beauty and magnificence of hearing and the value of sound in our lives, to enlighten people about the fact that the world is not all about seeing, and how much hearing contributes and may so often be the sense that carries the day in terms of emotion, involvement, and joy.

Talk a little about some of the research you have been involved with.

My research has focused on understanding aspects of measuring hearing protector performance and the development of our popular E-A-Rfit™ validation system. I have conducted fundamental research that answered questions about the correct measurement method for evaluating hearing protector attenuation both with human subjects and acoustical test fixtures. I have also conducted fundamental research into the level-dependent attenuation of hearing protection devices (HPDs) to

understand how their attenuation might change in the face of gunfire for example, where attenuation typically increases as the level of the incident sounds increases.

What are some of the biggest changes you have seen happen?

The changes I have observed have been in the marketing of products, and the types of products that are being sold today. With respect to marketing, I have seen the number of major players producing HPDs shrink dramatically as one company has purchased another and in turn been purchased by another. At the same time, however, in recent years with the advent of crowdsourcing, there has been an explosion of products being developed by smaller players for specialty niches.

In terms of product types, the major change has been in the creation of electronic products that can provide many new features. The amount of protection has not improved since basic passive protectors like a foam earplug are about as good as it gets, but the advancements have been in the ability to reduce attenuation via ambient noise sensing microphones when it is not needed, level-dependent performance, and also communication enhancements have provided valuable enhancements. Some of these features are often spoken as the ability to enhance situational awareness.

What is something that has surprised you?

I was surprised and how supportive my first boss, Ross Gardner Jr., was. He was the chemist who invented the E-A-R™ Classic™ foam earplugs, and his vision was for me to become a leader in the field. I began to conceive of the value of reorienting users from having a visually dominant perception of the world to one that also is balanced by and enlivened by the majesty of sound.

To that end, I asked for permission and support to take a class at the Olympic Institute on the art of listening and recording in nature and had the good fortune to be the only one to sign up for a class taught by one of the leading nature recordists or our era, Gordon Hempton, *The Sound Tracker*. And, thus began my deeper journey into sound and this experience has subsequently enhanced my awareness of, my joy for, and my capabilities of influencing others to more fully perceive the world around them, by simply... *listening*.

What are you most proud of personally and professionally?

The number of students, customers, and peers that have thanked me over the years for explaining to them a key concept, demonstrating to them how to correctly use an earplug, especially a foam earplug, and for opening their minds to a greater appreciation of the importance of sound and the value of good hearing. My video on foam earplugs that has been posted on YouTube for the past decade has accumulated almost 500,000 views.

What advice do you have for the next generation of acoustic and audiology professionals?

Ears are a marvelous tool to help you accomplish your work. Many times, I have observed that the quickest solution to an acoustic or auditory issue is to listen to the system or device that is being evaluated and use your ears to accomplish that initial assessment. This can then guide you in how to subsequently apply sophisticated measurement instrumentation more correctly, and often your ears may lead you to realize that a measurement you have just completed has resulted in erroneous data. Just as an engineer will often make a quick estimate of the answer in his/her head or with a calculator to determine if the comprehensive full-blown analysis has produced a reasonable answer, your ears can be that quick assessment tool that will guide you in your further

measurements.

What are you going to do next?

Slow down and create more space in my life for things beyond those that have so fascinated and occupied me professionally for almost 42 years. I look forward to time with my wife and family, travel, reading, pickleball, bicycling, and involvement with social and political organizations that I feel are important to get our country back on the right track. And I will also maintain a consulting relationship with 3M and involvement with the professional community of acoustics. And finally, I look forward to more writing, public speaking, and completing the sixth edition of the AIHA *Noise Manual*.