

John Gordon Casali, Ph.D., CPE

John Grado Professor

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- Web Page-Short Vita & Laboratory: <https://sites.google.com/a/vt.edu/john-g-casali-grado-chaired-professor/>
- 2016 NIOSH Safe-in-Sound Award for Innovation: See <http://www.safeinsound.us/winners.html>
- A 33-year overview of the Auditory Systems Lab at Virginia Tech: <http://www.safeinsound.us/swf/2016/VATECHIST/index.html>

Brief Vita



Dr. Casali is the John Grado Professor of Industrial and Systems Engineering (ISE) and Director of the Auditory Systems Laboratory at Virginia Tech in Blacksburg, VA. He is a Board-Certified Professional Ergonomist (CPE registration # 222). Since 2015, he also is Founder and Chief Technology Officer of *Hearing, Ergonomics & Acoustics Resources (HEAR) LLC*, a Virginia company that conducts product design/testing, intellectual property assistance, research contracts, and litigation support, including expert witness services.

Dr. Casali attended public schools in Princeton, WV and received a B.S. in Psychology (1977) and M.S. (1979) and Ph.D. (1982) degrees in Industrial Engineering (IE) with concentrations in Human Factors Engineering at Virginia Tech. During his graduate work, he received two IE scholarships and was a Virginia Tech Cunningham Dissertation Year Fellow. He joined the faculty in 1982 and was promoted to Associate Professor with tenure in 1986, to Full Professor in 1991, to the Grado Professorship in 1996, and was Department Head from 1995-2002. He is an international authority on ergonomics, human factors engineering, human hearing perception, situation awareness, hearing protection, and auditory displays. Dr. Casali is a *Fellow* of the Human Factors

and Ergonomics Society since 1994, and a *Fellow* of the Institute of Industrial Engineers (IIE) since 2001. Dr. Casali recently received two major national awards, the *Lauer Safety Award* for outstanding accomplishments in safety-related research/practice from the Human Factors and Ergonomics Society (HFES) in October, 2017, and the *Safe-in-Sound Award for Innovation* in hearing conservation from the National Institute for Occupational Safety and Health (NIOSH) in February, 2016. In April, 2022, he received Virginia Tech's highest award for external service, the *Alumni Award for Excellence in Outreach*.

As a consultant, Dr. Casali has served over 80 U.S. and foreign companies and U.S. government organizations in over 150 projects concerning industrial and product safety, acoustics and hearing protection, ergonomics, warning signal design, operator displays and zoning/ordinances. He is active as a legal consultant, having served in expert witness or other litigation support capacities in over 60 cases involving civil tort law (including large mass tort cases), patent litigation, criminal law and public hearings. These cases have encompassed industrial safety, product and premises liability, ergonomics, hearing-critical arbitration, hearing protection, acoustic alarms, situation awareness, community and occupational noise, laboratory practices, intellectual property, and U.S. Patent and Trademark Office *inter partes* reviews. He also developed and teaches a university course and outreach seminars on expert witnessing and litigation for engineers.

Dr. Casali has research interests in human factors, ergonomics, product/premises safety and acoustics/hearing, and he has conducted experiments spanning the display design, operator workload-attention, hearing protection devices, auditory situation awareness in military and industrial applications, active noise cancellation, headset design, ear anthropometry, aircraft cockpit communications, truck safety, driver-vehicle interaction and vehicular displays, warning signal design, backup alarm design, aural nondetectability of military devices, and operator communications in noise and under workload. He has developed both a truck and an automobile simulator, as well as two computer-controlled systems to train humans to detect, recognize and localize stimuli in their environment. His research contracts, spanning over 120 separate projects, have been funded to a total of over \$6.5 million at Virginia Tech and over \$2 million at HEAR LLC by a variety of government and military agencies (e.g., Office of Naval Research, U.S. Navy Submarine Medical Research Lab, FHWA, NIOSH-CDC, U.S. Army Aeromedical Research Laboratory, U.S. Army Human Engineering Laboratory, Naval Training Systems Center, U.S. Bureau of Mines, DoD Hearing Center of Excellence) as well as industrial corporations (e.g., Alcoa, 3M, Etymotic Research, General Motors, Toyota, Battelle, United Parcel Service, Triton Systems, Carilion Health Care Systems, Peltor AB and Bilsom AB of Sweden, Bose Corp., Shure Inc., Sound Innovations, Inc., AEARO Corp., Custom Protect Ear, Inc., and Aviation Supplies and Academics, Inc.). In total, he has been responsible for procuring approximately \$15 million of contract and foundation funds at Virginia Tech, and another \$2 million at HEAR, LLC. A large portion of his research work on human hearing, hearing protection and auditory situation awareness has been supported by the National Institute of Occupational Safety and Health and the Office of Naval Research.

Dr. Casali founded and developed the Auditory Systems Laboratory, which is unique among U.S. academic institutions in that it is equipped to conduct experimentation on and testing of hearing protectors as per ANSI Standards S3.19-1974, S12.42-2010, and S12.6-2016, as well as several ISO and military standards. This facility houses both anechoic and reverberant acoustical chambers as well as a variety of acoustical and audiometric instrumentation. In 2009, he also developed the Auditory Field Test Range, in which he conducts outdoor experiments involving detection, identification, localization and other situation awareness tasks. Many of the publications emanating from the laboratory and field test range concern human operational performance, auditory situation awareness and communications, hearing protection effects and military hearing scenarios, and vehicular-related auditory displays; Dr. Casali is considered to be a leading expert in these research areas. He has also developed an ultra-low noise floor facility to perform human aural nondetectability acoustical testing for military devices per MIL-STD-1474E. Furthermore, he has tested hundreds of hearing protection devices and headsets for noise attenuation performance and has testified to the EPA regarding testing protocols and product labeling.

In February, 2006, Dr. Casali was elected *President* of the *National Hearing Conservation Association*, an international organization whose mission is to prevent hearing loss due to noise and other environmental factors in all sectors of society. He was awarded the *Outstanding Hearing Conservationist* award by this Association in February, 2009. In May of 2005, he received the *Institute of Industrial Engineers (IIE) Alexander Holtzman Distinguished Educator Award*, the premier industrial engineering educator award, and in 1999, he also received from IIE the *David Baker Award*, the premier industrial engineering research award. Dr. Casali was also selected for the following honorary societies: Sigma Xi, Alpha Pi Mu, Psi Chi, and Phi Kappa Phi. He is an Editorial Board member of *Human Factors* and serves as reviewer for several other journals. He is active on several ANSI and ISO Standards committees dealing with hearing protection and human engineering standards. He previously served on the Scientific Advisory Board for Custom Protect Ear of Canada and for Personics, Inc., and on the U.S. Military Scientific Advisory Board for Auditory Fitness for Duty.

He also has received from the Human Factors and Ergonomics Society (HFES) the *Paul M. Fitts Award* (September, 1997) for outstanding contributions to the education and training of human factors specialists, and the *Jack A. Kraft Award* (September, 1991) for his efforts to extend or diversify the application of human factors. He also received the *American Psychological Association Briggs Award* for the Outstanding Dissertation in Engineering Psychology for 1982. From the National Hearing Conservation Association (NHCA) he received the *Outstanding Lecture Award* based on audience ratings for his papers at both the 2008 and 1991 NHCA Conferences, and the 1994 *Media Award* for television and newspaper interviews he gave on the problems of noise exposure. He has been interviewed and the Virginia Tech Auditory Systems Lab featured on three national Cable News Network (CNN) TV shows: World News Tonight, Headline News, and Science and Technology Week. In May, 1998, Virginia Tech awarded him the *Engineering Award for Excellence in Research* while he was serving as Department Head of Industrial and Systems Engineering. In September, 2002, Virginia Tech awarded him its highest research award, the *Alumni Award for Research Excellence*. From the College of Engineering at Virginia Tech, in May of both 2006 and 2020 he received the *Outreach Excellence Award*, in May, 2011 he received the *Dean's Teaching Excellence Award*, and in May of both 1998 and 2013, he received the *Dean's Research Excellence Award*. In 2014, his former Ph.D. student, Lt. Col. Kristy Casto and he received the *Haley Writing Award* from the Army Aviation Medical Association, for the best helicopter-related aerospace medicine publication in any media (journal, book, video) for year 2013. Three of his Ph.D. advisees have won the top international dissertation awards in human factors engineering.

As Department Head (1995-2002) at Virginia Tech, Dr. Casali recruited 15 faculty and procured over \$7.2 million in donations and scholarships/fellowships, including a major endowment which resulted in the permanent naming of the ISE department for the benefactor (Mr. John Grado). Under his leadership, in 2000 the ISE department was named as one of three *Exemplary Departments* at Virginia Tech for accomplishments toward diversity and multiculturalism. In 2002, the ISE department also rose to become the 7th-ranked department nationally in *U.S. News and World Report* rankings for undergraduate programs and 8th-ranked for graduate programs, and it remains one of the top-ranked programs at Virginia Tech.

Dr. Casali has been a versatile teacher, receiving several commendations for his classroom performance. Under Casali's chairmanship, 31 M.S. and 25 Ph.D. students (10 from the U.S. military) have completed degrees. He credits much of the research accomplishments of the Auditory Systems Laboratory to the work of these students. Dr. Casali is co-holder of three U.S. Patents (#8,550,206 B2, #5,333,622 and #5,131,411) for innovative hearing protection and communications devices, has another U.S. patent (#5,651,422) for a detachable power drive/steer attachment for a folding wheelchair, is co-holder of U.S. Patent (#7,822,219) for a method of displacing cartilage in the ear canal to position hearing aids and earplugs and of U.S. Patent (#9,763,003) for a method of maintaining constant signal-to-noise ratio in vehicle to enhance situation awareness. He has authored or co-authored noise ordinance legislation adopted by small cities and participated in numerous public hearings on zoning and community noise annoyance issues.

In the human factors engineering and acoustics literature, Dr. Casali has authored over 175 publications, including over 120 refereed papers. He has also given over 130 technical presentations, workshops, and seminars, including plenary or invited speeches at conferences in South America, Canada, NATO-AGARD in Belgium, Germany, and Denmark, as well as in the U.S.

A few sample publications are listed below. A curriculum vita which lists all publications, patents, consulting and expert witness activities, research contracts, and other accomplishments is available upon request.

Casali, J. G. Sound and noise: Measurement and design guidance. Refereed book chapter in Salvendy, G. (Ed.) Handbook of Human Factors, 5th Ed., New York: John Wiley, 2021, Chapter 18, 459-493.

Lee, K. and Casali, J. G. Learning to localize a broadband tonal complex signal with advanced hearing protectors and TCAPS: The effectiveness of training on open-ear vs. device-occluded performance. International Journal of Audiology, 2019, 58, Suppl 1, 3-11.

Cave, K. M., Thompson, B., Lee, K. and Casali, J. G. Optimization of an auditory azimuth localization training protocol for military service members. International Journal of Audiology, 2019, 59, Suppl 1, 1708-8186.

Casali, J. G. and Lee, K. Auditory Situation Awareness: The conundrum of providing critical aural cues while simultaneously protecting hearing, with implications for training. Spectrum, 2018, 35(3), 12-28.

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Clasing, J. E. and Casali, J. G. Warfighter auditory situation awareness: Effects of augmented hearing protection/enhancement devices and TCAPS for military ground combat applications. International Journal of Audiology, 2014, 52, Suppl 2, 43-52.

Casto, K. L. and Casali, J. G. Effects of headset, flight workload, hearing ability, and communications message quality on pilot performance. Human Factors, 2013, 55(3), 486-498.

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Robinson, G. S. and Casali, J. G. Audibility of reverse alarms under hearing protectors for normal and hearing-impaired listeners. Ergonomics, 1995, 38(11), 2281-2299.

Casali, J. G. and Park, M. Y. Attenuation performance of four hearing protectors under dynamic movement and different user fitting conditions. Human Factors, 1990, 32(1), 9-25.

Casali, J. G. and Wierwille, W. W. Mental workload assessment. In Gael, S. (Ed.) The Job Analysis Handbook for Business, Industry, and Government I, New York: John Wiley, 1988, 697-714.

Casali, J. G. and Frank, L. H. Perceptual distortion and its consequences in vehicular simulation: Basic theory and incidence of simulator sickness. Transportation Research Record, 1986, 1059, 57-65.