ACOUSTICAL SOCIETY OF AMERICA Silver Medal in Noise



Scott D. Sommerfeldt

2020

The Silver Medal is presented to individuals, without age limitation, for contributions to the advancement of science, engineering, or human welfare through the application of acoustic principles, or through research accomplishment in acoustics.

PREVIOUS RECIPIENTS

Harvey H. Hubbard	1978	Kenneth M. Eldred	1994
Henning E. von Gierke	1981	Larry H. Royster	1999
William W. Lang	1984	Louis C. Sutherland	2002
Tony F. W. Embleton	1986	Alan M. Marsh	2006
William J. Galloway	1988	Michael R. Stinson	2009
George C. Mailing, Jr.	1992	Keith Attenborough	2012



CITATION FOR SCOTT D. SOMMERFELDT

... for contributions to active noise and structural acoustic control.

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Scott Sommerfeldt graduated Summa Cum Laude from Brigham Young University (BYU) in Provo, Utah in 1983, with a Bachelor's degree in Music Education and emphasis in clarinet performance. He then saw the light (heard the sound?) and switched over to the science of acoustics as a graduate student, earning a M.S. degree in Physics from BYU in 1986 working with Bill Strong on the acoustics of the clarinet. Scott then moved to State College, Pennsylvania as a doctoral student and earned his Ph.D. in Acoustics from the Pennsylvania State University in 1989 working with Jiri Tichy on adaptive control of vibration. Upon graduation, he accepted a position as a Research Associate and Assistant Professor at Penn State. In 1995, he saw an opportunity to revitalize the acoustics research group at BYU and accepted a faculty position in the Department of Physics and Astronomy. His dedication has resulted in several additional hires and the significant expansion of research and education activities. Scott also has a talent for administration. He served as Department Chair from 2003 to 2007 and then Dean of BYU's College of Physical and Mathematical Sciences from 2007 to 2017.

Scott is truly one of the pioneers of active noise and vibration control. Early on, he solved one of the difficult problems that had limited practical implementation -a unique method for maintaining control in time-varying environments, making adaptive control solutions much more robust. On the topic of active control, he has authored 35 peer reviewed journal articles, over half in the Journal of the Acoustical Society of America (JASA). Scott has also pioneered the use of new metrics to provide active control, incorporating loudness calculations, eigenvalue equalization, sound quality metrics, and energy-based acoustic quantities into control strategies and controller design. Many of his most-cited papers on active control of noise and vibration include this energy-based acoustics approach because it requires far fewer sensors than other approaches, sometimes only one. This effort has spawned entirely new research areas including adaptive equalization of sound fields, sound power measurements in nonideal environments, global active control of enclosures using energy density, new approaches to near-field acoustical holography, energy-density sensor design, and looking for parallel approaches in structural vibration and radiation. Scott's approach to problems—to understand the essential physics and then use that information to guide the design of solutions-has allowed him to successfully reduce the noise from aircraft engines, desktop and laptop cooling fans, noise in tractor cabs, and more.

For more than 30 years, Scott has been creating a legacy of outstanding research while also training an exceptional generation of professionals in acoustics through his mentorship. Especially noteworthy are his pioneering work in active control of noise and vibration and novel investigation of energy-based quantities in both the structural and acoustic domains. Scott has produced 66 peer reviewed journal publications and an additional 68 conference proceedings, multiple book chapters, and holds six patents. His 66 journal publications have included 51 student authors, often with them as first author, demonstrating his training of future acousticians. His mentoring of 50 students as their principal advisor has ranged from undergraduates to post-doctoral scholars. Additionally he has published with another 20 professionals, demonstrating his extensive network of collaboration. Scott's research track record is recognized by the impressive list of industry sponsors of his work: BBN, GE, Caterpillar, Intel, STI Technologies, etc., in addition to government sponsors: NSF, NSWC, and NASA.

Scott has been extensively involved in the Acoustical Society's technical activities and leadership. He recently served the ASA as Vice President in 2018, as a Member of the Executive Council, Chair of the Structural Acoustics and Vibration Technical Committee, and Chair of the Noise Technical Committee. Scott is a Fellow, has organized numerous special sessions at ASA meetings, and has served as an Associate Editor for JASA Express Letters. He was also the General Chair and General Co-Chair for the ASA meetings in Salt Lake City in 2007 and 2016, respectively. Scott has served on several additional committees and has represented ASA as liaison on education and physics resources policy committees of the American Institute of Physics (AIP). In addition to his extensive service within ASA, Scott has served as a member of the AIP Governing Board, as a member of the Institute of Noise Control Engineering (INCE) Board of Directors, as an Associate Editor for Noise Control Engineering Journal, Chair of the INCE Active Control Technical Group, General Chair for Active 99 (INCE), and Editor of conference proceedings.

One of Scott's notable qualities is his ever-present sense of humor. It has served him well as he has raised five children with his wife, Lisa, and balanced significant administrative, professional, and ecclesiastical responsibilities while also being a professor. He is skilled in telling "Dad jokes," especially when he is chairing large gatherings. He loves to teach students the "magimatics" of acoustics. He also likes to refer to the "finite elephant method." From Penn State to BYU, he has impressed upon hundreds of acoustics students the need to memorize Euler's equation just in case they're faced with a life-threatening situation where reciting it will save them from certain death. (In case you've forgotten, the linear Euler's equation is

$$\rho_{\mathbf{0}} \frac{\partial \vec{u}}{\partial t} = -\vec{\mathbf{v}}p$$

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