

Ask an Acoustician: Kent L. Gee

Kent L. Gee

Address:

Department of Physics and Astronomy
Brigham Young University
N243 ESC
Provo, Utah 84602
USA

Email:

kentgee@byu.edu

Micheal L. Dent

Address:

Department of Psychology
University at Buffalo
State University of New York (SUNY)
B76 Park Hall
Buffalo, New York 14260
USA

Email:

mdent@buffalo.edu



Meet Kent L. Gee

In this “Ask an Acoustician” column, we hear from Kent L. Gee, a professor in physics and astronomy at Brigham Young University (BYU), Provo, UT. If you go to the Acoustical Society of America (ASA) meetings, you have likely seen Kent around. He was awarded the prestigious R. Bruce Lindsay Award in 2010 and became a fellow of the Society in 2015. He currently serves as editor of the *Proceedings of Meetings on Acoustics (POMA)* and is on the Membership Committee. He has developed demonstration shows

for the physical acoustics summer school, advised his local BYU ASA student chapter for more than a decade, has brought dozens of students to the ASA meetings, and has organized numerous ASA sessions. Kent is active in the Education in Acoustics, Noise, and Physical Acoustics Technical Committees of the ASA. So if you think you know him, you probably do! I will let Kent tell you the rest.

A Conversation with Kent Gee, in His Words

Tell us about your work.

My research primarily involves characterizing high-amplitude sound sources and fields. With students and colleagues, I have been able to make unique measurements of sources like military jet aircraft, rockets, and explosions (e.g., Gee et al., 2008, 2013, 2016a,b). Along the way, we’ve developed new signal analysis techniques for both linear and nonlinear acoustics. Whenever possible, I also try to publish in acoustics education (e.g., Gee, 2011). For those interested, nearly all my journal articles and conference publications are found at acousticstoday.org/gee-pubs.

Describe your career path.

When I arrived at BYU as a freshman, I had a plan: major in physics and become a high-school physics teacher and track coach. That plan lasted about one week because I rapidly became disillusioned with the large-lecture format and over-enthusiastic students to whom I simply didn’t relate. But, after a year of general education classes and a two-year religious mission, I found my way back to physics. After another year of studies, I became disenchanted again. I was doing well in my classes, but I didn’t feel excited about many of the topics, at least not enough to want to continue as a “general” physics major. I began to explore various emphases for an applied physics major and soon discovered that acoustics was an option. In my junior year, I began to do research with Scott Sommerfeldt and took a graduate course in acoustics. Although I was underprepared and struggled in the course, I discovered that I absolutely loved the material. That rapidly led to my taking two more graduate courses, obtaining an internship at the NASA Glenn Research Center, taking on additional research projects, fast tracking a master’s degree at BYU, and then pursuing a PhD in acoustics at Pennsylvania State University, University Park, under Vic Sparrow. Along the way, I found that my passion for

acoustics only increased the more I learned. Remarkably, after receiving my doctorate, I found my way back to BYU as a faculty member and I've been here ever since.

What is a typical day for you?

My typical day at work involves juggling teaching, scholarship, mentoring, and service. I currently teach a graduate course on acoustical measurement methods and 550 students in 2 sections of a general education course in physical science. Scholarship and mentorship are intertwined because I work with several graduate and undergraduate students on projects related to military jet noise, rocket noise, sonic booms, vector intensity measurements, and machine learning. Service involves committee work (like chairing the Awards Committee in my department), outreach activities at schools, reviewing journal manuscripts, and being editor of *POMA*. Those that have met me, and perhaps those that haven't, know of my particular passion for the possibilities of *POMA* as a publication. Alliteration aside, I believe *POMA* has an important role to play in the long-term growth and health of the Society, and I work hard to address issues that arise and to expand its global reach and visibility.

How do you feel when experiments/projects do not work out the way you expected them to?

I admit that when a project doesn't work out the way I envisioned because of data anomalies, misunderstandings, or poor experimental design, I tend to dwell on these failures for a long time. Sometimes, the dwelling will be productive and lead to other project possibilities, but when it just can't be furthered, it's tough. On the other hand, when we've discovered something that we didn't anticipate leads to whole new ways of thinking, all the down moments melt away in the excitement of breaking science!

Do you feel like you have solved the work-life balance problem? Was it always this way?

Not in the least. Every day is a battle to decide where and how I can do the most good. I have an amazing wife and 5 wonderful children, ages 9-16, who are growing up too quickly. I have a job that I am passionate about and that allows me to influence the next generation of educators and technological leaders. I have opportunities to serve in the community and at my church. At the end of the day, I try to prioritize by what is most important and most urgent and let other things fall away. I just hope I'm getting better at it.

What makes you a good acoustician?

In all seriousness, this question is probably best asked of someone else. But, any good I have accomplished probably

comes from three things. First, I have strived to be an effective student mentor by learning and employing mentoring principles (Gee and Popper, 2017). I have been blessed to work with remarkable students. I help them navigate the discovery and writing processes and add insights along the way. Second, I have found connections between seemingly disparate research areas of my research and leveraged them for greater understanding and applicability. For example, as a new faculty member, I was able to combine my prior experiences with vector intensity and military jet noise to investigate near-field energy-based measurements of rocket plumes. This study led to improved source models of rockets and a new method for calculating vector intensity from microphone probes that is being applied to a variety of problems, including infrasound from wind turbines. The hardware required for those infrasound measurements was recently developed for space vehicle launches and is now being refined to make high-fidelity recordings of quiet sonic booms in adverse weather conditions. Seeking connections has led to unexpected opportunities for learning. Third, a lesson my father taught me was that hard work and determination can often compensate for lack of natural ability. I hope to always apply that lesson. Perseverance and passion do seem to go a long way.

How do you handle rejection?

Not very well, I'm afraid. I tend to stew and lose sleep over these things. But I'm getting a little better with time, I think. One thing that helps is focusing on the other great things in my life when a grant or project doesn't get funded. So, while it's hard to balance all the things I listed above, it actually helps to balance the ups and downs very naturally.

What are you proudest of in your career?

I am proudest of my students and their accomplishments, both in research and in the classroom. Seeing the good they're doing in the world is no small victory for me.

What is the biggest mistake you've ever made?

Niels Bohr purportedly said, "An expert is a man who has made all the mistakes which can be made in a very narrow field" (available at en.wikiquote.org/wiki/Niels_Bohr). Regrettably, I have not yet achieved expert status in any area of research, teaching, or mentoring, but I'll share one experience from which I've learned. Before my first military jet aircraft measurement at BYU, I programmed the input range of the data-acquisition system in terms of maximum expected voltage instead of expected acoustic pressure. The moment the F-16 engine was fired up, many channels clipped because the hardware input range was set too low. Yet, I wasn't able to figure out the problem until shortly after the measurement was over. I was able to pull

physical insights from several channels that didn't clip, but it was an incredibly stressful experience that taught me to double and triple check hardware configurations before getting into the field. Thankfully, my colleagues were gracious about the mistake and I am able still count them as friends and collaborators today.

What advice do you have for budding acousticians?

I have benefited immensely from exceptional mentoring. Try to be affiliated with people who care at least as much about who you are becoming as about what you are learning and then work as hard as possible to learn from them. The acoustics community is full of this kind of researchers and professionals. Conversely, when faced with those who neither have time nor concern for your progress, keep moving forward. Perseverance and passion!

Have you ever experienced imposter syndrome?

How did you deal with that if so?

In late 2009, I found out that I was going to receive the ASA Lindsay Award. I honestly had a hard time doing much of anything for a few weeks after that because I felt extraordinarily inadequate. Somehow, a lot of smart people had been fooled into thinking I had done something special, and there

was no way that I could sustain that charade. Over time, the feeling of academic paralysis was gradually replaced with a determination to at least try to live up to what others thought I was capable of. Although imposter syndrome doesn't go away, I have learned to recognize it and use it as motivation.

What do you want to accomplish within the next 10 years or before retirement?

I just want to make a difference, whether connecting nonlinearities in jet and rocket noise to human annoyance, developing improved vector measurement methods, or mentoring the next generation of students who will go on to do great things.

References

- Gee, K. L. (2011). The Rubens tube. *Proceedings of Meetings on Acoustics* 8, 025003.
- Gee, K. L., Neilsen, T. B., Downing, J. M., James, M. M., McKinley, R. L., McKinley, R. C., and Wall, A. T. (2013). Near-field shock formation in noise propagation from a high-power jet aircraft. *The Journal of the Acoustical Society of America* 133, EL88-EL93.
- Gee, K. L., Neilsen, T. B., Wall, A. T., Downing, J. M., James, M. M., and McKinley, R. L. (2016a). Propagation of crackle containing noise from military jet aircraft. *Noise Control Engineering Journal* 64, 1-12.
- Gee, K. L., and Popper, A. N. (2017). Improving academic mentoring relationships and environments. *Acoustics Today* 13(3), 27-35.
- Gee, K. L., Sparrow, V. W., James, M. M., Downing, J. M., Hobbs, C. M., Gabrielson, T. B., and Atchley, A. A. (2008). The role of nonlinear effects in the propagation of noise from high-power jet aircraft. *The Journal of the Acoustical Society of America* 123, 4082-4093.
- Gee, K. L., Whiting E. B., Neilsen, T. B., James, M. M., and Salton, A. R. (2016b). Development of a near-field intensity measurement capability for static rocket firings. *Transactions of the Japan Society for Aeronautical and Space Sciences, Aerospace Technology Japan* 14(ists30), Po_2_9-Po_2_15.



**BECOME
AN ASA STANDARDS MEMBER**

MAKE YOUR VOICE HEARD

Help shape the standards that influence your business and bottom line

**National ANSI-Accredited
Standards Committees:**

- S1 Acoustics
- S2 Mechanical Vibration and Shock
- S3 Bioacoustics
 - S3/SC1 Animal Bioacoustics
- S12 Noise

**International ANSI-Accredited
U.S. Technical Advisory Groups:**

- ISO/TC 43 Acoustics
- ISO/TC 43/SC1 Noise
- ISO/TC 43/SC3 Underwater acoustics
- ISO/TC 108 Mechanical vibration, shock and condition monitoring and its subcommittees
- IEC/TC 29 Electroacoustics

Nancy Blair-DeLeon, Standards Manager
Acoustical Society of America Standards Secretariat
asastds@acousticalsociety.org acousticalsociety.org/standards



**Become
Involved!**

**Would you like to become
more involved with the ASA?**

Visit acousticalsociety.org/
volunteer to learn more about
the Society's technical and
administrative committees, and
submit a form to express your
interest in volunteering!