

2018 Harry Fielding Reid Medal David M. Boore, U.S. Geological Survey

This award honors outstanding contributions in seismology or earthquake engineering.

Citation

The characterization of strong ground motion from earthquakes is of great practical significance to earthquake-resistant design and earthquake safety assessments throughout the world. If we can accurately describe the ground motions to be expected from future earthquakes, we can design or retrofit structures to withstand them - even if we do not know when or where future earthquakes will occur. David Boore is the world's foremost authority on the characterization of ground motion—and he has owned this field for the last forty years. His landmark 1981 paper in *BSSA* with Bill Joyner illuminated the path for a rigorous and thorough approach to empirical ground-motion modeling. Hundreds of studies have followed its lead, including the well-known Next-Generation-Attenuation models, to which Dave has been a key contributor and guiding influence.

After graduating from Stanford and MIT, Dave spent most of his career at the U.S. Geological Survey in Menlo Park, becoming one of its most prolific and widely-recognized scientists. A cornerstone of Dave's contributions was the recognition, more than 30 years ago, that strictly-empirical methods to characterize ground motion are only useful in data-rich regions. So he pioneered a more versatile approach—the stochastic ground motion model, published in *BSSA* in 1983 and cited more than 1500 times since then. The idea was to use limited empirical data to anchor simple seismological models. He started from the work of Hanks and McGuire who, in the late 1970s to early 80s, showed us the power and potential of considering ground motion as a band-limited noise process. Dave advanced these models to distill what is known about complex seismological effects of source, path and site, into simple yet powerful engineering tools. He made application of his work widely accessible through his SMSIM software, freely published online; over time, SMSIM became one of engineering seismology's most widely-used tools. Dave has worked tirelessly for decades to make continuous improvements to his models, and to provide software updates and informative study notes freely to other researchers online. Through his work on empirical and stochastic ground motion models, Dave has made unique and lasting contributions to both science and engineering. He is the only person to have won both the Reid Medal and the Bruce Bolt medal.

Dave Boore has also made broad and valuable contributions in many related topics as reflected by his 250 published papers and evidenced by his 10's of thousands of citations. His work has explored record processing, the measurement of shear-wave velocity, site response modeling techniques, soil nonlinearity, and wave propagation. His trademark signature is a con-

ceptual simplicity that belies the thoroughness and rigor that underlies his work.

It is particularly fitting that Dave's contributions are being recognized by The Seismological Society of America. Dave acted as the Editor of the Bulletin for seven years during the 1980s, at a time when everything was done hard-copy, and the Editor read all the papers! It was through interactions with Dave as Editor that I had the immense good fortune to begin collaborating with him on a long run of papers. Working with Dave was without a doubt the highlight of my very enjoyable career - no one could ask for a better colleague, friend, mentor, or brother. Thanks Dave.

Dave has been a prolific contributor to the SSA's journal, publishing 100 contributions in *BSSA*. Dave has also been a formidable reviewer for hundreds of other *BSSA* publications, almost always signing his reviews, even when critical. I know that I am not the only one in this room that has opened a Dave Boore review with both trepidation and gratitude. Trepidation, because Dave will find all the flaws in your work, and you will likely end up with a long list of revisions. But trepidation is outweighed by gratitude - because after you have finished, your paper will be much better. Moreover, Dave's critiques are always delivered with courtesy and respect—even if you've made some truly bone-headed errors. Look in any issue of *BSSA* in the last 40 years, and you will find the guiding hand and wisdom of Dave Boore. You will also find his influence, and often his active participation, in just about every major international seismic hazard application. And yet for all that, Dave is a lesson in humility, being quick to deflect credit away from himself and onto others.

In closing, David M. Boore is inspirational in his scientific talent, integrity, grace and impact. Congratulations, Dave, on the richly-deserved honor of the Harry Fielding Reid Medal.

Gail M. Atkinson

Response

Thanks, Gail, for the citation and award. When I started on my career as an undergrad major in geophysics at Stanford more than 58 years ago, I never dreamed that one day I would be standing here to receive our society's highest award. I am deeply honored. But I have to tell you that my first reaction upon hearing of my award was that there must have been some mistake. But here I am, so I guess there wasn't a mistake.

As scientists you are trained to be critical of what you read and hear. I can't resist reading a somewhat different appraisal as a counterbalance to the citation you just heard. This was written by Julian Bommer some years ago for a promotion at the USGS.

“Regarding your request for a letter in support of Dr. Dave Boore's promotion, I am seriously concerned that something is really fishy here. Has he falsified his record? Is his CV fake? I ask this because although his CV bears witness to his enor-



▲ David Boore accepts the 2018 Reid Medal from Gail Atkinson and 2019 SSA President Susan Hough.

mous output, he somehow achieves this despite incredibly short working hours averaged over a typical week. I have spent time with Dave in Menlo Park, supposedly to learn about strong-motion seismology, only to use 80% of the time having him do his docent thing on me up in the hills, chasing after migratory birds in the Central Valley, being inducted to the world of spectator sports, skiing, or playing the guitar. So there you have it: how can this overgrown adolescent spend all his time on outdoor activities, sports and music, and then still publish all these hot papers? I think you will agree with me that this is very suspicious (although if it's true, then he is a total dude)."

Which citation is more accurate? I think both have their merits.

I was fortunate that my career spanned a revolution in computer power and data acquisition. I remember the days when computer programs were on punched cards that we submitted at the computer center, coming back in a day or two to see if they ran. When I was Editor of *BSSA*, working out of my home with my wife Judy as my Editorial Assistant, I thought it an extravagance to buy a 10-megabyte hard drive to support our work. And long gone are the days when a paper analyzing a single ground motion recording could be published in the *Bulletin*, as I did several times.

I recently came across this quote in the novel *A Gentleman in Moscow* by Amor Towles: "No doubt there have been moments when your life has taken a bit of a leap forward; and no doubt you look back upon those moments with self-assurance and pride.

But was there really no third-party deserving of even a modicum of credit? Some mentor, family friend, or schoolmate...?"

That has certainly been the case for me, but it wasn't just a single third party: it was my fellow students and postdocs at Stanford and MIT, my students at Stanford, my colleagues at the USGS, and after the internet made it so easy to communicate around the world, my wonderful colleagues and collaborators in many countries. You are too numerous to identify by name, but you know who you are. But one person I do want to single out by name is Judy, who for more than 54 years has provided the bedrock foundation on which my whole career has been built. Thanks to all of you for making my career possible.

I'd like to leave you with these words from the book *Flowering Earth*, by Donald Peattie, a botanist. He describes the following guiding principles for doing research, which are similar to those I have tried to follow during my career:

Speaking of his professors, he said:

"They taught us to postpone judgments, to acknowledge mistakes, to mistrust your own work and give cordial credit to others', to assume nothing in general from particular instance, to search for contrary evidence as if it were pearls, to walk all around a question, to define a problem, to finish what you began."

I think this is timeless advice for researchers in any field. Thank you.

David M. Boore