

TEACHING ACOUSTICS

By Pete Weiss *An Associate Professor's Site Is for Students and Others.*

One of the requirements for a Web site featured in On the Web is that the site must be noncommercial, although it may have links to commercial sites. Well, Karl Marx hasn't been proved right yet, and capitalism has not yet been brought down. One result of this, however, is that truly noncommercial sites on the Web are getting tougher and tougher to find. At the other end of the spectrum from full-blown commercial sites are those sites set up by individuals and it is one of these that we examine in this

issue. The site, www.kettering.edu/~drussell is run by Dr. Daniel A. Russell, associate professor of applied physics at Kettering University in Flint, Michigan. Dr. Russell has a rather interesting academic background. In 1995, he received a Ph.D. in Acoustics from the Graduate Program in Acoustics at Pennsylvania State University. His M.S. in Applied Physics was earned at Northern Illinois University in 1991 – and here's the real interesting part – he walked away from Bradley University in Peoria, Illinois, in 1988 with two bachelor's degrees, one in Physics and the other in Music/Piano Performance.

Dr. Russell's passion for acoustics, and in particular musical acoustics, is evident throughout the site, including a link to two of his research projects, "Acoustics of (Electric and Acoustic) Guitars" and "Nonlinear Behavior of Piano Hammers."

For our purposes, the portions of the site we would guide visitors to initially is the one with the animated GIFs and MPEG movie-lets that Dr. Russell has created to help students visualize the nature and behavior of sound waves. The latter are playable with the built-in Windows Media Player, which will launch with a single mouse click on the non-animated image. The animated GIFs are in motion when their pages are loaded.

The animations, although accompanied by equations that describe the various phenomena (radiation, reflection at a hard surface, etc.), actually show fairly basic acoustical/wave mechanics principles. Thus, they can be good adjuncts to teaching non-technical personnel (and maybe fledgling techs with no acoustics training) some of the basics.

Once a visitor has checked out the wave movies, a tour of the rest of the site would, in our opinion, definitely be in order.

Scholarly Activity (Research) in Acoustics

Acoustics of Musical Instruments

- Acoustics of Guitars: World Acoustic Museum of Instruments (Project) Acoustic guitar and acoustic guitar
- Acoustic Guitars of the Past
- Acoustic Guitars of the Future

Standard Acoustics and Vibrations

- Acoustics of Musical Instruments: A comparison of the sound of a violin and a trumpet
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Vibration and Waves Animations

Dr. Dan A. Russell, Associate Professor of Applied Physics at Kettering University in Flint, MI

The following animations describe the behavior of sound waves in various situations and show how they are affected by the environment. The animations are designed to help students visualize the nature and behavior of sound waves.

Sound Fields Radiated by Simple Sources

Dr. Dan A. Russell, Kettering University, Flint, MI

Radiation from a monopole source

If a source is a piston that radiates sound equally in all directions, the sound waves will radiate equally in all directions.

Daniel A. Russell, Ph.D.

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at Kettering University formerly known as
GMU Engineering & Management Institute in Flint, MI