

*Opera was a summer gig for Daniel Boye as a student.  
But when the real world called, he couldn't give it up.*

# Physics not Davidson professor's only forte

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Lesson of the moment: myoelastic-aerodynamic theory.

Daniel Boye gave his Davidson College class a hint about what that mouthful of syllables means. The prefix “myo,” he said, signals that muscles are involved. Aerodynamics deals with air flowing around objects.

As he talked, he took a piece of paper from the table behind him and tore off a strip. Time for a demonstration.

Boye held one end of the strip to his chin, let the rest of it dangle and blew above it. The paper floated upward — responding, just as airplane wings do, to the decrease in air pressure above it caused by the moving air.

Boye wasn't done. He took a second strip of paper, held the end of it against the end of the first and blew hard between them. They let out a squeal.

“It's not a pretty sound,” Boye said. “But there's a pitch there.”

He had just demonstrated what goes on in our throats when we speak — or, more to his point, when we sing. The paper had stood in for the vocal cords, which are a pair of ligaments attached to muscles that tighten and loosen to control them as the breath rushes past. Thus, myoelastic-aerodynamic.

This was all aimed toward another demonstration in a world different from Davidson's science complex. Boye's students were headed that night to a myoelastic-aerodynamic rampage: the opening night of Opera Carolina's production of “Tosca.” The first person they'd see onstage would be Boye, the chairman of Davidson's physics department.

Raised in Tennessee, Boye started singing as a boy in his church's children's choir. He studied voice on the side as he earned a batch of science degrees, culminating in a doctorate in physics from the University of Georgia. During graduate school, he spent three summers singing opera at the Brevard Music Center.

“One was a release from the other,” Boye said in an interview. “I was learning the rigors and the art of science at the same time I was learning the rigors and art of music....”

“When I got to Davidson (in 1989), they started becoming more and more a part of everyday life for me. I realized that I needed to have both of them in my life with some regularity.”

He has certainly had that lately, returning to a role he played for Opera Carolina in 1997: Angelotti, an escaped political prisoner who staggers onto stage almost as soon as the curtain rises on Giacomo Puccini's “Tosca.”

But at Davidson he actually gets to combine his interests. This semester, Boye teaches *Physics 115: Musical Technology*.

The course looks at the science behind music. Its subjects range from what shapes a theater's acoustics to how instruments create their sounds to how music ends up in an MP3 file.

Thursday's subject was the voice. Boye ushered the class through diagrams of the head and larynx. Video from a tiny camera inside a singer's throat showed the larynx at work.

On film, the vocal cords — or vocal folds, as scientists call them, because a mucous membrane covers the ligaments and muscles — behaved like curtains of flesh in motion. They parted when the singer breathed, came together to vibrate into sonic life. For high notes, they pulled tight; for lower ones, they loosened.

This finally led back to "Tosca." Boye played two recordings of the last tenor aria, a soliloquy for a man envisioning his sweetheart before he faces a firing squad. Boye told the students to listen how Thursday's singer, after a full night of dramatic singing, fared with it.

"If it's done right," Boye told the class, "it'll leave you breathless."

Then everyone took off — the students to their afternoon studies, Boye to rest a little before his 5:30 p.m. makeup call.

The curtain rose at 7:30. A wig, beard and smudges of makeup had turned the neatly dressed professor into a bedraggled escapee.

Boye threw himself into director Brian Deedrick's staging, beginning with a collapse to the stage to drive home Angelotti's sad state. For the next half-hour, Boye and tenor William Joyner were free-thinking political activists in Napoleonic-era Italy.

A few hours after the curtain fell, one of Boye's students e-mailed her reaction.

"This is honestly the first opera that I have attended and not been at all bored," Molly Valentine wrote.

No doubt that's what Boye had in mind. He said that part of his goal for the course is to cultivate audiences of the future.

To him, teaching and singing opera are akin. Both take preparation. Both are performances aimed at an audience. When music comes off in a way that brings the work to life, Boye said, it gives him a special excitement. A lecture can do that, too, when it really reaches the students.

"You look out at the class," Boye said, "and you can see in their eyes that they understood what you just said. Those are my chill-bump moments."