



BY | BETHANY BRODERICK

# THE SCIENCE OF MUSIC

## Uniting the liberal arts with STEM disciplines

AUBURN-NATIVE SARAH STEVENSON'S UNDERGRADUATE research fellowship includes a heart-racing, heavy-breathing, sweaty project. What does she study? Music.

This past year, the College of Liberal Arts received a grant from the Science Education for New Civic Engagements and Responsibilities (SENCER) and the National Science Foundation (NSF) to unite the liberal arts and STEM disciplines. They did this by creating an innovative and interdisciplinary learning, teaching, and researching experience through a Music and Science class. Undergraduate students in the class, taught by Dr. Ann Knipschild, professor in the Department of Music, learned about and researched the psychological and physiological affects of music.

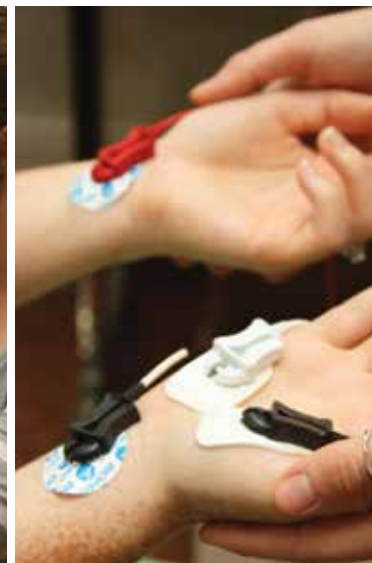
For the research project, students were asked to listen to two different songs—one upbeat and loud and the other calm and relaxing—while attached to a respiration belt, ECG, and galvanized skin test (measuring respiration, heart rate, and skin conductance, respectively). They also completed a survey after each song, giving feedback about their emotional response. The students then conducted background research about the science of

music and presented their research and data to the class.

Stevenson, a senior in the College of Liberal Arts double majoring in psychology and Spanish, played a special role in the research project. A member of the Honors College preparing for optometry school, Stevenson received an Auburn University undergraduate research fellowship to oversee the student research conducted in the biofeedback lab. She processed and analyzed the data they collected, explained the results to students in the class, and helped them integrate the data into their presentations. She says the results surprised her—showing significant differences in the physiological and psychological responses to the two types of songs.

“When I’m doing the test, I can hear the music. I’ll hear a loud point in the song and watch on the computer a huge spike, though the student doesn’t appear to react at all,” Stevenson describes. “Our bodies really do react to what’s going on outside of us, though we may not realize.”

CLA Associate Dean of Research and Faculty Development Paula Bobrowski coordinated the research project and the high performance teams in the class. She says the students were amazed when they saw the results.



*Stevenson prepares a student research participant in the biofeedback lab.*

Though they had been learning about the effects of music in the class, it became more real when the students saw their own unconscious physiological reaction.

“They were quite shocked because it’s something you don’t really notice. You don’t feel like your heart is racing, and you don’t see moisture on your skin,” says Bobrowski. “They were really surprised to see those physiological responses because you can’t detect them naturally.”

Finally the students applied their findings to different healthcare industry settings. They studied how music could improve high-stress environments in healthcare, such as hospital waiting rooms and operating rooms, to result in better health outcomes or how music could be used in children’s physical therapy to help decrease recovery time. Students were challenged to invent new ways music could impact healthcare.

Bobrowski and Knipschild plan to use the data the students collected and publish their findings about the science of music—including Stevenson as a co-author. Because of her experience, Stevenson says she encourages all students to take advantage of research opportunities while at Auburn to make them stand out from their peers when applying for graduate school or jobs.

“My research project is more science related even though it’s within the College of Liberal Arts, and that’s really beneficial and makes me a really unique candidate,” Stevenson says. “It looks good that I’ve already done research.”

She also believes that doing research helps forge strong relationships, both professional and personal, with professors. Timid at first to approach professors, Stevenson has found she turns to them more for guidance and networking. Further, she thinks that doing research teaches liberal arts students the skills of critical and methodical thinking.

“Doing research combines everything you learned in these various different classes into one thing,” Stevenson says. “You have to apply the knowledge you’re learning to something very specific.”

Bobrowski, who presented about the innovative class with Knipschild at a SENCER conference this past July, found significant advantages to including an undergraduate research project with the course. Students were more likely to have higher integration of learning, have a better attitude towards the class, and learn more skills.

“The undergraduate research project itself helped them to take the concepts that they were learning and understand them better through the data they were collecting on themselves,” says Bobrowski. “Experiencing it and reading about it are two different things.”



## FULBRIGHT AWARDS

*The Fulbright Program is the flagship international educational exchange program sponsored by the US government and is designed to increase mutual understanding between the people of the United States and the people of other countries.*

### **Tyler Look '15 (Houston, Texas)**

Major: German-International Trade & Aviation Management

Purpose: To examine public transportation systems at the Technical University of Berlin

### **Matthew Goforth '15 (Huntsville, Alabama)**

Major: Physics, Minor: German

Purpose: To continue his research on complex plasma experiments at the Technical University of Munich, Germany

### **Matthew Pollock '15 (Port Orange, Florida)**

Major: English Literature & Spanish, Minor: German & Linguistics

Purpose: To teach high school students in the northern German village of Trittau

### **Steven Vickers '15 (Mobile, Alabama)**

Major: History

Purpose: To teach English to high school and middle school students in Riga, the capital of Latvia

## GILMAN SCHOLARSHIPS

*The Benjamin A. Gilman International Scholarship program, a nationally competitive scholarship program, is sponsored by the Bureau of Educational and Cultural Affairs at the US Department of State and offers grants for US citizen undergraduate students to pursue academic studies around the world.*

### **Shannon Bewley, sophomore (Birmingham, Alabama)**

Major: Studio Art & Art History, Minor: German

Purpose: To study in Rome

### **Braxton Nelson, sophomore (Lilburn, Georgia)**

Major: Biomedical Sciences, Minor: Spanish

Purpose: To study in Madrid

### **Sarah Grace Simpson, sophomore (Russellville, Alabama)**

Major: Chemical Engineering, Minor: Asian Studies

Purpose: To study in Shanghai

### **Catherine Tabor, sophomore (Centreville, Alabama)**

Major: English & German-International Trade

Minor: Psychology & Community and Civic Engagement

Purpose: To study in Vienna