

**Instructional Related Activities
Report Form**

| SPONSOR | DEPARTMENT |
|----------------|-----------------|
| Jerry Clifford | Applied Physics |

| ACTIVITY TITLE | DATE (S) OF ACTIVITY |
|-------------------------------------------------------|----------------------|
| Guest Musicians - Physics of Music TK910-821-90470 | Fall 2013 |

E-mail to the Dean's Office
30 days after activity

Activity Relation to Course:

The Physics of Music course is designed to give a useful and fun understanding of music and sound for general education, physics and performing arts students interested in music and speech. After covering the basic foundations of sounds and music, the students investigate each musical instrument group, including percussion, plucked strings, bowed strings, air pipes, reed instruments, horns and the human voice.

My musical ability consists of playing the radio – and sometimes I get talk, talk, talk. To go beyond my playing happy birthday one note at a time, which is not always entertaining, I wanted professional musicians who could demonstrate their instruments with skill. Over the past five years, we have invited professional musicians, who understand the art of their instrument, to be guest presenters. The students find the professional musicians add greatly to their understanding of the individual instruments. This aspect of the course always rates highest on our end-of-class surveys.

Description of Activity:

As the students investigate each musical instrument group, the guest musicians show the students how the instrument is constructed and how it can produce a variety of musical sounds. Having knowledgeable musicians share their intimate understanding adds immeasurably to the depth and breadth of the course. The live musical demonstrations integrate well with our active format of lectures, demonstrations, and hands-on activities.

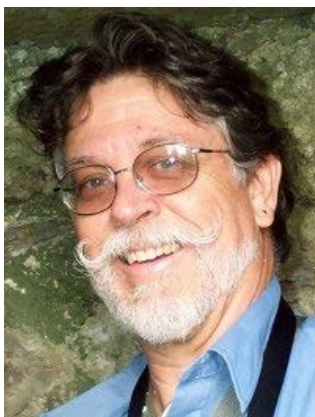
Each of our guest musicians has visited our class several times in the past. Each has learned from their exposure to the course and spent time studying their instrument from a new perspective. Each has honed his presentation to make it more informative on the physics of their instrument, which is not always familiar. Each musician has become much more comfortable in addressing the students. Each gave the best presentation / performance – by far – of the past many years.

Guest musicians for the fall semester were:



Steve Marsh played five saxophones, two flutes, a piccolo, and two clarinets. As a Los Angeles studio musician, he is expected to be very versatile with reed and edge-tone instruments. He said that he has to produce a myriad of sounds for movies, advertisements or other gigs. He showed the frequency ranges of the instruments and the ways that you can jump octaves. He showed how and why the mouthpiece for a saxophone or clarinet affects the sound. He talked about selecting and testing the reeds to get one or two good ones out of a packet. We recorded his playing various instruments for analysis using our Raven Fourier Analysis program. The students loved when he played the Pink Panther theme.

Chris Tedesco showed the various horns, especially the trumpet. He demonstrated the basics of horns using a piece of garden hose and a funnel. He showed different mouthpieces and demonstrated the different sounds from each, and talked about the various applications. He showed how the three keys on the trumpet changed the length of the instrument – and thus the sound. He showed how differences in air pressure changed the tone from the fundamental frequency to the higher harmonics. He demonstrated over a dozen different mutes and discussed the kinds of music where a specific mute might be appropriate. The students were fascinated by the wide range of sounds produced by the different mutes.



James Browne is a barbershop singer and chorale director with a long history of singing. He engaged the students in a series of exercises to develop their singing voice. He showed students how they could change the resonance cavities in their vocal tract, which students could feel in their Adam's apple. The exercises helped students understand the way a singer tunes his/her voice, particularly to achieve the “singer's formant” which allows them to be heard unamplified about a full orchestra. We recorded his voice along with several students so that we could compare the singer's formant of a professional singer and a novice. Jim's engagement of the students was lots of fun and very instructive.

Two of our regular guest musicians couldn't join us this year: Dan Peyton for the acoustic and electric guitar and Chris Banta for the marimba. Paul Murphy visited the class between his classes to demonstrate guitar sounds, but he was not supported by IRA funds.

The students found the guests to be an important part of the course. In a class survey, the students stated emphatically that hearing the musicians helped them understand more clearly the physics of the various instruments.

Accounting:

The IRA funding approved for “Guest Musicians – Physics of Music”, TK910-821-90470, was \$1500.

The musicians are paid directly from IRA funds. Each guest musician was paid \$300 for an hour presentation / performance. Most of the musicians came from Los Angeles, which added over two hours to their time. The total cost was \$900 for the three musicians. Due to scheduling problems, we could not get two of our regular musicians to join us so we had \$600 unspent.

Conclusion:

The guest musicians are a valuable asset for the Physics of Music course and we hope IRA support will continue to bring these talented artists to CSU Channel Islands.