
FY09 Innovations in Teaching with Technology Awards

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<th>Proposal Title:</th>
<th>Spectral Analysis for Visual Realization in Teaching Applied Lessons</th>
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<td>Investigators:</td>
<td>Kenneth Tse</td>
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<td>Org Unit:</td>
<td>College of Liberal Arts and Sciences</td>
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<td>Department(s):</td>
<td>School of Music</td>
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<td>Funding Awarded:</td>
<td>$9,200</td>
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Professors Tse and Skiff plan to study the use of spectrum analysis software with visual aid in teaching applied instrumental or vocal lessons. The aesthetics of musical sound is often thought of being a subject of abstraction. Students learn the concept of good tone quality mostly from imitating aurally. It is the primary objective of this research project to investigate the prospect and applicableness of using real-time visual spectrogram to aid a student's understanding, realization and production of, what is visually and aurally perceived, a good sound.

What do you intend to do?

The first step of the project will be an evaluation of several selected (both commercial and freeware) spectrum analysis software to determine which one would be best suited for our purpose. In addition, further testing will verify whether it is necessary to work with a software developer to customize the software for our particular use. Secondly, once the appropriate software is selected or developed, it will be tested in Professor Tse's saxophone studio to determine the appropriate setup for capturing acoustical information and its optimal use in a lesson setting; students will be monitored weekly to ascertain their progress. Lastly, once this system has been in placed for regular use, any other interested music faculty may have access to the system and findings for their own perusal and consideration for future implementation in their studios.

How will it improve student

Similar to the technique of designing musical instruments, an instrumental teacher often teaches the student to listen to the reference tone of either the teacher's demonstration or recorded sources and to replicate this "good" sound (by altering one's oral cavity, tongue position, and air velocity) that is heard. For some students this can be a tedious and daunting process and one often thinks that it would be easier if there was a way to "see" the sound. Spectrum analysis is a tool that gives us the ability to see the timbre. By analyzing in real time during lessons and learning how to interpret
learning?

the spectrogram results shown on screen, the student can then understand more readily the correlation between different aspects of physical and timbral manifestations.

This interactive method and tool has the potential of changing the way instrumental and vocal teachers approach sound projection problems in students and how students remedy these problems.

What resources will you need?

- Laptop computer: Macbook Pro $3,900 including protection plan and case
- Apple HD Display (30" flat panel) and wall mount kit $2,000
- Professional audio interface: Digidesign Mbox 2 Pro $800
- Professional microphone and stand: $600
- Spectrum analysis software:
  - Spectrafoo Complete $800
  - Spectrashop $150
  - Spectre $80
- La Cie mobile 500 GB hard drive $200
- Altec Lansing iMotion portable speakers $200
- Miscellaneous connection cables $100
- Estimated expense for software customization $300

Rough estimate of costs

All the necessary hardware and software should cost around $9,200

ITSupport Information