![USC | IMSC Integrated Media Systems Center logo]
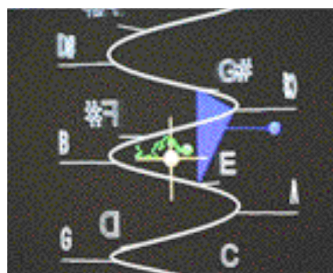
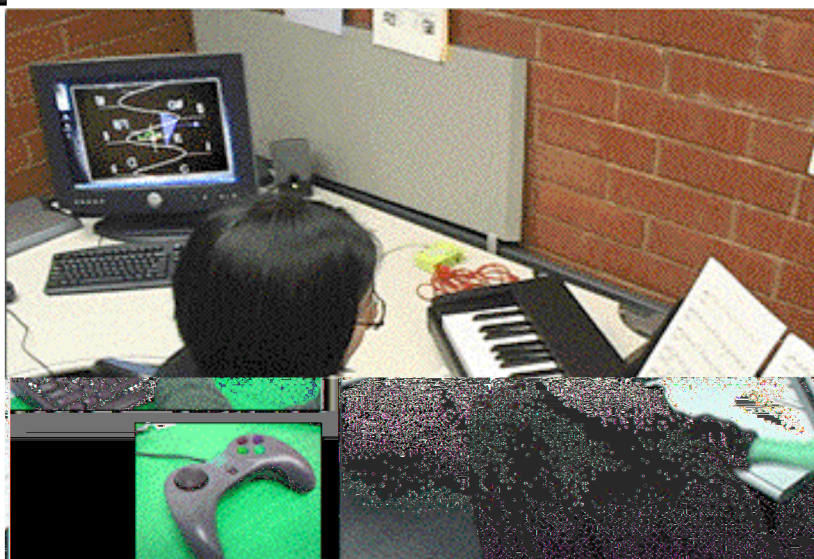**INTEGRATED MEDIA SYSTEMS CENTER**
**A National Science Foundation**
**Engineering Research Center at the**
**UNIVERSITY OF SOUTHERN CALIFORNIA**

**PRINCIPAL INVESTIGATOR**

Elaine Chew



MuSA.RT

## Co-PRINCIPAL INVESTIGATOR

Alexandre François, Research Associate (Co-PI)

## BRIEF DESCRIPTION OF DEMONSTRATION

MuSA.RT – Music on the Spiral Array . Real Time – is an interactive environment for content-based music visualization.  MIDI output from a live performance is mapped to the Spiral Array model, revealing important pitch, chord and key structures.  The user can also navigate through the Spiral Array space using a gaming device.  The software was implemented using the Modular Flow Scheduling Middleware, an open source implementation of IMSC's Software Architecture for Immersipresence.

## UNIQUE OR DISTINGUISHING CHARACTERISTICS RELATIVE TO STATE-OF-THE-ART

<u>Real-time</u> visualization of tonal patterns in live performance.

<u>Interactive</u> environment for navigating through metaphorical tonal space.

Computer generates content-based musical art.

| APPLICATIONS | RECENT HIGHLIGHTS, LEVEL OF DEVELOPMENT, UPCOMING MILESTONES |
|---|---|
| Interactive music visualization<br>Content-based music visualization<br>Computer generated musical art | First prototype completed in September 2002.<br>Color-coding, shading and textures added in March 2003.<br>Automatic pilot incorporated to smoothly show features from best viewing angles. |

**UNDERLYING TECHNOLOGIES**

The software was implemented in C++, using the Modular Flow Scheduling Middleware, an open source implementation of IMSC's Software Architecture for Immersipresence (SAI). SAI provides a framework for distributed parallel processing of generic data streams. The rendering is implemented using OpenGL.

LIST OF PUBLICATIONS, REFERENCES, URLs

MuSA.RT, url: *http://cappriccio.usc.edu/MuSA.RT*
MFSM, url: *http://mfsm.sourceforge.net*
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Chew, Elaine (2001). Modeling Tonality: Applications to Music Cognition. In Proceedings of 23rd Annual Meeting of the Cognitive Science Society, Edinburg, Scotland, August 1-4, 2001.
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François, Alexandre & Medioni, Gerard (2000). A Modular Middleware Flow-Scheduling Framework. In Proceedings of the ACM Multimedia 2000, Los Angeles, CA, November 2000, pp. 371-374.
Sapp, Craig Stuart (2001). Harmonic Visualizations of Tonal Music, *http://www-ccrma.stanford.edu/~craig/keyscape*.

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