

music computation and cognition laboratory


elaine chew

mucoaco



university of southern california  
viterbi school of engineering

[www.rcf.usc.edu/~mucoaco](http://www.rcf.usc.edu/~mucoaco)




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research


- music representation
- music analysis
- music visualization
- expressive performance
- composition / improvisation
- music and emotion

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music representation



Longuet-Higgins' harmonic network, neo-Riemannian tonality



spiral array model: major key spiral

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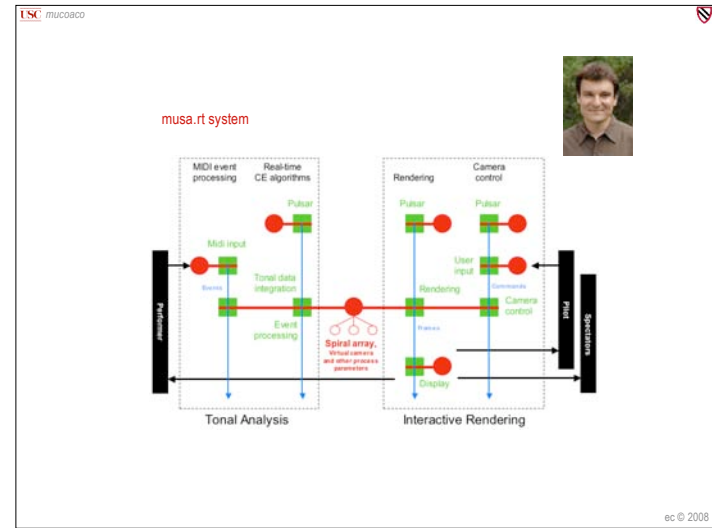
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**musa.rt: music on the spiral array . real-time**

elaine chew and alexandre r.j. francois, since 2002



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**musa.rt in concert**

the mathematics in music, created 2007

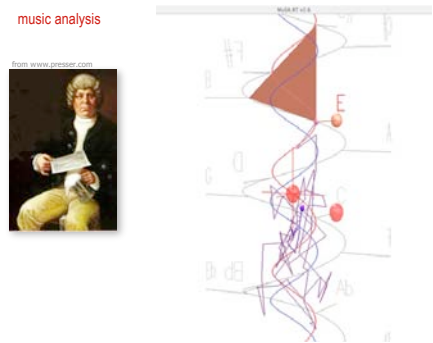


jan 2007 - usc  
 feb 2007 - u. of victoria  
 mar 2007 - natl. u. of singapore  
 mar 2008 - n. carolina state  
 may 2008 - mit

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**music analysis**



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research

- music representation
- other music analysis
  - rhythm and metric analysis (anja volk)
  - retrieval under uncertainty (erdem unal, shri narayanan)
  - unsupervised learning of melodic structure (reid swanson)
- other music visualization
  - tonal distribution and similarity (arpi mardrossian)
- expressive performance
- composition / improvisation
- music and emotion

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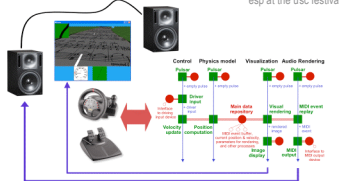
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esp: expression synthesis project

elaine chew, alexandre r.j. francois, and jie liu, since 2002



esp at the usc festival 125 pavillion, october 2005.




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topics in engineering approaches to music cognition

since 2003



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topics in engineering approaches to music cognition

**Spring 2006**

**Computational Modeling of Expressive Performance**

Spring 2006

**Week 1**

**Week 2**

**Week 3**

**Week 4**

**Week 5**

**Week 6**

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topics in engineering approaches to music cognition

**Final Project (Expression, Timing, From Contexts)**

**Analysis of Dynamic Shaping in Transcomposed Rock** by Eric Cheng [video]

**Following a guitar's path: exploring the information revealed by tempo changes** by Cheng-Hua Chen [video]

**An Exploration of RTR Rules Application for Sax** [presentation] [video]

**Emotion Reading by DR** (for Liu and Tsung-Hsi Chang) [video] [presentation] [40']

**Musical Expression Synthesis by Driving in the Tempo-Landmark Space** by Jie Gu [video] [presentation] [40']

**Music of Silence - Analysis of Silent Music Made by Agnieszka** [video]

**Emotionless: Visualization of Emotional Content from Audio** by Rishabh Iyer and Miroslav Mardoch [video] [presentation] [40']

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eric cheng: masters thesis

**Example Phrase**

**Global Average Profile**

**Number of Local Maxima by Location**

(a) Phrase Strength Parameters

(b) Phrase Typicality Visualization

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**Figure 3.11: Average Individual P.T. ratios**


(a) P.S. + L.

(b) Average P.S.

(c) Average P.T.

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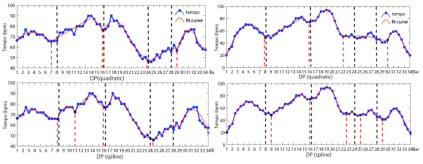
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ching-hua chuan: dp phrase segmentation 

Chopin's *Prelude No. 1*

**Kissin's Performance**  
Boundaries at bars 8, 16, 24, and 28.  
Slow-start: bar 29.

**Rubinstein's Performance**  
Agogic accent: bar 22.  
Groupings: four 2-bar sub-phrases.



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mimi: multi-modal interaction for musical improvisation


alexandre r.j. francois, elaine chew, and c. dennis thurmond, since 2006





mimi and the seiler piano – the first midi grand piano, built in the 50s for tv production – at the berlin musical instrument museum, may 2007.

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palestrina pal 

anna huang, 2003-2005 



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**music, film, and emotion**

rob parke, elaine chew, and chris kyriakakis



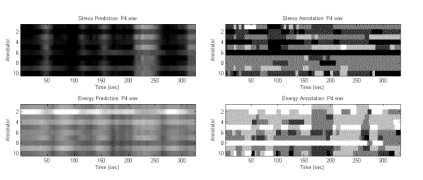
Film and Music Combined	Music Alone	Piece / Emotion
		Mellow - Koolhaas (antivirus)
		Debris - Chair de Lune (constant)

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**individual listener modeling**


merrick mosst: masters thesis



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computing in music symposium • april 2008  
 analytical listening through interactive visualization  
[www-rcf.usc.edu/~mucoaco/Radcliffe](http://www-rcf.usc.edu/~mucoaco/Radcliffe)

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