

# Bringing Instrumental Musicians into Interactive Music Systems through Notation

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When I was a composition student in New York City, I often witnessed a notational arms race between composers and ensembles. The staggering diversity of contemporary music confounded any efforts toward conventions for musical interpretation and performance practice. So in the face of limited rehearsal time, many talented performers would play the printed page literally, adding little of their own musical interpretation and expression. Composers, unhappy with the results of these readings, increased the notational density of their scores, spelling out every expressive nuance. As this process iterated and the scores became ever denser, the performances moved further away from what draws me to music: the magical union of the composer's score and the performers' ideas.

My own aesthetic response to this phenomenon was to move in the opposite direction, composing open-form scores that challenged musicians to take ownership of the music, making decisions about order, tempo and dynamics that are normally handled by the composer. Over the years, my artistic practice has shifted from acoustic chamber music to digital interactive music systems, but these approaches to notation have remained at the core of my work.

The reason is simple: Notation is an incredibly powerful mechanism for communication. We have an overabundance of input mechanisms into our software, ranging from computer vision to music information retrieval to touch gestures. Yet on the other end, interactive music systems rarely place their output back in human hands. They usually send their output as electronic sound directly to speakers.

Notation makes human musicianship possible at the output stage of an interactive system: The system creates notation for musicians to perform rather than creating sound directly. The form of the notation, naturally, must evolve from the printed page: As a key component of an interactive system, it must become dynamic. This new context for notation necessarily imposes new design constraints: It often must be rendered algorithmically, displayed digitally and sight-read in performance. High notational density is usually impractical; un-

conventional, open-ended scores predominate.

In my live performance works, such as *Glimmer* (2005) and *Flock* (2007) [1], I have used notation as a way to link audiences to musical ensembles in real time: Input from audiences drives the algorithmic generation of notation for the musicians. In my web-based works such as *Graph Theory* (2006) and *Piano Etudes* (2009), I have used notation to similar ends, but out of real time: Web participants create their own versions of an open-form score, and then musicians print out and perform a version of the piece that reflects the on-line activity.

I am currently using real-time notation as a tool to bring laptop musicians and instrumental musicians together in collaborative improvisation. *LOLC*, a software application and corresponding series of musical works I have created with Akito Van Troyer, Andrew Colella, Sang Won Lee and Shannon Yao, enables a laptop ensemble to improvise with both music notation and electronic sound. (*LOLC* originally stood for Laptop Orchestra Live Coding, but given how the project has evolved we now consider the applicability of the latter term debatable.)

With *LOLC*, the laptop musicians type text commands on a laptop keyboard (Fig. 1) to load, display, transform and share short fragments of traditional notation that I have pre-composed. In performance, each laptop musician is paired with an instrumental player who sight-reads the notation from an external computer display as it is rendered. The instrumentalists are able to sight-read because the notation is a mixture of pre-existing, familiar fragments and new modifications and combinations of them.

The instrumental players' interpretations of the notation are not input digitally back into the computer system. Instead, the laptop musicians react directly to their performances as they continue to type and create new notation to play. In this manner, *LOLC* facilitates a rich interaction between digital and acoustic performers. The audience follows this collaboration through a video projection, which shows the text typed by the laptop musicians, animates the music being played by the instrumental musicians and indicates the ways in which the laptop players are sharing musical material.

## ABSTRACT

The author describes the use of real-time music notation software that allows laptop musicians and instrumental musicians to perform together in collaborative, interactive improvisation.

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Fig. 1. Laptop musicians use a text-based interface in LOLC to load, transform and display real-time music notation to instrumental performers, 2010. (Photo © J. Freeman)

By using notation as a mechanism to deeply integrate acoustic musicians into interactive music systems, I ultimately seek to enable compelling musical experiences for composers, performers and audiences that redistribute creativity in an effort to form new kinds of magical unions.

#### Acknowledgment

LOLC is supported by a grant from the National Science Foundation as part of a larger research project on musical improvisation in performance and education (NSF CreativeIT #0855758). It is available for download at <[www.jasonfreeman.net/lolc/](http://www.jasonfreeman.net/lolc/)>.

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#### References and Notes

1. I discuss these works in Jason Freeman, "Collaborative Creation, Live Performance and Flock," *Leonardo Music Journal* 18 (2008); Jason Freeman, "Glimmer: Lights, Orchestral Performance, and Audience Participation," Supplement to *Leonardo Music Journal* 17 (2007).

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