



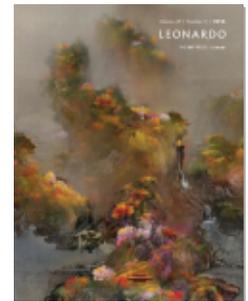
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Communicating Science: Explorations through Science and Art

Eleanor Gates-Stuart

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SUPPORTING MUSIC COMPOSITION WITH INTERACTIVE PAPER

Jérémie Garcia

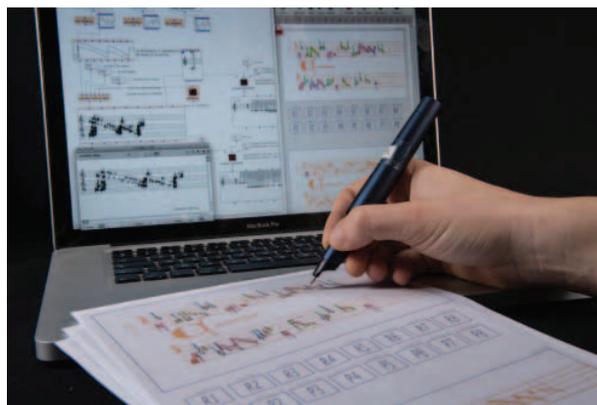
Music composition has been deeply influenced by the computational power introduced by computers, but despite the use of software to create new sounds or process symbolic music, composers still use paper in their creative process. Interactive paper creates new opportunities for combining expression on paper and computation. However, designing for highly individual creative practitioners who use personal musical representations is challenging. In this thesis, the author argues that composers need personal and adaptable structures on paper in which they can express and explore musical ideas.

The author first presents three field studies with contemporary composers that examined the use of paper and the computer during the composition process and how linking the two media supports exploration of musical ideas. Based on participatory design studies, the author introduces Paper Substrates, interactive paper components that provide modular structures for interacting with personal representations of computer-based musical data. The author details tools to develop paper applications with the Paper Substrates approach.

Then the author describes a structured observation study with 12 composers who used Polyphony, a unified user interface that integrates interactive paper and electronic user interfaces, to compose a short electroacoustic piece. The study allowed the participants to systematically observe and compare their compositional processes.

Finally, the author reports on a project with Philippe Leroux during the composition of his piece “Quid Sit Musicus.” Several work sessions with the composer and a musical assistant led to the design of new paper-based interfaces for synthesizing sounds or controlling the spatialization from handwritten gestures over an old manuscript.

Jérémie Garcia: <jeremie.garcia@yahoo.fr>. PhD diss., Université Paris-Sud, France, 2014.



Jérémie Garcia, exploring computer-based musical processes on paper. (© Inria. Photo: H. Raguét.)

COMMUNICATING SCIENCE

Explorations through Science and Art

Eleanor Gates-Stuart

Science and art have a history of distinctive differences and opposing notions of experimentation. Nevertheless, these “two cultures,” as described by C.P. Snow, have more in common than might be supposed. Both are highly creative, both are exploratory, both have flashes of brilliance. It is surprising, therefore, that “scienceart,” or “artscience,” has not been intensively studied as a “third culture.” It is in this interactive space between the disciplines that this research study is focused. It is the expression of science through art and art through science.

Three case studies of communicating science through art are discussed. The works in these studies used art to express science to sectors of the public, research organizations and scientists themselves. Each case study addresses a research question about the communication of science and in turn discusses the creation of art to achieve this communication.

The first case study, *FingerCodes*, concerns a series of works using the fingerprint as a foundation for expressions of identity. The second, *Titanium Insects*, describes a collaboration between a scientist and an artist to inform both the science and the art. The third, *StellrScope*, extends the scope and depth of science-art intersection through an extensive study of wheat-science innovation over one hundred years, which resulted in a public artwork in a national science museum. The thesis makes recommendations for future practice and concludes with a new template—a model for similar collaborations.

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Eleanor Gates-Stuart, *In the Mix*, archival pigment ink on paper, 2013. (© Eleanor Gates-Stuart)