

Panel Intro

Welcome to the Leonardo Education and Art Forum panel “Migratory Structures: Scientific Imagery and Contemporary Art Practice.”

LEAF promotes the advancement of artistic research and academic scholarship at the intersections of art, science, and technology.

You can find links to information about LEAF and Leonardo membership on the web page for this panel, where you’ll also find contact information, links, and bibliographic materials for each of our presenters. Here’s the URL:

[slide: http://ignotus.com/research/leaf_panel.html]

I am extremely happy—absolutely smitten—with the panel we have today. I will introduce each of them more fully when they give their presentations, but for now let me introduce, in the order of their presentations:

Marlena Novak, Associate Director of the Animate Arts Program at Northwestern University

Jay Alan Yim, Associate Professor in Composition at the Bienen School of Music, Northwestern University, and Marlena’s collaborator in LocalStyle, an arts collective of two.

Jean-Pierre Hébert, Artist-in-Residence, Kavli Institute for Theoretical Physics, University of California, Santa Barbara

Diane Gromala, Professor, School of Interactive Arts and Technology, Simon Fraser University

Jack Ox, Research Assistant Professor at the University of New Mexico, Albuquerque

Hannah Higgins, our discussant, Associate Professor in Art History, University of Illinois at Chicago.

My name is Paul Hertz. Like all of our panelists except Hannah, whose eloquent books on art and technology you should all read, I am an artist who works with technology. In fact, I am a full time artist—happily so, now that the grants that supported me as an educator at Northwestern University have run out. I am also an independent curator. My most recent foray, *Imaging by Numbers: A Historical View of the Computer Print*, co-curated with Debora Wood, was shown at the Mary and Leigh Block Museum in 2008. I refer you to essays in the Spring 2009 number of *Art Journal* if you’re curious about that show.

The focus of this panel is on the complex relationships among art, science, and technology. More specifically, it concerns the exchanges between art and science, which I have characterized as “migratory structures.” I hope this term is vague enough to cover an unbounded terrain that includes formal, mathematical structures; classical structuralism and cybernetics; algorithms and data structures; metaphor and other

rhetorical tropes; and cognitive and neurological structures. Structures, in my vague appellation, are to be understood as both synchronic and diachronic, as entities and processes. All of these are representative types in the exchanges between art and science.

Despite their divergent attitudes and history, artists and scientists share a deep concern with pattern, form, structure, and process. In different ways, both attribute meaning to form. Arguably, methodical experiment and the formal description of natural phenomena constitute science, while the production of forms that “imitate Nature in her manner of operation,” as Ananda Coomaraswamy put it, offers one definition of art.

But I would not like to suggest any sort of bifurcated cultural view with this distinction. Friedrich Kittler, in the epilogue to the second edition of *Discourse Networks*, asserts that discourse networks—feedback loops of material and cultural production, deeply imbricated and tangled—offer a more accurate rendering of the relations of art, technology, and science than does C.P. Snow’s “two cultures.”

With this I concur, and would like to attempt to highlight a few loops and tangles relevant to this panel.

First, as to structure and totality. Werner Heisenberg, in the *Physicist’s Conception of Nature*, noted how science had progressed from a deliberate modesty, of limited domains of validity, to aspirations of explaining all Nature and subsuming philosophy, back to a restrained attitude, in which knowledge and limits are mutually dependent. Think of the progression from Galileo to Newton to quantum physics. Similarly, the 20th century structuralist project of analyzing diachronic form in terms of elements, transformations, totalities, and feedback succeeded brilliantly, only to founder on its inability to rescue structures from a quasi-Platonic existence as the “form of forms,” and from the critique of regimes of authority in which totalities got the ax. Nevertheless, form, transformation, and feedback, even in the absence of closure (afforded by totality), remain critical methods in science and art.

Second, as to mapping and metaphor. All of the panelists deal with mapping of one sort or another. Jean-Pierre works with algorithms that map mathematical entities into visual representation. Jack Ox has analyzed musical compositions to produce visualizations of musical structure and mapped metaphorical imagery onto her formal elements to elicit larger cultural associations. Jay and Marlena, the two members of LocalStyle, will talk about works that map scientific data into visual and audio representations, often foregrounding the process of data capture and visualization rather than the dataset per se. Diane Gromala’s collaboration with physicians and scientists in managing pain through virtual worlds involves mappings between the real and virtual body, not simply as a trope or metaphor, but as a deep entanglement of physical experience—internal states—with technological construction. If mapping can operate as method of analysis and of information production, it also can operate as a projection of internal states back onto the world, a “reversed perception” that Warren Neidich calls *proception*. The field of potential projections and the field of potential productions are mediated by and tangled in feedback loops of discourse.

Finally, as to meaning, the joker in the deck, a wild card. Clearly, even the most formal works of art and the most abstruse equations of physics are muddied by meaning—if not in their representation, then in their context, reception, and elaboration. In the wake of Thomas Kuhn’s analysis of scientific revolutions, we may judge that research is never pure, always socially determined and *a priori* charged with meaning. Like totality, pure form and pure research operate as myths. And yet, meaning itself eludes easy formulation. To paraphrase Piaget’s description of intelligence: meaning arises not just as a social operation nor as an effect of individual mental life, but as a form of equilibrium of cognitive and social functions that is constantly being renegotiated. Artists are a catalytic point within this production of meaning; they decouple form from originary meaning to recreate the processes whereby form and meaning are associated. Form and content, structure and concept do not exist in absolute terms, neither in reality nor in mathematics. They continually trade places: forms conceive forms, concepts form concepts. Meaning begets meaning.

I hope that our panel will provide you with a few windows on this process as it operates at the intersection of art and science.

Paul Hertz
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