

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy
Edgar Cardenas

Will defend his dissertation

Art-Science for Sustainability

Abstract

The complexity and interconnectedness of sustainability issues has led to the joining of disciplines – whether individually or through collaborations. This effort has been primarily within the sciences with minimal attention given to the relationship between science and art. The exclusion of art is problematic since sustainability challenges are not only scientific and technical; they are also cultural, so the arts, as shapers of culture, are critical components that warrant representation. In addition to contributing to the production of culture, arts have also been credited as catalysts for scientific breakthroughs; thus it stands to reason that understanding art-science integration will benefit sustainability's focus on use-inspired basic research. The focus of my research is to place art and science on equal footing to enhance understanding of how individual artists-scientists and collaborative artist-scientist teams creatively address sustainability challenges. In other words, I address the question "What does it take to develop high functioning artists-scientists or artist-scientist collaborations?"

To answer this question, I used a multipronged approach to triangulate a richer understanding of *what* art-science synthesis offers to sustainability and *how* it functions. First, I performed an historical analysis of a maladapted wilderness aesthetic and turned to the work Aldo Leopold – an exemplar of an artist-scientist – for a new sustainability aesthetic. Then, I engaged in an individual contemporary art practice, culminating in a gallery exhibit, which displayed ecologically-informed work from a three year study of my backyard. Finally, I conducted small group research of artist-scientist teams tasked with developing interpretive signage for the Tres Rios wetland site. For this final element, I collected survey, sociometric (wearable sensors), and ethnographic data.

Through this composite research, I found that successful art-science practices require significant energy and time investment. Although art-science is most intensive in an individual practice where the person must become "fluent" in two disciplines, it is still challenging in a group setting where members must become "conversational" in each

other's work. However, successful art-science syntheses appear to result in improved communication skills, better problem articulation, more creative problem solving, and the questioning of personal and disciplinary mental models. Thus, the outcomes of such syntheses warrant the effort required at both the individual and collaborative level.

Monday, October 19, 2015
1:00 PM
SHESC, Room 254

Faculty, students, and the general public are invited.

Supervisory Committee:
Mark Klett (Co-Chair)
Ben Minter (Co-Chair)
Edward Hackett
Daniel Childers