Abstract

**Transdisciplinary Research, Transformational Learning, and Transformative Science: The Structure of Scientific Revolutions Revisited**

Mechanistic understanding of the relationship between inter- and trans-disciplinary research and potentially transformative science is lacking. Dr. Jeanne Fair from Los Alamos National Laboratory will review a case study of a highly successful, long-term, transdisciplinary research effort that lead to the discovery of Hantavirus in 1993 in New Mexico. The review of this historical scientific event shows that transformative research depends on human and material foundations within disciplines, effective collaborative mutualism across disciplines, and a learning process that enables knowledge synthesis across diverse perspectives. The review shows that deliberate engagement in disorienting activities that arise during transdisciplinary collaboration initiates transformational learning, the key mechanism for generating new, creative scientific understanding. The model provides a generalized mechanistic framework for understanding how transformative science is generated, consistent with classic studies of the structure of scientific revolutions. The initial Hantavirus outbreak in the four corners area of the Southwest lead to strong relationships between researchers of different disciplines and several decades of strong scientific collaboration.