

A DBER Science Education Seminar

# Quantifying students' epistemological beliefs about science using computer-based inquiry: a multi-pronged approach to a multi-faceted construct

**Melanie Pepper, Ph.D.**

Molecular, Cellular & Developmental Biology / ICS  
University of Colorado, Boulder

**Monday, 9<sup>th</sup> March 2020 Porter BioScience B121 @ 3:30 PM**

Epistemological beliefs about science, or beliefs about the nature of science knowledge and how knowledge is generated during the process of inquiry, is an essential yet difficult to operationalize component of scientific literacy. An emerging solution to the challenge of creating reliable and valid metrics to assess this construct is to instead examine student science practices. How specific epistemological beliefs relate to science practices, such as inquiry, are largely unknown. My previous work characterized the inquiry practices of experts and novices engaged in the authentic science inquiry experiences provided by Science Classroom Inquiry (SCI) simulations and suggested that inquiry practices may reflect underlying epistemological beliefs. SCI generates a high-throughput data source that can be analyzed using learning analytics, which have been proposed as a method for assessing traditionally difficult to assess phenomena, such as epistemology. In my talk, I will describe a biology inquiry-based assessment of epistemological beliefs about science and apply this assessment strategy to highlight differences in epistemological beliefs between biology and non-STEM majors. This interdisciplinary work offers science education researchers and practitioners a high-throughput, practices-based assessment that provides unprecedented insight into students' epistemological beliefs about science, potentially leading to classroom interventions and personalized experiences in real-world inquiry environments.

science, math & engineering  
**I am an<sup>^</sup>education Buff**

University of Colorado **Boulder**