

## Session A6: What PER Tells us About Physics Learning

Sunday, Jan. 15,

Galleria South

10:30 a.m.–12:20 p.m. Moderator: TBA Sponsor: Committee on Research in Physics Education

### **A6-07 (11:30 to 11:40 AM) | Contributed | Physics Students' Mathematical Environment: Operational Skills, Contextual Understanding, Symbolic Representation\***

*Presenting Author: David Meltzer, Arizona State University*

*Additional Author | Dakota H. King, Arizona State University*

*Additional Author | John D. Byrd, Michigan State University*

We will present a perspective on introductory physics students' mathematical difficulties that places operational skills in a broader context, incorporating challenges related to symbol and language difficulties, understanding of context, and self-checking behavior. The mathematical difficulties encountered by physics students are generated and influenced by a broad array of factors, including weak understanding of both mathematical concepts and their interpretation in physical contexts, and mismatches in content and language between mathematics and physics courses. Many students also suffer from insufficiently developed self-checking and self-correcting behavior that can become a persistent obstacle to success with mathematics-intensive subject matter. Our most recent findings reflecting administration of a mathematics diagnostic text will be presented within this broader context, and used to offer perspective on the nature and scope of the challenges students face.

\*Supported in part by NSF DUE #1504986 and #1914712