Session BJ PER: Student Understanding about Mathematics in Physics

Location: CC - Ballroom A **Sponsor:** AAPT/PER **Time:** 1:30–2:40 p.m. **Date:** Monday, July 22 **Presider:** TBA

BJ01: 1:30-1:40 p.m. Nature of Students' Mathematical Difficulties in Introductory Physics Courses*

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We report findings from our three-year investigation into mathematical difficulties encountered by students in introductory physics courses. We have administered over 4000 written diagnostic tests in dozens of different algebra- and calculus-based physics courses on two different campuses at Arizona State University, and carried out over 60 individual problem-solving interviews. We find that regardless of course (i.e., algebra- or calculus-based), campus, or semester (spring or fall), that (1) difficulties with basic mathematical operations (algebra, trigonometry, graphing, geometry) are widespread, with average error rates ranging from 20-70%; (2) performance on problems using symbols for constants is consistently and significantly worse than on problems using numbers; and (3) during problem-solving interviews, students self-correct approximately 50% of all errors with only minimal prompting.

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