

DEPARTMENT OF PHYSICS & ASTRONOMY

Physics & Astronomy Colloquium

Jayson Nissen

Montana State University

3:30 - 4:30 p.m. | Tuesday, September 15
Science Building 234

Modernizing formative, research-based assessments to support personalized instruction

Students enter introductory physics courses with a wide range of skills, knowledge, and attitudes. Existing research-based assessments tell us whether students learned over a course. Researchers have used these instruments to show the improved learning that student-centered, collaborative instruction provides over lecture-based instruction. The next generation of instruments must do more. They must help us understand individual students' knowledge and attitudes, how these develop within a course, and which instructional approaches work for whom and when. In this talk, I will motivate the need for these instruments by presenting investigations of inequities in students' knowledge and attitudes. These studies used Bayesian multilevel models to investigate student outcomes across the intersections of race, ethnicity, and/or gender. The talk will then describe our ongoing development of a suite of cognitive diagnostic computer adaptive tests for physics and calculus. These assessments provide timely and actionable information by providing both an overall score and identifying which learning objectives students have and have not mastered. Researchers and educators choose which learning objectives to measure and when to measure them. Computer adaptive testing means that the instruments select questions that provide the maximum information to produce precise measures of students' knowledge or attitudes with as few questions as possible.

Biography

Dr. Jayson Nissen is an assistant professor in the physics department at Montana State University. Dr. Nissen is the co-director of the LASSO platform, which supports STEM instructors assessing the efficacy of their courses for free. Dr. Nissen served on the Leadership Council of the Learning Assistant Alliance and has taught with Learning Assistants at Oregon State University and the University of Maine. Dr. Nissen uses quantitative methods and a critical framework to investigate racism, sexism, and classism in college science courses through the analyses of large datasets. This work includes a focus on the efficacy and impacts of the Learning Assistant model nationally. His research focuses on the development of cognitive diagnostics and computer adaptive testing. These research-based assessments provide researchers and educators with timely actionable evidence of students' knowledge, skills, and attitudes.

Refreshments at 3 p.m. | SC 103



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