Announcing the Final Examination of Mr. Jarrad Pond for the Degree of Doctor of Philosophy in Physics

Date: Thursday, July 7, 2016
Time: 9:00 a.m.
Room: PSB 445
Dissertation title: Investigating the Predictive Power of Student Characteristics on Success in Studio-mode, Algebra-based Introductory Physics Courses

As part of a project to explore successful strategies for using the studio-mode of physics instruction, such as SCALE-UP, the objective of this work is to investigate the characteristics of students enrolled in algebra-based, studio-mode introductory physics courses at various universities in order to evaluate what effects these characteristics have on different measures of student success, such as gains in conceptual knowledge, shifts to more favorable attitudes toward physics, and final course grades. In my analysis, I explore the strategic self-regulatory, motivational, and demographic characteristics of students in algebra-based, studio-mode physics courses at three universities: the University of Central Florida (UCF), Georgia State University (GSU), and the George Washington University (GW). Each of these institutions possesses varying student populations and differing levels of success in their studio-mode physics courses, as measured by students' overall average conceptual learning gains.

In order to collect information about the students at each institution, I compiled questions from several existing questionnaires designed to measure student characteristics such as study strategies and motivations for learning physics, organization of scientific knowledge, and demographics. Measures of students' conceptual knowledge and attitudes toward physics were also collected. In addition, instructors teaching algebra-based, studio-mode introductory physics courses were interviewed about what makes students successful in order to better understand what instructors perceive is important for students to excel in their physics courses.

Using model-based cluster analysis methods to organize students into distinct groups, I identify five distinct learning profiles in the population of algebra-based, studio-mode physics students, groups similar to those found in previous research. Furthermore, using Automatic Linear Modeling, an application of multiple linear regression modeling, I explore which demographic variables (including the identified learning profiles) are the most influential in predicting student outcomes, both pre- and post- instruction and at differing institutions. In addition, I synthesize the results of these statistical analyses with the prominent themes present in the instructor interviews.

In this presentation, I will give details about the motivation, methodologies, and major outcomes of this work.

Outline of Studies:
Major: Physics

Educational Career:
B. S., 2009, University of Central Florida

Committee in Charge:
Dr. Talat S. Rahman
Dr. Jacquelyn J. Chini
Dr. Eduardo R. Mucciolo
Dr. Malcolm B. Butler

Approved for distribution by Talat Rahman, Committee Chair, and Jacquelyn Chini, Committee Co-Chair, on June 28, 2016.

The public is welcome to attend.