

The UCSD/SDSU Mathematics and Science Education
Doctoral Program Proudly Presents a Dissertation Defense:

Jessica Fabricant Ellis

**Preparing Future College Instructors: The Role of Graduate Student
Teaching Assistants (GTAs) in Successful College Calculus Programs**

Date: Thursday, June 26, 2014
Time: 10 a.m.
Location: Center for Research in Mathematics and Science Education (CRMSE)
SDSU, 6475 Alvarado Rd, Suite 128

Graduate student Teaching Assistants (GTAs) contribute to calculus instruction in two ways: as the primary teacher and as recitation leaders. GTAs can also be viewed as the next generation of mathematics instructors. Thus, in addition to their immediate contribution to the landscape of Calculus I instruction, GTAs will contribute significantly to the long-term state of Calculus in their future occupations. However, their preparation for these roles varies widely and is often minimal. In this study, I first compare the mathematical beliefs, instructional practices, and student success of GTAs to other Calculus I instructors. I then provide rich descriptions for three GTA professional development (PD) programs that prepare graduate students as course instructors, as recitation leaders, and as future faculty. I then investigate the instructional practices and mathematical beliefs of graduate students coming from these three PD programs. I conclude this work with a description of a framework for GTA PD programs.

To accomplish this work, I conducted a mixed-method analysis on national survey data and case study data from four doctoral granting institutions. These four institutions were chosen because of their higher-than-expected student success in Calculus I. The results of these analyses indicate that graduate students teach in more innovative ways than other instructors, though their students were less successful. Among the four case study institutions, I identified three models of GTA PD, each of which appeared successful in accomplishing their goals. These goals included transitioning graduate students into the role of instructor, preparing graduate students to implement an innovative approach to Calculus I, and supporting graduate students as recitation leaders. These analyses also led to the development of a framework to be used to characterize, evaluate, and consider the implementation of graduate student professional development programs.