



# Department of Mathematics and Statistics



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## Incorporating Inquiry-Oriented Instruction in Proof-Based Courses

**Abstract:** In efforts to transform undergraduate mathematics education, there has been a shift to implement more inquiry-based approaches in the classroom. Proof-based courses are in need of this reform, as it is well documented that students often struggle with proof and proof-related activity. In this talk I will discuss how my research works to address this need from a variety of different perspectives. Specifically, I will present work from a recent study of students' collective proving activity where I investigate how students engage collaboratively on tasks in a synchronous online inquiry-oriented introduction to proofs course. I present two studies that came from this work. First, a case study of two students working together on a conjecturing task where I studied the role that the students' listening activity played in the co-construction of a shared solution. Findings from this study suggest that by listening to their peers in different ways a student can play a critical role in the co-construction of a shared solution without being the one to appear to be leading the mathematical ideas. Second, I investigated how students operationalize the technological tools available to them in the remote environment to work collectively in small groups. For the results of this study, I identified several uses that the students developed for the tools available to them and implication of these uses. I conclude the talk by briefly describing a couple of directions I have for future work.

**Keywords:** Inquiry-Oriented Instruction, Collaborative Activity, Introduction to Proofs, Technology.

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