“Transforming Instruction in Undergraduate Mathematics via Primary Historical Sources”
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The speaker is one of a team of seven mathematicians and mathematics educators, representing different universities across the United States, who have been at work to design, author, classroom test, revise, evaluate, and disseminate classroom modules called Primary Source Projects (PSPs), which are meant to teach standard topics from across the early years of the undergraduate mathematics curriculum through primary historical source materials. This endeavor, called by the acronym TRIUMPHS, intends for PSPs to replace traditional textbook presentations of mathematical content by focusing student attention on the interpretation of historical source texts combined with brief contextual material and carefully crafted exercises meant to encourage sense-making by students. PSPs are also designed to incorporate principles of active learning, wherein the bulk of classroom time is given over to student work on project tasks and exercises, both alone and in discussion with small groups of classmates, or involving the entire class, rather than to traditional lectures by the instructor.

The TRIUMPHS team, supported with funding from the US National Science Foundation, have created some 48 such modules together with a few external authors. These are now freely available from the TRIUMPHS website. Some PSPs can take as little as 30 minutes to implement, while others are designed to take up to four weeks (with median implementation time of about one week) of classroom time. There are modules written to support standard coursework from precalculus and calculus, linear algebra, differential equations, algebra, theory of numbers, geometry, analysis, statistics, and a few other subjects as well.

This talk will discuss the TRIUMPHS endeavor generally but will show examples of PSPs at work through a pair of projects authored by the speaker, one of which is an introduction to the study of trigonometry, the other of which teaches the matrix determinant.