

## CSAAPT Fall 2022 Semi-Virtual Meeting



Chesapeake Section of the  
American Association of Physics Teachers  
Fall 2022 Semi-Virtual Meeting  
October 22, 2022 in Falls Church, VA

Contribution ID: 20

Type: **talk (15-minute)**

# Designing a First-Year Undergraduate Lab Course to Teach Authentic Experimentation Skills

*Saturday, October 22, 2022 3:15 PM (15 minutes)*

Traditional undergraduate laboratory courses are typically designed to reinforce and verify lecture content and use highly structured experiments to achieve this goal. In recent years, there have been numerous national calls to examine and enhance the student experience in these lab courses. AAPT and APS have recommended that undergraduate lab curricula should develop students' critical thinking and experimentation skills, such as uncertainty and data analysis, modeling, computational proficiencies, and experimental design. At Virginia Tech, we have re-designed the first-year physics lab course to align it with these recommendations by removing verification goals and incorporating more authentic scientific activities. These activities engage students in scientific decision-making and allow students to construct knowledge through empirical investigations. This talk will focus on the curricular design of this lab course –how the coursework, lessons, and assessments help achieve the course's learning goals. In particular, I will discuss how we leverage Mathematica to teach statistical concepts and methods and data analytics.

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**Session Classification:** Afternoon Session 2A (Chair: Simone Kulin, Zoom Monitor: James Freericks)