1163-D5-1561   **Katherine Walsh Hall***. *Creating and Using GeoGebra 3D Models in Multivariable Calculus.* Preliminary report.

In multivariable calculus, many students struggle to visualize many of the concepts because they have a hard time picturing surfaces and solids in $\mathbb{R}^3$. In past semesters, we have given students a chance to see 3D printed models and use Play-Doh to help visualize such concepts. With the move to online courses, we have been relying more heavily on virtual 3D graph models, many of which are developed using GeoGebra.

There are several ways students might see these - watching them be used during lecture, interacting with pre-built demos on their own or building their own demos. In this talk, we see several examples of such models and discuss how we can analyze student learning outcomes in these three different methods and what we found through a preliminary study during Fall 2020. This work will help determine the best use cases for these models in future semesters. We will also talk about what we learned as best practices for sharing such models and having students gain comfort with the application so they can create their own models. (Received September 15, 2020)