# VCU Discrete Mathematics Seminar 

## 2-Connected Graphs <br> Have Many Cycle Lengths

## Prof Neal Bushaw VCU!

Wednesday, Jan. 24
1:00-1:50
4145 Harris Hall


Understanding the cycle structure of graphs has long been of great interest to graph theorists. Many classical results involve the girth of graphs - does the graph contain a really long cycle? For instance, it is elementary to show that every graph contains a cycle of length at least its minimum degree (this has been proven in the first week of every graph theory course I've ever attended). Adding a connectivity condition gives much more: (one of) Dirac's Theorem(s) says that every 2-connected graph of minimum degree d contains a cycle of length $\min \{2 \mathrm{~d},|\mathrm{G}|\}$.
When one starts scribbling 2-connected graphs on a blackboard, we realize that not only do these graphs seem to contain long cycles, they seem to contain cycles of many different lengths. And so, we must explore the cycle spectrum of 2-connected graphs: the set of cycle lengths appearing in the graph. In this talk, we'll tell a little bit of the history of results on the cycle spectrum, as well as present some new results on the even cycle spectrum of large 2-connected graphs.

