VCU Discrete Mathematics Seminar

Planar graphs are 9/2-colorable and have independence ratio at least 3/13

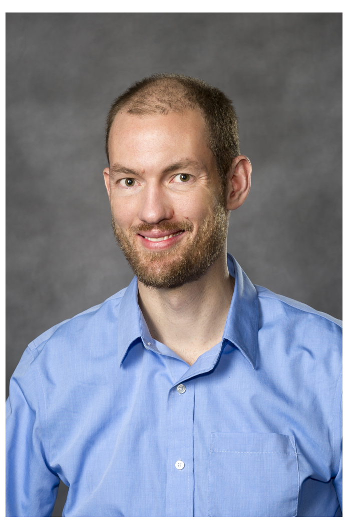
Prof Dan Cranston
VCU!

Tuesday, January 27
12:30–1:20
4119 Harris Hall (or 4145 Harris, TBA)

For nearly a century, one of the major open questions in graph theory was the Four Color Conjecture: Every planar graph can be properly colored with four colors. Appel and Haken proved this conjecture in 1976. Their result is called the **4 Color Theorem**. Unfortunately, their proof (as well as later proofs of this theorem) relies heavily on computers. In contrast, the 5 Color Theorem is easy to prove. In this talk we look at a 9/2 Color Theorem, which we can prove by hand.

A 2-fold coloring assigns to each vertex 2 colors, such that adjacent vertices get disjoint sets of colors. We show that every planar graph G has a 2-fold 9-coloring. In particular, this implies that G has fractional chromatic number at most $\frac{9}{2}$. This is the first proof (independent of the 4 Color Theorem) that there exists a constant $k < 5$ such that every planar G has fractional chromatic number at most k.

This is joint work with Landon Rabern.



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`http://www.people.vcu.edu/~dcranston/DM-seminar/`