

# VCU Discrete Mathematics Seminar

## *The Odd-even invariant of oriented matroids: Hyperplane arrangements and graphs*

**Prof Jim Lawrence**  
**George Mason University**

Tuesday, April 21

12:30–1:20

4145 Harris Hall

The complement in Euclidean space of an arrangement of hyperplanes is the union of pairwise disjoint pieces, each of which is an open convex polyhedron. These polyhedral regions may be colored, Red or Blue, in such a way that no two adjacent regions have the same color. The (absolute) difference between the number of Red and Blue regions is the “odd-even invariant” of the arrangement, or of the corresponding oriented matroid.

It has interesting properties, some of which will be described in this talk. When specialized to graphic oriented matroids, the odd-even invariant yields a graphical invariant, closely related to the number of acyclic orientations of the graph. In the graphical case, the invariant has additional properties, some of which we present. There is an “odd-even chromatic polynomial,” which in a way generalizes the ordinary chromatic polynomial.

This talk will include a brief introduction to oriented matroids.

