

# VCU Discrete Mathematics Seminar

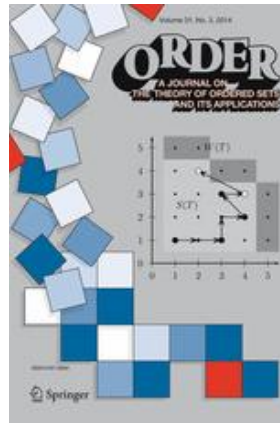
## *Extremal theorems on posets*

**Prof Ryan Martin**  
**Iowa State University**

Wednesday, Mar. 3

1:00-1:50

Zoom! @ <https://vcu.zoom.us/j/92975799914>  
password=graphs2357



A partially-ordered set (poset) is a set equipped with a relation that is reflexive, anti-symmetric, and transitive. A typical example is the so-called  $n$ -dimensional Boolean lattice, which is the set of subsets of  $\{1, 2, \dots, n\}$  ordered by inclusion.

In graphs, Turán theory asks for the maximum number of edges in a graph  $G$  that has no copies of some forbidden graph  $H$ . A similar question can be asked in posets. That is, what is the maximum number of elements in an  $n$ -dimensional Boolean lattice that has no copy of a forbidden subposet  $P$ ?

Saturation theory, initiated by Erdős, Hajnal, and Moon, is also well-studied in graphs and similar questions can be asked in posets. That is, what is the minimum number of elements in an  $n$ -dimensional Boolean lattice that has no copy of a forbidden subposet  $P$  but that the addition of any element produces a copy of  $P$ ?

In addition, both of these extremal problems have induced versions. We will discuss some progress on these kinds of extremal poset questions as well as open problems.

For the DM seminar schedule, see:

<https://www.people.vcu.edu/~nobushaw/dms.html>