# Department of Mathematics and Statistics
# COLLOQUIUM
## The Dresden Memorial Lectures

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## MONDAY, APRIL 20th
### Uncertainty and Contradiction

Math is thought of as a discipline where the point is to get the right answers. In fact, the interesting part of math is much more likely to concern asking the right questions. And when it does come time for answers, math is not black and white: it concerns itself with uncertainty and contradiction. I'll tell some math stories — concerning World War II bombers, Nate Silver, a summer job I had in college, and the Pythagorean theorem — recite some poetry, argue against Theodore Roosevelt, and try to make the case that thinking like a mathematician is *especially* useful in domains of uncertainty, ambiguity, and apparent paradox.

## TUESDAY, APRIL 21st
### Spinning a needle in a finite field

The Kakeya conjecture concerns the following question: how big can a subset of space be if it contains a length one line segment in every direction? In 2008, a graduate student named Zeev Dvir surprised everybody by proving an analogue of the Kakeya conjecture over finite fields, a problem which had resisted some of the best analysts and combinatorists in the world. He proved: if a subset $S$ of $F_{p^n}$ contains a line in every direction, then $|S|$ must be at least $c_n p^n$ for some constant $c_n$ depending only on $n$. In other words, "sets containing a line in every direction are big." Dvir's proof was just two pages long and I can (and will) explain it in one lecture; the rather surprising idea is to turn what appears to be a problem in combinatorics into a problem in algebraic geometry.

### SCIENCE CENTER 199
### Refreshments 4:15
### Talks 4:30

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