

# Arithmetic patterns, games, and the quest for fast algorithms

A talk by Professor Jacob Fox  
February 1, 2017 5:00-6:00pm  
Askwith Hall  
13 Appian Way, Cambridge, MA

## Abstract:

In this talk, I will discuss recent advances on three seemingly disparate questions and how they relate to each other.

1. What patterns can we find in prime numbers?
2. How many cards do we need in the popular card game SET® to guarantee a valid set?
3. Can we find faster algorithms to better analyze large networks?

Finding patterns like arithmetic progressions in prime numbers has fascinated mathematicians for many centuries. More recently, people have enjoyed playing the card game SET®, and natural questions that arise from this game have been shown to be closely related to longstanding open problems in mathematics and computer science. Over the last few decades, as we strive to better understand the world through large networks, analyzing enormous data sets has become a priority. Traditional algorithms are insufficient for these purposes, and the need for faster algorithms has become apparent.

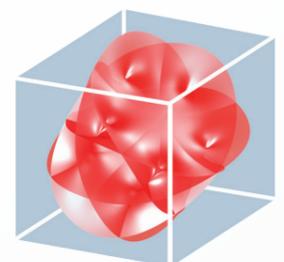
Advances (some quite surprising) on these questions have used tools from a variety of areas of mathematics, including combinatorics, analysis, algebra, probability, geometry, and number theory. No prior knowledge is assumed.



## About Prof. Fox:

Jacob Fox is a Professor in the Department of Mathematics at Stanford University. Before recently joining Stanford, he enjoyed the hospitality of the MIT Department of Mathematics, and he is one of the co-organizers of the program on combinatorics and complexity. He completed his Ph.D. in mathematics at Princeton University in 2010.

This talk is part of the Program on Combinatorics and Complexity hosted by the Center of Mathematical Sciences and Applications during AY2017-18. The program will feature workshops, seminars, and additional public talks throughout the year. For more information please visit <http://cmsa.fas.harvard.edu/combinatorics/> or contact Sarah LaBauve at [slabauve@math.harvard.edu](mailto:slabauve@math.harvard.edu).



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