

# Kaori Kitao Lecture

## Swarthmore College

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# William Dunham

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Wednesday, April 9, 2025

**4:15PM Refreshments,**  
**4:30PM Lecture**

## The Infinitude of Primes: Euclid, Euler, Erdős

**Prime numbers are the bedrock of number theory. We will examine three different proofs, from across history, of the infinitude of primes.**

**We first look at Euclid's argument that appeared in Book IX of the Elements in 300 BCE. Even seasoned mathematicians might be surprised to see his argument in its original form. Next is a result from Leonhard Euler in the eighteenth century, using the "product-sum formula" derived using his freewheeling imagination. Finally, we examine Paul Erdős's combinatorial proof from the twentieth century that uses an elementary argument, reminding us that "elementary" does not mean "trivial." These proofs show that mathematics is a subject of remarkable variety.**

**The talk will be accessible to all who have had a course in calculus.**

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**Chang Hou Hall (Science Center 101)**