How elliptic curves can keep secrets and prove theorems

Elliptic curves (and their higher dimensional analogues) have proven to be interesting, powerful, and enigmatic objects of study; on one hand elliptic curves are often a topic in undergraduate courses on group or number theory, yet there are deep open problems that arise from simple questions about their structure. In this talk we will think about how to do arithmetic on small sets, define elliptic curves in two different ways, explore their geometric and algebraic structure, and explain some of their uses within and outside of mathematics. Only the definition of a prime number will be assumed.

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