# Philadelphia Area Number Theory Seminar

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## Divisibility Properties of Abelian Varieties

**Abstract:** Let $E$ be an elliptic curve defined over the rational numbers $\mathbf{Q}$. It is well known that $E(\mathbf{Q})_{\text{tor}}$ injects into $\overline{E}(\mathbf{F}_p)$ for all but finitely many primes $p$. Thus, if $|E(\mathbf{Q})_{\text{tor}}|$ is divisible by $m$, then so is $|\overline{E}(\mathbf{F}_p)|$ for almost all $p$. On the other hand, what if almost all the numbers $|\overline{E}(\mathbf{F}_p)|$ are divisible by some fixed integer $m > 1$? Is it true that $|E(\mathbf{Q})_{\text{tor}}|$ is also divisible by $m$? (Not necessarily.)

In this talk we will consider the same divisibility question in the context of abelian varieties over general number fields and show how to reinterpret everything in terms of Galois representations. After a brief survey of known results we will present work in progress on abelian surfaces and fourfolds.

Wednesday, September 20, 2017
2:40 – 4:00 PM

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Tea and refreshments at 2:20PM in Park 339