

# Philadelphia Area Number Theory Seminar

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## Massey products and elliptic curves

**Abstract:** This is joint work with T. Chinburg and J. Gillibert. The application of Massey products to understand the Galois groups of extensions of number fields is a longstanding research topic. In 2014, Minac and Tan showed that triple Massey products vanish for the absolute Galois group of any field  $F$ . In 2019, Harpaz and Wittenberg showed that this remains true for all higher Massey products in the case when  $F$  is a number field. The first natural case to consider beyond fields is that of Massey products for curves over fields. I will discuss some known and new vanishing and non-vanishing results in this case. In particular, for elliptic curves I will provide a classification for the non-vanishing of triple Massey products under various natural assumptions. The main tool is the representation theory of étale fundamental groups into upper triangular unipotent matrix groups. I will begin with background about Massey products, which first arose in topology, and about the relevant representation theory, before discussing our results.

**Wednesday, March 29, 2023**  
2:00–4:00 PM

Temple University  
Tuttleman Hall, Room **1A**

Informal refreshments at 2:00PM – Talk at 2:30PM