Topology Seminar

Kirsten Wickelgren

of Harvard University will be speaking on

Massey Products in Galois Cohomology via Rational Points

on November 7 at 4:30 in
MIT Room 2-131

The Milnor conjecture identifies the cohomology ring $H^*(\mathrm{Gal}(\bar{k}/k), \mathbb{Z}/2)$ with the tensor algebra of k^* mod the ideal generated by $x \otimes 1 - x$ for x in $k - \{0, 1\}$ mod 2. In particular, $x \cup 1 - x$ vanishes, where x in k^* is identified with an element of H^1. We show that order n Massey products of $n-1$ factors of x and one factor of $1-x$ vanish by embedding $\mathbb{P}^1 - \{0, 1, \infty\}$ into its Picard variety and constructing $\mathrm{Gal}(\bar{k}/k)$-equivariant maps from π_1^{et} applied to this embedding to unipotent matrix groups. This also identifies Massey products of the form $\langle 1 - x, x, \ldots, x, 1 - x\rangle$ with $f \cup 1 - x$, where f is a certain cohomology class which arises in the description of the action of $\mathrm{Gal}(\bar{k}/k)$ on $\pi_1^{\mathrm{et}}(\mathbb{P}^1 - \{0, 1, \infty\})$.