**Project title:** New directions in homological algebra

**Lead faculty:**  Haynes Miller, MIT, hrm@math.mit.edu

**General area:** Mathematics; Homological algebra

**Description:**

This project will explore one of several possible new directions in

homological algebra, depending upon the interests of the students.

The starting point is the study of cohomology of groups (going back

to the 1930s). What if the word "group" is replaced by other algebraic

structures (such as ring, or commutative algebra, or monoid). What

is the analogous theory, and how do we compute it? There are actually

two competing definitions of cohomology in these cases, and in this

project we will compare them and try to find out when they agree.

**Requirements:** Basic modern algebra (groups, rings, fields).

Some familiarity with homology is desirable but not required.

**Start date, End date:** Flexible

**Estimated hours per week:** Flexible, but 10 hours per week would work well.

**Application deadline:** Flexible