

# TEMPLE UNIVERSITY MATHEMATICS COLLOQUIUM

**Brian Camley**

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will speak on

## **Complex cell motility: periodic crawling, collective rotation, and persistence**

ABSTRACT: In order to perform their functions, many cells must move through a complex environment, including neighboring cells and a confining polymer matrix. This environment can modify their behavior. I will present mathematical models of crawling cells in confinement ranging from continuum phase field models including cell mechanics and chemistry (as modeled by reaction-diffusion systems within the cell) to simple persistent random walks. I will also discuss how to generalize phase field models of cells to multiple cells with cell-cell adhesion. I apply these models to several examples of complex cell motions, including collective rotations of confined cells, anomalously large persistence of cells in microchannels, and periodic migration, where cells crawl in one direction, reverse, and retrace their steps repeatedly. These results emphasize that the addition of confinement can cause new behaviors to emerge, even if the underlying physical and mathematical rules governing the cell's motion have not changed.

MONDAY, JANUARY 12, 2015

LECTURE AT 4:00 PM

COFFEE, TEA, AND REFRESHMENTS FROM 3:40 PM

ROOM 617, WACHMAN HALL

DEPARTMENT OF MATHEMATICS