Richard Lenski – Colloquium Seminar – January 22, 2026
MSU

Title:
Dynamics and Repeatability of Evolution in a Long-Term Experiment with Bacteria

Abstract:
Evolution has produced the wonderful diversity of life on Earth, but it is usually difficult to observe evolution while it is happening. With their rapid generations and the ability to freeze and later revive cells, microbes allow one to observe evolution in action. We have maintained 12 populations of *E. coli* in a simple environment for over 35 years and 75,000 generations. The aims of this experiment have been to characterize the tempo and mode of evolution, and to examine the repeatability and even predictability of phenotypic and genomic changes. We have quantified the dynamics of adaptation by natural selection, documented many cases of parallel evolution, observed changes in the underlying mutation rate, and seen the appearance of a new metabolic function. We have sequenced hundreds of genomes to identify the mutations in longitudinal samples from the populations. These data shed light on the dynamic coupling of phenotypic and genotypic evolution during periods of both optimization and innovation.