School of Natural Sciences

UCMERCED

Quantitative Systems Biology Seminar Series

Mechanisms of Long-Term Survival and Evolution of Bacteria

By Steven Finkel

Professor of Biological Sciences

University of Southern California

Date:

Friday,

9/30/16

Time:

1:30pm

Location:

COB 267

Abstract:

Bacteria can survive long periods of incubation in very low nutrient environments during long-term stationary phase. For example, populations of *E. coli* have been maintained for years without the addition of nutrients, leading to highly dynamic communities of microbes. One of the key changes observed is the expression of the growth advantage in stationary phase, or GASP, phenotype, which is manifested by the appearance of mutants with significant fitness advantages in the population. We are applying genetic and large-scale genomic approaches to define both the extent of the genetic diversity appearing in evolving populations, as well as the mechanisms underlying survival mechanisms that appear to be under positive selection. We are also probing the effects of specific environmental conditions on the mode and tempo of evolution in our laboratory microcosms.

Bio:

Steven Finkel is a Professor of Biological Sciences in the Molecular & Computational Biology section at the University of Southern California. In 2015, Dr. Finkel was elected a Fellow of the American Academy of Microbiology. Dr. Finkel is also a Senior Scientist with the Center for Dark Energy Biosphere Investigations, an NSF-funded Science & Technology Center, where he directs an undergraduate research program directed toward increasing the diversity of students in the STEM fields. Dr. Finkel received his B.A. in Molecular Biology from the University of California, Berkeley, his Ph.D. in Biological Chemistry from the University of California, Los Angeles, and was a Helen Hay Whitney Foundation Postdoctoral Fellow in the Department of Microbiology and Molecular Genetics at Harvard Medical School. Research in Dr. Finkel's laboratory focuses on the long-term survival and evolution of bacteria both in planktonic culture and in biofilms, including understanding natural systems and applications to bacterial respiration and electricity production. Among the topics of current study in the laboratory are (1) the mechanisms of survival in many organisms, including population structure at the genetic & genomic level and studies of the GASP (growth advantage in stationary phase) phenotype; (2) the generation of bacterial diversity in different environments, including the roles of error-prone DNA polymerases in generating diversity; (3) genomic and metagenomic analyses of evolving populations of microbes; and (4) understanding the role of extracellular electron transport in the long-term survival ability of bacteria in electricity-generating microbial fuel cells (MFCs), human gut and human lung. Model organisms in the laboratory include: *Escherichia coli, Shewanella oneidensis, and Pseudomonas aeruginosa*. Steve is married and has twin daughters.

For More Information Contact:

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