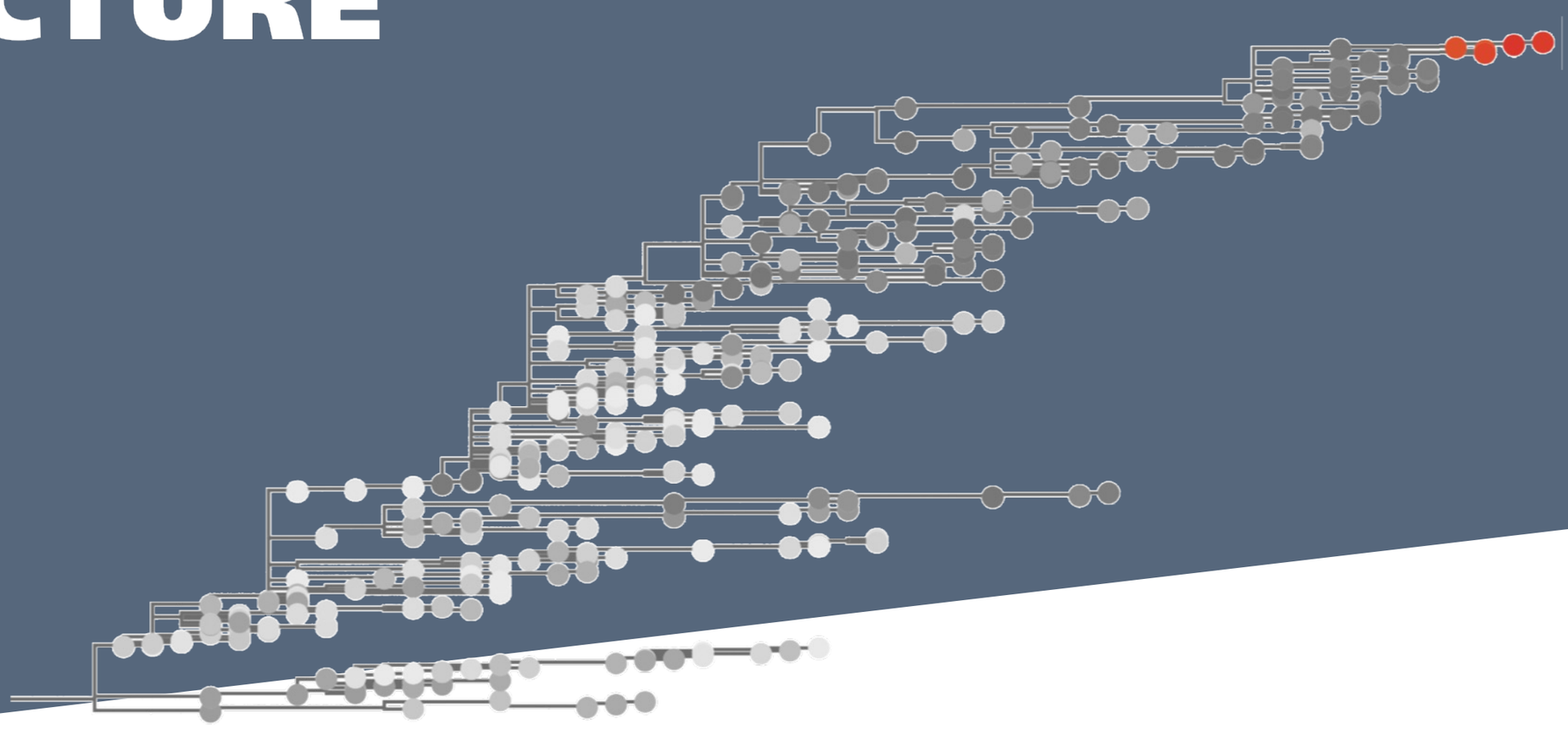
MAX DELBRÜCK LECTURE



Redefining mobility in bacterial genetics and its impact on infectious disease

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Bacterial infections are a leading cause of global mortality and new multi-drug resistant clones are continuing to emerge. Accordingly, it's imperative that we understand the processes that drive the evolution of virulence and antibiotic resistance. Classically, it has been assumed that mobile genetic elements (MGEs) play important roles in these processes because of their ability to spread horizontally in bacterial populations. In contrast, bacterial chromosomes are traditionally considered to be largely immobilised within the cell, acting as a framework for the generation of diverse genomes via horizontal acquisition of exchangeable genes. The recent discovery of lateral transduction in Staphylococcus aureus and Salmonella enterica challenges this model. We have recently demonstrated that lateral transduction can mediate the mobility of core genes in bacterial chromosomes at frequencies exceeding that of elements classically considered to be mobile. This raises important questions over the definition of an MGE, as well as the impact of this phenomenon on bacterial populations. In this talk we will challenge the concept that the mobility of the bacterial chromosomes is higher than that observed for many MGEs. We anticipate that our findings will force a complete re-evaluation of what constitutes a MGE, revealing previously cryptic roles for bacteriophages in both driving the emergence of novel virulent and multi resistant bacteria, and preserving the integrity of successful pathogenic clones.

Tuesday, November 22, 2022,17:00
University of Cologne
Institute for Biological Physics
Zülpicher Str. 77a, Room S0.03

Hosted by Yuval Mulla

CRC 1310 PREDICTABILITY IN EVOLUTION