

BIOCHEMISTRY SEMINAR

Timothy Strutzenberg

JF Foster Lecture

Senior Research Associate | Fellow in Lyumkis Lab | Salk Institute

"Cryo-EM structure of an RNA polymerase ribozyme replication complex"

Abstract: Life began with the emergence of a molecule that could replicate its own genetic material, a task plausibly mediated by an RNA-dependent RNA polymerase ribozyme. Here, I will present the cryo-EM structure of such a polymerase ribozyme, bound to RNA substrates comprising the template, primer, and nucleoside triphosphate (NTP) analog, and resolved to 2.8 Å resolution. The structure reveals how directed evolution shaped flanking elements around a highly conserved catalytic core derived from the ancestral class I ligase ribozyme. Each element serves as a functional module, positioning the primer-template duplex and incoming NTP within the active site of the enzyme. This emergent domain organization is remarkably similar to the "right hand" configuration of polymerase proteins, suggesting a common functional form for copying nucleic acids, regardless of biopolymer catalyst.

Bio: Timothy S. Strutzenberg is a structural biologist at the Salk Institute for Biological Studies whose research utilizes multidisciplinary techniques to examine evolutionary processes behind gene regulation and the origins of life.