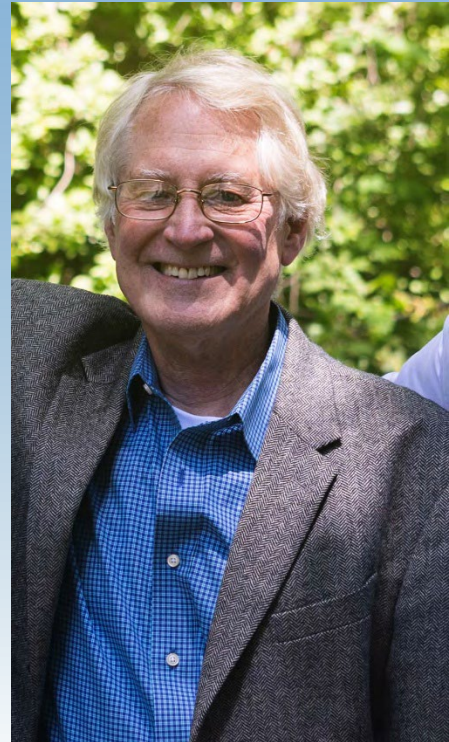


Colloquium

Thursday, October 8, 2026 at 4 p.m.
Physics & Astronomy Building (PAB) 1-434

Ken Dill
(The Laufer Center,
Stony Brook
Univeristy)



The Molecular Origins of Life: A Physics Perspective

How did living cells first arise on earth 4 billion years ago? Maybe an RNA world? A proteins world? Or, something else? First, we seek some driven dynamical process, a precursor to evolution, like a ball that rolls forward and gets faster and more irreversible as it goes. Second, biology has the Darwinian notion of "fitness", but chemistry does not. How did fitness arise from chemistry? We find support in theory, computation and experiments for the Foldcat Mechanism, which says that short random hydrophobic and polar (HP) peptides can give the necessary snowballing forward. However, proteins alone cannot be the full answer. Our modeling also illuminates the further advantage of complexation of proteins with RNAs, combining heritability with fitness, to achieve much longer-term persistence.

Hosted by Seth Putterman