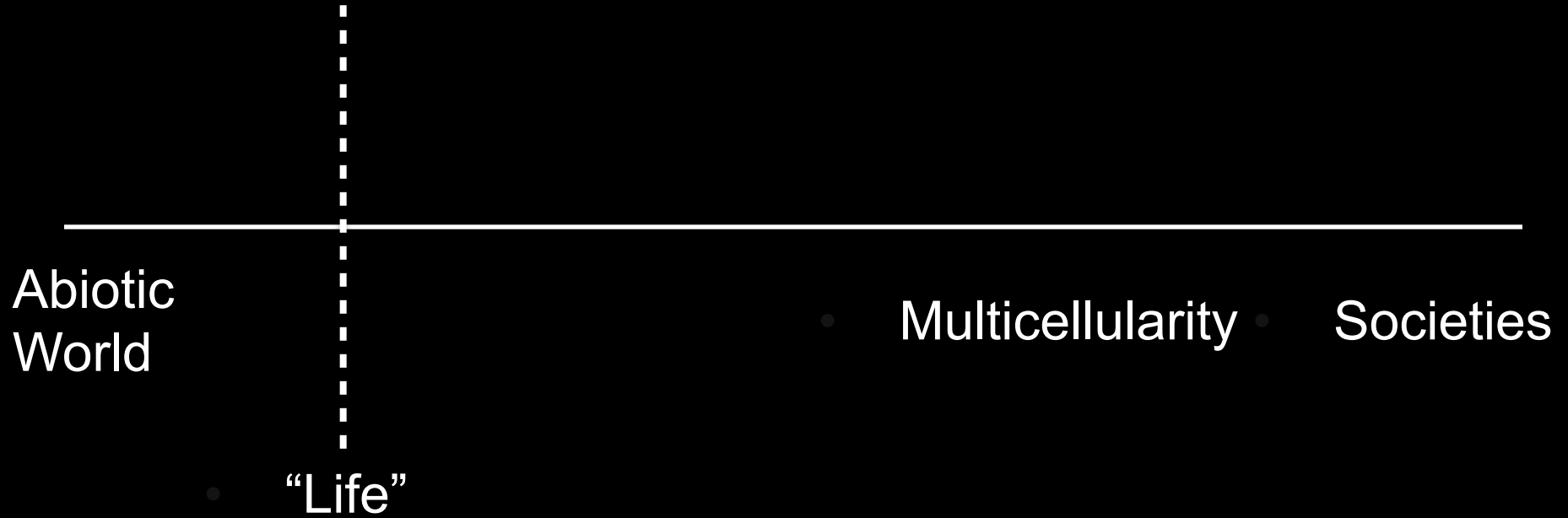


# Overview

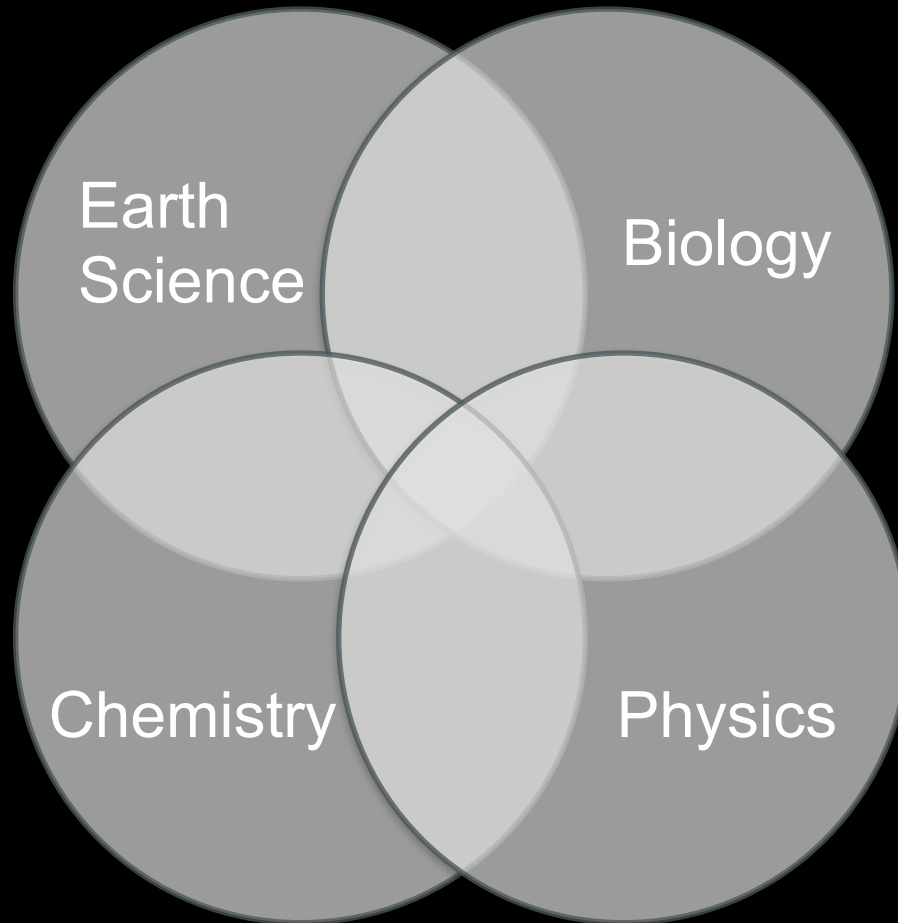
Chris Kempes



# Life's Transitions



# Origins of Life



# Earth Science

- What was the environment like during the time when life originated?
- What chemistry was possible on the early Earth?
- What was the diversity and complexity of various micro-environments on the early Earth?
- How did early life and the geosphere co-evolve?

# Biology

- How do we wind the clock back from modern life to early life?
- What does the composition, structure, and function of modern life tell us about the origin?
- Which aspects of extant life are general and which are arbitrary?
- How do we apply modern evolutionary theory to the proto-life?

# Chemistry

- How does life arise from the huge space of chemical reactions and compounds?
- What was early “living” chemistry like?
- How do we go from complicated chemistry in an environment to the amazing chemical complexity of even the simplest cells?

# Physics

- How do physical constraints, such as the laws of thermodynamics, bound the possibilities for life?
- What properties and processes are “easy” to obtain through physical dynamics alone?
- How do we generalize physical concepts to understand life’s formation?