



CAL POLY

Physics

BAILEY COLLEGE OF
SCIENCE & MATHEMATICS

What the Heck is *Entropy*?

Dr. Afshin Montakhab

Lecturer, Physics Department
California Polytechnic State University

Thursday, January 30, 2025

11:10 am - 12:00 Noon

Building 53, Room 215

Pizza will be served!



Abstract: Foundation of quantum mechanics has concerned physicists and philosophers for the past 100 years. However, foundation of statistical mechanics has been causing lively debates, confusion, and suicides for over 150 years. The debate is essentially about the definition of entropy and the meaning of the second law of thermodynamics, i.e. entropy never decreases in a closed system. In this talk, I will discuss how information theory addresses these issues, and how I believe such an approach reduces the foundation of statistical mechanics to statements about our reasonable expectation about behavior of macroscopic systems. This is in sharp contrast to the conventional (textbook) way of characterizing statistical mechanics as being derived from mechanical laws obeyed by microscopic constituents. I will try to structure my talk in an accessible way to interested undergraduate students.

Bio: I was born in Shiraz Iran, and I had my first physics course in the 9th grade and fell in love with the subject right away. Years later, I got my bachelor's degree from UCLA (with honors) and won a scholarship to study condensed matter physics at UCSB. I moved to my home country in 2000 where I helped transform the physics department at Shiraz University to become a leading graduate program in Iran. I moved back to the US in 2023 where I hope to mentor and teach talented undergraduate students. When I am not "doing" physics, I like to hike, swim and play poker.