Statistical Mechanics
presentation and vocabulary sheet by Jonathan Lam

Term / Person	Definition / Significance
statistical mechanics	the quantitative study of systems with many variables or particles via statistical methods, especially when many degrees of freedom are present; often applied to thermodynamics
degree of freedom / dimension	a variable in a system, such as three-dimensional position or number of particles
thermodynamics	the study of mechanical energy, especially heat
stochastic	describing something with inherently random nature, for which statistics is a good tool to analyze it
statistical ensemble	the probability distribution of all possible states of a system; statistical mechanics chooses the most probable state
statistical equilibrium	when a statistical ensemble contains all past and future phases of the system
microcanonical (NVE) ensemble	a classification of statistical ensemble with a fixed number of particles and amount of energy
canonical (NVT) ensemble	a classification of statistical ensemble with a fixed number of particles but variable amount of energy
grand canonical (μVT) ensemble	a classification of statistical ensemble with a variable number of particles and amount of energy
Daniel Bernoulli	pioneer of the Kinetic Theory of Gases, the first model that predicted large numbers of particles moving in stochastic motion
Rudolf Clausius	known for work with thermodynamics, derived equation for mean free path of a particle; first basic probabilistic equation
James Maxwell	improved Clausius's equation for MFP; wrote the first statistical distribution, the Maxwell-Boltzmann distribution for velocity of particles, and the root mean square velocity
Ludwig Boltzmann	worked closely with Maxwell, generalizing his equations to non-equilibrium systems; famous H-theorem for the Second Law of Thermodynamics
Josiah Gibbs	introduced the statistical ensemble and generalized Boltzmann's work to all mechanical systems (not just thermodynamics)