Abstract Submitted
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Foundations and Application of Non-equilibrium Thermodynamics[1] GREGORY ROBINSON, UC Davis and Google — Non-equilibrium thermodynamics provides a powerful but still unfamiliar way to peer into the properties of systems yet unexplored and holds promise for ready application to important engineered systems. This talk will consider some of the challenges, promises, and progress made toward an intuitive statistical theory of non-equilibrium behavior as well as recent work applying it. We will briefly discuss large deviations and the formalism of Freidlin and Wentzell for perturbed dynamical systems, which recasts certain questions about stochastic processes in the form of Hamiltonian mechanics. The methods and their applicability are illustrated by analyzing transitions between different stable states of a chemical reaction network, supplemented by a fast numerical solution of escape trajectories. We conclude with the prospects for using the ideas and methods in the design of more efficient and reliable grid computing platforms, which are crucial both to modern science and the operation of entire industries.

Gregory Robinson
UC Davis and Google

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