Dr. Margaret Eppstein

Dr. Margaret (Maggie) Eppstein has highly interdisciplinary educational background and interests with a B.S. and graduate study in Biology, an M.S. in computer science, a Ph.D. in environmental engineering, and continuing education in complex systems. She is currently Associate Professor of Computer Science and was the founding Director of the Complex Systems Center at the University of Vermont (2006-2010). Most of her early research focused on developing novel Bayesian computational methods for large-scale, nonlinear, multi-scale tomographic inverse image reconstruction problems in three-dimensional subsurface hydrology, geophysics, and deep-tissue imaging. However, over the past decade her research has shifted towards modeling and analysis of complex adaptive systems in general. Current or recent projects include developing, studying, and using novel bio-inspired computational approaches (including evolutionary algorithms, agent-based modeling, and artificial neural networks) for a wide range of important problems, including design of watershed management plans, plant species' invasiveness in ecological communities, biological speciation, the impact of spatial topologies on information flow through complex interaction networks, identifying nonlinear interactions between single nucleotide polymorphisms that predispose for complex disease traits, agent-based integrated assessment modeling of transportation energy alternatives, analyzing non-linearly interacting outages that cause cascading failures in electrical networks, studying the evolution, structure, and function of a world-wide network of neonatal intensive care units, and exploring the effectiveness of alternative search strategies used by hospital teams in seeking improvements in health care. In a more general sense, she is interested in understanding evolvability and emergent properties of dynamical processes on complex networks.