Statistical properties of Henon maps

Abstract:
For most realistic Hamiltonian systems the phase space contains both chaotic and regular orbits, mixed in a complex, fractal pattern in which islands of regular motion are surrounded by a chaotic sea. The Henon map is an example of such a system. Though such dynamics has been extensively studied, a full understanding depends on many fine details that typically are beyond experimental and numerical resolution. This calls for a statistical approach that is the subject of the talk. In particular transport in phase space is of great interest for dynamics, therefore the distributions of fluxes through island chains were computed. Evidence for their universality was given. The relation to a model proposed by Meiss and Ott will be discussed. Also the statistics of the boundary circle winding numbers were calculated, contrasting the distribution of the elements of their continued fractions to that for uniformly selected irrationals. In particular results that contradict conjectures that were made in the past were found.