1141-60-168 **Timothy Chumley*** (tchumley@mtholyoke.edu) and **Renato Feres**. *Entropy production in random billiards and the second law of thermodynamics.*

A random dynamical system is said to be time-reversible if the statistical properties of orbits do not change after reversing the arrow of time. The degree of irreversibility of a given system is captured by the notion of entropy production rate. We describe a general formula for entropy production that applies to a class of random billiard systems on Riemannian manifolds with boundary for which it is meaningful to talk about energy exchange between billiard particle and boundary. This formula establishes a relation between the purely mathematical concept of entropy production rate and physics textbook thermodynamic entropy. In particular, it recovers Clausius formulation of the second law of thermodynamics: the system must evolve so as to transfer energy from hot to cold. We also demonstrate the relationship between entropy production rate and certain geometric and thermodynamic parameters of systems for some explicit examples. (Received July 27, 2018)