Date: Friday 9 April 2010, 4:30pm
Location: Hempfield High School, Room 213
Speaker: David Richeson, Dickinson College
Title: A new way of generating symbolic dynamics for discrete dynamical systems

Abstract. A common technique for studying a discrete dynamical system is to partition the space and construct itineraries for the orbits as they pass through the elements of the partition. This produces symbolic dynamics, which is well understood and easy to work with. For example, the invariant set in Smale's horseshoe is dynamically the same as the full 2−shift. More generally, a Markov partition is a partition of the space into rectangles and the dynamics is represented by a subshift of finite type. In this work we (this is joint work with Jim Wiseman) use the Conley index to get a topological generalization of Markov partitions called index systems. The mapping of the index system mimics the expansion and contraction of the rectangles in a Markov partition, and they may be used to generate symbolic dynamics. Because of their topological robustness, we hope that index systems will be used to obtain rigorous results from computer approximations of a dynamical system. NOTE: this talk will be aimed at a general mathematical audience. I will not assume prior knowledge of symbolic dynamics or Conley index theory.