1065-65-116 **Sarah Day*** (sday@math.wm.edu), The College of William and Mary, Department of Mathematics, P.O. Box 8795, Williamsburg, VA 23187-8795, and **Jean-Philippe Lessard** and **Konstantin Mischaikow**. *Validated Continuation: a study of the Swift-Hohenberg Equation.*

Traditionally, stationary solutions of PDEs have been studied numerically via Galerkin projections and continuation algorithms. Many arguments may be made as to why this approach is expected to yield useful results under certain conditions. However, the traditional approach does not include verifying that the required conditions are met and may lead to misleading results. In this talk, we present a rigorous numerical method called "validated continuation" which combines topological tools with continuation algorithms to obtain proofs about the structure of the set of stationary solutions. The computational cost of validated continuation is arguably less than the cost of the traditional continuation approach. For illustration, these techniques are demonstrated in a study of the Swift-Hohenberg equation modeling pattern formation and thermal convection. If time permits, we will discuss how these and similar computations can be used to construct a model of the global attractor for the system. (Received September 08, 2010)