1145-65-1250   **L. Ridgway Scott*** (`ridg@uchicago.edu`), Department of Mathematics, University of Chicago, Chicago, IL 98040. *Automated Modeling with FEniCS.*

The FEniCS Project develops both fundamental software components and end-user codes to automate numerical solution of partial differential equations (PDEs). FEniCS and other automated software are catalyzing a change for PDEs similar to the one that Matlab did for linear algebra.

FEniCS enables users to translate scientific models quickly into efficient finite element code and also offers powerful capabilities for more experienced programmers. FEniCS is a disruptive force for both research and education related to PDEs. Both aspects will be discussed in this presentation.

FEniCS uses the variational formulation of PDEs as a language to define models and a rigorous basis for the finite element method. Variational formulations also provide a firm theoretical foundation for understanding PDEs. Combining theory with coding provides a way to teach PDEs and their numerical solution without requiring extensive prerequisites.

FEniCS also provides a productive platform for research. We will present examples where it has been used to answer questions that would have required months of programming using traditional techniques. (Received September 20, 2018)