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ORNL and the University of California, San Diego (UCSD) are undertaking collaborative research in the area of computational, multi-scale modeling of the heart based on the theory and usage of finite elements. Computational modeling of the heart will bring another form of analysis to understanding how the heart behaves and what could cause the heart to behave abnormally. UCSD's open source, problem-solving environment for this type of multi-scale modeling is called Continuity. The heart model consists of three interconnected sub-models that are solved in a loop, each highlighting critical functions of the heart. One of the objectives is to determine how each of these steps is coded within Continuity. The effects of modifications to one of these submodels will be examined to show differences in heart function over a period of time. This research will provide insights on how multi-scale modeling will assist in solving common and complex biomedical and bioengineering problems around the world. In addition, porting such model codes to ORNL's high performance computational (HPC) resources will prepare ORNL in testing the scalability and performance of the heart model on its HPCs.

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