Computational modeling of cardiac defibrillation

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Confidently predict thoracic electric fields for defibrillation produced by varied & clinically relevant electrode poses
Understand relation of cardiac myofiber anatomy to effects of applied electric fields
Using validated model, develop design criteria for specific populations and clinical scenarios of interest
*In silico* modeling of innovative clinical approaches to cardiac defibrillation
Modeling of cardiothoracic anatomy and implementation of FEM (Jolley et al., Heart Rhythm 2008/2010)

Clinical validation of modeled predictions of body surface potential maps

Modeling of age-specific human myofiber anatomy from DT-MRI datasets

Extensive utilization of customized SCIRun modules and environment
Future Collaborative Goals

Expand capacity / efficiency of robust simulation approach: accuracy, interactivity, parameter sensitivity analysis

Integrate thoracic model with active defibrillation model utilizing myofiber datasets (Computational Electrophysiology Laboratory, Johns Hopkins)

Develop predictive algorithms to provide clinical decision support in ICD implant planning

Perform experimental and clinical validation studies