Thesis Outline v1.0

1. Abstract
2. Introduction
3. *Literature Review/Background*
   1. *Cardiac Physiology*
      1. *Structure of the Mammalian Heart*
      2. *Electrophysiological Properties of Cardiomyocytes*
         1. *The Action Potential*
         2. *Ion Channel Dynamics*
         3. *Excitation-Contraction Coupling*
   2. *Computational Cell Models*
      1. *Key Concepts*
         1. *Nernst Potential*
         2. *Hodgkin-Huxley Current*
         3. *Markov Models*
      2. *Development*
      3. *Difficulties in Model Construction*
   3. *Variation*
      1. *Experimental & Physiological Variation*
         1. *Action Potential Variation*
         2. *Ion Channel Variation*
      2. *Computational Modelling of Variation*
   4. *Cardiac Disease*
      1. *Ischæmia*
         1. *Anoxia*
         2. *Hyperkalemia*
         3. *Acidosis*
      2. *Arrhythmogenesis*
         1. *Ionic Basis for Arrhythmia*
4. Computational Methods
   1. Parameter Space Exploration
      1. Nimrod Computing Grid
      2. Dimensional Stacking
      3. Model Specific Changes
   2. Ischæmia Modelling
      1. Model Specific Changes
5. *Parameter Space Exploration*
   1. *Important Considerations*
   2. Model Fitting & Assessment via Biomarker Metrics
   3. Effects of Parameter Variation
   4. Population of Models to Reproduce Physiological Variation
      1. Connectivity in the Parameter Space
6. Variation in Ischæmia
   1. Changes in Population Variability
      1. Arrhythmogenic Consequences
   2. Model Failure within the Population
   3. Population-level Effects & Dynamics
      1. IK-ATP Population-level effects
7. Conclusions

## Appendices

1. *Diffusion*
   1. *Simple Diffusion*
   2. *Facilitated Diffusion, Michaelis-Menten Kinetics*
   3. *Electrodiffusion*
      1. *The Nernst Equation*