Simplified Egg and Changing Yolk Model
User Manual (version 1.0)

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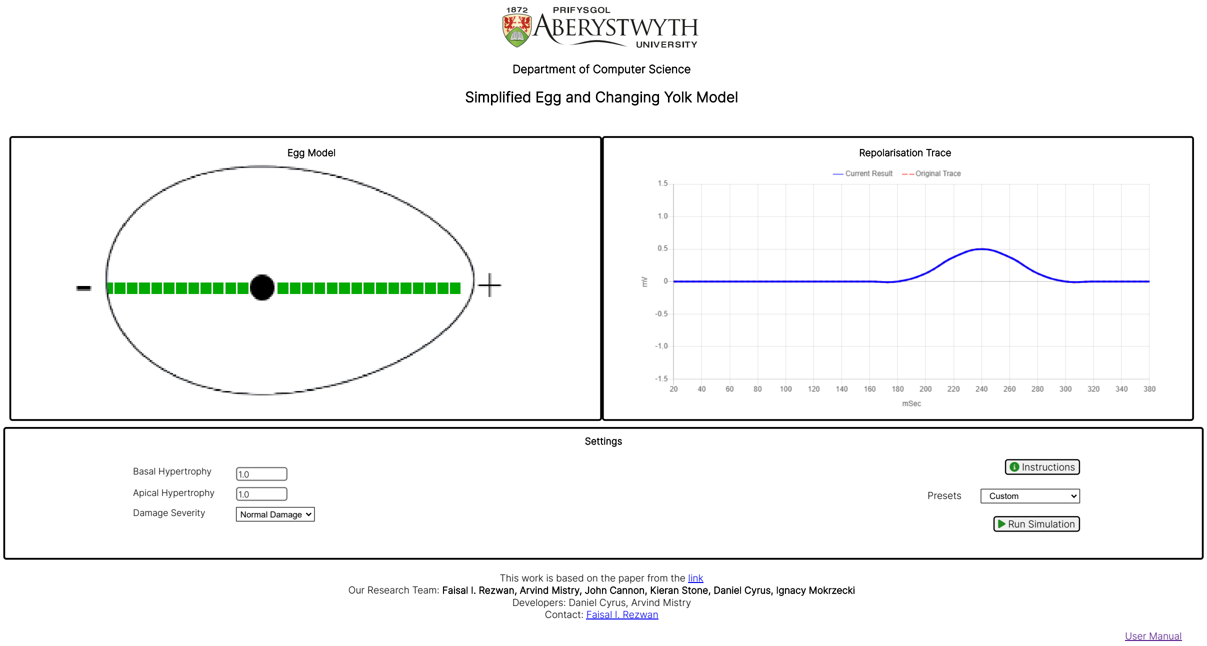
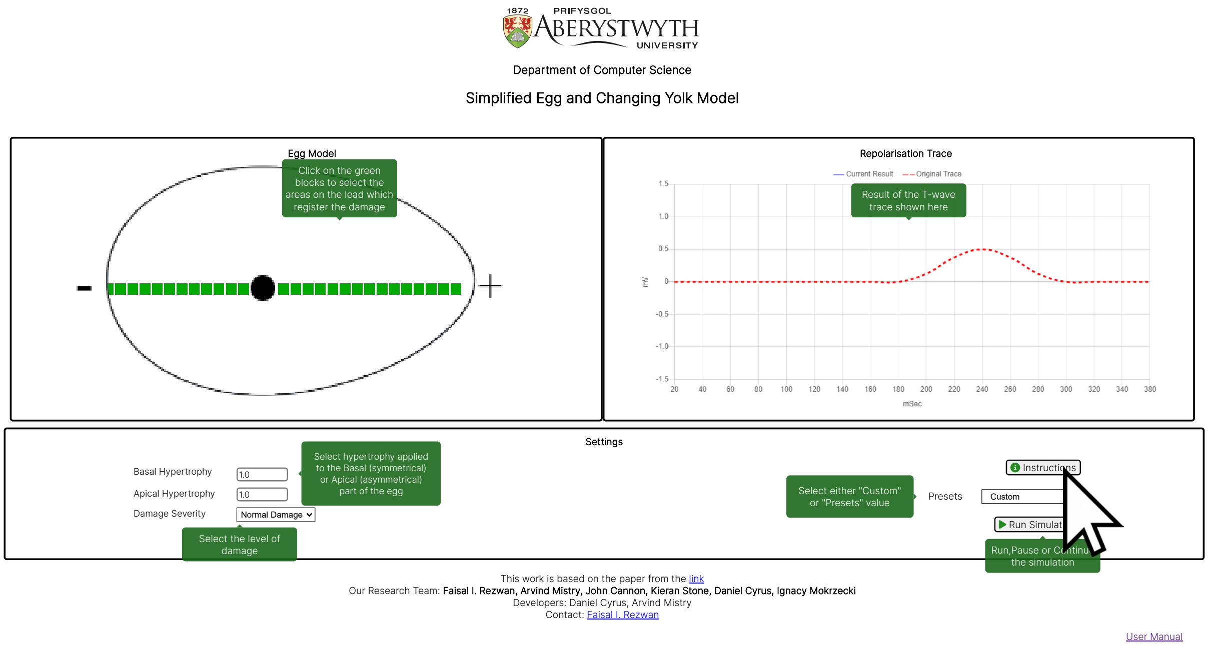
1. Overview

This web tool models the ventricular repolarisation, which is currently thought to be the ST and T wave segments on an electrocardiograph (ECG) trace. In the model, the heart is simplified to a mass of muscle in the form of an 'egg' shape. Here, the vector for lead V5 is seen as passing through the long axis of the egg shape. The repolarisation trace represents the calculated electrical deflection as seen in lead V5 over time. The model allows you to allocate the severity and location of any hypertrophy and/or damage to see the effects on the repolarisation trace.



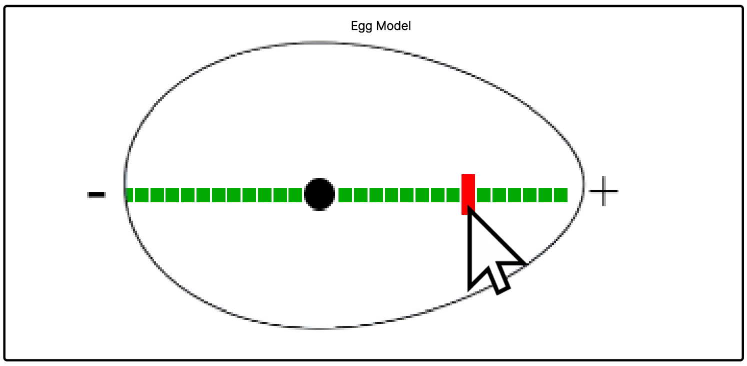
2. Instructions

In this web tool, you can select the 'Instructions' button at any time to see the different elements and functions of the model. These instructions will appear in green pop-up boxes. The pop-up boxes disappear when any other selection is subsequently made.



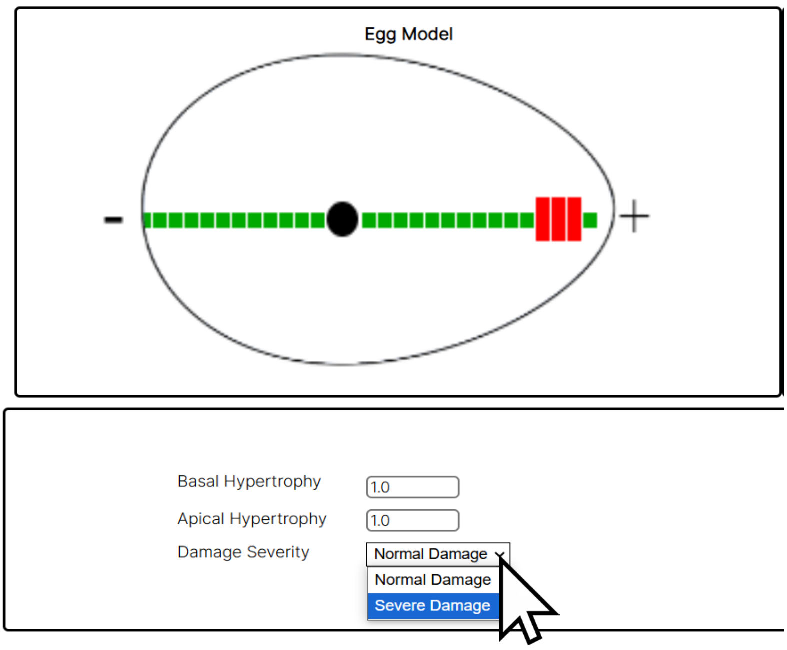
3. Damage Location Selection

You can allocate the areas where any damage is registered on lead V5 by clicking the selected green blocks on the egg. The green block will change to red indicating where the damage is registered. By clicking the (red) block again, you can undo any damage and the block will reset to green.



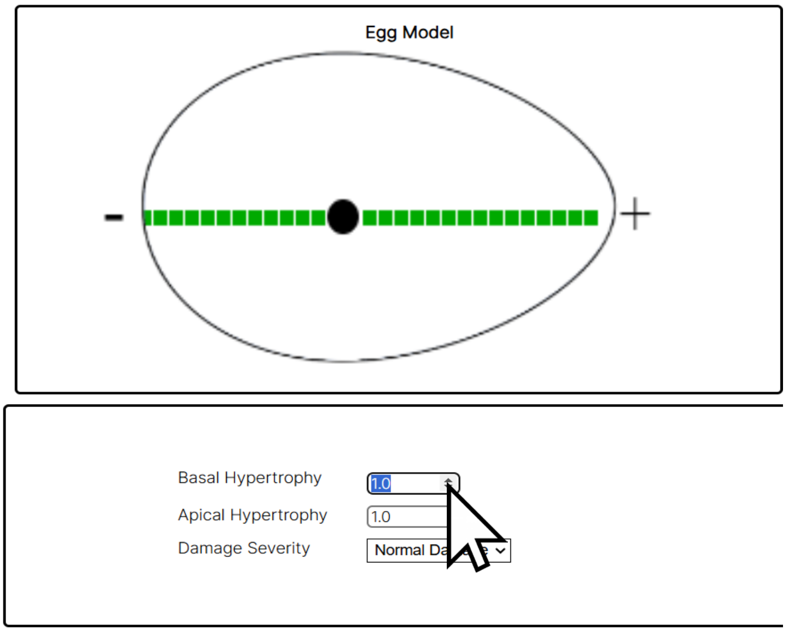
4. Choosing Damage Severity

You can select either 'Normal' or 'Severe' levels of damage to be applied to the damaged areas of egg. This allows this model to allocate a higher level of damage for demonstrating certain conditions, such as flattened and inverted T waves.



5. Hypertrophy Allocation

You can select the level of 'Basal' and or 'Apical' hypertrophy to be applied to the model. Basal applies hypertrophy to the 'symmetrical' part or body of the egg shape. Apical applies hypertrophy to the 'asymmetrical' to apex part of the egg shape.

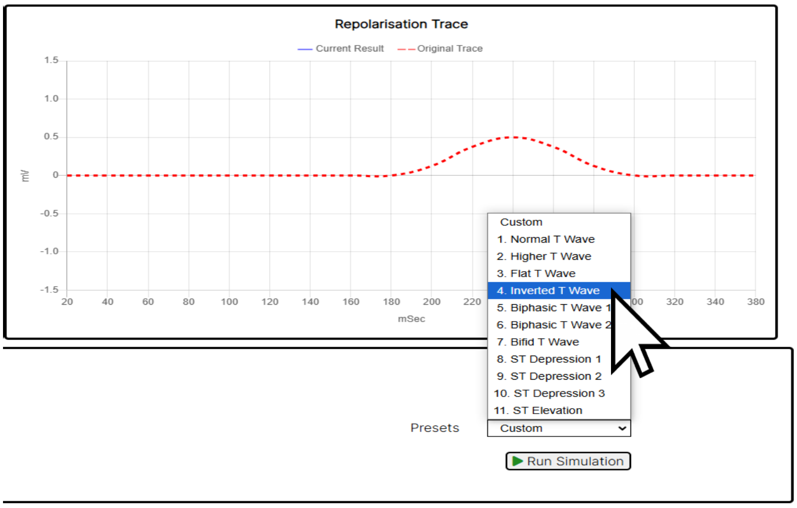


The range of hypertrophy that can be allocated in this simplified model is between 1.0 and 2.0. Allocating 1.0 for either Basal or Apical Hypertrophy means that those parts are normal and there is no allocated hypertrophy at those sites. By allocating more than 1.0 hypertrophy means that area of the model has some hypertrophy.

For example, if hypertrophy is applied to the apical part of the egg model **without** any allocated damage, then this will result in a higher T wave in the repolarisation trace. If any damage is allocated to a hypertrophied part of the egg, then this will have a greater 'damage' effect on the repolarisation trace.

6. Presets Selection

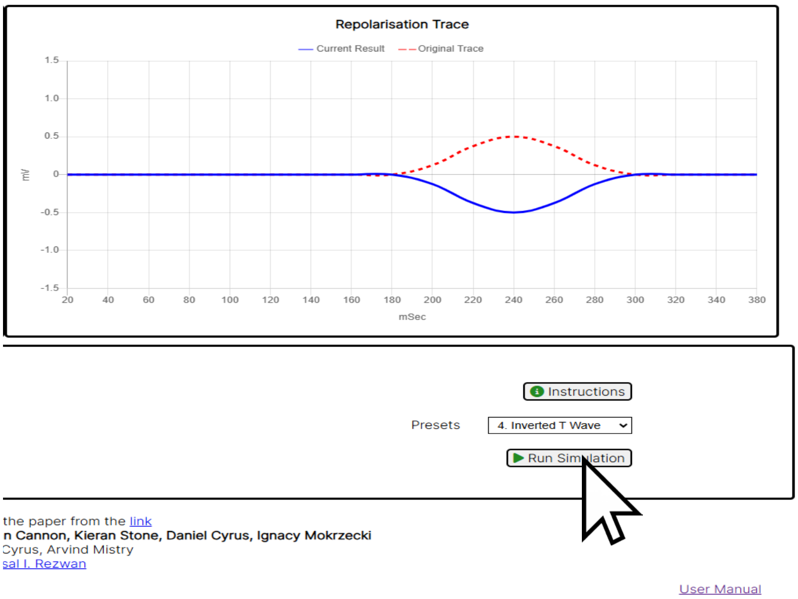
As an alternative to 'Custom' adjusting the settings, you can pre-select damaged and hypertrophy areas by selecting one of eleven 'Presets'.



The theory underpinning these Presets are discussed in the paper linked to this model.

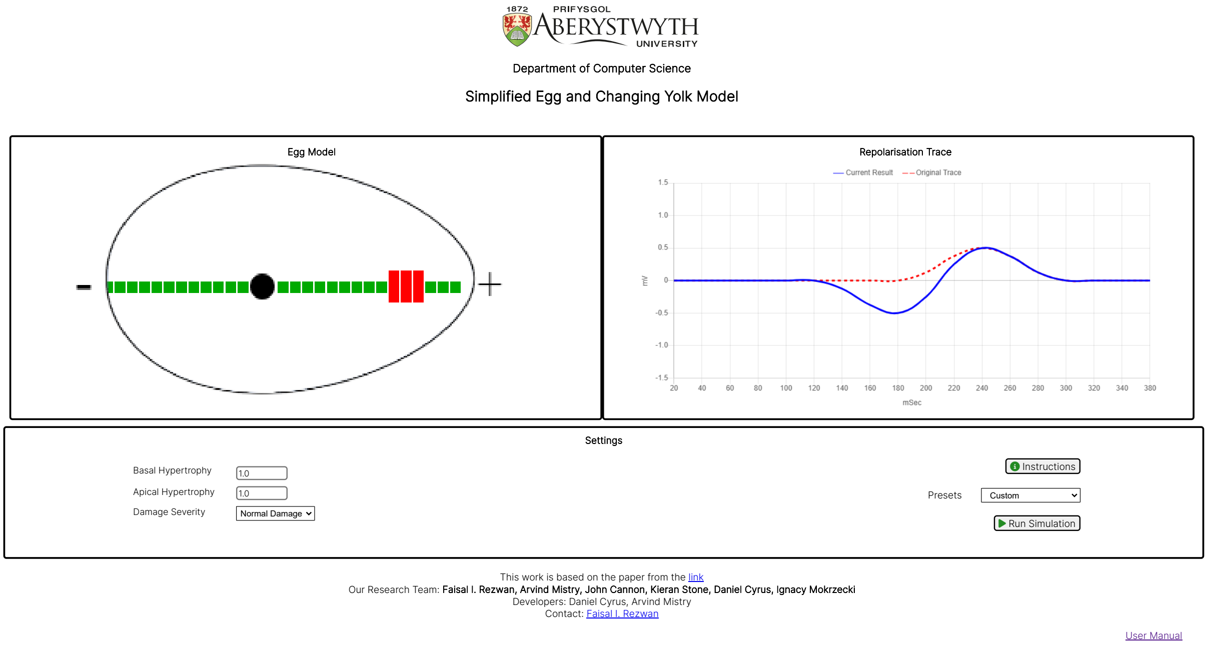
7. Running the Simulation

When the 'Run Simulation' button is selected the model will calculate and display the resulting repolarisation trace for this simplified model. Deviations from the original repolarisation trace indicate hypertrophy and/or damage to the heart.

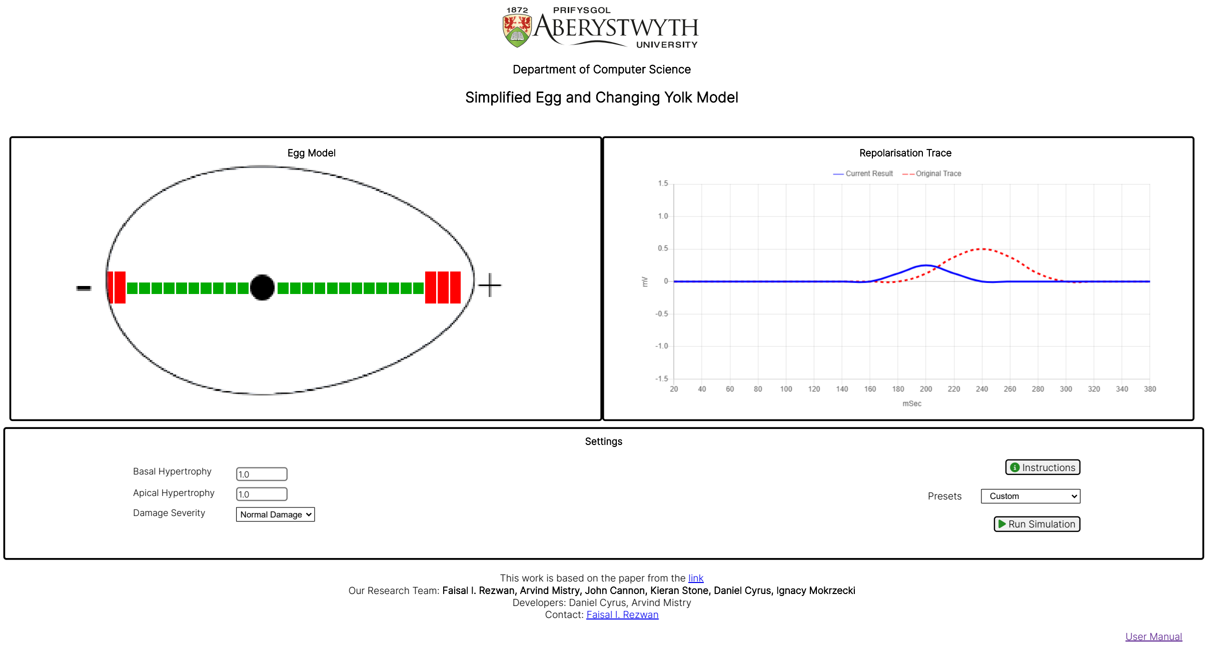


8. Hot Tips for Using the Model

When selecting the 'Damage' blocks, it is best to select one, two or three adjacent blocks on one side of the egg to mimic a localised area of damage.



It is possible to have 'Damage' blocks on both sides of the egg shape, which results in various specialised configuration of the repolarisation trace. However, explanations of circumstances, when this would occur, are outside of the remit of this web tool. Please contact the research team for more detailed explanation.



9. Known issue(s):

The texts inside green instruction pop-ups do not load properly in safari web browser in iOS. They only appear after refreshing the web tool.

Research Team and Contact Details

This "Simplified Egg and Changing Yolk Model" has been developed by Aberystwyth University Computer Science Department as a part of the 3D ECG Project.

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