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NerveSim V2.0.0

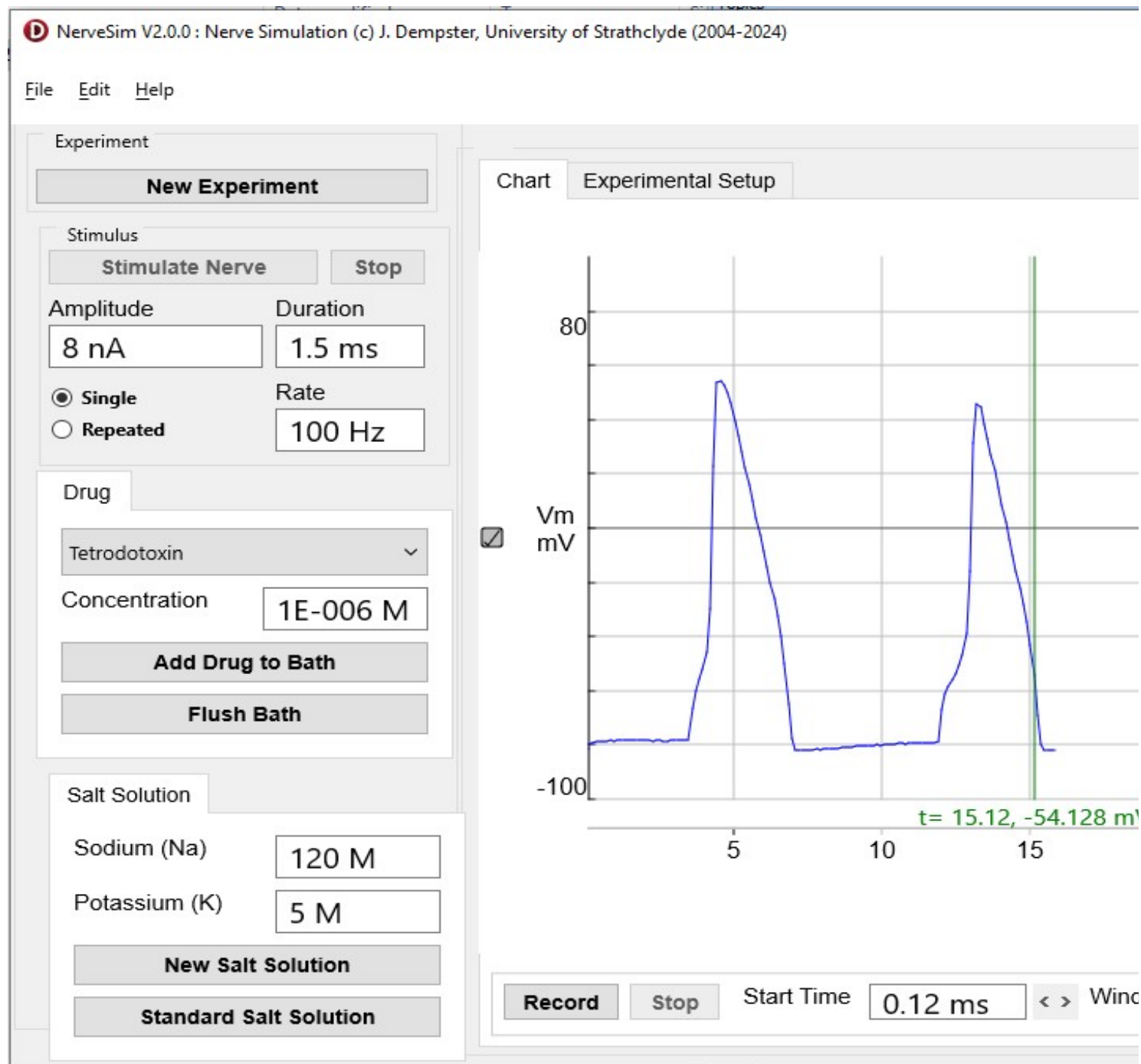
Nerve Action Potential Simulation

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NerveSim is a simulated experiment for investigating the effects of drugs and the ionic composition (Na, K concentrations) of the bathing solution on the nerve action potential. Drugs (tetrodotoxin, lidocaine, 4AP) can be applied to the bath and the concentration of the Na and K ions changed.



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To start a new experiment:

1. Click the **New Experiment** button.



2. Click the **Record** button to start the simulation running. (**Stop** stops the recording)



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To stimulate the nerve by injecting electrical current:

1. Enter the amplitude (nA) of the stimulus current into the Stimulus **Amplitude** box.
2. Enter the duration (ms) of the stimulus current pulse into the Stimulus **Duration** box.
3. Select the **Single** option to apply one stimulus only or the **Repeated** option to apply stimuli at regular intervals (enter the the stimulus repeat rate (Hz) in the **Rate** box).
4. Click the **Stimulate Nerve** button to apply the stimulus/stimuli.

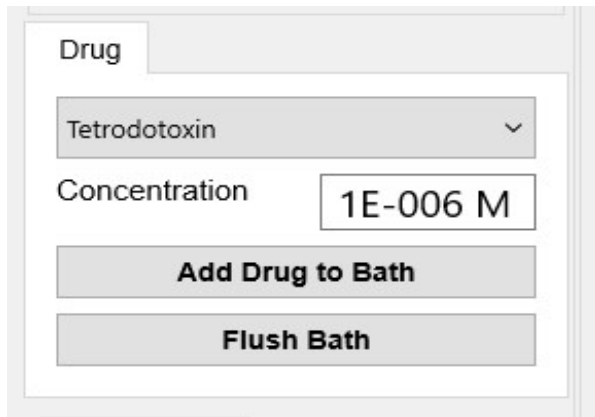
The image shows a software interface for controlling a stimulus. It has a title bar 'Stimulus'. Below it are two buttons: 'Stimulate Nerve' and 'Stop'. There are four input fields: 'Amplitude' with '8 nA', 'Duration' with '1.5 ms', 'Rate' with '100 Hz', and a 'Drug' field which is currently empty. The 'Single' option is selected with a radio button, and the 'Repeated' option is unselected.

Stimulus
Stimulate Nerve Stop
Amplitude: 8 nA
Duration: 1.5 ms
<input checked="" type="radio"/> Single
<input type="radio"/> Repeated
Rate: 100 Hz
Drug:

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To add a drug to the bath:

1. Select the type of drug to be applied from the **Drugs** list.
2. Enter the concentration (in M/litre) of the drug to be added in the **Concentration** box.
3. Click the **Add Drug to Bath** button to add the drug to the bath. (Click **Flush Bath** to remove drug(s)).

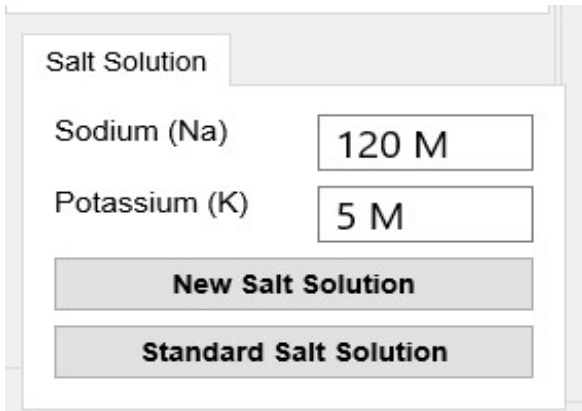


The screenshot shows a software window with a 'Drug' tab. Below the tab is a dropdown menu currently displaying 'Tetrodotoxin' with a downward arrow. Underneath the dropdown is a label 'Concentration' followed by a text input field containing '1E-006 M'. At the bottom of the window are two buttons: 'Add Drug to Bath' and 'Flush Bath'.

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To change the concentration of sodium or potassium ions in the bath:

1. Enter the new sodium ion concentration (in mM/l) in the **Sodium (Na)** box.
2. Enter the new potassium ion concentration (in mM/l) in the **Potassium (K)** box.
3. Click the **New Salt Solution** button to change the salt solution in the bath to the new solution (Click **Standard Salt Solution** to return to the standard solution).



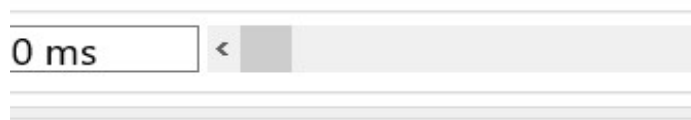
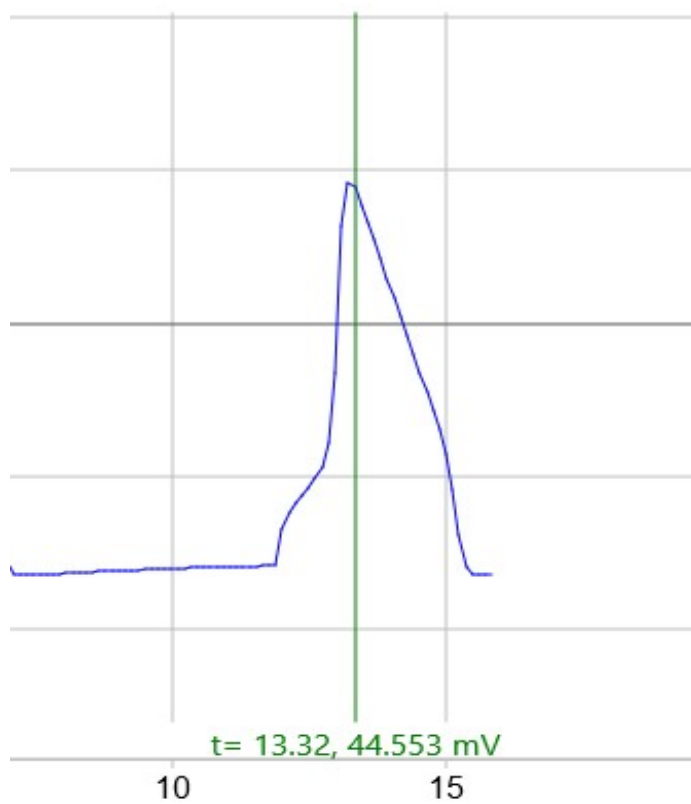
The image shows a software window titled "Salt Solution". It contains two input fields: "Sodium (Na)" with the value "120 M" and "Potassium (K)" with the value "5 M". Below these fields are two buttons: "New Salt Solution" and "Standard Salt Solution".

Salt Solution	
Sodium (Na)	120 M
Potassium (K)	5 M
New Salt Solution	
Standard Salt Solution	

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To measure the membrane potential recording:

1. Click the **Stop** button to stop recording.
2. Using the scroll bar at the bottom of the chart recorder display, select a section of the recording containing the tissue contraction to be measured.
3. Drag the measurement cursor on the chart display to the point on the recording trace to be measured. The membrane potential at the cursor point (in units of mV.) is displayed below the cursor.



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To print a copy of the displayed recording on a printer, select **Print** from the **File** menu.

To select a specific printer or change printer settings, select **Printer Setup** from the **File** menu.

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Copy Data: To copy the data points of the displayed recording to the Windows clipboard for pasting into a spreadsheet or graph plotting program, select **Copy Data** from the **Edit** menu.

Copy Image: To copy a picture of the displayed recording to the Windows clipboard for pasting into a Word document or a PowerPoint presentation, select **Copy Image** from the **Edit** menu.

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Saving a recording to file: To save the recording for the current experiment to a data file, select **Save Experiment** from the **File** menu and enter the name of a new data file.

Loading an existing recording from file: To load a previously saved recording from a data file, select **Load Experiment** from the **File** menu and enter the name of the data file.