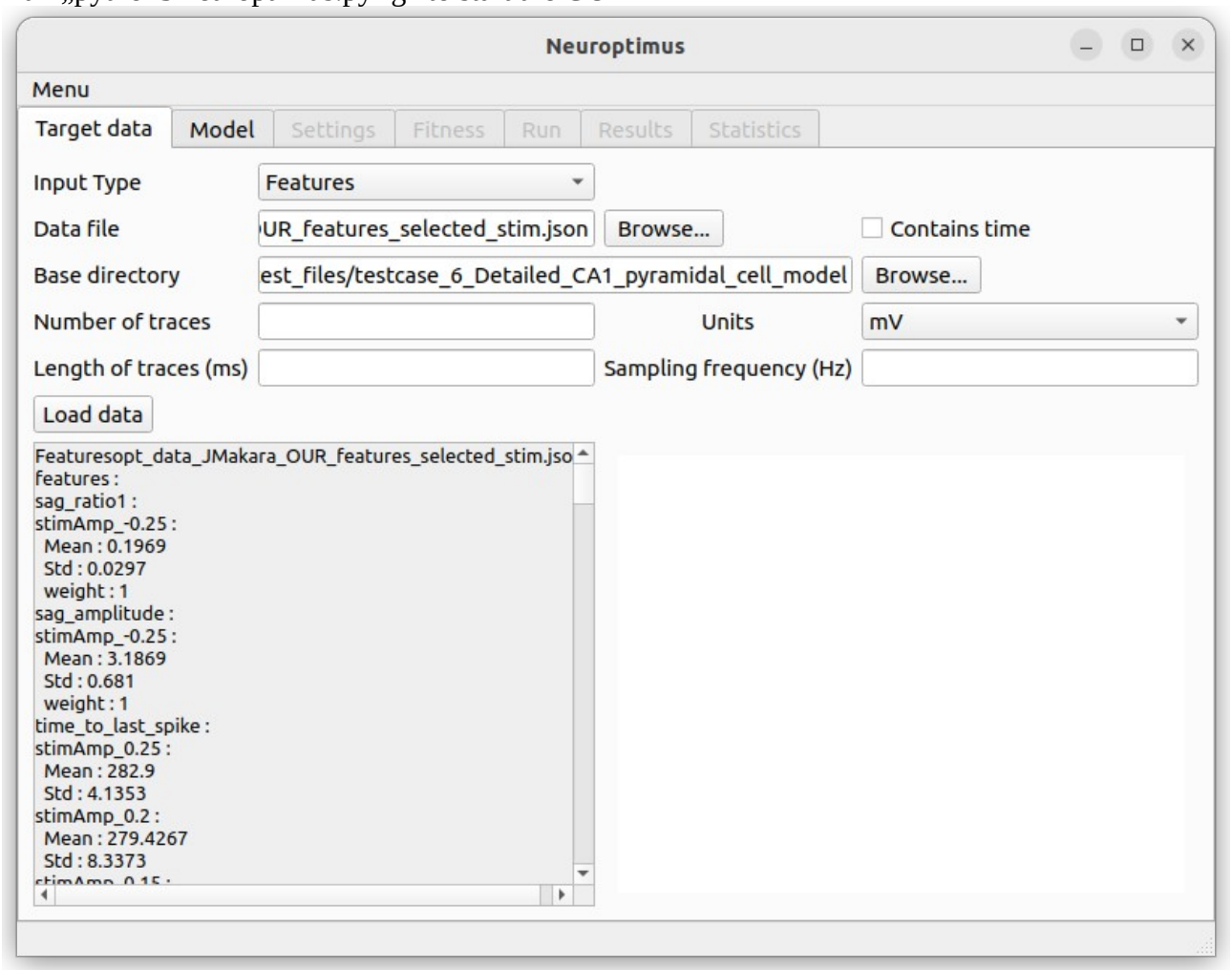
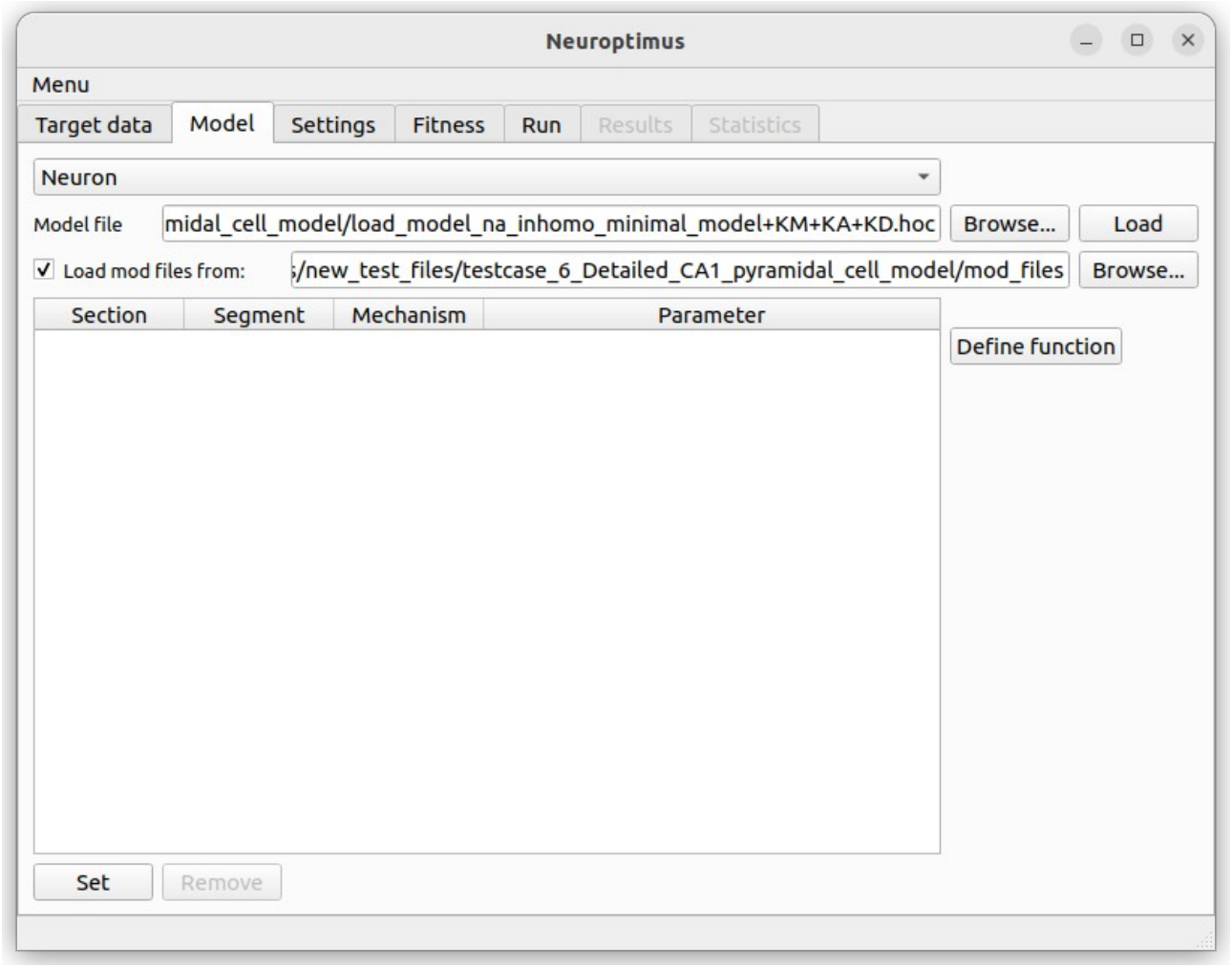
Summary of example:
This example involves fitting ion channel densities and properties in a morphologically and biophysically detailed model of a hippocampal CA1 pyramidal neuron based on experimentally recorded voltage responses to somatic current injections.
Multiple attributes determined by experiments, including the biophysics, ion channel distribution, and electrophysiological characteristics were used in designing the model. The task is to optimize the 12 channel density and kinetic parameters of the model. The stimulus amplitudes were -0.25, 0.05, 0.1, 0.15, 0.2 0.25 nA, respectively. Somatic subthreshold and spiking features extracted by eFEL from the model's voltage response were compared to the mean values of the same features extracted from experimental measurements from several cells of the cell type.

The additional mechanisms required by the model are in the mod_files folder. You must run the 'nrnivmodl' command (which is installed with NEURON) to make the mechanisms available to the simulator.
input file: opt_data_JMakara_OUR_features_selected_stim.json
model: load_model_na_inhomo_minimal_model+KM+KA+KD.hoc

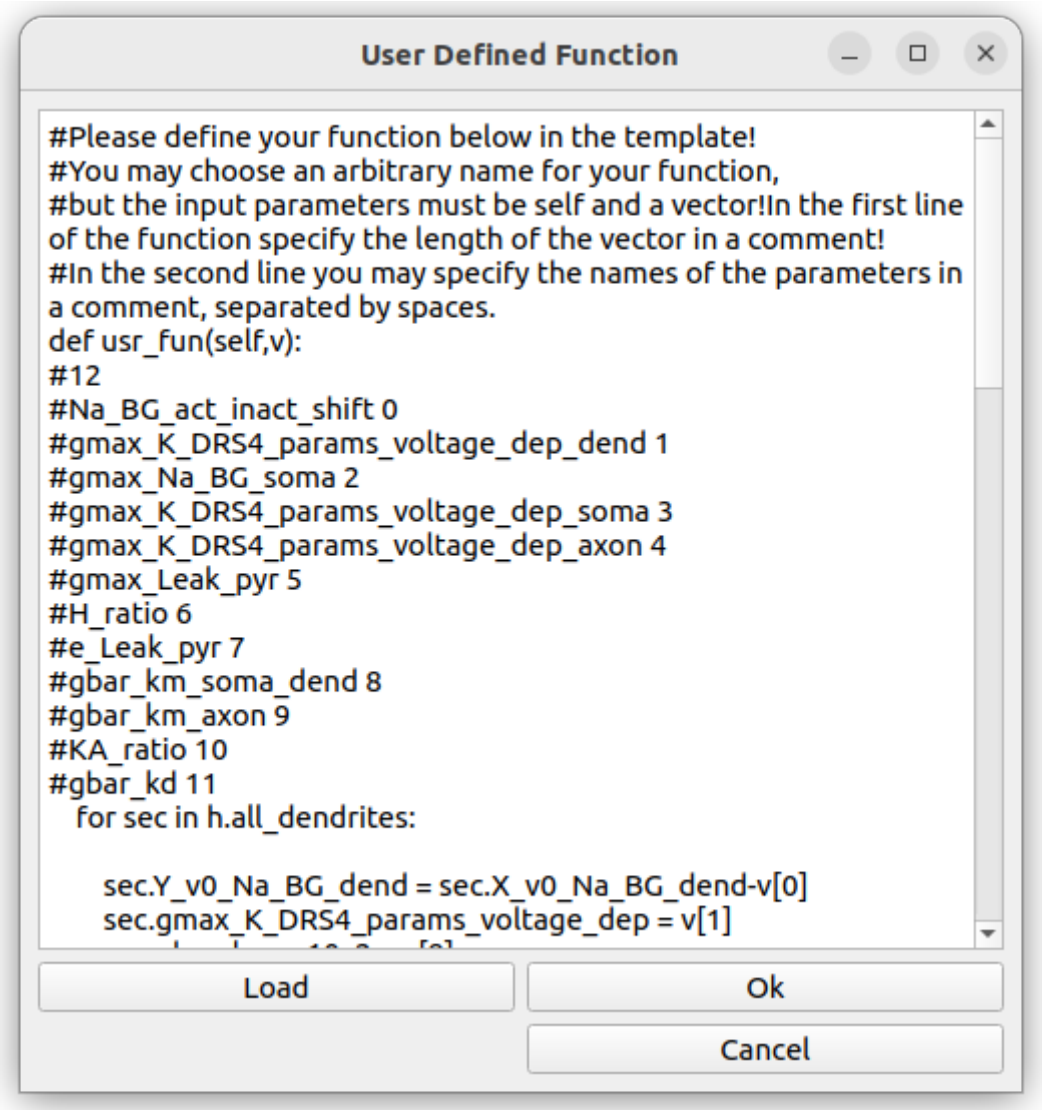
Step-by-step instructions to run the example from the Neuroptimus GUI:
Run „python3 neuroptimus.py -g” to start the GUI



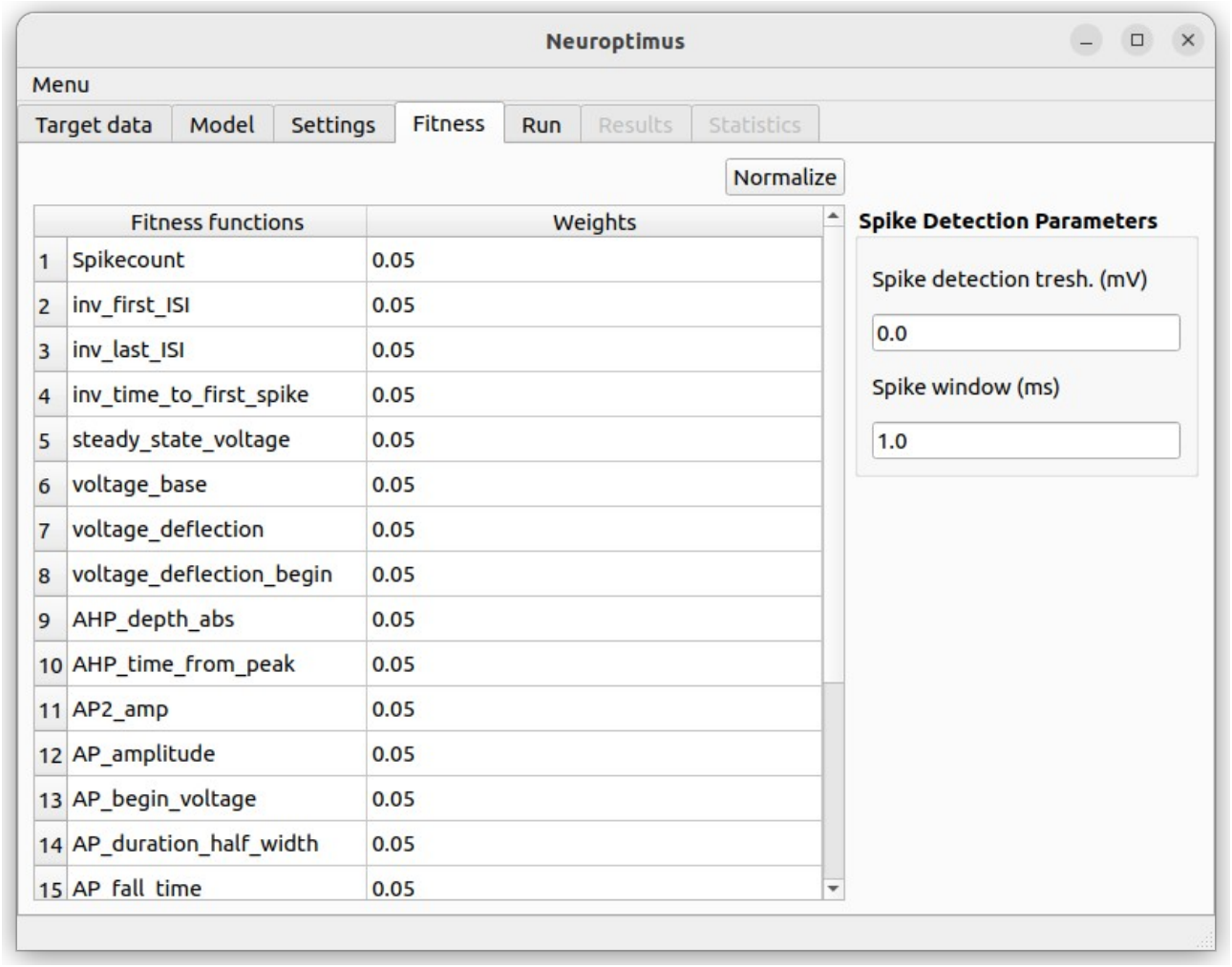
Set ‘Input Type’ to Features.
At ’Data File’ load the target data, at ’Base Directory’ choose the directory where you want to save the results and press ’Load data’. Go on by pressing the Model Tab.



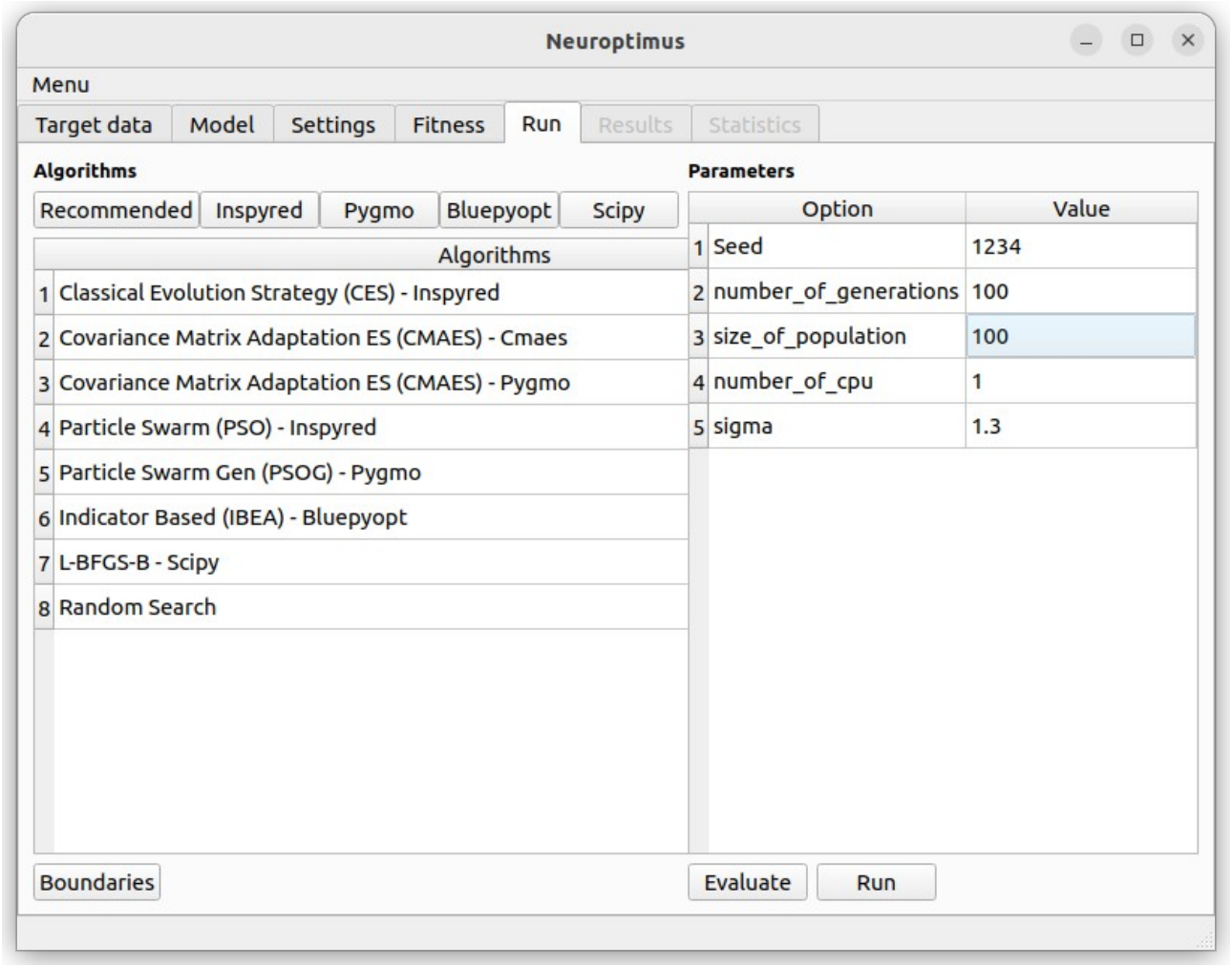
Browse to the model file.
Check the “Load model files from” box and browse for the mod files directory (you should select the folder where the x86_64 directory and files were created by the nrnivmodl), then load the model.



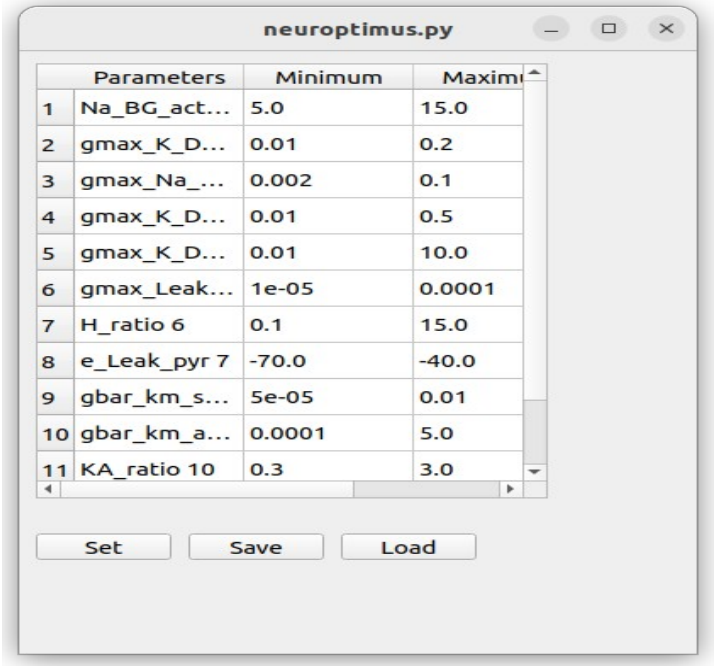
Press the ’Define Function’ button to load the user defined function (the text file 'user_fun.txt' in the folder of the model):
Press ’Ok’, then go on by pressing the Fitness tab (You can skip the Settings tab in this use case.).



Choose fitness function(s), and define their weights. Go on by pressing the Run tab.



Select an algorithm, and set its parameters.
Press the ’Boundaries’ button to define the boundaries of the parametersto be optimized:
Press ’Set’.
Boundaries can also be loaded from a file.



Start the optimization pressing the ’Run’ button.