

Quick Guide to Plasticity

Brian Blais

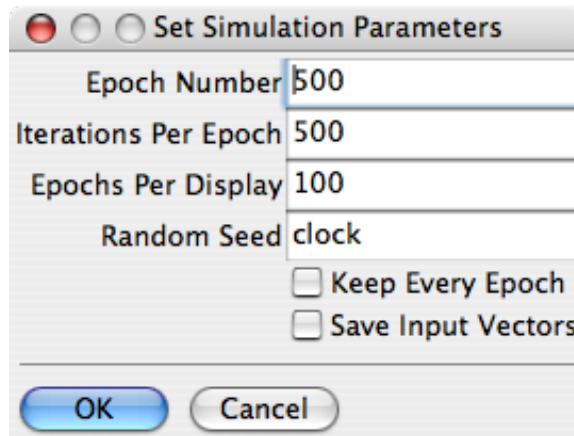
1 Menus

File

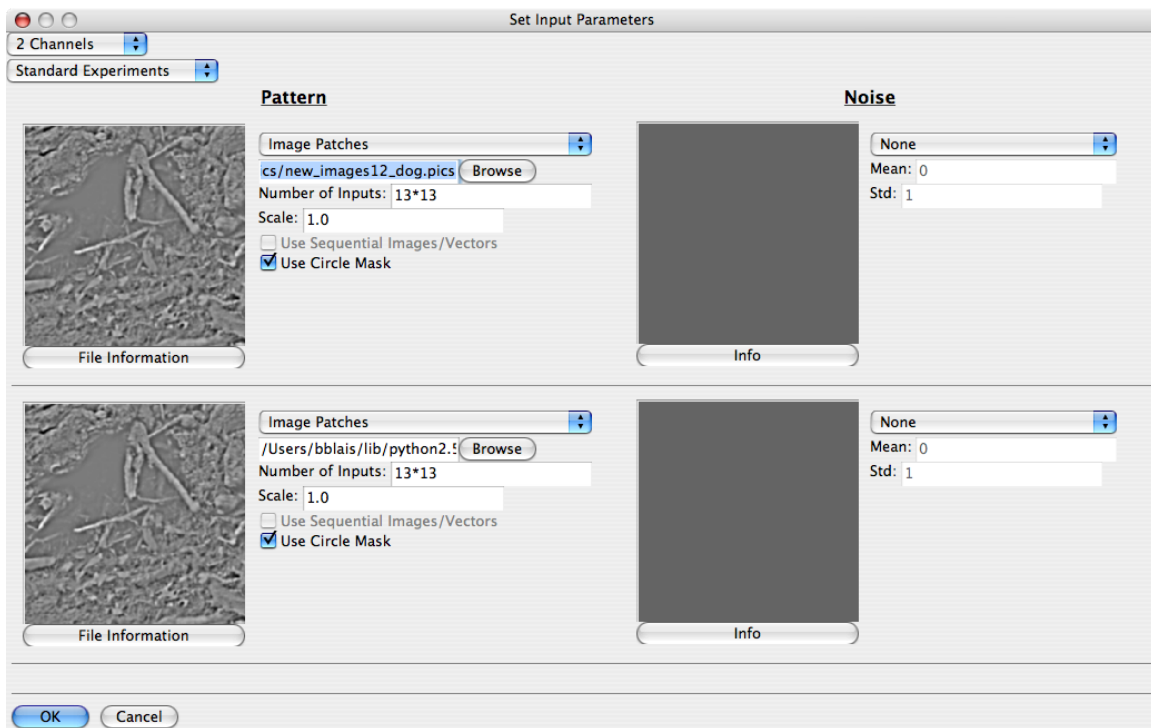
- Save/Load State - save/load an entire simulation
- Save/Load Params - save/load just the params that describe how to run a simulation, not the results of the simulation
- Run/Pause - Runs a simulation
- Restart - resets the initial weights to random, to begin another simulation

Edit

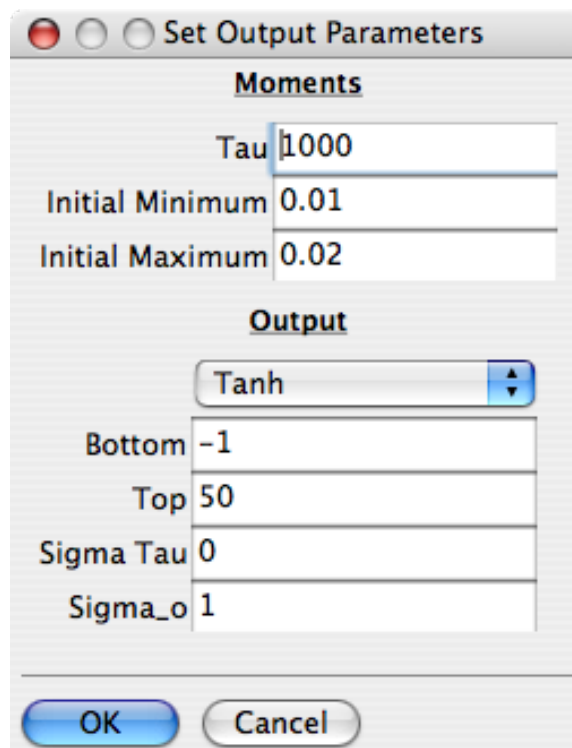
- Set Simulation Params. One simulation consists of a series of epochs, each of which is a certain number of iterations. This the total number of iterations is $(\text{epoch_number}) \times (\text{iter_per_epoch})$. The data is saved each epoch, not each iteration, to save on memory.



- Set Input Params - The single neuron gets input from 2 channels by default. The input consists of patches from natural images. You can choose to change the image file, or not have any input at all (all zeros). You can also choose the value of noise, on the right. By default there is none, and both channels see exactly the same natural image patches. For deprivation, set the Pattern to None, and the Noise to Uniform or Gaussian, and set the Standard Deviation (std) to something greater than zero. For a template, choose the Standard Experiments menu in the upper left.



- Set Output Params



- Set Weight Params

You can set the minimum and maximum initial weights, and the learning rule. Some learning rules require stabilization, such as min/max on the weights or normalization.

Set Weight Parameters

Weight Initialization

Initial Minimum -0.05

Initial Maximum 0.05

Weight Modification

Learning Rule BCM

$$dw_i/dt = \eta y(y - \theta_M)x_i$$

Learning Rule Params

Learning Rate 8e-06

Weight Stabilization

None

Bottom -1

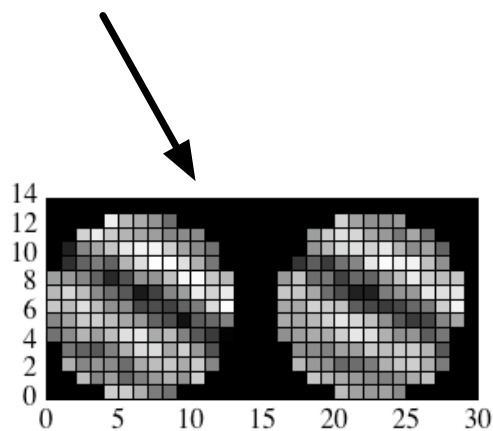
Top 1

Decay 1

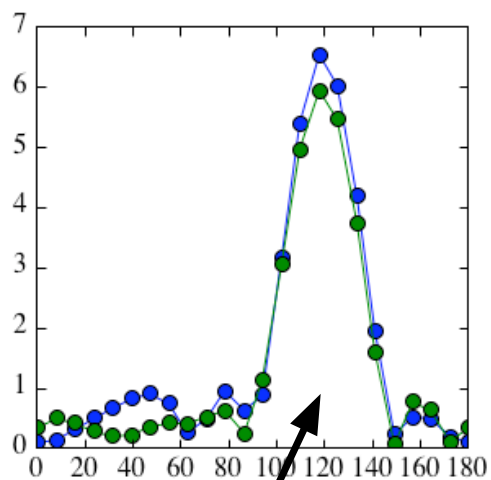
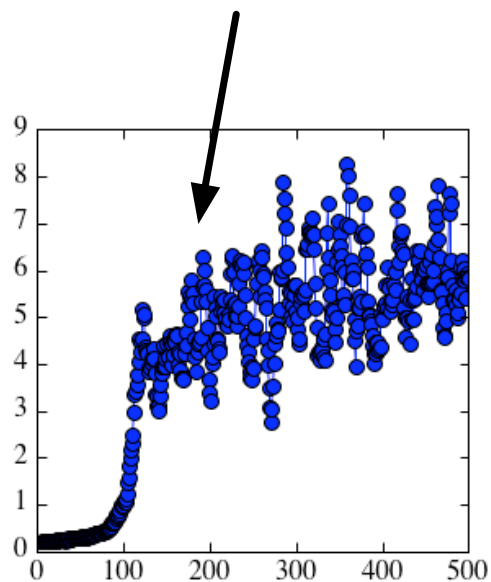
OK Cancel

2 Main Output Screen

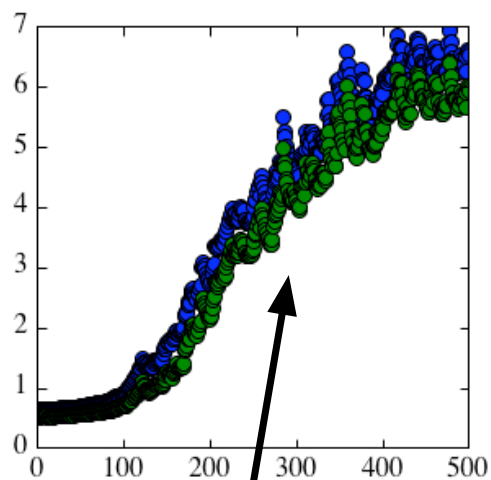
Synaptic weights
(white = high value,
black = low value)



BCM Threshold or
Squared activity over time



Response of cell versus
angle of test stimulus



Response of cell versus
time. Or, the peak of the
response versus angle plot