



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Albert Zhang	Project Number J0819
Project Title A Probabilistic Network Model of Neural Systems	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project seeks to propose a simulation-based model of synaptic development, with special focus on two features which are crucial to the process of learning: synaptic plasticity and synaptic pruning. Synaptic plasticity is the strengthening of the active synapses and weakening of the less active ones, and synaptic pruning is the elimination of the rarely used synapses.</p> <p>Methods/Materials A laptop computer with a MATLAB compiler was used to code the model.</p> <p>Results The simulations generated from the model indeed display the key features of synaptic plasticity and synaptic pruning. In addition, the adjustment of various parameters within the model can roughly account for the various levels of intellectual or creative ability in each person.</p> <p>Conclusions/Discussion This model captures several key features of synaptic development, and provides huge flexibility for future revisions so as to incorporate more features of neural systems. Moreover, this model is easy to understand, and due to the simulations it is easily verifiable.</p>	
Summary Statement This project proposes a probabilistic model which effectively captures important features of synaptic development in neural systems.	
Help Received None. I conceptualized, coded, and analyzed the model myself.	