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Rebecca E Gasper* (rebeccagasper@creighton.edu). *Stochastic Gating in a Peripheral Auditory Neuron: Effects on Post Stimulus Time and Firing Efficiency of Action Potentials.*

Random effects in voltage change in the auditory neurons has been documented since at least 1995. A reaction-diffusion PDE is used in place of a system of Stochastic DEs to model randomness in NaV channel gating. The result is a stunning visual representation of the probability density function, along with necessary numerical data for the spread of firing times and firing efficiency for a given stimulus protocol. A PDE has the advantages of giving additional information about states, such as flow into a firing region (the firing rate), and accommodating clinical uncertainty of initial conditions with an initial probability distribution. This method can be applied to nearly any ODE (SDE), but is especially useful for a large class of action potential models. (Received September 22, 2015)