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Novel Dynamics Observed in a Spiking Neural Network Model of the NTS in the Rat Hind-brain JINGYI ZHOU[1], J. DAVID SCHAFFER[2], PATRICIA DILORENZO[3], CRAIG LARAMEE[4], Binghamton University — The Nucleus of the Solitary Tract (NTS) is a hind-brain structure in the rat that is the first way-station in taste processing. Its structure and function are poorly understood. Recently our group produced a model, implemented as a spiking neural network (SNN), that successfully replicated experimental data. The model's topology was manually devised and the parameters were set by a genetic algorithm. In order to better understand its information processing capabilities, we probed the model with a variety of input spike patterns and observed a striking winner-take-all decision-making dynamic. We show how the topology and tuned parameters enable this decision to depend on precise spike timing events. It is curious that the experimental data upon which the model was originally evolved did not include winner-take-all examples; this was an emergent capability. It remains for additional experiments on rats to confirm or reject this model prediction.

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