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1107-92-180 **Kathleen A. Hoffman**, **Hye-Won Kang*** (hwkang@umbc.edu) and **Phyllis R. Robinson**.

Title of abstract: A stochastic model of the melanopsin phototransduction cascade

Melanopsin is a photopigment expressed in a small subset of intrinsically photosensitive ganglion cells (ipRGCs). Melanopsin signaling is involved in non-image forming vision, and controls circadian rhythms, pupillary light reflex, and sleep. The biochemical cascade underlying the light response in ipRGCs has not been fully understood. We suggest a hypothesized melanopsin phototransduction cascade and develop a stochastic model for the cascade using a continuous-time Markov jump process. Parameter values in the signaling pathway under several different environments are estimated based on the experimental results. Comparing the simulation results to the experimental data, our stochastic model can qualitatively reproduce experimental results. We perform parameter sensitivity analysis using a method of partial rank correlation coefficient (PRCC), which suggests that the melanopsin phototransduction pathway is robust as the one in Drosophila photoreceptors. This is joint work with R.L. Brown, E. Camacho, E.G. Cameron, C. Hamlet, K.A. Hoffman, P.R. Robinson, K.S. Williams, and G.R. Wyrick.

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