1146-60-67 **Alan Lindsay*** (a.lindsay@nd.edu), Dept of Applied & Computational Math & Stats, University of Notre Dame, South Bend, IN 46617. *Boundary homogenization of patchy membranes and the role of clustering in chemoreception.*

Cells interact with their environment and communicate with other agents through contact with diffusing signaling molecules at receptor sites distributed on the cellular surface. For this process of chemoreception to be effective in such a noisy environment, surface receptors must be numerous and widely distributed. The spatial organization or 'clustering' of these receptors has long been known to play a key biophysical role, however, mathematical analysis of this role is a challenging problem that, despite much attention, is not yet resolved.

In this talk I will describe new theoretical results, which give precise information of the role of clustering in scenarios where receptors occupy spherical surfaces or are periodically arranged on infinite planes. With these new results, optimizing configurations of receptors can be identified. In the case of a plane with a periodic arrangement of receptors, we find that a hexagonal configuration maximizes the sensing rate of the receptors.

In addition, we will discuss a new suite of Kinetic Monte Carlo methods for diffusive signaling problems. These methods are able to verify theoretical results and in addition allow for efficient exploration of the space of receptor clustering configurations. (Received January 07, 2019)