

---

**GERDA DE VRIES**, University of Alberta

*Quantitative Analysis of Single Particle Tracking Experiments: Applying Ecological Methods in Cell Biology*

A commonly used experimental technique to study the movement of biomolecules in the cell membrane is Single Particle Tracking (SPT). SPT involves tagging biomolecules with a fluorescent label and observing and recording their trajectories over time. A diffusion coefficient then can be extracted from the data from mean square displacement calculations. Although the diffusion coefficient provides an overall measure of mobility, it does not provide insight into the underlying heterogeneity of the membrane environment.

Since the method of data collection from individual biomolecules is analogous to that from individual animals, we propose to use methods from ecology to provide spatial insight. Ecologists regularly quantify animal movement using the concepts of correlated random walk, net squared displacement, and first-passage time. In this talk, we will demonstrate the applicability of these methods in the context of cell biology. In particular, we will show how we can distinguish biomolecule trajectories undergoing a correlated random walk from those that do not, and how we can identify the presence of transient confinement zones in molecular diffusion.