1176-60-251 **Denis Patterson*** (denispatterson@princeton.edu), **Simon Levin**, **Carla Staver** and **Jonathan Touboul**. *Spatial stochastic mean-field models and applications.* Preliminary report.

Many phenomena in the natural sciences involve large numbers of agents simultaneously interacting and moving spatially in response to one another. We develop mean-field theory for a class of stochastic particle systems with mixed discrete-continuous state-space and nonlocal interactions and illustrate this theory with several applications. Our first application generalizes a non-spatial model of forest-savanna dynamics and allows us to understand how long-run transient dynamics and front-pinned solutions arise. Our second application is to a spatial opinion dynamics model with diffusive movement and jumps. This example illustrates how the Fokker-Planck-Kolmogorov equations of the mean-field limiting process can help in deriving reduced phenomenological models of complex collective behavior. (Received January 24, 2022)