1154-37-417 **Maria-Veronica Ciocanel*** (ciocanel.1@osu.edu), **Bjorn Sandstede** and **Scott McKinley**.
Stochastic and continuum dynamics in cellular transport.

The cellular cytoskeleton ensures the dynamic transport, localization, and anchoring of various proteins and vesicles. For example, in the development of egg cells into embryos, messenger RNA (mRNA) molecules bind and unbind to and from cellular roads called microtubules, switching between bidirectional transport, diffusion, and stationary states. Since models of intracellular transport can be analytically intractable, asymptotic methods are useful in understanding effective cargo transport properties as well as their dependence on model parameters. We consider these models in the framework of partial differential equations as well as stochastic processes and derive the effective velocity and diffusivity of cargo at large time for a general class of problems. We illustrate applications of the proposed method to macroscopic models of protein localization and microscopic models of processive cargo movement by teams of molecular motor proteins. In the context of mRNA localization, our simulations incorporating the microtubule geometry suggest that anchoring of certain protein complexes may be necessary in promoting healthy development. (Received September 03, 2019)