1137-92-115 **Nikolay S. Strigul*** (nick.strigul@wsu.edu), 14204 NE Salmon Creek Ave, Vancouver, WA 98686. *Scaling of forest dynamics and self-organization using discrete and continuous conservation law models.*

One of the ecological challenges is to understand why plant species coexist, and which forces drive forest community structure and dynamics. I consider the forest as a complex adaptive system. The modeling includes: 1) the use of individual-based models, as a promising tool for simulating complex-adaptive systems and interactions on multiple scales, 2) the development of scaling methods that approximate individual-based processes, and 3) the investigation of inverse problems to connect models with empirical data. The first component involves mostly simulations of analytically intractable stochastic processes. Scaling methods allow models to be reduced to analytically tractable objects–such as different stochastic and deterministic dynamical systems–which are both more valuable for experimental scientists and computationally simpler. The same scaling method can be presented in several alternative mathematical forms. I will discuss scaling methods that are non-linear partial differential or integral equations in case of continuous models, and non-linear difference equations and Markov chains in case of discrete models. The mathematical problems are quite challenging including analysis of the transient dynamics and stationary states for non-linear discrete or continuous models. (Received January 30, 2018)