

1086-VG-1537 **Shishi Z Luo*** (shishi.luo@gmail.com), Department of Mathematics, Duke University, Box 90320, Durham, NC 27708. *A ball-and-urn system for understanding multilevel selection.*

Natural selection can act at multiple biological levels, often in opposing directions. This is particularly the case for pathogen evolution, which occurs both within the host it infects and via transmission between hosts, and for the evolution of cooperative behavior, where individually advantageous strategies are disadvantageous at the group level. In mathematical terms, these are multiscale systems characterized by stochasticity at each scale. We show how a simple and natural formulation of this can be viewed as a ball-and-urn process. This equivalent process has very nice mathematical properties, namely it converges weakly to the solution of an analytically tractable integro-partial differential equation. We then study properties of this limiting object to infer general properties of multilevel selection. (Received September 23, 2012)