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Abstract for an Invited Paper
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A Statistical Physicist Looks at Evolution and Ecology¹

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Biological evolution and ecology pose many questions that can be seen as involving large many-particle systems with complicated, nonlinear (and often poorly understood) interactions. Over the last two decades, this has inspired many statistical physicists to construct and study models in this interdisciplinary area. In this Colloquium I will discuss and compare the dynamics and community structures generated by two individual-based models of biological coevolution of interacting species that I have recently developed and studied with my students and collaborators. I will focus on fluctuations in the number of species (aka. diversity) and population size, probability distributions for species lifetimes and the duration of evolutionarily quiet periods, and comparisons of degree distributions for simulated food webs with data from real food webs. Finally, I will discuss our most recent results on a spatially extended generalization of one of these models.

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