Colloquium

UNIVERSITY OF NOTRE DAME
Department of Mathematics

Speaker: Rick Durrett
Duke University

Wednesday, April 25, 2018
4:00 PM
129 Hayes-Healy Hall

Title: Spatial Evolutionary Games

Abstract:

Recently, a rigorous mathematical theory has been developed for spatial games with weak selection, i. e., when the payoff differences between strategies are small. The key to the analysis is that when space and time are suitably rescaled, the spatial model converges to the solution of a partial differential equation (PDE). This approach can be used to analyze all 2 x 2 games, but there are a number of 3 x 3 games for which the behavior of the limiting PDE, a system of reaction-diffusion equations is not known. In this talk, we give rules for determining the behavior of a large class of 3 x 3 games and show their validity using simulation. In words, the effect of space is equivalent to making changes in the payoff matrix, and once this is done, the behavior of the spatial game can be predicted from the behavior of the replicator equation for the modified game. This is joint work done with Mridu Nanda during the summer after her junior year at the North Carolina School for Science and Math. She is now a freshman at Harvard. The paper appeared in Proceedings of the National Academy of Science. 114 (2017) , 6046-6051