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Lei Zhang* (zhangl4@uci.edu) and **Qing Nie** (qnie@uci.edu). *Regeneration and Noise Attenuation During Development.*

During development and regeneration of a biological system, different types of cells are organized in a precise spatial pattern to achieve different biological functions. To establish a desirable spatial arrangement of various cells, such as stem cells and terminated differentiated cells, the biological host has to utilize many biological processes including diffusible molecules, feedback regulations on cell lineages, and growth. In this talk, we study how interaction among multiple morphogens and their regulations on cell differentiation capability can robustly control stability of regeneration. We also investigate the underlying mechanisms that attenuate spatial and temporal noises in both extra and intra-cellular spaces to enable formation of distinct regions with sharp boundaries consisting different cell types. In particular, we will investigate two biology systems: regeneration of colonic crypt and development of zebrafish hindbrain, using stochastic PDE models and simulations with moving boundaries. (Received February 23, 2011)