1145-92-1970 **Sofya Zaytseva***, szaytseva@email.wm.edu, and **Leah B. Shaw**, **Junping Shi**, **Romuald N. Lipcius** and **Matthew L. Kirwan**. *Model of pattern formation in marsh ecosystems with nonlocal interactions.*

Spatial self-organization, a common feature of multi-species communities, can provide important insights into ecosystem structure and resilience. We present a mathematical model to describe self-organization of an eroding marsh shoreline based on three-way interactions between sediment volume and two ecosystem engineers – smooth cordgrass and ribbed mussels. The proposed model is a system of reaction-diffusion equations with nonlocal interaction terms accounting for scale-dependent grass-sediment and mussel-mussel interactions and modeled using Mexican hat kernel functions. We find that the emergence of spatial patterns depends on the scale and strength of the scale-dependent feedbacks modulated by the shape of the Mexican hat kernel functions. Further, changes in wavelength and variance of the observed spatial patterns can give insight into marsh recession. Overall, the model suggests that self-organization of the marsh edge increases the system's productivity, allows it to withstand harsh erosion, and delays degradation that otherwise would occur in the absence of strong nonlocal species interactions, demonstrating the potential value of self-organization for marsh ecosystem management and restoration. (Received September 24, 2018)