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Pavel B. Bochev and **Giacomo Capodaglio***, gcapodaglio@fsu.edu, and **Marta D’Elia** and **Max D. Gunzburger**. *Modeling and approximation of interface problems in nonlocal diffusion.*

In this talk, I will present recent results on the nonlocal modeling of interface problems in the context of heterogeneous materials. First, I will lay out the mathematical foundation of the problem, which is based on a minimization of the nonlocal energy of the system. Such an approach provides a useful mean to identify transmission conditions leading to a well-posed interface problem. A theoretical study of local limits shows that under certain sufficient conditions on the kernel function of the nonlocal operator the classical formulation is recovered, guaranteeing physical consistency.

Next, I will discuss the approximation of the nonlocal interface problem using the finite element method, and present several numerical results that support the theoretical predictions obtained analytically. More specifically, I will consider 1D and 2D examples to show that the proposed discretized nonlocal interface models achieve the appropriate order of convergence expected from the finite element method. Moreover, results on numerical convergence to the local limits will also be reported, with a specific focus on the behavior of the nonlocal solution at the interface.

Finally, I will discuss future work and currently open questions. (Received September 06, 2019)