1145-00-2483 **Xiaochuan Tian*** (xtian@math.utexas.edu). *Numerical mathematics for peridynamics and nonlocal models.*

Nonlocal continuum models are in general integral-differential equations in place of the conventional partial differential equations. While nonlocal models show their effectiveness in modeling a number of anomalous and singular processes in physics and material sciences, for example, the peridynamics model of fracture mechanics, they also come with increased difficulty in numerical analysis with nonlocality involved. We present in this talk numerical analysis for nonlocal models characterized by a horizon parameter which measures the range of nonlocal interactions. Considering their close connections to classical local PDE models in the limit when the horizon parameter shrinks to zero and to global fractional PDEs in the limit when the horizon parameter tends to infinity, we present numerical schemes that are robust under the changes of the horizon parameter. Those schemes are effective to deal with multiscale models where different scales of nonlocality are presented. (Received September 25, 2018)