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Cory Wright* (cwright11@unl.edu), **Petronela Radu** and **Mikil Foss**. *Existence and regularity of minimizers for nonlocal energy functionals*. Preliminary report.

Over the past two decades there has been a surge of mathematical and engineering interest in problems that model phenomena with potentially discontinuous behavior. In 2000 Silling introduced peridynamics, a nonlocal unified framework, which has successfully captured deformations, the structure of fractures, and propagation of cracks in solid materials. Motivated by this theory, we consider energy functionals that involve integral operators with weakly singular kernels. I will present results with sufficient conditions associated with the existence of minimizers, the necessity of Euler-Lagrange equations along with demonstrating connections with the classical results. We also investigate regularity of solutions to nonlocal equations. (Received September 24, 2017)