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Antoine Mellet and **Yijing Wu*** (yijingwu@umd.edu), 4176 Campus Dr, College Park, MD 20742. *An isoperimetric problem with a competing nonlocal singular term.*

we investigate the minimization of a functional in which the usual perimeter is competing with a non local singular term such as the fractional perimeter. The motivation for this problem is a cell motility model. We establish several facts about global minimizers with a volume constraint. In particular we prove that minimizers exist for small mass, and are radially symmetric. Though we do not fully determine whether the minimizers exist for large mass, we prove that either the minimizing sequences splits into smaller sets or develop fingers. Which of these two alternatives occurs depends on a related minimization problem for the optimal constant in a classical interpolation inequality (a Gagliardo-Nirenberg type inequality for fractional perimeter). (Received August 23, 2020)