1154-74-2607 **Michael C. Barg***, mbarg@niagara.edu. *Numerical solutions in a self-organizing inhibitory system on a torus.* Preliminary report.

We conduct numerical investigations into the size and shape of equilibrium patches on a torus. Such patches arise as solutions to a constrained minimization problem in the context of self-organizing inhibitory systems. The functional to be minimized includes contributions from both local and non-local energy terms. Our results for a torus extend and complement recent work completed by others on ellipsoids. Solutions with a small inhibitory parameter and a small conservation parameter are typically single droplet equilibrium patches centered near a location of maximum Gauss curvature. If such patches are sufficiently small, they will assume a geodesic disk-like shape. In the case of a small inhibitory parameter and a larger conservation parameter, a variety of solutions may be obtained. In this regime, equilibrium solutions no longer take the geodesic disk-like shape. When the inhibitory parameter is sufficiently large, single droplet solutions appear to become unstable and droplet assemblies become the preferred configuration instead. In addition to presenting representative solutions, we discuss improvements to previously used finite element models. Such modifications include the use of different types of finite elements and alternative forms for the conservation constraint. (Received September 17, 2019)