1131-76-292 **Nguyenho Ho*** (hono@uc.edu), **Karin Leiderman** and **Sarah Olson**. *A 3-dimensional model of flagellar swimming in a Brinkman fluid.*

We investigate 3-dimensional flagellar swimming in a fluid with a sparse network of stationary obstacles or fibers. The Brinkman equation is used to model the average fluid flow where a resistance term is inversely proportional to the permeability and represents the effect due to the presence of fibers. The flagellum is represented as a Kirchhoff rod that can exhibit propagating planar or spiral bending. To solve for the local fluid velocity and angular velocity, we use the method of regularized Brinkmanlets and extend it to the case for a Kirchhoff rod that is discretized as point forces and torques along the centerline. The new numerical method is validated by comparing to asymptotic swimming speeds derived for an infinite-length cylinder propagating lateral or spiral waves in a Brinkman fluid. Similar to the asymptotics, we observe that in the case of small amplitude, swimming speed is enhanced relative to the Stokes case as the resistance is increased. For larger amplitude bending, the simulations show a non-monotonic change in swimming speed as the resistance is varied. This is due to the emergent amplitude and wavelengths; as the resistance is increased (or as the number of stationary fibers is increased), the emergent amplitude of the swimmer has a tendency to decrease. (Received July 17, 2017)