1151-76-309 **Pooja Rao*** (pooja.rao@stonybrook.edu), **Daniel An**, **Taras Kolomatski**, **Ruth Lawrence** and **Dennis Sullivan**. *Numerical investigation of low to moderate Reynolds number fluid flows using the lattice hydrodynamics model.* Preliminary report.

We numerically study a three dimensional discrete fluid model, the "lattice model", derived from the principles of algebraic topology. It offers an advantage over discrete implementations of Navier-Stokes in the sense that it removes the need of the discretization step of the continuous PDEs. Our current work is focused on development of an efficient, parallel implementation of the lattice model to run high resolution simulations. The fine scale simulations are run dynamically in conjunction with coarser level simulations to study the effect of regularization of the solution at various times on the overall dynamics of the flow. The switching back between different grid levels is achieved using a harmonic map that maintains some of the algebraic properties. (Received August 21, 2019)