1143-65-299 **Aycil Cesmelioglu*** (cesmelio@oakland.edu) and **Prince Chidyagwai** (pchidyagwai@loyola.edu). *A Monolithic Finite Element Method for a Fluid-Poroelastic Structure Interaction Problem.* Preliminary report.

The interaction of a fluid with a poroelastic material takes place in many multiphysics problems in science and engineering. For example, blood flow is affected by the porous and deformable nature of the arterial wall and simulations may be beneficial for medical research. This interaction is modeled by the coupling of the time-dependent Stokes equations with the fully dynamic Biot equations. In this talk, we present a monolithic scheme based on the finite element method and its analysis under the assumption that the domain is fixed. We first reduce the second order in time problem to a first order problem and derive our monolithic scheme using the backward Euler method to discretize in time and the finite element method to discretize in space. We use inf-sup stable finite elements for the Stokes velocity and pressure pair and for the structure displacement and pore fluid pair. Wellposedness and stability of the scheme will be explored, and error estimates will be provided. A heuristic stabilization technique will also be discussed to take care of the non-physical oscillations that may happen with realistic problem parameters. A few numerical experiments will be presented to corroborate the error analysis. (Received August 17, 2018)