1135-86-2861 **Jonathan Matthews*** (jmatthews@mail.sdsu.edu), San Diego State University, 5500 Campanile Drive, San Diego, CA 92182-1326, and **Christopher Paolini** (paolini@engineering.sdsu.edu) and **Jose Castillo** (jcastillo@mail.sdsu.edu). *Fluid Structure Interaction in Geologic CO2 sequestration using Coupled Finite Element and Mimetic Methods.*

A Thermal-Hydrologic-Mechanical-Chemical ("THMC") simulator for modeling geologic CO2 sequestration is presented. The model implements fluid structure interaction ("FSI") by coupling finite element methods for solid mechanics and mimetic methods for chemical transport and reactivity. A mixed finite element method is used for fluid pressure and velocity, while a Galerkin method is used for poroelastic mechanics. The poroelastic and pressure-velocity fields are solved in parallel with MPI using domain decomposition. High-order mimetic operators are used in a mass-transport advection-diffusion model to solve for solute concentration and mineral dissolution and precipitation using the open-source Mimetic Operators Library Enhanced ("MOLE") toolkit. The Distributed Coupling Toolkit ("DCT") facilitates solution data exchange between the finite element and mimetic models. Results of a CO2 injection simulation are presented and validated against the Frio Test Pilot experiment. (Received September 26, 2017)