1126-35-5 **Elisabeth MM Brown*** (embrown5@ncsu.edu) and **Michael Shearer**. *A Dual-Flux Conservation Law for Plume Migration in Carbon Sequestration.*

A quasi-linear hyperbolic partial differential equation with a discontinuous flux models geologic carbon dioxide (CO_2) migration and storage. Dual flux curves emerge in this model, giving rise to flux discontinuities. One flux describes the invasion of the plume into pore space, and the other captures the flow as the plume leaves CO_2 bubbles behind, which are then trapped in the pore space. Flux functions with discontinuities in space have been previously studied; the flux in this model depends on how the unknown is changing at any position and time. We prove the existence of an entropy solution of the Cauchy problem for any initial CO_2 plume using wave-front tracking. During our analysis, we introduce a new construction with *cross-hatch characteristics* in regions of the characteristic plane where the solution is constant, and the characteristic speed depends on which flux is invoked. We present a computer simulation that tracks CO_2 plume migration in the characteristic plane. Some wave interactions yield novel phenomena due to the dual flux, such as shock-rarefaction interactions that would persist for all time with a single flux, here are completed in finite time. (Received September 11, 2016)