1015-49-180 **Qinglan Xia*** (qlxia@math.ucdavis.edu), University of California at Davis, Department of Mathematics, One Shields Ave., Davis, CA 95616. *A variational problem related to optimal mass transportation and mud cracking.*

In this talk, I will present a variational model related to optimal mass transportation. It is motivated by the study of the formation of mud cracking. We study the regularity of the boundary of sets minimizing a quasi perimeter $T(E) = P(E,\Omega) + G(E)$ with a volume constraint. Here Ω is any open subset of $\mathbb{R}^n$ with $n \geq 2$, G is a lower semicontinuous function on sets of finite perimeter satisfying a condition that $G(E) \leq G(F) + C|E\Delta F|^{\beta}$ among all sets of finite perimeter with equal volume. In the case of mud cracking, G is given by the Wasserstein distance from the varying sets to a given set. We show that under the condition $\beta > 1 - \frac{1}{n}$, any volume constrained minimizer E of the quasi perimeter T has both interior points and exterior points, and E is indeed a quasiminimizer of perimeter without the volume constraint. Using a well known regularity result about quasi minimizers of perimeter, we get the classical $C^{1,\alpha}$ regularity for the reduced boundary of E. (Received February 04, 2006)