Title: *An introduction to optimal mass transportation.*

Abstract: Suppose that we have a collection of n mines mining iron ore, and a collection of n factories which use the iron ore that the mines produce. Suppose these mines and factories form two subsets M and F of the Euclidean space $\mathbb{R}^d$. Suppose also that we have a cost function $c : \mathbb{R}^d \times \mathbb{R}^d \to [0, \infty)$, so that $c(x, y)$ is the cost of transporting one shipment of iron from x to y. We also assume that each mine can supply only one factory (no splitting of shipments) and that each factory requires precisely one shipment to be in operation (factories cannot work at half- or double-capacity). Having made the above assumptions, a transport plan is a bijection $T : M \to F$. In other words, each mine $m \in M$ supplies precisely one factory $T(m) \in F$ and each factory is supplied by precisely one mine. We wish to find the optimal transport plan, the plan T of least total cost

$$c(T) := \sum_{m \in M} c(m, T(m)).$$

Our goal is to discuss this problems and its applications to various fields of sciences and engineering.