

Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

February 22 **David Jekel and Wuchen Li**, UC San Diego
and University of South Carolina at Columbia

Title: *Free Wasserstein manifold.*

We formulate a free probabilistic analog of the Wasserstein manifold on \mathbb{R}^d (the formal Riemannian manifold of smooth probability densities on \mathbb{R}^d). The points of the free Wasserstein manifold are certain smooth tracial non-commutative functions which correspond to minus the log-density in the classical setting. The manifold structure allows to formulate and study a number of differential equations giving rise to non-commutative transport maps as well as analogs of measure-preserving transformations. One of the applications of our results is the optimality (in the sense of the Biane-Voiculescu 2-Wasserstein distance) of certain monotone optimal transport maps, which correspond to geodesics in our manifold (joint work by D. Jekel, W. Li and D. Shlyakhtenko).