

# Beatrice Yormark Distinguished Lecture Series



Thursday,  
February 18, 2016  
@ 4:30 pm in 380W

(Reception at 3:30pm in the fourth  
floor lounge)

**Alice Guionnet**  
(MIT and CNRS)

**Free probability, random matrices  
and transport maps**

## **Abstract:**

Free probability is a probability theory for non-commutative variables, equipped with a notion of freeness that resembles independence, but is a generalization of the notion of free groups. A central question in this framework is to understand when a non-commutative measure is the push-forward of another non-commutative measure by a smooth map, inducing isomorphisms of the related algebras. We shall extend classical ideas dating back to Monge and Ampere to solve some of these questions. Free probability is also a natural framework to study the asymptotics of random matrices. Pushing the previous ideas to construct large dimensional transport maps, we shall derive universality results for the local fluctuations of matrix models. This lecture is based on joint works with F. Bekerman, A. Figalli and D. Shlyakhtenko.