

**Stanford University**  
**Departments of Mathematics and Statistics**

PROBABILITY SEMINAR

\*\*\* Extra Seminar \*\*\*

4pm, Friday, December 6, 2019

\*\*\* Location Change \*\*\*

Sloan Mathematics Center Room 384H

Refreshments served at 3:30pm in Sequoia Lounge.

**Speaker:** Assaf Naor, *Princeton University*

**Title:** Quantitative vector-valued laws of large numbers  
for Markov chains

**Abstract:**

A powerful paradigm in Banach space theory since the 1960s is that key geometric and analytic properties of norms could be characterized by considering the behavior of sums of vector-valued random variables. Deep and influential investigations have focused on the natural settings of sums of independent random variables and martingale differences, but not on Markov chains. The case of real-valued Markov chains was understood only in the 1990s (Gillman's expander Chernoff bound). A decade ago the need to obtain rates in the law of large numbers for vector-valued Markov chains arose in the computer science literature. This talk will present progress that was obtained recently in some settings of interest (e.g., joint work with Rao and Regev that settles the case of Markov chains in a Hilbert space), but most of the theory is yet to be uncovered.