



THE UNIVERSITY OF  
**CHICAGO**

Department of Statistics  
STATISTICS COLLOQUIUM

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YI SUN

Department of Mathematics  
Columbia University

Fluctuations for Products of Random Matrices

FRIDAY, January 31, 2020 at 4:00 PM  
Jones 303, 5747 S. Ellis Avenue

### ABSTRACT

Products of large random matrices appear in many modern applications such as high dimensional statistics (MANOVA estimators), machine learning (Jacobians of neural networks), and population ecology (transition matrices of dynamical systems). Inspired by these situations, this talk concerns global limits and fluctuations of singular values of products of independent random matrices as both the size  $N$  and number  $M$  of matrices grow. As  $N$  grows, I will show for a variety of ensembles that fluctuations of the Lyapunov exponents converge to explicit Gaussian fields which transition from log-correlated for fixed  $M$  to having a white noise component for  $M$  growing with  $N$ . I will sketch our method, which uses multivariate generalizations of the Laplace transform based on the multivariate Bessel function from representation theory.

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For further information and inquiries about building access for persons with disabilities, please contact Jonathan Rodriguez at 773.702.8333 or send him an email at [jgrodriquez@galton.uchicago.edu](mailto:jgrodriquez@galton.uchicago.edu). If you wish to subscribe to our email list, please visit the following website: <https://lists.uchicago.edu/web/subscribe/statseminars>.