

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

PROBABILITY SEMINAR

4pm, Monday, November 18, 2019  
Sequoia Hall Room 200

Refreshments served at 3:30pm in the Lounge.

**Speaker:** Philip Wood, *UC Berkeley*

**Title:** **Outliers in the spectrum for products of independent random matrices**

**Abstract:**

For fixed positive integers  $m$ , we consider the product of  $m$  independent  $n$  by  $n$  random matrices with iid entries as in the limit as  $n$  tends to infinity. Under suitable assumptions on the entries of each matrix, it is known that the limiting empirical distribution of the eigenvalues is described by the  $m$ th power of the circular law. Moreover, this same limiting distribution continues to hold if each iid random matrix is additively perturbed by a bounded rank deterministic error. However, the bounded rank perturbations may create one or more outlier eigenvalues. We describe the asymptotic location of the outlier eigenvalues, which extends a result of Terence Tao for the case of a single iid matrix. Our methods also allow us to consider several other types of perturbations, including multiplicative perturbations.

This is joint work with Natalie Coston and Sean O'Rourke.