



## Mathematics and CS Seminar

# Generalized empirical covariance matrices and large deviations

**Jonathan Husson**

University of Michigan

Host: Laszlo Erdős

In many applications of random matrix theory, such as Principal Component Analysis or the study of random landscapes, the behaviour of the largest eigenvalue is of particular importance. In this talk, we will consider a model of generalized empirical covariance matrix and we will state a large deviation principle for its largest eigenvalue. The main tool of the proof is the use of a spherical integral of rank one as a proxy for this largest eigenvalue. This makes it possible to tackle not only Gaussian entries but also so-called "sharp sub-Gaussian" entries such as Rademacher random variables. We then have a universality phenomenon - which is rather surprising in the regime of large deviation - as well as an elegant representation for the rate function. This talk is based on a collaboration with Ben McKenna.

**Thursday, December 21, 2023 04:15pm - 05:15pm**

Heinzel Seminar Room (I21.EG.101), Office Building West, ISTA



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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<https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.