



TEXAS A&M
Institute of
Data Science

**TAMIDS
Seminar Series**



TEXAS A&M UNIVERSITY

Research Institute for Foundations
of Interdisciplinary Data Science

TRIPODS DISTINGUISHED LECTURE

ScreeNOT: Exact MSE-Optimal Singular Value Thresholding in Correlated Noise



Truncation of the singular value decomposition is a true scientific workhorse. But where to truncate?

For 55 years the answer, for many scientists, has been to eyeball the scree plot, an approach which still generates hundreds of papers per year.

The speaker will describe ScreeNOT, a mathematically solid alternative deriving from the many advances in Random Matrix Theory over those 55 years.

Assuming a model of low-rank signal plus possibly correlated noise, and adopting an asymptotic viewpoint with number of rows proportional to the number of columns, the speaker shows that ScreeNOT has a surprising oracle property.

It typically achieves exactly, in large finite samples, the lowest possible MSE for matrix recovery, on each given problem instance—i.e., the specific threshold it selects gives exactly the smallest achievable MSE loss among all possible threshold choices for that noisy dataset and that unknown underlying true low-rank model. The method is computationally efficient and robust against perturbations of the underlying covariance structure. The talk is based on joint work with Matan Gavish and Elad Romanov, Hebrew University.

David Donoho, Ph.D.

Professor of Statistics
Anne T. and Robert M. Bass Professor of
Humanities and Sciences
Stanford University

Date: Monday, October 18, 2021

Time: 1:50 – 3:00 p.m. US Central Time

Zoom Meeting ID: 998 4499 3279

Passcode: 724615

Faculty host: Simon Foucart, MATH

Biography

Dr. David Donoho is Professor of Statistics and the Anne T. and Robert M. Bass Professor of Humanities and Sciences at Stanford University. Dedicating his professional life to statistics, information theory, and applied mathematics, he has made significant contributions to a wide range of statistics and data science problems, especially using sparsity in signal recovery including for denoising, superresolution, and solution of underdetermined equations. Dr. Donoho has a long list of honors and recognitions. He was named a MacArthur Fellow in 1991, was the winner of the COPSS Presidents' Award in 1994, won the John von Neumann Prize of SIAM in 2001, the Norbert Wiener Prize in 2010, the Shaw Prize in 2013, and the Gauss Prize at the 2018 International Congress of Mathematicians. Dr. Donoho is a member of the National Academy of Sciences (USA), a Foreign Associate of the Académie des Sciences (France), and a Fellow of APS, AAAS, AMS and SIAM.

You can also click this link to join the seminar <https://tamu.zoom.us/j/99844993279?pwd=TkJodWFVRURyMmkwakl4SWZGeVJTQT09>



TEXAS A&M
UNIVERSITY

TEXAS A&M
AGRI LIFE



Texas A&M Engineering
Experiment Station

For more information about TAMIDS tutorial series, please contact Ms. Jennifer South at jsouth@tamu.edu