COURSE ANNOUNCEMENT: FALL 2024

High-dimensional Probability

Math 382/Math 482/Stats 382/Stats 482

High dimensional probability is a rich topic at the intersection of probability, convex geometry, analysis, statistics and data science (to name a few subjects). A snapshot of the topics include: concentration inequalities, behavior of random vectors and random matrices in high dimensions, and applications to data science, geometry, and analysis.

The course is both theoretically beautiful and applicable to those interested in data science and AI. Moreover, this is highly applicable to modern day theoretical computer sciences.

For inspiring discussions about these cool topics, please see the following:

(1) 3-Blue 1-Brown: Understanding High Dimensions
(2) Quanta Mag article on the work of Yuansi Chen

Instructor: Michael Roysdon

E-mail: mar327@case.edu

Webpage: Instructor Webpage

Course Time. Mon/Wed/Fri: 2:15 PM-3:05 PM

Textbook: *High-Dimensional Probability, An Introduction with Applications in Data Science* by Roman Vershynin, Cambridge University Press, 2018. PDF download.

Additional Resources:

(i) *Asymptotic Geometric Analysis Part I* by Shiri Arstein-Avidan, Apostolos Giannopoulos, and Vitali Milman.
(ii) *Probability in High Dimensions* by Ramon van Handel. PDF download

Prerequisites. Probability at the level of MATH 380 or STAT 345. Linear algebra at the level of MATH 307. Additional work is required of graduate students for 400-level credit. Contact me if you have questions about your background!