

Amir Dembo

Marjorie Mhoon Fair Professor of Quantitative Science, Professor of Statistics and, by courtesy, of Electrical Engineering Mathematics

Bio

ACADEMIC APPOINTMENTS

- Professor, Mathematics
- Professor, Statistics
- Professor (By courtesy), Electrical Engineering

Teaching

COURSES

2025-26

- Lebesgue Integration and Fourier Analysis: MATH 172 (Spr)
- Theory of Probability III: MATH 230C, STATS 310C (Spr)

2024-25

- Discrete Probabilistic Methods: MATH 159 (Win)
- Theory of Probability II: MATH 230B, STATS 310B (Win)

2023-24

- Theory of Probability III: MATH 230C, STATS 310C (Spr)
- Topics in Probability: MATH 232 (Spr)

2022-23

- Integral Calculus of Several Variables: MATH 52 (Win)
- Theory of Probability II: MATH 230B, STATS 310B (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Michael Howes, Ran Xie

Postdoctoral Faculty Sponsor

Theo McKenzie, Eric Thoma

Doctoral Dissertation Advisor (AC)

Jiyun Park, Christian Serio, Ruochuan Xu

Doctoral Dissertation Co-Advisor (AC)

Zhenyuan Zhang, Yanxin Zhou

Doctoral (Program)

Rupert Li, Michael Ren

Publications

PUBLICATIONS

- **Limit law for the cover time of a random walk on a binary tree** *ANNALES DE L INSTITUT HENRI POINCARÉ-PROBABILITÉS ET STATISTIQUES*
Dembo, A., Rosen, J., Zeitouni, O.
2021; 57 (2): 830-855
- **Upper tail for homomorphism counts in constrained sparse random graphs** *RANDOM STRUCTURES & ALGORITHMS*
Bhattacharya, S., Dembo, A.
2021
- **Diffusions interacting through a random matrix: universality via stochastic Taylor expansion** *PROBABILITY THEORY AND RELATED FIELDS*
Dembo, A., Gheissari, R.
2021
- **Averaging Principle and Shape Theorem for a Growth Model with Memory** *COMMUNICATIONS ON PURE AND APPLIED MATHEMATICS*
Dembo, A., Groisman, P., Huang, R., Sidoravicius, V.
2020
- **Exponential Concentration for Zeroes of Stationary Gaussian Processes** *INTERNATIONAL MATHEMATICS RESEARCH NOTICES*
Basu, R., Dembo, A., Feldheim, N., Zeitouni, O.
2020; 2020 (23): 9769–96
- **Large deviations of subgraph counts for sparse Erdos-Renyi graphs** *ADVANCES IN MATHEMATICS*
Cook, N., Dembo, A.
2020; 373
- **Dynamics for Spherical Spin Glasses: Disorder Dependent Initial Conditions** *JOURNAL OF STATISTICAL PHYSICS*
Dembo, A., Subag, E.
2020
- **Random walks among time increasing conductances: heat kernel estimates** *PROBABILITY THEORY AND RELATED FIELDS*
Dembo, A., Huang, R., Zheng, T.
2019; 175 (1-2): 397–445
- **Criticality of a Randomly-Driven Front** *ARCHIVE FOR RATIONAL MECHANICS AND ANALYSIS*
Dembo, A., Tsai, L.
2019; 233 (2): 643–99
- **The infinite Atlas process: Convergence to equilibrium** *ANNALES DE L INSTITUT HENRI POINCARÉ-PROBABILITÉS ET STATISTIQUES*
Dembo, A., Jara, M., Olla, S.
2019; 55 (2): 607–19
- **COMPONENT SIZES FOR LARGE QUANTUM ERDOS-RENYI GRAPH NEAR CRITICALITY** *ANNALS OF PROBABILITY*
Dembo, A., Levit, A., Vadlamani, S.
2019; 47 (2): 1185–1219
- **Cut-off for lamplighter chains on tori: dimension interpolation and Phase transition** *PROBABILITY THEORY AND RELATED FIELDS*
Dembo, A., Ding, J., Miller, J., Peres, Y.
2019; 173 (1-2): 605–50
- **LARGE DEVIATIONS THEORY FOR MARKOV JUMP MODELS OF CHEMICAL REACTION NETWORKS** *ANNALS OF APPLIED PROBABILITY*

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- Agazzi, A., Dembo, A., Eckmann, J.
2018; 28 (3): 1821–55
- **Cutoff for lamplighter chains on fractals** *ELECTRONIC JOURNAL OF PROBABILITY*
Dembo, A., Kumagai, T., Nakamura, C.
2018; 23
 - **A large deviation principle for the Erdos-Renyi uniform random graph** *ELECTRONIC COMMUNICATIONS IN PROBABILITY*
Dembo, A., Lubetzky, E.
2018; 23
 - **EQUILIBRIUM FLUCTUATION OF THE ATLAS MODEL** *ANNALS OF PROBABILITY*
Dembo, A., Tsai, L.
2017; 45 (6B): 4529–60
 - **EXTREMAL CUTS OF SPARSE RANDOM GRAPHS** *ANNALS OF PROBABILITY*
Dembo, A., Montanari, A., Sen, S.
2017; 45 (2): 1190-1217
 - **FERROMAGNETIC ISING MEASURES ON LARGE LOCALLY TREE-LIKE GRAPHS** *ANNALS OF PROBABILITY*
Basak, A., Dembo, A.
2017; 45 (2): 780-823
 - **Nonlinear large deviations** *ADVANCES IN MATHEMATICS*
Chatterjee, S., Dembo, A.
2016; 299: 396-450
 - **Large Deviations for Diffusions Interacting Through Their Ranks** *COMMUNICATIONS ON PURE AND APPLIED MATHEMATICS*
Dembo, A., Shkolnikov, M., Varadhan, S. R., Zeitouni, O.
2016; 69 (7): 1259-1313
 - **Weakly Asymmetric Non-Simple Exclusion Process and the Kardar-Parisi-Zhang Equation** *COMMUNICATIONS IN MATHEMATICAL PHYSICS*
Dembo, A., Tsai, L.
2016; 341 (1): 219-261
 - **Matrix Optimization Under Random External Fields** *JOURNAL OF STATISTICAL PHYSICS*
Dembo, A., Zeitouni, O.
2015; 159 (6): 1306-1326
 - **NO ZERO-CROSSINGS FOR RANDOM POLYNOMIALS AND THE HEAT EQUATION** *ANNALS OF PROBABILITY*
Dembo, A., Mukherjee, S.
2015; 43 (1): 85-118
 - **Monotone interaction of walk and graph: recurrence versus transience** *ELECTRONIC COMMUNICATIONS IN PROBABILITY*
Dembo, A., Huang, R., Sidoravicius, V.
2014; 19: 1-12
 - **Walking within growing domains: recurrence versus transience** *ELECTRONIC JOURNAL OF PROBABILITY*
Dembo, A., Huang, R., Sidoravicius, V.
2014; 19: 1-20
 - **The Replica Symmetric Solution for Potts Models on d-Regular Graphs** *COMMUNICATIONS IN MATHEMATICAL PHYSICS*
Dembo, A., Montanari, A., Sly, A., Sun, N.
2014; 327 (2): 551-575
 - **FACTOR MODELS ON LOCALLY TREE-LIKE GRAPHS** *ANNALS OF PROBABILITY*
Dembo, A., Montanari, A., Sun, N.
2013; 41 (6): 4162-4213

- **Limiting spectral distribution of sums of unitary and orthogonal matrices** *ELECTRONIC COMMUNICATIONS IN PROBABILITY*
Basak, A., Dembo, A.
2013; 18: 1-19
- **Persistence of iterated partial SUMS** *ANNALES DE L INSTITUT HENRI POINCARÉ-PROBABILITES ET STATISTIQUES*
Dembo, A., Ding, J., Gao, F.
2013; 49 (3): 873-884
- **Central limit theorem for biased random walk on multi-type Galton-Watson trees** *ELECTRONIC JOURNAL OF PROBABILITY*
Dembo, A., Sun, N.
2012; 17: 1-40
- **Markovian perturbation, response and fluctuation dissipation theorem** *ANNALES DE L INSTITUT HENRI POINCARÉ-PROBABILITES ET STATISTIQUES*
Dembo, A., Deuschel, J.
2010; 46 (3): 822-852
- **Gibbs measures and phase transitions on sparse random graphs** *BRAZILIAN JOURNAL OF PROBABILITY AND STATISTICS*
Dembo, A., Montanani, A.
2010; 24 (2): 137-211
- **ISING MODELS ON LOCALLY TREE-LIKE GRAPHS** *ANNALS OF APPLIED PROBABILITY*
Dembo, A., Montanari, A.
2010; 20 (2): 565-592
- **Spectral Measure of Heavy Tailed Band and Covariance Random Matrices** *COMMUNICATIONS IN MATHEMATICAL PHYSICS*
Belinschi, S., Dembo, A., Guionnet, A.
2009; 289 (3): 1023-1055
- **FINITE SIZE SCALING FOR THE CORE OF LARGE RANDOM HYPERGRAPHS** *ANNALS OF APPLIED PROBABILITY*
Dembo, A., Montanari, A.
2008; 18 (5): 1993-2040
- **A lower bound on the disconnection time of a discrete cylinder** *Joint Meeting of the 10th Brazilian School of Probability/69th Annual Meeting of the Institute-of-Mathematical-Statistics*
Dembo, A., Sznitman, A.
BIRKHAUSER BOSTON.2008: 211–227
- **Limiting dynamics for spherical models of spin glasses at high temperature** *JOURNAL OF STATISTICAL PHYSICS*
Dembo, A., Guionnet, A., Mazza, C.
2007; 128 (4): 847-881
- **How large a disc is covered by a random walk in n steps?** *ANNALS OF PROBABILITY*
Dembo, A., Peres, Y., Rosen, J.
2007; 35 (2): 577-601
- **Limiting dynamics for spherical models of spin glasses at high temperature** *Conference on Mathematical Physics of Spin Glasses*
Dembo, A., Guionnet, A., Mazza, C.
SPRINGER.2007: 781–815
- **Valleys and the maximum local time for random walk in random environment** *PROBABILITY THEORY AND RELATED FIELDS*
Dembo, A., Gantert, N., Peres, Y., Shi, Z.
2007; 137 (3-4): 443-473
- **Aging for interacting diffusion processes** *ANNALES DE L INSTITUT HENRI POINCARÉ-PROBABILITES ET STATISTIQUES*
Dembo, A., Deuschel, J.
2007; 43 (4): 461-480
- **Cugliandolo-Kurchan equations for dynamics of Spin-Glasses** *PROBABILITY THEORY AND RELATED FIELDS*
Ben Arous, G., Dembo, A., Guionnet, A.

2006; 136 (4): 619-660

- **On the disconnection of a discrete cylinder by a random walk** *PROBABILITY THEORY AND RELATED FIELDS*
Dembo, A., Sznitman, A.
2006; 136 (2): 321-340
- **Large and moderate deviations for Hotelling's T-2-statistic** *ELECTRONIC COMMUNICATIONS IN PROBABILITY*
Dembo, A., Shao, Q.
2006; 11: 149-159
- **Late points for random walks in two dimensions** *ANNALS OF PROBABILITY*
Dembo, A., Peres, Y., Rosen, J., Zeitouni, O.
2006; 34 (1): 219-263
- **Spectral measure of large random Hankel, Markov and Toeplitz matrices** *ANNALS OF PROBABILITY*
Bryc, W., Dembo, A., Jiang, T. F.
2006; 34 (1): 1-38
- **Universal denoising for the finite-input general-output channel** *IEEE International Symposium on Information Theory*
Dembo, A., Weissman, T.
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2005: 1507-17
- **Lectures on probability theory and statistics** *33rd Probability Summer School*
Dembo, A., Funaki, T.
SPRINGER-VERLAG BERLIN.2005: 5-101
- **Large deviations of Markov chains indexed by random trees** *ANNALES DE L INSTITUT HENRI POINCARÉ-PROBABILITÉS ET STATISTIQUES*
Dembo, A., Morters, P., Sheffield, S.
2005; 41 (6): 971-996
- **Cover times for Brownian motion and random walks in two dimensions** *ANNALS OF MATHEMATICS*
Dembo, A., Peres, Y., Rosen, J., Zeitouni, O.
2004; 160 (2): 433-464
- **Large portfolio losses** *FINANCE AND STOCHASTICS*
Dembo, A., Deuschel, J. D., Duffie, D.
2004; 8 (1): 3-16
- **Universal denoising for the finite-input-general-output channel** *IEEE International Symposium on Information Theory*
Dembo, A., Weissman, T.
IEEE.2004: 201-201
- **On the maximum correlation coefficient** *THEORY OF PROBABILITY AND ITS APPLICATIONS*
Bryc, W., Dembo, A., Kagan, A.
2004; 49 (1): 132-138
- **Large deviations for random walk in random environment with holding times** *ANNALS OF PROBABILITY*
Dembo, A., Gantert, N., Zeitouni, O.
2004; 32 (1B): 996-1029
- **The minimax distortion redundancy in noisy source coding** *IEEE TRANSACTIONS ON INFORMATION THEORY*
Dembo, A., Weissman, T.
2003; 49 (11): 3020-3030
- **Moderate deviations for the spectral measure of certain random matrices** *ANNALES DE L INSTITUT HENRI POINCARÉ-PROBABILITÉS ET STATISTIQUES*
Dembo, A., Guionnet, A., Zeitouni, O.
2003; 39 (6): 1013-1042
- **Source coding, large deviations, and approximate pattern matching** *IEEE TRANSACTIONS ON INFORMATION THEORY*

-
- Dembo, A., Kontoyiannis, I.
2002; 48 (6): 1590-1615
- **Large deviations for random walks on Galton-Watson trees: averaging and uncertainty** *PROBABILITY THEORY AND RELATED FIELDS*
Dembo, A., Gantert, N., Peres, Y., Zeitouni, O.
2002; 122 (2): 241-288
 - **Random polynomials having few or no real zeros** *JOURNAL OF THE AMERICAN MATHEMATICAL SOCIETY*
Dembo, A., Poonen, B., Shao, Q. M., Zeitouni, O.
2002; 15 (4): 857-892
 - **The minimax distortion redundancy in noisy source coding** *IEEE International Symposium on Information Theory*
Dembo, A., Weissman, T.
IEEE.2002: 318–318
 - **Thick points for intersections of planar sample paths** *TRANSACTIONS OF THE AMERICAN MATHEMATICAL SOCIETY*
Dembo, A., Peres, Y., Rosen, J., Zeitouni, O.
2002; 354 (12): 4969-5003
 - **Ordered overlaps in disordered mean-field models** *PROBABILITY THEORY AND RELATED FIELDS*
Comets, F., Dembo, A.
2001; 121 (1): 1-29
 - **Aging of spherical spin glasses** *PROBABILITY THEORY AND RELATED FIELDS*
Ben Arous, G., Dembo, A., Guionnet, A.
2001; 120 (1): 1-67
 - **Remarks on the maximum correlation coefficient** *BERNOULLI*
Dembo, A., Kagan, A., SHEPP, L. A.
2001; 7 (2): 343-350
 - **Critical behavior in lossy source coding** *IEEE TRANSACTIONS ON INFORMATION THEORY*
Dembo, A., Kontoyiannis, I.
2001; 47 (3): 1230-1236
 - **Thick points for planar Brownian motion and the Erdos-Taylor conjecture on random walk** *ACTA MATHEMATICA*
Dembo, A., Peres, Y., ROSEN, J., Zeitouni, O.
2001; 186 (2): 239-270
 - **Greedy lattice animals: Negative values and unconstrained maxima** *ANNALS OF PROBABILITY*
Dembo, A., Gandolfi, A., Kesten, H.
2001; 29 (1): 205-241
 - **Thin points for Brownian motion** *ANNALES DE L INSTITUT HENRI POINCARÉ-PROBABILITÉS ET STATISTIQUES*
Dembo, A., Peres, Y., ROSEN, J., Zeitouni, O.
2000; 36 (6): 749-774
 - **Thick points for spatial Brownian motion: Multifractal analysis of occupation measure** *ANNALS OF PROBABILITY*
Dembo, A., Peres, Y., ROSEN, J., Zeitouni, O.
2000; 28 (1): 1-35
 - **The asymptotics of waiting times between stationary processes, allowing distortion** *ANNALS OF APPLIED PROBABILITY*
Dembo, A., Kontoyiannis, I.
1999; 9 (2): 413-429
 - **Self-normalized moderate deviations and lils** *STOCHASTIC PROCESSES AND THEIR APPLICATIONS*
Dembo, A., Shao, Q. M.
1998; 75 (1): 51-65
 - **Refined Gibbs conditioning principle for certain infinite dimensional statistics** *STUDIA SCIENTIARUM MATHEMATICARUM HUNGARICA*
Dembo, A., Kuelbs, J.

1998; 34 (1-3): 107-126

- **Uniform large and moderate deviations for functional empirical processes** *STOCHASTIC PROCESSES AND THEIR APPLICATIONS*
Dembo, A., Zajic, T.
1997; 67 (2): 195-211
- **Large deviations for quadratic functionals of Gaussian processes** *JOURNAL OF THEORETICAL PROBABILITY*
Bryc, W., Dembo, A.
1997; 10 (2): 307-332
- **Information inequalities and concentration of measure** *ANNALS OF PROBABILITY*
Dembo, A.
1997; 25 (2): 927-939
- **Tail estimates for one-dimensional random walk in random environment** *COMMUNICATIONS IN MATHEMATICAL PHYSICS*
Dembo, A., Peres, Y., Zeitouni, O.
1996; 181 (3): 667-683
- **Large deviations for subsampling from individual sequences** *STATISTICS & PROBABILITY LETTERS*
Dembo, A., Zeitouni, O.
1996; 27 (3): 201-205
- **Large deviations and strong mixing** *ANNALES DE L INSTITUT HENRI POINCARÉ-PROBABILITÉS ET STATISTIQUES*
Bryc, W., Dembo, A.
1996; 32 (4): 549-569
- **Refinements of the Gibbs conditioning principle** *PROBABILITY THEORY AND RELATED FIELDS*
Dembo, A., Zeitouni, O.
1996; 104 (1): 1-14
- **ON LARGE DEVIATIONS OF EMPIRICAL MEASURES FOR STATIONARY GAUSSIAN-PROCESSES** *STOCHASTIC PROCESSES AND THEIR APPLICATIONS*
Bryc, W., Dembo, A.
1995; 58 (1): 23-34
- **LARGE DEVIATIONS - FROM EMPIRICAL MEAN AND MEASURE TO PARTIAL-SUMS PROCESS** *STOCHASTIC PROCESSES AND THEIR APPLICATIONS*
Dembo, A., Zajic, T.
1995; 57 (2): 191-224
- **EXACT BEHAVIOR OF GAUSSIAN SEMINORMS** *STATISTICS & PROBABILITY LETTERS*
Dembo, A., MAYERWOLF, E., Zeitouni, O.
1995; 23 (3): 275-280
- **EXPONENTIAL RATES FOR ERROR PROBABILITIES IN DMPK SYSTEMS** *IEEE TRANSACTIONS ON COMMUNICATIONS*
Dembo, A., Galperin, V., Zeitouni, O.
1995; 43 (2-4): 915-921
- **Large deviations via parameter dependent change of measure, and an application to the lower tail of Gaussian processes** *Seminar on Stochastic Analysis, Random Fields and Applications*
Dembo, A., Zeitouni, O.
BIRKHAUSER VERLAG AG.1995: 111-121
- **THE RATE-DISTORTION DIMENSION OF SETS AND MEASURES** *IEEE TRANSACTIONS ON INFORMATION THEORY*
Kawabata, T., Dembo, A.
1994; 40 (5): 1564-1572
- **LARGE EXCEEDANCES FOR MULTIDIMENSIONAL LEVY PROCESSES** *ANNALS OF APPLIED PROBABILITY*
Dembo, A., Karlin, S., Zeitouni, O.
1994; 4 (2): 432-447

- **ON THE PERCEPTRON LEARNING ALGORITHM ON DATA WITH HIGH-PRECISION** *JOURNAL OF COMPUTER AND SYSTEM SCIENCES*
Siu, K. Y., Dembo, A., KAILATH, T.
1994; 48 (2): 347-356
- **A TOPOLOGICAL CRITERION FOR HYPOTHESIS-TESTING** *ANNALS OF STATISTICS*
Dembo, A., Peres, Y.
1994; 22 (1): 106-117
- **BOUNDS ON THE SYMMETRICAL BINARY CUTOFF RATE FOR DISPERSIVE GAUSSIAN CHANNELS** *IEEE TRANSACTIONS ON COMMUNICATIONS*
Shamai, S., Dembo, A.
1994; 42 (1): 39-53
- **A NOTE ON UNIFORM LAWS OF AVERAGES FOR DEPENDENT PROCESSES** *STATISTICS & PROBABILITY LETTERS*
Nobel, A., Dembo, A.
1993; 17 (3): 169-172
- **CENTRAL LIMIT-THEOREMS OF PARTIAL-SUMS FOR LARGE SEGMENTAL VALUES** *STOCHASTIC PROCESSES AND THEIR APPLICATIONS*
Dembo, A., Karlin, S.
1993; 45 (2): 259-271
- **LIMIT DISTRIBUTIONS OF MAXIMAL SEGMENTAL SCORE AMONG MARKOV-DEPENDENT PARTIAL-SUMS** *ADVANCES IN APPLIED PROBABILITY*
Karlin, S., Dembo, A.
1992; 24 (1): 113-140
- **INFORMATION THEORETIC INEQUALITIES** *IEEE TRANSACTIONS ON INFORMATION THEORY*
Dembo, A., COVER, T. M., Thomas, J. A.
1991; 37 (6): 1501-1518
- **STRONG LIMIT-THEOREMS OF EMPIRICAL DISTRIBUTIONS FOR LARGE SEGMENTAL EXCEEDANCES OF PARTIAL-SUMS OF MARKOV VARIABLES** *ANNALS OF PROBABILITY*
Dembo, A., Karlin, S.
1991; 19 (4): 1756-1767
- **STRONG LIMIT-THEOREMS OF EMPIRICAL FUNCTIONALS FOR LARGE EXCEEDANCES OF PARTIAL-SUMS OF IID VARIABLES** *ANNALS OF PROBABILITY*
Dembo, A., Karlin, S.
1991; 19 (4): 1737-1755
- **A GENERAL WEIGHT MATRIX FORMULATION USING OPTIMAL-CONTROL** *IEEE TRANSACTIONS ON NEURAL NETWORKS*
FAROTIMI, O., Dembo, A., KAILATH, T.
1991; 2 (3): 378-394
- **ONSAGER MACHLUP FUNCTIONALS AND MAXIMUM A POSTERIORI ESTIMATION FOR A CLASS OF NON-GAUSSIAN RANDOM-FIELDS** *JOURNAL OF MULTIVARIATE ANALYSIS*
Dembo, A., Zeitouni, O.
1991; 36 (2): 243-262
- **HIGH-ORDER ABSOLUTELY STABLE NEURAL NETWORKS** *IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS*
Dembo, A., FAROTIMI, O., KAILATH, T.
1991; 38 (1): 57-65
- **MAXIMUM A POSTERIORI ESTIMATION OF ELLIPTIC GAUSSIAN FIELDS OBSERVED VIA A NOISY NONLINEAR CHANNEL** *JOURNAL OF MULTIVARIATE ANALYSIS*
Dembo, A., Zeitouni, O.
1990; 35 (2): 151-167
- **STATISTICAL COMPOSITION OF HIGH-SCORING SEGMENTS FROM MOLECULAR SEQUENCES** *ANNALS OF STATISTICS*
Karlin, S., Dembo, A., Kawabata, T.

1990; 18 (2): 571-581

- **Model-free distributed learning.** *IEEE transactions on neural networks*

Dembo, A., KAILATH, T.

1990; 1 (1): 58-70

- **ON THE RELATION OF ANTICIPATIVE STRATONOVICH AND SYMMETRIC INTEGRALS - A DECOMPOSITION FORMULA** *LECTURE NOTES IN MATHEMATICS*

Dembo, A., Zeitouni, O.

1989; 1390: 66-76

- **MAXIMUM A-POSTERIORI ESTIMATION OF TIME-VARYING ARMA PROCESSES FROM NOISY OBSERVATIONS** *IEEE TRANSACTIONS ON ACOUSTICS SPEECH AND SIGNAL PROCESSING*

Dembo, A., Zeitouni, O.

1988; 36 (4): 471-476