Jennifer Tang

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Current Position

2022–Present | Postdoctoral Associate, **Massachusetts Institute of Technology**
- Institute for Data, Systems, and Society (IDSS)
- Advisor: Ali Jadbabaie

Education

Ph.D | **Massachusetts Institute of Technology**, Cambridge, MA
Electrical Engineering and Computer Science, Feb 2022
- Advisor: Yury Polyanskiy
- Thesis Title: Divergence Covering

S.M | **Massachusetts Institute of Technology**, Cambridge, MA
Electrical Engineering and Computer Science, Sep 2015

B.S.E | **Princeton University**, Princeton, NJ
Electrical Engineering *summa cum laude*, June 2013
Certificates: Applications in Computing, Computational and Applied Mathematics

Research Interests

Information sciences with a focus on finding theoretical **fundamental limits** for storing, transmitting and predicting high-dimensional data, including topics like quantization and data compression, channel capacity, prediction and estimation; high-dimensional statistics; analyzing models for opinion dynamics and inference using agent-based social networks

Publications and Preprints

Conference

- Jennifer Tang, Aviv Adler, Amir Ajorlou, and Ali Jadbabaie. "Convergence of Opinion Dynamics under Social Pressure for General Networks". In: *To appear at IEEE Conference on Decision and Control (CDC) 2023*
- Jennifer Tang. "Minimax Regret on Patterns Using Kullback-Leibler Divergence Covering". In: *Proceedings of Thirty Fifth Conference on Learning Theory (COLT)*. ed. by Po-Ling Loh and Maxim Raginsky. Vol. 178. Proceedings of Machine Learning Research. PMLR, Feb. 2022, pp. 3095–3112
- Jennifer Tang and Yury Polyanskiy. "Capacity of Noisy Permutation Channels". In: *2022 IEEE International Symposium on Information Theory (ISIT)*. 2022, pp. 1987–1992 **(Best Student Paper Award)**
- Aviv Adler, Jennifer Tang, and Yury Polyanskiy. "Efficient Representation of Large-Alphabet Probability Distributions via Arcsinh-Compander". In: *2022 IEEE International Symposium on Information Theory (ISIT)*. 2022, pp. 162–167

- Gary C.F. Lee, Amir Weiss, Alejandro Lancho, Jennifer Tang, Yuheng Bu, Yury Polyanskiy, and Gregory W. Wornell. "Exploiting Temporal Structures of Cyclostationary Signals For Data-Driven Single-Channel Source Separation". In: *2022 IEEE International Workshop on Machine Learning for Signal Processing (MLSP)*. 2022 **(Best Student Paper Award)**
- Alejandro Lancho, Amir Weiss, Gary C.F. Lee, Jennifer Tang, Yuheng Bu, Yury Polyanskiy, and Gregory W. Wornell. "Data-Driven Blind Synchronization and Interference Rejection for Digital Communication Signals". In: *GLOBECOM 2022 - 2022 IEEE Global Communications Conference*. 2022, pp. 2296–2302
- Aviv Adler, Jennifer Tang, and Yury Polyanskiy. "Quantization of Random Distributions under KL Divergence". In: *2021 IEEE International Symposium on Information Theory (ISIT)*. IEEE. 2021, pp. 2762–2767
- Jennifer Tang, Atulya Yellepeddi, Sefa Demirtas, and Christopher Barber. "Tracking to Improve Detection Quality in Lidar For Autonomous Driving". In: *ICASSP 2020 - 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. 2020, pp. 2683–2687
- Jennifer Tang, Da Wang, Yury Polyanskiy, and Gregory Wornell. "Defect tolerance: Fundamental limits and examples". In: *2016 IEEE International Symposium on Information Theory (ISIT)*. 2016, pp. 3028–3032 **(Shannon Centennial Celebration Student Competition Winner)**

Journal

- Jennifer Tang and Yury Polyanskiy. "Capacity of Noisy Permutation Channels". In: *IEEE Transactions on Information Theory* 69.7 (2023), pp. 4145–4162
- Aviv Adler, Jennifer Tang, and Yury Polyanskiy. "Efficient Representation of Large-Alphabet Probability Distributions". In: *IEEE Journal on Selected Areas in Information Theory* 3.4 (2022), pp. 651–663
- Jennifer Tang, Da Wang, Yury Polyanskiy, and Gregory W. Wornell. "Defect Tolerance: Fundamental Limits and Examples". In: *IEEE Transactions on Information Theory* 64.7 (2018), pp. 5240–5260

Preprints

- Jennifer Tang, Aviv Adler, Amir Ajorlou, Ali Jadbabaie "Estimating True Beliefs from Declared Opinions" (in submission to conference)
- Jennifer Tang, Amir Ajorlou, Ali Jadbabaie "Evolution of Opinions under Social Pressure on Random Graphs" (in submission to conference)
- Jennifer Tang, Aviv Adler, Amir Ajorlou, Ali Jadbabaie "Estimating True Beliefs from Declared Opinions" (under review for journal)
- Jennifer Tang, Aviv Adler, Amir Ajorlou, Ali Jadbabaie "Stochastic Opinion Dynamics under Social Pressure in Arbitrary Networks" (under review for journal)

Presentations

Talk

- *"Capacity of the Permutation Channel"*. Invited Talk at TU Munich, 2022
- *"Parameter Estimator with Unknown Transition Point"*. 23rd LIDS Student Conference, MIT, 2018, **(Runner-Up for Best Presentation)**

- *"Defect Tolerance: Fundamental Limits and Examples"*. Invited Talk at Shannon Centennial Celebration, Nokia Bell Labs, 2016. **Competition Winner**
- *"Improving Speed and Reliability of SAR ADCs"*. 21st LIDS Student Conference, MIT, 2016
- *"Analysis of Models for Physical Redundancy"*. 20th LIDS Student Conference, MIT, 2015

Poster

- *"Information Theoretical Limits to Successive-Approximation-Register (SAR) ADCs"*. IDSS Launch Event, MIT, 2016
- *"Defect Tolerance: Fundamental Limits and Examples"*. Center for Science of Information (CSoI) NSF Site Visit, Purdue University, 2016
- *"Defect Tolerance: Fundamental Limits and Examples"*. SONIC (Systems On Nanoscale Information fabriCs) Annual Review Meeting, University of Illinois at Urbana-Champaign, 2016
- *"Defect Tolerance: Fundamental Limits and Examples"*. North American School of Information Theory, UC San Diego, 2015

Awards and Honors

2022	**ISIT Best Student Paper Award Winner**
2022	MLSP Best Student Paper Award Winner
2017	Prof. Rahamimoff Travel Grant for Young Scientists, US-Israel BSF
2016	**Shannon Centennial Celebration Student Competition Winner**, Nokia Bell Labs
2013–2014	Irwin Mark Jacobs and Joan Klein Jacobs Presidential Fellowship, MIT *Fellowship for first year graduate students awarded to top candidates*
2013	G. David Forney Jr. Prize, Princeton University *Awarded for an outstanding record in the area of communication sciences, systems and signals*
2013	Tau Beta Pi Prize, Princeton University *Awarded for significant contribution to the School of Engineering and Applied Science*
2012–2013	Undergrad Channels Scholar, NSF Center for Science of Information

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Teaching Experience

Fall 2020	**Teaching Assistant for MIT 6.008: Introduction to Inference** (virtual class) *Prepared/gave recitations, office hours, prepared homework, prepare/graded exams* *Teaching Evaluations: Average 6.6/7.0, Median 7.0/7.0*
Spring 2020	**Graduate Instructor for MIT 6.041/6.431: Probabilistic Systems Analysis** *Lecturer for recitations, 2 classes each twice a week* *Prepared and graded exams* *(No teaching evaluations due to COVID)*
Fall 2019	**Teaching Assistant for MIT 6.008: Introduction to Inference** *Prepared/gave recitations, office hours, prepared homework, prepare/graded exams* *Teaching Evaluations: Average 6.8/7.0, Median 7.0/7.0*
Spring 2019	**Teaching Assistant for MIT 6.437: Inference and Information** *Prepared/gave recitations, office hours, prepared homework, prepare/graded exams* *Teaching Evaluations: Average 6.6/7.0, Median 7.0/7.0*
Fall 2018	**Teaching Assistant for MIT 6.439: Statistics, Computation and Applications** *Prepared and gave recitations, office hours, prepared and graded homework/exams* *Teaching Evaluations: Average 6.3/7.0, Median 7.0/7.0*
Summer 2017	**Mathematics Instructor for MIT Women's Technology Program** *Developed material (15 lectures and homework assignments) for exploratory summer math course for 40 high school girls* *Gave lectures, managed 3 teaching assistants*
Spring 2013	**Teaching Assistant for Princeton ELE 302: System Design and Analysis** *Work with students in course to build and design RC cars for specific functions*

Industry Experience

Summer 2020	**Search Team, Amazon.com, Inc.** *Applied Scientist Intern (Core AI)* – Applied machine learning to ordering search results
Summer 2019	**Analog Garage, Analog Devices, Inc.** *Research Intern* – Designed software algorithm for detecting noisy moving objects with LIDAR
Jun - Dec 2018	**Boston Bruins Hockey Analytics** *Intern and part-time employee* – Developed pipeline and machine learning models for data analysis
Summer 2013	**TripAdvisor LLC** *Software Engineering Intern* – Worked on internal tool for monitoring website traffic
Summer 2011	**Microsoft Corporation**, Microsoft Exchange Team *Software Developer Engineer Summer Intern* – Created folder prediction model

University and Professional Service

2022–2023	Reviewer for IEEE International Symposium on Information Theory
2023	Reviewer for IEEE Transactions on Signal Processing
2018–2023	Reviewer for IEEE Transactions on Information Theory
2016–2018	LIDS & Stats Tea Organizing Committee, MIT *Organized weekly chalk-talks given by students*
2016–2017	LIDS Student Conference Committee, MIT *Chair*
Spring 2016	EE Faculty Search Student Subcommittee, MIT *Met with faculty candidates and provided feedback*
2014–2016	Graduate Student Council, MIT *Off-Campus Housing Chair*
2013–2016	LIDS Student Committee, MIT *Social Committee Member*
2014–2015	EECS Graduate Student Association, MIT *Academic Chair*

Activities

2015–2022	MIT Women's Club Ice Hockey
2010–2013	Princeton Juggling Club *President* 2010–2011
2009–2013	Princeton Rubik's Cube Club *Officer*