Vincent Y. F. Tan

Department of Electrical and Computer Engineering
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National University of Singapore, Singapore 119077
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Research Interests

Information Theory, Statistical Signal Processing, Machine Learning

Education

Massachusetts Institute of Technology
Ph.D. in Electrical Engineering and Computer Science, February 2011
Thesis topic: Large-Deviations Analysis and Applications of Learning Tree-Structured Graphical Models (Jin-Au Kong Outstanding Thesis Prize)

Cambridge University
B.A. (Class 1), M.Eng. (Distinction) in Electrical and Information Sciences, July 2005
Thesis topic: Blind Audio Source Separation (Charles Lamb Prize)

Professional Experiences

Dean's Chair Associate Professor, Dept. of Electrical and Computer Engineering (ECE) and Dept. of Mathematics, National University of Singapore (NUS)
Jan 2019 - present. Teaching classes, advising graduate students, internal service

Associate Professor, Dept. of Electrical and Computer Engineering (ECE) and Dept. of Mathematics, National University of Singapore (NUS)
Jan 2018 - Dec 2018. Teaching classes, advising graduate students, internal service

Assistant Professor, Dept. of Mathematics, National University of Singapore (NUS)
Jul 2014 - Dec 2017. Teaching classes and advising graduate students

Assistant Professor, Dept. of Electrical and Computer Engineering (ECE), NUS
Jan 2014 - Dec 2017. Teaching classes and advising graduate students

Scientist, Data Analytics Dept., Institute for Infocomm Research (I^2R), Agency for Science, Technology and Research (A*STAR), Singapore
Feb 2012 - Dec 2013. Designing algorithms for analyzing high-dimensional data

Adjunct Assistant Professor, Dept. of ECE, NUS
Apr 2012 - Dec 2013. Teaching classes and advising graduate students

Post-Doctoral Researcher, Dept. of ECE, University of Wisconsin-Madison
Dec 2010 - Oct 2011. Worked with Prof. Stark Draper on information theoretic security, machine learning and coding theory

Graduate Research Assistant, Laboratory for Information and Decision Systems, Dept. of Electrical Engineering and Computer Science, Massachusetts Institute of Technology
Jan 2007 - Dec 2010. Advised by Prof. Alan Willsky and performed research in signal processing and machine learning, specifically in the learning of graphical models

Intern, E-Science Research Group, Microsoft Research Los Angeles, CA
Summer 2009. Worked with Dr. David Heckerman and Dr. Jonathan Carlson on machine learning techniques to infer structure and parameters of evolutionary trees

Intern, Machine Learning and Perception Group, Microsoft Research Cambridge U.K.
Summer 2008. Worked with Prof. Christopher Bishop, Dr. John Winn and clinician scientists in the University of Manchester, UK to apply Bayesian graphical modeling techniques to categorize childhood asthma classes automatically

Significant Grants

2022: Ministry of Education Tier 2 Grant "Learning Latent Structure of High-Dimensional

Data with Adversarial Training" (SGD $476,000)

2021: DESCARTES: A CREATE Program on AI-based Decision making in Critical Urban Systems, Workpackage 3: Optimization-Driven Hybrid AI (SGD $3,600,000)

2018: National Research Foundation (NRF) Fellowship "Fundamental Limits for Statistical Learning Algorithms" (SGD $2,060,000)

2017: NRF Cybersecurity R&D Programme Grant "Machine Learning, Robust Optimisation, and Verification: Creating Synergistic Capabilities in Cybersecurity" (SGD $379,000)

2017: Ministry of Education Tier 2 Grant "Nonnegative Matrix Factorization: Geometry, Privacy and Statistical Lower Bounds" (SGD $450,000)

2015: Ministry of Education Tier 2 Grant "Network Communication with Synchronization Errors: Fundamental Limits and Codes" (SGD $500,000)

2014: NUS Young Investigator Award for the project "An Information-Theoretic Understanding of Machine Learning Algorithms" (SGD $500,000)

Awards and Honors

2019-2021: Dean's Chair Associate Professorship

2019/2020 to 2020/2021: Engineering Educator Award

2020: IEEE Transactions on Signal Processing Outstanding Editor Award

2019: NUS Young Researcher Award

2018: IEEE Information Theory Society Distinguished Lecturer (2018/9)

2018: NUS Faculty of Engineering Young Researcher Award

2018: Singapore National Research Foundation (NRF) Fellowship (Class of 2018)

2017/8: NUS Faculty of Engineering Teaching Honors List

2014/5 to 2016/7: NUS Faculty of Engineering Teaching Commendation Award

2016: Finalist for the Singapore Young Scientist Award

2014: NUS Young Investigator Award

2014: Co-author of a paper shortlisted for the Best Student Paper Award of the IEEE Intl. Symposium on Information Theory (ISIT)

2011: Philip Yeo Prize for Outstanding Achievements in Research

2011: MIT EECS Jin-Au Kong Outstanding Doctoral Thesis Prize

2009: Student Travel Award for the IEEE Intl. Symposium on Information Theory

2006: A*STAR National Science Scholarship (Full funding for Ph.D. studies at MIT)

2005: Charles Lamb Prize: Top M.Eng. student in the Electrical and Information Sciences Tripos in Cambridge University

2001: Overseas Merit Scholarship, Public Service Commission (PSC) (Full funding for undergraduate studies at Cambridge University)

Recent Invited/ Keynote Talks

2022: Tutorial Speaker at the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)

2022: Plenary Speaker at the National Conference on Communications (NCC), IIT Bombay

2021: Tutorial Speaker at the International Symposium on Information Theory (ISIT)

2021: Invited Speaker at the Georgia Tech Machine Learning Seminar Series

2019: Invited speaker at the Low Rank Matrices and Applications (LRMA) Workshop in Mons, Belgium

2019: Invited speaker at the Iran Workshop on Comm. and Inform. Theory in Tehran

2019: Keynote speaker at the Taiwan Telecommunications Annual Meeting in Taichung

2019: Keynote speaker at the Australian Comms. Th. Workshop (AusCTW) in Sydney

Teaching Experiences

Instructor, EE2012A *Analytical Methods at NUS* (Spring 2022)

Instructor, MA3110, *Mathematical Analysis II* at Math (Fall 2019)

Instructor, MA6241, *Bandit Algorithms* at Math (Spring 2019)

Instructor, MA4270, *Data Modeling & Computation* at Math (Spring 2016–8)

Instructor, EE5137, *Stochastic Processes* at ECE (Fall 2017–8, Spring 2021–2)

Instructor, EE5138R, *Optimization for Comm. Systems* at ECE (Spring 2015)

Instructor, EE5139R, *Information Theory for Comm. Systems* at ECE (Fall 2014–6, Fall 2019)

Co-Instructor, EE5139R *Comm. Systems* at NUS (Fall 2012, Fall 2013)

Tutorials, EE2012 *Analytical Methods at NUS* (Fall 2006, Spring 2013)

Instructor, *Network Information Theory* at University of Wisconsin-Madison (Fall 2011)

Teaching Assistant, 6.437 *Inference and Information* at MIT

Teaching Assistant, 6.241 *Dynamic Systems and Control at MIT*

Publications

A full list of publications is given in Appendix A, or the following websites:
`https://vyftan.github.io/journal.html`
`https://vyftan.github.io/csconf.html`

Professional Activities

Senior Area Editor, *IEEE Transactions on Signal Processing* (2022–present)

Elected Member of the IEEE Information Theory Society Board of Governors (2021–present)

Technical Program Committee (TPC) Co-chair of the IEEE Information Theory Workshop, 2021

Lead Guest Editor, Special Issue on "Reinforcement and Online Learning" of the *IEEE Journal on Selected Areas in Information Theory* (2020–2021)

Assoc. Editor in Machine Learning and Statistics, *IEEE Transactions on Information Theory* (Feb 2020–present)

Assoc. Editor, *IEEE Transactions on Signal Processing* (2018–2022)

Guest Editor, Special Issue on "Information-Theoretic Methods in Data Acquisition, Analysis, and Processing" of the *IEEE Journal on Selected Topics in Signal Processing* (2017–2018)

Assoc. Editor, *IEEE Transactions on Green Comms. and Networking* (2016–2019)

Assoc. Editor, *IEEE Transactions on Communications* (2015–2018)

Member of the IEEE Machine Learning & Signal Processing Tech. Comm. (2012–2015)

Technical Program Committee Member for the following conferences

- IEEE Intl. Symposium on Information Theory (2013–present)
- IEEE Intl. Workshop on Machine Learning and Signal Processing (2013)
- IEEE Intl. Conference on Acoustics, Speech and Signal Processing (2013, 2014)

Conference Organization

Co-organized the "Beyond i.i.d. in information theory" workshop in NUS (2014, 2017)

Co-organized the "Mathematical Tools of Information-Theoretic Security" Merlion workshop in Paris (2015)

Internal/NUS Service

Chair of the University Midterm Advisory Report (MTAR) Committee for Science and Technology Disciplines (2020–present)

Member of the University Midterm Advisory Report (MTAR) Committee for Science and Technology Disciplines (2019–2020)

Member of the Faculty (of Engg.) Promotion & Tenure Committee (2018–present)

Coodinator of the ECE Department Search Committee (2018–present)

Graduate Students

Mr. WANG Shuche (PhD expected in 2025)
Mr. CHEN Zhirui (PhD expected in 2025)
Mr. SHI Yujun (PhD expected in 2025)
Mr. ZHANG Fengzhuo (PhD expected in 2024)
Mr. YANG Junwen (PhD expected in 2024)
Mrs ZHAO Jingyi (PhD expected in 2023)
Ms. PAN Jiachun (PhD expected in 2023)
Mr. YAN Hanshu (PhD expected in 2022)
Ms. HE Haiyun (PhD expected in 2022)

Mr. ZHU Qiuyu (PhD graduated in 2022)
Ms. ZHONG Zixin (PhD graduated in 2021)
Mr. CAO Daming (Exchange student from Southeast University China)
Mr. Boyd ANDERSON (PhD graduated in 2019)
Mr. ZHOU Lin (PhD graduated in 2018)
Mr. TRUONG Vinh Lan (PhD graduated in 2018)
Mr. LIU Zhaoqiang (PhD graduated in 2017)
Mr. LE Sy Quoc (PhD graduated in 2014)

Ms. Sandra TAN Shi Yun (M.Eng. graduated in 2020)
Mr. ZHAO Renbo (M.Sc. graduated in 2018.)

Appendix A: Vincent Y. F. Tan's Publications

Monographs

M1. Vincent Y. F. Tan, "Asymptotic Estimates in Information Theory with Non-Vanishing Error Probabilities" *Foundations and Trends on Communications and Information Theory*, vol. 11, no. 1-2, pp. 1 - 184, 2014

Journal Papers

The symbols * and † denote students and postdocs supervised by V. Y. F. Tan respectively.

J1. Nicolas Gillis, Le Thi Khanh Hien†, Valentin Leplat and Vincent Y. F. Tan, "Distributionally Robust and Multi-Objective Nonnegative Matrix Factorization", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2022+

J2. Yonglong Li†, Vincent Y. F. Tan, and Marco Tomamichel, "Optimal Adaptive Strategies for Sequential Quantum Hypothesis Testing", *Communications in Mathematical Physics*, 2022+

J3. Yuta Sakai† and Vincent Y. F. Tan, "On Smooth Rényi Entropies: A Novel Information Measure, One-Shot Coding Theorems, and Asymptotic Expansions", *IEEE Transactions on Information Theory*, Vol. 68, No. 3, Pages 1496 - 1531, Mar 2022

J4. Zexin Wang, Vincent Y. F. Tan, and Jonathan Scarlett, "Tight Regret Bounds for Noisy Optimization of a Brownian Motion", *IEEE Transactions on Signal Processing*, Vol. 70, Pages 1072 - 1087, Jan 2022

J5. Yuta Sakai†, Recep Can Yavas, and Vincent Y. F. Tan, "Third-Order Asymptotics of Variable-Length Compression Allowing Errors", *IEEE Transactions on Information Theory*, Vol. 67, No. 12, Pages 7708 - 7722, Dec 2021

J6. Zixin Zhong*, Wang Chi Cheung, and Vincent Y. F. Tan, "Thompson Sampling Algorithms for Cascading Bandits", *Journal of Machine Learning Research*, Vol. 22, No. 218, Pages 1 - 66, 2021

J7. Haiyun He*, Qiaosheng (Eric) Zhang†, and Vincent Y. F. Tan, "Optimal Change-Point Detection with Training Sequences in the Large and Moderate Deviations Regimes", *IEEE Transactions on Information Theory*, Vol. 67, No. 10, Pages 6758 - 6784, Oct 2021

J8. Sadaf Salehkalaibar, Mohammad Hossein Yassaee, Vincent Y. F. Tan, Mehrasa Ahmadipour "Covert Identification over Binary-Input Memoryless Channels", *IEEE Transactions on Information Theory*, Vol. 67, No. 9, Pages 5651 - 5673, Sep 2021

J9. Qiaosheng Zhang† and Vincent Y. F. Tan "Covert Identification over Binary-Input Memoryless Channels [Video]", *IEEE Transactions on Information Theory*, Vol. 67, No. 8, Pages 5387 - 5403, Aug 2021

J10. Sandra S. Y. Tan*, Antonios Varvitsiotis†, and Vincent Y. F. Tan, "Analysis of Optimization Algorithms via Sum-of-Squares", *Journal of Optimization Theory and Applications*, Vol. 190, Pages 56 - 81, Jul 2021

J11. Dana Lahat, Yanbin Lang*, Vincent Y. F. Tan, and Cédric Févotte, "Positive Semidefinite Matrix Factorization: A Connection with Phase Retrieval and Affine Rank Minimization", *IEEE Transactions on Signal Processing*, Vol. 69, Pages 3059 - 3074, Apr 2021

J12. Ting Cai†, Vincent Y. F. Tan, and Cd́ric Fv́otte, "Adversarially-Trained Nonnegative Matrix Factorization", *IEEE Signal Processing Letters*, Vol. 28, Pages 1415 - 1419, Jun 2021

J13. Mahdi Haghifam, Vincent Y. F. Tan, and Ashish Khisti "Sequential Classification with Empirically Observed Statistics", *IEEE Transactions on Information Theory*, Vol. 67, No. 5, Pages 3095–3113, May 2021

J14. Yonglong Li† and Vincent Y. F. Tan, "On the Capacity of Channels with Deletions and States", *IEEE Transactions on Information Theory*, Vol. 67, No. 5, Pages 2663–2679, May 2021

J15. Lei Yu† and Vincent Y. F. Tan, "On Non-Interactive Simulation of Binary Random Variables", *IEEE Transactions on Information Theory*, Vol. 67, No. 5, Pages 2528–2538, Apr 2021

J16. Qiaosheng Zhang[†] , Vincent Y. F. Tan, and Changho Suh, "Community Detection and Matrix Completion with Social and Item Similarity Graphs", *IEEE Transactions on Signal Processing*, Vol. 69, No. 12, Pages 917–931, Jan 2021

J17. Kang-Hee Cho, Si-Hyeon Lee and Vincent Y. F. Tan, "Throughput Scaling of Covert Communication over Wireless Adhoc Networks", *IEEE Transactions on Information Theory*, Vol. 66, No. 12, Pages 7684–7701, Dec 2020

J18. Anshoo Tandon[†], Vincent Y. F. Tan, Lav R. Varshney "The Bee-Identification Error Exponent with Absentee Bee", *IEEE Transactions on Information Theory*, Vol. 66, No. 12, Pages 7602–7614, Dec 2020

J19. Yuta Sakai[†] and Vincent Y. F. Tan, "Variable-Length Source Dispersions Differ Under Maximum and Average Criteria", *IEEE Transactions on Information Theory*, Vol. 66, No. 12, Pages 7565–7587, Dec 2020

J20. Anshoo Tandon[†], Vincent Y. F. Tan, Shiyao Zhu[*] "Exact Asymptotics for Learning Tree-Structured Graphical Models: Noiseless and Noisy Samples", *IEEE Journal on Selected Areas in Information Theory*, Vol. 1, No. 3, Pages 760–776, Nov 2020

J21. Yonglong Li[†] and Vincent Y. F. Tan, "Second-Order Asymptotics of Sequential Hypothesis Testing", *IEEE Transactions on Information Theory*, Vol. 66, No. 11, Pages 7222–7230, Nov 2020

J22. Yuta Sakai[†], Vincent Y. F. Tan, and Mladen Kovačević[†], "Second- and Third-Order Asymptotics of the Continuous-Time Poisson Channel", *IEEE Transactions on Information Theory*, Vol. 66, No. 8, Pages 4742–4760, Aug 2020

J23. Haiyun He[*], Lin Zhou[†], and Vincent Y. F. Tan, "Distributed Detection with Empirically Observed Statistics", *IEEE Transactions on Information Theory*, Vol. 66, No. 7, Pages 4349–4367, Jul 2020

J24. Lei Yu[†] and Vincent Y. F. Tan, "Corrections to "Wyner's Common Information under Rényi Divergence Measures" ", *IEEE Transactions on Information Theory*, Vol. 66, No. 4, Pages 2599–2608, Apr 2020

J25. Lei Yu[†] and Vincent Y. F. Tan, "On Exact and ∞-Rényi Common Informations", *IEEE Transactions on Information Theory*, Vol. 66, No. 6, Pages 3366–3406, Jun 2020

J26. Lei Yu[†] and Vincent Y. F. Tan, "Exact Channel Synthesis", *IEEE Transactions on Information Theory*, Vol. 66, No. 5, Pages 2299–2818, May 2020

J27. Lin Zhou[*], Vincent Y. F. Tan, and Mehul Motani, "Second-Order Asymptotically Optimal Statistical Classification", *Information and Inference: A Journal of the IMA*, Vol. 9, Issue 1, Pages 81–111, Mar 2020

J28. Daming Cao[*] and Vincent Y. F. Tan, "Exact Error and Erasure Exponents for the Asymmetric Broadcast Channel", *IEEE Transactions on Information Theory*, Vol. 66, No. 2, Pages 865 – 885, Feb 2020

J29. Daming Cao[*], Lin Zhou[*], and Vincent Y. F. Tan, "Strong Converse for Hypothesis Testing Against Independence over a Two-Hop Network", *Entropy*, Vol. 21, No. 12, Article 1171, Nov 2019 (Special Issue on Multiuser Information Theory II)

J30. Anshoo Tandon[†], Vincent Y. F. Tan, and Lav R. Varshney, "The Bee-Identification Problem: Bounds on the Error Exponent"", *IEEE Transactions on Communications*, Vol. 67, No. 11, Pages 7405 – 7416, Nov 2019

J31. Zhaoqiang Liu[*] and Vincent Y. F. Tan, "The Informativeness of k-means for Learning Mixture Models", *IEEE Transactions on Information Theory*, Vol. 65, No. 11, Pages 7460 – 7479, Nov 2019

J32. Ting-Yi Wu, Lav R. Varshney, and Vincent Y. F. Tan, "On the Throughput of Channels that Wear Out", *IEEE Transactions on Communications*, Vol. 67, No. 8, Pages 5311 – 5320, Aug 2019

J33. Lan V. Truong[*] and Vincent Y. F. Tan, "The Reliability Function of Lossy Source-Channel Coding of Variable-Length Codes with Feedback", *IEEE Transactions on Information Theory*, Vol. 65, No. 8, Pages 5028 – 5042, Aug 2019

J34. Lan V. Truong* and Vincent Y. F. Tan, "Moderate Deviation Asymptotics for Variable-Length Codes with Feedback", *IEEE Transactions on Information Theory*, Vol. 65, No. 7, Pages 4364 – 4386, Jul 2019

J35. Ling-Hua Chang, Po-Ning Chen, Vincent Y. F. Tan, Carol Wang†, and Yunghsiang S. Han, "On the Maximum Size of Block Codes Subject to a Distance Criterion", *IEEE Transactions on Information Theory*, Vol. 65, Mar 2019

J36. Lei Yu† and Vincent Y. F. Tan, "Simulation of Random Variables under Rényi Divergence Measures of All Orders", *IEEE Transactions on Information Theory*, Vol. 65, No. 6, Pages 3349 – 3383, Jun 2019

J37. Mladen Kovačević†, Carol Wang†, and Vincent Y. F. Tan, "Error-Free Communication over State-Dependent Channels with Variable-Length Feedback", *IEEE Transactions on Communication*, Vol. 67, No. 5, Pages 3182 – 3191, May 2019

J38. Atefeh Gilani, Selma Belhadj Amor†, Sadaf Salehkalaibar and Vincent Y. F. Tan, "Distributed Hypothesis Testing with Privacy Constraints", *Entropy*, Vol. 21, No. 5, Article 478, May 2019

J39. Vincent Y. F. Tan and Si-Hyeon Lee, "Time-Division is Optimal for Covert Communication over Some Broadcast Channels", *IEEE Transactions on Information Forensics and Security*, Vol. 14, No. 5, Pages 1377 – 1389, May 2019

J40. Lin Zhou*, Vincent Y. F. Tan, and Mehul Motani, "Refined Asymptotics for Rate-Distortion using Gaussian Codebooks for Arbitrary Sources", *IEEE Transactions on Information Theory*, Vol. 65, No. 5, Pages 3145 – 3159, May 2019

J41. Lin Zhou*, Vincent Y. F. Tan, and Mehul Motani, "The Dispersion of Universal Joint-Source Channel Coding for Arbitrary Sources and Additive Channels", *IEEE Transactions on Information Theory*, Vol. 65, No. 4, Pages 2234 – 2251, Apr 2019

J42. Lei Yu† and Vincent Y. F. Tan, "Rényi Resolvability and Its Applications to the Wiretap Channel", *IEEE Transactions on Information Theory*, Vol. 65, No. 3, Pages 1862 – 1897, Mar 2019

J43. Lei Yu† and Vincent Y. F. Tan, "Asymptotic Coupling and Its Applications in Information Theory", *IEEE Transactions on Information Theory*, Vol. 65, Vol. 65, No. 3, Pages 1321 – 1344, Mar 2019

J44. Silas L. Fong* and Vincent Y. F. Tan, "Strong Converse for Multimessage Networks with Tight Cut-Set Bounds", *Problems of Information Transmission (Problemy Peredachi Informatsii)*, Vol. 55, No. 1, Pages 67 – 100, Jan 2019

J45. Mladen Kovačević† and Vincent Y. F. Tan, "Asymptotically Optimal Codes Correcting Fixed-Length Duplication Errors in DNA Storage Systems", *IEEE Communication Letters*, Vol. 22, No. 11, Pages 2194 – 2197, Nov 2018

J46. Mine Alsan†, Ranjitha Prasad† and Vincent Y. F. Tan, "Lower Bounds on the Bayes Risk of the Bayesian BTL Model with Applications to Comparison Graphs", *IEEE Journal on Selected Topics in Signal Processing*, Vol. 12, No. 5, Pages 975 – 988, Oct 2018

J47. Lin Zhou*, Vincent Y. F. Tan, Lei Yu* and Mehul Motani, "Exponential Strong Converse for Content Identification with Lossy Recovery", *IEEE Transactions on Information Theory*, Vol. 64, No. 8, Pages 5879 – 5897, Aug 2018

J48. Mladen Kovačević† and Vincent Y. F. Tan, "Codes in the Space of Multisets–Coding for Permutation Channels with Impairments", *IEEE Transactions on Information Theory*, Vol. 64, No. 7, Pages 5156 – 5169, Jul 2018

J49. Lin Zhou*, Vincent Y. F. Tan and Mehul Motani, "Achievable Moderate Deviations Asymptotics for Streaming Slepian-Wolf Coding", *IEEE Transactions on Information Theory*, Vol. 64, No. 5, Pages 3756 – 3780, May 2018

J50. Vincent Y. F. Tan and Masahito Hayashi, "Analysis of Remaining Uncertainties and Exponents under Various Conditional Rényi Entropies", *IEEE Transactions on Information Theory*, Vol. 64, No. 5, Pages 3734 – 3755, May 2018

J51. Lei Yu* and Vincent Y. F. Tan, "Wyner's Common Information under Rényi Divergence Measures", *IEEE Transactions on Information Theory*, Vol. 64, No. 5, Pages 3616 – 3623, May 2018

J52. Lan V. Truong* and Vincent Y. F. Tan, "On Gaussian MACs with Variable-Length Feedback and Non-Vanishing Error Probabilities", *IEEE Transactions on Information Theory*, Vol. 64, No. 4, Pages 2333 – 2346, Apr 2018

J53. Jiachun Liao, Lalitha Sankar, Vincent Y. F. Tan, and Flavio du Pin Calmon, "Hypothesis Testing under Mutual Information Privacy Constraints in the High Privacy Regime", *IEEE Transactions on Information Forensics and Security*, Vol. 13, No. 4, pp. 1058 – 1071, Apr 2018

J54. Silas L. Fong†, Vincent Y. F. Tan and Ayfer Özgür, "On Achievable Rates of AWGN Energy-Harvesting Channels with Block Energy Arrival and Non-Vanishing Error Probabilities", *IEEE Transactions on Information Theory*, Vol. 64, No. 3, Pages 2038 – 2064, Mar 2018

J55. Renbo Zhao*, Vincent Y. F. Tan and William B. Haskell, "Stochastic L-BFGS Revisited: Improved Convergence Rates and Practical Acceleration Strategies", *IEEE Transactions on Signal Processing*, Vol. 66, No. 5, Pages 1155 – 1169, Mar 2018

J56. Masahito Hayashi and Vincent Y. F. Tan, "Minimum Rates of Approximate Sufficient Statistics", *IEEE Transactions on Information Theory*, Vol. 64, No. 2, pp. 875 – 888, Feb 2018

J57. Renbo Zhao* and Vincent Y. F. Tan, "A Unified Convergence Analysis of the Multiplicative Update Algorithm for Regularized NMF", *IEEE Transactions on Signal Processing*, Vol. 66, No. 1, pp. 129 – 138, Jan 2018

J58. Silas L. Fong† and Vincent Y. F. Tan, "A Proof of the Strong Converse Theorem for Gaussian Broadcast Channels via the Gaussian Poincaré Inequality", *IEEE Transactions on Information Theory*, Vol. 63, No. 12, pp. 7737 – 7746, Dec 2017

J59. Mladen Kovačević†, Miloš Stojaković, and Vincent Y. F. Tan, "Zero-Error Capacity of P-ary Shift Channels and FIFO Queues", *IEEE Transactions on Information Theory*, Vol. 63, No. 12, pp. 7698 – 7707, Dec 2017

J60. Christopher T. Chubb, Vincent Y. F. Tan and Marco Tomamichel, "Moderate Deviations Analysis for Classical Communication over Quantum Channels," *Communications in Mathematical Physics*, Vol. 355, No. 3, pp. 1283 – 1315, Nov 2017

J61. Silas L. Fong† and Vincent Y. F. Tan, "A Tight Upper Bound on the Second-Order Coding Rate for Parallel Gaussian Channels with Feedback", *IEEE Transactions on Information Theory*, Vol. 63, No. 10, pp. 6474 – 6486, Oct 2017

J62. Mladen Kovačević† and Vincent Y. F. Tan, "Improved Bounds on Sidon Sets via Lattice Packing of Simplices", *SIAM Journal on Discrete Mathematics*, Vol. 31, No. 3, pp. 2269 – 2278, Sep 2017

J63. Zhaoqiang Liu* and Vincent Y. F. Tan, "Rank-One NMF-Based Initialization for NMF and Relative Error Bounds under a Geometric Assumption", *IEEE Transactions on Signal Processing*, Vol. 65, No. 18, pp. 4717 – 4731, Sep 2017

J64. Silas L. Fong† and Vincent Y. F. Tan, "Scaling Exponent and Moderate Deviations Asymptotics of Polar Codes for the AWGN Channel", *Entropy*, Vol. 19, No. 7, Article 364, Jul 2017

J65. Silas L. Fong† and Vincent Y. F. Tan, "Achievable Rates for Gaussian Degraded Relay Channels with Non-Vanishing Error Probabilities", *IEEE Transactions on Information Theory*, Vol. 63, No. 7, pp. 4183 – 4201, Jul 2017

J66. Lin Zhou*, Vincent Y. F. Tan, and Mehul Motani, "Second-Order and Moderate Deviation Asymptotics for Successive Refinement", *IEEE Transactions on Information Theory*, Vol. 63, No. 5, pp. 2896 – 2921, May 2017

J67. Si-Hyeon Lee, Vincent Y. F. Tan, and Ashish Khisti, "Exact Moderate Deviation Asymptotics for Streaming Data Transmission", *IEEE Transactions on Information Theory*, Vol. 63, No. 5, pp. 2726 – 2736, May 2017

J68. Eldho K. Thomas†, Vincent Y. F. Tan, Alexander Vardy and Mehul Motani, "Polar Coding for the Binary Erasure Channel with Deletions", *IEEE Communication Letters*, Vol. 21, No. 4, pp. 710 – 713, Apr 2017

J69. Changho Suh, Vincent Y. F. Tan, and Renbo Zhao*, "Adversarial Top-K Ranking", *IEEE Transactions on Information Theory*, Vol. 63, No. 4, pp. 2201 – 2225, Apr 2017

J70. Lin Zhou*, Vincent Y. F. Tan, and Mehul Motani "Discrete Lossy Gray-Wyner Revisited: Second-Order Asymptotics, Large and Moderate Deviations", *IEEE Transactions on Information Theory*, Vol. 63, No. 3, pp. 1766 - 1791, Mar 2017

J71. Lan V. Truong*, Silas L. Fong† and Vincent Y. F. Tan, "On Gaussian Channels with Feedback under Expected Power Constraints and with Non-Vanishing Error Probabilities", *IEEE Transactions on Information Theory*, Vol. 63, No. 3, pp. 1746 - 1765, Mar 2017

J72. Masahito Hayashi and Vincent Y. F. Tan, "Equivocations, Exponents and Second-Order Coding Rates under Various Rényi Information Measures", *IEEE Transactions on Information Theory*, Vol. 63, No. 2, pp. 975 - 1005, Feb 2017

J73. Renbo Zhao* and Vincent Y. F. Tan, "Online Nonnegative Matrix Factorization with Outliers", *IEEE Transactions on Signal Processing*, Vol. 65, No. 3, pp. 555 - 570, Feb 2017

J74. Jonathan Scarlett, Vincent Y. F. Tan, and Giuseppe Durisi, "The Dispersion of Nearest-Neighbor Decoding for Additive Non-Gaussian Channels", *IEEE Transactions on Information Theory* Vol. 62, No. 12, pp. 81 - 92, Jan 2017

J75. Si-Hyeon Lee, Vincent Y. F. Tan and Ashish Khisti, "Streaming Data Transmission in the Moderate Deviations and Central Limit Regimes", *IEEE Transactions on Information Theory*, Vol. 62, No. 12, pp. 6816 - 6830, Dec 2016

J76. Silas L. Fong† and Vincent Y. F. Tan, "On the Scaling Exponent of Polar Codes for Binary-Input Energy-Harvesting Channels," *IEEE Journal of Selected Areas in Communications*, Vol. 34, No. 12, pp. 3540 - 3551, Dec 2016

J77. Silas L. Fong† , Vincent Y. F. Tan and Jing Yang, "Non-Asymptotic Achievable Rates for Energy-Harvesting Channels using Save-and-Transmit," *IEEE Journal of Selected Areas in Communications*, Vol. 34, No. 12, pp. 3499 - 3511, Dec 2016

J78. Silas L. Fong† and Vincent Y. F. Tan, "Strong Converse Theorems for Classes of Multimessage Multicast Networks: A Renyi Divergence Approach," *IEEE Transactions on Information Theory*, Vol. 62, No. 9, pp. 4953 - 4967, Sep 2016

J79. Silas L. Fong† and Vincent Y. F. Tan, "A Proof of the Strong Converse Theorem for Gaussian Multiple Access Channels," *IEEE Transactions on Information Theory*, Vol. 62, No. 8, pp. 4376 - 4394, Aug 2016

J80. Jonathan M. Carlson, Victor Y. Du, Nico Pfeifer, Anju Bansal, Vincent Y. F. Tan, Karen Power, Chanson J. Brumme, Anat Kreimer, Charles E. DeZiel, Nicolo Fusi, Malinda Schaefer, Mark A. Brockman, Jill Gilmour, Matt A. Price, William Kilembe, Richard Haubrich, Mina John, Simon Mallal, Roger Shapiro, John Frater, P. Richard Harrigan, Thumbi Ndung'u, Susan Allen, David Heckerman, John Sidney, Todd M. Allen, Philip J. R. Goulder, Zabrina L. Brumme, Eric Hunter, Paul A. Goepfert, "Impact of Pre-Adapted HIV Transmission", *Nature Medicine*, Vol. 22, No. 6, pp. 606 - 613, Jun 2016

J81. Fan Cheng† and Vincent Y. F. Tan, "A Numerical Study on the Wiretap Network with a Simple Network Topology", *IEEE Transactions on Information Theory*, Vol. 62, No. 5, pp. 2481 - 2492, May 2016

J82. Jonathan Scarlett and Vincent Y. F. Tan, "Second-Order Asymptotics for the Gaussian MAC with Degraded Message Sets", *IEEE Transactions on Information Theory*, Vol. 61, No. 12, pp. 6700 - 6718, Dec 2015

J83. Masahito Hayashi and Vincent Y. F. Tan, "Asymmetric Evaluations of Erasure and Undetected Error Probabilities" *IEEE Transactions on Information Theory*, Vol. 61, No. 12, pp. 6560 - 6577, Dec 2015

J84. Yanina Shkel, Vincent Y. F. Tan and Stark C. Draper, "Unequal Message Protection: Asymptotic and Non-Asymptotic Tradeoffs", *IEEE Transactions on Information Theory*, Vol. 61, No. 10, pp. 5396 - 5416, Oct 2015

J85. Vincent Y. F. Tan and Matthieu R. Bloch, "Information Spectrum Approach to Strong Converse Theorems for Degraded Wiretap Channels", *IEEE Transactions on Information Forensics and Security*, Vol. 10, No. 9, pp. 1891 - 1904, Sep 2015

J86. Marco Tomamichel and Vincent Y. F. Tan, "Second-Order Asymptotics for the Classical Capacity of Image Additive Quantum Channels," *Communications in Mathematical Physics*, Vol. 338, No. 1, pp. 103 - 137, Aug 2015

J87. Sy-Quoc Le*, Vincent Y. F. Tan and Mehul Motani, "A Case Where Interference Does Not Affect the Channel Dispersion," *IEEE Transactions on Information Theory*, Vol. 61, No. 5, pp. 2439 - 2453, May 2015

J88. Vincent Y. F. Tan and Marco Tomamichel, "The Third-Order Term in the Normal Approximation for the AWGN Channel," *IEEE Transactions on Information Theory*, Vol. 61, No. 5, pp. 2430 - 2438, May 2015

J89. Shun Watanabe, Shigeaki Kuzuoka and Vincent Y. F. Tan, "Non-Asymptotic and Second-Order Achievability Bounds for Coding With Side-Information," *IEEE Transactions on Information Theory*, Vol. 61, No. 4, pp. 1574 - 1605, Apr 2015

J90. Vincent Y. F. Tan, "On the Reliability Function of the Discrete Memoryless Relay Channel," *IEEE Transactions on Information Theory*, Vol. 61, No. 4, pp. 1550 - 1573, Apr 2015

J91. Tzu-Han Chou, Vincent Y. F. Tan and Stark C. Draper, "The Sender-Excited Secret-Key Agreement Model: Capacity, Reliability and Secrecy Exponents," *IEEE Transactions on Information Theory*, Vol. 61, No. 1, pp. 609 - 627, Jan 2015

J92. Hong Cao, Vincent Y. F. Tan and John Z. F. Pang, "A Parsimonious Mixture of Gaussian Trees Model for Oversampling in Imbalanced and Multi-Modal Time-Series Classification" *IEEE Transactions on Neural Networks and Learning Systems*, Vol. 25, No. 12, pp. 2226 - 2239, Dec 2014

J93. Marco Tomamichel and Vincent Y. F. Tan, "Second-Order Coding Rates for Channels with State," *IEEE Transactions on Information Theory*, Vol. 60, No. 8, pp. 4427 - 4448, Aug 2014

J94. Vincent Y. F. Tan, "A Formula for the Capacity of the General Gel'fand-Pinsker Channel" *IEEE Transactions on Communications*, Vol. 62, No. 6, pp. 1857 - 1870, Jun 2014

J95. Vincent Y. F. Tan and George K. Atia, "Strong Impossibility Results for Sparse Signal Processing," *IEEE Signal Processing Letters*, Vol. 21, No. 3, pp. 260 - 264, Mar 2014

J96. Vincent Y. F. Tan and Oliver Kosut, "On the Dispersions of Three Network Information Theory Problems," *IEEE Transactions on Information Theory*, Vol. 60, No. 2, pp. 883 - 903, Feb 2014

J97. Marco Tomamichel and Vincent Y. F. Tan, "A Tight Upper Bound for the Third-Order Asymptotics for Most Discrete Memoryless Channels," *IEEE Transactions on Information Theory*, Vol. 59, No. 11, pp. 7041 - 7051, Nov 2013

J98. Gang Yang, Vincent Y. F. Tan, Chin Keong Ho, See Ho Ting and Yong Liang Guan, "Wireless Compressive Sensing for Energy Harvesting Sensor Nodes over Fading Channels," *IEEE Transactions on Signal Processing*, Vol. 61, No. 18, pp. 4491 - 4505, Sep 2013

J99. Vincent Y. F. Tan and Cédric Févotte, "Automatic Relevance Determination in Nonegative Matrix Factorization with the β-Divergence," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol. 35, No. 7, pp. 1592 - 1605, Jul 2013

J100. Animashree Anandkumar, Vincent Y. F. Tan, Furong Huang and Alan S. Willsky, "High-Dimensional Gaussian Graphical Model Selection: Walk Summability and Local Separation Criterion," *Journal of Machine Learning Research*, Vol. 13, pp. 2293 - 2337, Aug 2012

J101. Animashree Anandkumar, Vincent Y. F. Tan, Furong Huang and Alan S. Willsky, "High-Dimensional Structure Estimation of Ising Models: Local Separation Criterion," *Annals of Statistics*, Vol. 40, No. 3, pp. 1346 - 1375, 2012

J102. Jonathan M. Carlson, Jennifer Listgarten, Nico Pfeifer, Vincent Y. F. Tan, Carl Kadie, Bruce D. Walker, Thumbi Ndung'u, Roger Shapiro, John Frater, Zabrina L. Brumme, Philip J. R. Goulder, David Heckerman, "Widespread Impact of HLA Restriction on Immune Control and Escape Pathways in HIV-1" *Journal of Virology*, Vol. 86, No. 9, pp. 5230 - 5243, May 2012.

J103. Vincent Y. F. Tan, Laura Balzano and Stark C. Draper, "Rank Minimization over Finite Fields: Fundamental Limits and Coding-Theoretic Interpretations," *IEEE Transactions on Information Theory*, Vol. 58, No. 4, pp. 2018 - 2039, Apr 2012

J104. Myung Jin Choi, Vincent Y. F. Tan, Animashree Anandkumar and Alan S. Willsky, "Learning Latent Tree Graphical Models," *Journal of Machine Learning Research*, Vol. 12, pp. 1771 - 1812, May 2011

J105. Vincent Y. F. Tan, Animashree Anandkumar and Alan S. Willsky, "Learning High-Dimensional Markov Forest Distributions: Analysis of Error Rates," *Journal of Machine Learning Research*, Vol. 12, pp. 1617 - 1653, May 2011

J106. Vincent Y. F. Tan, Animashree Anandkumar, Lang Tong and Alan S. Willsky, "A Large-Deviation Analysis of the Maximum-Likelihood Learning of Markov Tree Structures," *IEEE Transactions on Information Theory*, Vol. 57, No. 3, pp. 1714 - 1735, Mar 2011

J107. Vincent Y. F. Tan, Sujay Sanghavi, John W. Fisher III and Alan S. Willsky, "Learning Graphical Models for Hypothesis Testing and Classification," *IEEE Transactions on Signal Processing*, Vol. 58, No. 11, pp. 5481 - 5495, Nov 2010

J108. Angela Simpson[@], Vincent Y. F. Tan[@], John Winn, Markus Svensen, Chris Bishop, David Heckerman, Iain Buchan and Adnan Custovic, "Beyond Atopy: Multiple Patterns of Sensitization in Relation to Asthma in a Birth Cohort Study," *American Journal of Respiratory and Critical Care Medicine*, Vol. 181, pp. 1200 - 1206, Jun 2010 ([@]Co-first Authorship)

J109. Vincent Y. F. Tan, Animashree Anandkumar and Alan S. Willsky, "Learning Gaussian Tree Models: Analysis of Error Exponents and Extremal Structures," *IEEE Transactions on Signal Processing*, Vol. 58, No. 5, pp. 2701 - 2714, May 2010

J110. Vincent Y. F. Tan and Vivek K. Goyal, "Estimating Signals with Finite Rate of Innovation from Noisy Samples: A Stochastic Algorithm," *IEEE Transactions on Signal Processing*, Vol. 56, No. 10, pp. 5135 - 5145, Oct 2008

Highly-Selective Computer Science Conference Papers

C1. Yujun Shi*, Kuangqi Zhou, Jian Liang, Zihang Jiang, Jiashi Feng, Philip Torr, Song Bai, and Vincent Y. F. Tan, "Mimicking the Oracle: An Initial Phase Decorrelation Approach for Class Incremental Learning", *Proc. of the Conference on Computer Vision and Pattern Recognition (CVPR)*, New Orleans, USA, Jun 2022

C2. Jiawei Du*, Hanshu Yan*, Jiashi Feng, Joey Tianyi Zhou, Liangli Zhen, Rick Siow Mong Goh, and Vincent Y. F. Tan, "Efficient Sharpness-aware Minimization for Improved Training of Neural Networks", *Proc. of the 10th International Conference on Learning Representations (ICLR)*, Virtual, Apr 2022

C3. Joel Q. L. Chang* and Vincent Y. F. Tan, "A Unifying Theory of Thompson Sampling for Continuous Risk-Averse Bandits", *Proc. of the 36th AAAI Conference on Artificial Intelligence (AAAI)*, Vancouver, BC, Canada, Feb 2022 (Oral Presentation)

C4. Fengzhuo Zhang* and Vincent Y. F. Tan, "Robustifying Latent Tree Learning Algorithms with Vector Variables', *Proc. of the 35th Annual Conference on Neural Information Processing Systems (NeurIPS)*, Virtual, Dec 2021

C5. Zixin Zhong*, Wang Chi Cheung and Vincent Y. F. Tan, "Probabilistic Sequential Shrinking: A Best Arm Identification Algorithm for Stochastic Bandits with Corruption", *Proc. of the 38th International Conference on Machine Learning (ICML)*, Virtual, Jul 2021

C6. Hanshu Yan*, Jingfeng Zhang, Gang Niu, Jiashi Feng, Vincent Y. F. Tan, and Masashi Sugiyama, "CIFS: Improving Adversarial Robustness of CNNs via Channel-wise Importance-based Feature Selection", *Proc. of the 38th International Conference on Machine Learning (ICML)*, Virtual, Jul 2021

C7. Anshoo Tandon†, Aldric J. Y. Han*, and Vincent Y. F. Tan, "SGA: A Robust Algorithm for Partial Recovery of Tree-Structured Graphical Models with Noisy Samples", *Proc. of the 38th International Conference on Machine Learning (ICML)*, Virtual, Jul 2021

C8. Qiuyu Zhu* and Vincent Y. F. Tan, "Thompson Sampling Algorithms for Mean-Variance Bandits", *Proc. of the 37th International Conference on Machine Learning (ICML)*, Vienna, Austria, Jul 2020

C9. Zixin Zhong*, Wang Chi Cheung, and Vincent Y. F. Tan, "Best Arm Identification for Cascading Bandits in the Fixed Confidence Setting", *Proc. of the 37th International Conference on Machine Learning (ICML)*, Vienna, Austria, Jul 2020

C10. Saurabh Khanna† and Vincent Y. F. Tan, "Economy Statistical Recurrent Units for Inferring Nonlinear Granger Causality", *International Conference on Learning Representations (ICLR)*, Addis Ababa, Ethiopia, 2020

C11. Hanshu Yan*, Jiawei Du, Vincent Y. F. Tan, and Jiashi Feng, "On Robustness of Neural Ordinary Differential Equations", *International Conference on Learning Representations (ICLR)*, Addis Ababa, Ethiopia, 2020 (Spotlight)

C12. Boyd Anderson*, Mingqian Shi, Vincent Y. F. Tan and Wang Ye, "Mobile Gait Analysis using Foot-Mounted UWB Sensors", *Proc. of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, Vol. 3, Issue 3, Sep 2019

C13. Rui Xia*, Vincent Y. F. Tan, Louis Filstroff, and Cédric Févotte"A Ranking Model Motivated by NMF with Applications to Tennis Tournaments", *Proc. of European Conference on Machine Learning (ECML/PKDD)*, 2019

C14. Wang Chi Cheung, Vincent Y. F. Tan, and Zixin Zhong* "A Thompson Sampling Algorithm for Cascading Bandits", *International Conference on Artificial Intelligence and Statistics (AISTATS)*, Naha, Okinawa, Japan, 2019 (Oral Presentation)

C15. Renbo Zhao*, William B. Haskell, and Vincent Y. F. Tan, "An Optimal Algorithm for Stochastic Three-Composite Optimization", *International Conference on Artificial Intelligence and Statistics (AISTATS)*, Naha, Okinawa, Japan, 2019

C16. Boyd Anderson*, Shenggao Zhu, Ke Yang, Jian Wang, Hugh Anderson, Chao Xu Tay*, Vincent Y. F. Tan, and Wang Ye "MANA: Designing And Validating A User-Centered Mobility Analysis System", *Proc. of the 20th Intl. ACM SIGACCESS Conference on Computers and Accessibility (ASSETS)*, Galway, Ireland 2018

C17. Lei Yu† and Vincent Y. F. Tan, "Rényi Resolvability and Its Applications to the Wiretap Channel", *Proc. of the 10th Intl. Conference on Information Theoretic Security (ICITS)*, Hong Kong, 2017

C18. Renbo Zhao*, William B. Haskell, and Vincent Y. F. Tan, "Stochastic L-BFGS Revisited: Improved Convergence Rates and Practical Acceleration Strategies", *Proceedings of the Uncertainty in Artificial Intelligence (UAI) Conference*, Sydney, Australia, 2017

C19. Renbo Zhao*, Vincent Y. F. Tan, and Huan Xu "Online Nonnegative Matrix Factorization with General Divergences", *International Conference on Artificial Intelligence and Statistics (AISTATS)*, Fort Lauderdale, FL, 2017

C20. Animashree Anandkumar, Vincent Y. F. Tan, and Alan S. Willsky, "High-Dimensional Graphical Model Selection: Tractable Graph Families and Necessary Conditions", *Proc. of the Neural Information Processing Systems (NIPS)*, Granada, Spain, 2011