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# 1 General Information

## 1.1 Academic Qualifications

- **Ph.D.** in Electrical Engineering and Computer Science, 2008  
Massachusetts Institute of Technology, USA  
Topic: Decentralized Detection in Resource-limited Sensor Network Architectures  
Advisors: John Tsitsiklis and Moe Z. Win
- **MS** in Electrical Engineering, 2002  
Stanford University, USA
- **BS** in Mathematics and Electrical Engineering with *distinction*, 2002  
Stanford University, USA

## 1.2 Awards and Honors

- **Outstanding Editorial Board Member Award**, 2023.  
IEEE Transactions on Signal and Information Processing Over Networks.
- **Excellent Paper Award**, International Conference on Smart Power & Internet Energy Systems, 2022.
- **IEEE Signal Processing Society Young Author Best Paper Award**, 2016.  
Awarded with Jack Ho. I am a co-author of the paper and the main supervisor of Jack.
- **Early Career Teaching Excellence Award**, 2016.  
School of Electrical and Electronic Engineering, Nanyang Technological University. In recognition of tenure-track assistant professors who have consistently demonstrated excellent teaching.
- **Tan Chin Tuan Exchange Fellowship in Engineering**, 2015.
- **Best Student Paper Award**, 46th Asilomar Conference on Signals, Systems, and Computers, 2012.  
The Asilomar Conference on Signals, Systems, and Computers is a prestigious conference in signal processing and computer systems, and is technically co-sponsored by the IEEE Signal Processing Society.
- **Frederick Emmons Terman Engineering Scholastic Award, Stanford University**, 2002.  
Awarded to the top engineering students.
- **President's Award, Stanford University**, 1999.  
Awarded to top students for academic excellence.

## 1.3 Work Experience

- Sep. 2023 – present, Professor of Signal and Information Processing, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore
- Sep. 2017 – Aug. 2023, Associate Professor (with tenure), School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore
- Mar. 2010 – Aug. 2017, Assistant Professor, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore
- Oct. 2008 – Mar. 2010, Associate, Quantitative Strategy, Morgan Stanley Asia Limited, Hong Kong
- Feb. 2008 – Sep. 2008, Associate, Quantitative Credit Research, Lehman Brothers Asia Limited
- Sep. 2004 – Dec. 2007, Research Assistant/Teaching Assistant, Massachusetts Institute of Technology
- Aug. 2002 – Jul. 2004, Various industry/academic positions due to scholarship bond, Singapore/US

## 1.4 Consulting Experience

- Apr. 2010 – Mar. 2012, Financial Modelling, Morgan Stanley Asia Limited

## 1.5 Professional Memberships

- Senior Member, IEEE

# 2 Research Activities

## 2.1 Ongoing Research Grants

- PI, “Generalized Message Passing for Federated Learning in Multi-Access Edge Computing”, Future Communications Program, Jun. 2022 – May 2025, S\$461,538
- PI, “Project Ananke2: Aerial-Ground Place Recognition for Drones”, DSO National Laboratories, Jul. 2024 – Dec. 2024, S\$50,000

## 2.2 Completed Research Grants

- PI, “Project LOCUS: RF Localization Using Donor Signals”, DSO National Laboratories, Sep. 2022 – Nov. 2024, S\$499,999.50
- PI, “Graph Signal Processing for High Dimensional Structures and Spaces”, Ministry of Education Academic Research Fund Tier 2, Nov. 2021 – Oct. 2024, S\$567,972
- PI, “Project Ananke: Robust Multi-Modal Neural Diffusion for Light-Weight Drone Perception”, DSO National Laboratories, Jul. 2023 – Jun. 2024, S\$100,000
- PI, “5G-V2X Communication Trial and Use Cases Development”, M1 Limited, Jan. 2020 – Dec. 2023, S\$98,040
- PI, “Next-Generation V2X Network Architecture and Ecosystem for Smart Mobility”, A\*Star Industry Alignment Fund - Pre Positioning (IAF-PP), Nov. 2019 – Oct. 2023, S\$21,240,000
- Co-PI, “Design and Reinforcement Security on Smart Grids Against Cyber-Physical Attack”, NRF, Oct. 2019 – Mar. 2023, S\$271,700 (total grant: S\$997,460)
- PI, “End to End Learned Localization for AV”, NRF/Continental Corp Lab/NTU, Dec. 2019 – Nov. 2022, S\$595,909
- PI, “Research and Applications of 5G-V2X Communication and Computing”, NI Singapore Ltd, Oct. 2020 – Oct. 2022, S\$120,000
- PI, “Decentralized Privacy for the Internet of Things: Theory and Algorithms”, Ministry of Education Academic Research Fund Tier 2, May 2019 – Jul. 2022, S\$568,512
- PI, “Energy Efficient Resilient Distributed Inference”, NRF/Delta Electronics Corp Lab/NTU, Jul. 2016 – Aug. 2020, S\$434,600
- Co-PI, “Outdoor Geo-Localization and Navigation Using DVB and LTE Signals-of-Opportunity in GPS-denied Environments”, Ministry of Defence, Aug. 2018 – Aug. 2020, S\$300,000 (total grant: S\$1,200,000)
- PI, “Relative Positions Determination Using Communication Signals”, Defence Science Organization National Laboratories, Aug. 2018 – Apr. 2020, S\$479,159
- Co-PI, “Development of NTU/NXP-Intelligent Transport System Test-Bed”, Economic Development Board, Dec. 2014 – Nov. 2019, S\$2,568,300 (total grant: S\$14,098,000)

- PI, “Fake News Detection: A Graph Signal Processing And Learning Approach”, Ministry of Education Academic Research Fund Tier 1, Nov. 2017 – Jul. 2019, S\$80,000
- Co-PI, “Project Moscato: A Holistic Approach to Combatting Insider Threats”, Ministry of Defence, Dec. 2015 – Jun. 2019, S\$308,000 (total grant: S\$4,762,600)
- Co-PI, “UWB Based Collaborative Decentralised Localisation”, NRF/ST Dynamics Corp Lab/NTU, Jul. 2015 – Jun. 2019, S\$427,400 (total grant: S\$1,187,000)
- Co-PI, “Feasibility Study of Multi-Function Millimeter-Wave RaCoPo System”, Huawei International Pte. Ltd., Oct. 2017 – Apr. 2019, S\$148,944 (total grant: S\$417,600)
- PI, “Multi-Target Track Before Detect On TDOA-FDOA Based Measurements”, Defence Science Organization National Laboratories, Mar. 2015 – Feb. 2016, S\$100,000
- PI, “Robust Learning in Social Networks: Fundamental Limits and Strategies”, Ministry of Education Academic Research Fund Tier 2, Jan. 2015 – Jun. 2018, S\$652,998
- PI, “Identifying Infection Sources in a Network”, Ministry of Education Academic Research Fund Tier 2, Apr. 2014 – Mar. 2017, S\$507,593
- Co-PI, “Project Urban-Nav: Urban Outdoor Navigation of Unmanned Platform under a GPS Challenged Environment”, Defence Research and Technology Office, Dec. 2013 – Feb. 2017, S\$223,000 (total grant: S\$1,854,000)
- PI, “GPS Free TDOA/FDOA Geolocation and Tracking II”, Defence Science Organization National Laboratories, Mar. 2013 – Nov. 2015, S\$236,500
- PI, “Project Technifibre: Cooperative and Distributed Tracking in Urban Environments”, Defence Science and Technology Agency, May 2012 – May 2015, S\$622,725
- PI, “Intelligent Information Fusion and Inference in Sensor Networks”, Ministry of Education Academic Research Fund Tier 1, Mar. 2011 – Feb. 2014, S\$100,000
- PI, “UWB Monitoring System for Sleep Studies”, Nanyang Institute of Technology in Health and Medicine, Jul. 2011 – Jan. 2013, S\$70,000
- PI, “GPS Free TDOA/FDOA Geolocation and Tracking”, Defence Research and Technology Office, Nov. 2011 – Nov. 2012, S\$65,200
- PI, “Distributed Signal Processing and Algorithms for Decentralized Decision Making and Computation in Sensor Networks”, NTU Startup Grant, Mar. 2010 – Mar. 2013, S\$100,000

## 2.3 Published/Accepted Journal Papers

- J1. Y. Yuan, W. Li, Y. Liang, W. P. Tay, W. Gao, and F. Shen, “Lane-aware dynamic spatio-temporal transformer for unimodal trajectory prediction,” *IEEE Transactions on Intelligent Vehicles*, 2024, in press
- J2. S. Wang, Q. Kang, R. She, K. Zhao, Y. Song, and W. P. Tay, “PRFusion: Toward effective and robust multi-modal place recognition with image and point cloud fusion,” *IEEE Transactions on Intelligent Transportation Systems*, vol. 25, no. 12, pp. 20 523 – 20 534, 2024
- J3. F. Ji, X. Jian, and W. P. Tay, “Modeling sparse graph sequences and signals using generalized graphons,” *IEEE Transactions on Signal Processing*, vol. 72, pp. 5048 – 5064, 2024
- J4. L. Yiqi, F. Ji, and W. P. Tay, “Heterogeneous graph adaptive flow network,” *Transactions on Machine Learning Research*, 2024. [Online]. Available: <https://openreview.net/forum?id=usvg3yhjAx>
- J5. X. Ran, W. P. Tay, and C. H. T. Lee, “Robust data-driven adversarial false data injection attack detection method with deep Q-network in power systems,” *IEEE Transactions on Industrial Informatics*, vol. 20, no. 8, pp. 10 405 – 10 418, 2024

- J6. X. Liu, Y. Yuan, T. Zhang, G. Cui, and W. P. Tay, "Integrated transmit waveform and RIS phase shift design for LPI detection and communication," *IEEE Transactions on Wireless Communications*, vol. 23, no. 6, pp. 5663 – 5679, Jun. 2024
- J7. X. Jian, W. P. Tay, and Y. Eldar, "Kernel based reconstruction for generalized graph signal processing," *IEEE Transactions on Signal Processing*, vol. 72, pp. 2308 – 2322, 2024
- J8. A. Darendeli, A. Sun, and W. P. Tay, "The geography of corporate fake news," *PLOS ONE*, vol. 19, no. 4, pp. 1 – 28, Apr. 2024
- J9. Q. Kang, W. P. Tay, R. She, S. Wang, X. Liu, and Y.-R. Yang, "Multi-armed linear bandits with latent biases," *Information Sciences*, vol. 660, p. 120103, 2024
- J10. R. She, Q. Kang, S. Wang, W. P. Tay, K. Zhao, Y. Song, T. Geng, Y. Xu, D. N. Navarro, and A. Hartmannsgruber, "PointDiffomer: Robust point cloud registration with neural diffusion and transformer," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 62, pp. 1 – 15, 2024
- J11. R. She, Q. Kang, S. Wang, Y.-R. Yang, K. Zhao, Y. Song, and W. P. Tay, "RobustMat: Neural diffusion for street landmark patch matching under challenging environments," *IEEE Transactions on Image Processing*, vol. 32, pp. 5550 – 5563, 2023
- J12. R. She, Q. Kang, S. Wang, W. P. Tay, Y. L. Guan, D. N. Navarro, and A. Hartmannsgruber, "Image patch-matching with graph-based learning in street scenes," *IEEE Transactions on Image Processing*, vol. 32, pp. 3465 – 3480, 2023
- J13. F. Ji, W. P. Tay, and A. Ortega, "Graph signal processing over a probability space of shift operators," *IEEE Transactions on Signal Processing*, vol. 71, pp. 1159 – 1174, 2023
- J14. W. Zhang, Z. Wang, and W. P. Tay, "Approximate maximum-likelihood RIS-aided positioning," *IEEE Transactions on Wireless Communications*, vol. 22, no. 12, pp. 8859 – 8875, Dec. 2023
- J15. H. Cheng, J. T. Zhou, W. P. Tay, and B. Wen, "Graph neural networks with triple attention for few-shot learning," *IEEE Transactions on Multimedia*, vol. 25, pp. 8225 – 8239, 2023
- J16. X. Liu, Y. Yuan, T. Zhang, G. Cui, and W. P. Tay, "LPI radar signal design resistant to identification by ESM systems," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 59, no. 6, pp. 9233 – 9246, Dec. 2023
- J17. P. Lin, C. Deng, Y. Yang, C. H. T. Lee, and W. P. Tay, "Resilience-oriented control for cyber-physical hybrid energy storage systems using a semi-consensus scheme: Design and practice," *IEEE Transactions on Industrial Electronics*, vol. 70, no. 3, pp. 2508 – 2519, Mar. 2023
- J18. X. Jian and W. P. Tay, "Wide-sense stationarity in generalized graph signal processing," *IEEE Transactions on Signal Processing*, vol. 70, pp. 3414 – 3428, 2022
- J19. Y. Yan, I. Bajaj, R. Rabiee, and W. P. Tay, "A tightly coupled integration approach for cooperative positioning enhancement in DSRC vehicular networks," *IEEE Transactions on Intelligent Transportation Systems*, vol. 23, no. 12, pp. 23 278 – 23 294, Dec. 2022
- J20. J. Yang and W. P. Tay, "An unsupervised Bayesian neural network for truth discovery in social networks," *IEEE Transactions on Knowledge and Data Engineering*, vol. 34, no. 11, pp. 5182 – 5195, Nov. 2022
- J21. A. B. Bhutto, X. S. Vu, E. Elmroth, W. P. Tay, and M. Bhuyan, "Reinforced transformer learning for VSI-DDoS detection in edge clouds," *IEEE Access*, vol. 10, pp. 94 677–94 690, 2022
- J22. Q. Kang and W. P. Tay, "Task recommendation in crowdsourcing based on learning preferences and reliabilities," *IEEE Transactions on Services Computing*, vol. 15, no. 4, pp. 1785–1798, 2022
- J23. F. Ji, Pratibha, and W. P. Tay, "Unlimited dynamic range signal recovery for folded graph signals," *Signal Processing*, vol. 198, p. 108574, 2022

- J24. F. Ji, G. Kahn, and W. P. Tay, "Signal processing on simplicial complexes with vertex signals," *IEEE Access*, vol. 10, pp. 41 889 – 41 901, 2022
- J25. C. Wang, W. P. Tay, Y. Wei, and Y. Wang, "Privacy-preserving distributed projection LMS for linear multitask networks," *IEEE Transactions on Signal Processing*, vol. 69, pp. 6530 – 6545, 2021
- J26. W. Zhang and W. P. Tay, "Cost-efficient RIS-aided channel estimation via rank-one matrix factorization," *IEEE Wireless Communications Letters*, vol. 10, no. 11, pp. 2562 – 2566, Nov. 2021
- J27. T. S. Lau and W. P. Tay, "Asymptotically optimal sampling policy for quickest change detection with observation-switching cost," *IEEE Transactions on Signal Processing*, vol. 69, pp. 1332 – 1346, 2021
- J28. C. X. Wang, Y. Song, and W. P. Tay, "Arbitrarily strong utility-privacy tradeoff in multi-agent systems," *IEEE Transactions on Information Forensics and Security*, vol. 16, pp. 671 – 684, 2021
- J29. Y. Song, C. X. Wang, and W. P. Tay, "Compressive privacy for a linear dynamical system," *IEEE Transactions on Information Forensics and Security*, vol. 15, pp. 895 – 910, 2020
- J30. M. Sun and W. P. Tay, "On the relationship between inference and data privacy in decentralized IoT networks," *IEEE Transactions on Information Forensics and Security*, vol. 15, pp. 852 – 866, 2020
- J31. M. Sun and W. P. Tay, "Decentralized detection with robust information privacy protection," *IEEE Transactions on Information Forensics and Security*, vol. 15, pp. 85–99, 2020
- J32. X. Liu, W. P. Tay, Z.-W. Liu, and G. Xiao, "Quasi-synchronization of heterogeneous networks with a generalized Markovian topology and event-triggered communication," *IEEE Transactions on Cybernetics*, vol. 50, no. 10, pp. 4200 – 4213, Oct. 2020
- J33. F. Ji, W. Tang, W. P. Tay, and E. K. P. Chong, "Network topology inference using information cascades with limited statistical knowledge," *Information and Inference: A Journal of the IMA*, vol. 9, no. 2, pp. 327 – 360, Jun. 2020
- J34. F. Ji and W. P. Tay, "A Hilbert space theory of generalized graph signal processing," *IEEE Transactions on Signal Processing*, vol. 67, no. 24, pp. 6188 – 6203, Dec. 2019
- J35. X. He, W. P. Tay, H. Lei, M. Sun, and Y. Gong, "Privacy-aware sensor network via multilayer nonlinear processing," *IEEE Internet of Things Journal*, vol. 6, no. 6, pp. 10 834 – 10 845, Dec. 2019
- J36. F. Wen, H. Wymeersch, B. Peng, W. P. Tay, H. C. So, and D. Yang, "A survey on 5G massive MIMO localization," *Digital Signal Processing*, vol. 94, pp. 21 – 28, Nov. 2019
- J37. Q. Kang and W. P. Tay, "Sequential multi-class labeling in crowdsourcing," *IEEE Transactions on Knowledge and Data Engineering*, vol. 31, no. 11, pp. 2190 – 2199, Nov. 2019
- J38. T. S. Lau and W. P. Tay, "Quickest change detection in the presence of a nuisance change," *IEEE Transactions on Signal Processing*, vol. 67, no. 20, pp. 5281 – 5296, Oct. 2019
- J39. L. Ma, W. P. Tay, and G. Xiao, "Iterative expectation maximization for reliable social sensing with information flows," *Information Sciences*, vol. 501, pp. 621 – 634, Oct. 2019
- J40. J. Yang, J. Wang, and W. P. Tay, "Using social network information in community-based Bayesian truth discovery," *IEEE Transactions on Signal and Information Processing over Networks*, vol. 5, no. 3, pp. 525 – 537, Sep. 2019
- J41. R. Rabiee, X. Zhong, Y. Yan, and W. P. Tay, "LaIF: A lane-level self-positioning scheme for vehicles in GNSS-denied environments," *IEEE Transactions on Intelligent Transportation Systems*, vol. 20, no. 8, pp. 2944 – 2961, Aug. 2019
- J42. F. Ji, W. Tang, and W. P. Tay, "On the properties of Gromov matrices and their applications in network inference," *IEEE Transactions on Signal Processing*, vol. 67, no. 10, pp. 2624 – 2638, May 2019
- J43. G. Yang, W. P. Tay, Y. L. Guan, and Y.-C. Liang, "Optimal power allocation for diffusion-type sensor networks with wireless information and power transfer," *IEEE Access*, vol. 7, pp. 32 408 – 32 422, Mar. 2019

- J44. T. S. Lau, W. P. Tay, and V. V. Veeravalli, "A binning approach to quickest change detection with unknown post-change distribution," *IEEE Transactions on Signal Processing*, vol. 67, no. 3, pp. 609 – 621, Feb. 2019
- J45. W. Tang, F. Ji, and W. P. Tay, "Estimating infection sources in networks using partial timestamps," *IEEE Transactions on Information Forensics and Security*, vol. 13, no. 2, pp. 3035 – 3049, Dec. 2018
- J46. J. Yang, X. Zhong, and W. P. Tay, "A dynamic Bayesian nonparametric model for blind calibration of sensor networks," *IEEE Internet of Things Journal*, vol. 5, no. 5, pp. 3942 – 3953, Oct. 2018
- J47. M. Z. A. Bhotto and W. P. Tay, "Non-Bayesian social learning with observation reuse and soft switching," *ACM Transactions on Sensor Networks*, vol. 14, no. 2, pp. 14:1–14:21, Jun. 2018
- J48. M. Sun, W. P. Tay, and X. He, "Toward information privacy for the Internet of Things: A non-parametric learning approach," *IEEE Transactions on Signal Processing*, vol. 66, no. 7, pp. 1734 – 1747, Apr. 2018
- J49. F. Quitin, P. De Doncker, F. Horlin, and W. P. Tay, "Virtual multi-antenna array for estimating the direction of a transmitter: system, bounds and experimental results," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 2, pp. 1510 – 1520, Feb. 2018
- J50. Y. Yu, G. Xiao, G. Li, W. P. Tay, and H. F. Teoh, "Opinion diversity and community formation in adaptive networks," *Chaos: An Interdisciplinary Journal of Nonlinear Science*, vol. 27, no. 20, p. 103115, Oct. 2017
- J51. W. Luo, W. P. Tay, and M. Leng, "On the universality of Jordan centers for estimating infection sources in tree networks," *IEEE Transactions on Information Theory*, vol. 63, no. 7, pp. 4634 – 4657, Jul. 2017
- J52. F. Ji, W. P. Tay, and L. Varshney, "An algorithmic framework for estimating rumor sources with different start times," *IEEE Transactions on Signal Processing*, vol. 65, no. 10, pp. 2517 – 2530, May 2017
- J53. J. Tang, W. P. Tay, T. Q. S. Quek, and B. Liang, "System cost minimization in cloud RAN with limited fronthaul capacity," *IEEE Transactions on Wireless Communications*, vol. 16, no. 5, pp. 3371 – 3384, May 2017
- J54. Y. Wang, W. P. Tay, and W. Hu, "A multitask diffusion strategy with optimized inter-cluster cooperation," *IEEE Journal of Selected Topics in Signal Processing*, vol. 11, no. 3, pp. 504 – 517, Mar. 2017
- J55. M. Leng, W. P. Tay, F. Quitin, C. Cheng, S. G. Razul, and C. M. S. See, "Anchor-aided joint localization and synchronization using SOOP: Theory and experiments," *IEEE Transactions on Wireless Communications*, vol. 15, no. 11, pp. 7670 – 7685, Nov. 2016
- J56. Y. Zhang, W. P. Tay, K. H. Li, M. Essegir, and D. Gaiti, "Learning temporal-spatial spectrum reuse," *IEEE Transactions on Communications*, vol. 64, no. 7, pp. 3092 – 3103, Jul. 2016
- J57. W. Luo, W. P. Tay, and M. Leng, "Infection spreading and source identification: A hide and seek game," *IEEE Transactions on Signal Processing*, vol. 64, no. 16, pp. 4228 – 4243, Aug. 2016
- J58. J. Ho, W. P. Tay, T. Q. S. Quek, and E. K. P. Chong, "Robust decentralized detection and social learning in tandem networks," *IEEE Transactions on Signal Processing*, vol. 63, no. 19, pp. 5019 – 5032, Oct. 2015, **IEEE Signal Processing Society Young Author Best Paper Award**
- J59. J. Tang, W. P. Tay, and T. Q. S. Quek, "Cross-layer resource allocation with elastic service scaling in cloud radio access network," *IEEE Transactions on Wireless Communications*, vol. 14, no. 9, pp. 5068 – 5081, Sep. 2015
- J60. W. Hu and W. P. Tay, "Multi-hop diffusion LMS for energy-constrained distributed estimation," *IEEE Transactions on Signal Processing*, vol. 63, no. 15, pp. 4022 – 4036, Aug. 2015
- J61. W. Xu, F. Quitin, M. Leng, W. P. Tay, and S. G. Razul, "Distributed localization of a RF target in NLOS environments," *IEEE Journal on Selected Areas in Communications*, vol. 33, no. 7, pp. 1 – 14, Jul. 2015
- J62. W. P. Tay, "Whose opinion to follow in multihypothesis social learning? A large deviations perspective," *IEEE Journal of Selected Topics in Signal Processing*, vol. 9, no. 2, pp. 344 – 359, Mar. 2015

- J63. M. Leng, W. P. Tay, T. Q. S. Quek, and H. Shin, "Distributed local linear parameter estimation using Gaussian SPAWN," *IEEE Transactions on Signal Processing*, vol. 63, no. 1, pp. 244 – 257, Jan. 2015
- J64. Y. Zhang, W. P. Tay, K. H. Li, and D. Gaiti, "Distributed boundary estimation for spectrum sensing in cognitive radio networks," *IEEE Journal on Selected Areas in Communications*, vol. 32, no. 11, pp. 1961 – 1973, Nov. 2014
- J65. W. Luo, W. P. Tay, and M. Leng, "How to identify an infection source with limited observations," *IEEE Journal of Selected Topics in Signal Processing*, vol. 8, no. 4, pp. 586 – 597, Aug. 2014
- J66. J. Tang, W. P. Tay, and Y. Wen, "Dynamic request redirection and elastic service scaling in cloud-centric media networks," *IEEE Transactions on Multimedia*, vol. 16, no. 5, pp. 1434 – 1445, Aug. 2014
- J67. M. Leng, W. P. Tay, C. M. S. See, S. G. Razul, and M. Z. Win, "Modified CRLB for cooperative geolocation of two devices using signals of opportunity," *IEEE Transactions on Wireless Communications*, vol. 13, no. 7, pp. 3636 – 3649, Jul. 2014
- J68. W. Hu and W. P. Tay, "An integer linear programming approach for a class of bilinear integer programs," *Operations Research Letters*, vol. 42, no. 3, pp. 226 — 230, May 2014
- J69. W. Luo, W. P. Tay, and M. Leng, "Identifying infection sources and regions in large networks," *IEEE Transactions on Signal Processing*, vol. 61, no. 11, pp. 2850 – 2865, Jun. 2013
- J70. D. W. Soh, W. P. Tay, and T. Q. S. Quek, "Randomized information dissemination in dynamic environments," *IEEE/ACM Transactions on Networking*, vol. 21, no. 3, pp. 681 – 691, Jun. 2013
- J71. T. M. Nguyen, Y. Jeong, T. Q. S. Quek, W. P. Tay, and H. Shin, "Interference alignment in a Poisson field of MIMO femtocells," *IEEE Transactions on Wireless Communications*, vol. 12, no. 6, pp. 2633 – 2645, Jun. 2013
- J72. Y. Nijssure, W. P. Tay, E. Gunawan, F. Wen, Y. Zhang, Y. L. Guan, and A. P. Chua, "An impulse radio ultrawideband system for contactless noninvasive respiratory monitoring," *IEEE Transactions on Biomedical Engineering*, vol. 60, no. 6, pp. 1509 – 1517, Jun. 2013
- J73. W. P. Tay, "The value of feedback in decentralized detection," *IEEE Transactions on Information Theory*, vol. 58, no. 12, pp. 7226 – 7239, Dec. 2012
- J74. G. Hu, W. P. Tay, and Y. Wen, "Cloud robotics: architecture, challenges and applications," *IEEE Network, Special Issue on Machine and Robotic Networking*, vol. 26, no. 3, pp. 21 – 28, May 2012
- J75. W. P. Tay, J. N. Tsitsiklis, and M. Z. Win, "Bayesian detection in bounded height tree networks," *IEEE Transactions on Signal Processing*, vol. 57, no. 10, pp. 4042 – 4051, Oct. 2009
- J76. W. P. Tay, J. N. Tsitsiklis, and M. Z. Win, "On the subexponential decay of detection error probabilities in long tandems," *IEEE Transactions on Information Theory*, vol. 54, no. 10, pp. 4767 – 4771, Oct. 2008
- J77. W. P. Tay, J. N. Tsitsiklis, and M. Z. Win, "Data fusion trees for detection: Does architecture matter?" *IEEE Transactions on Information Theory*, vol. 54, no. 9, pp. 4155 – 4168, Sep. 2008
- J78. W. P. Tay, J. N. Tsitsiklis, and M. Z. Win, "On the impact of node failures and unreliable communications in dense sensor networks," *IEEE Transactions on Signal Processing*, vol. 56, no. 6, pp. 2535 – 2546, Jun. 2008
- J79. W. P. Tay, J. N. Tsitsiklis, and M. Z. Win, "Asymptotic performance of a censoring sensor network," *IEEE Transactions on Information Theory*, vol. 53, no. 11, pp. 4191 – 4209, Nov. 2007

## 2.4 Refereed Conference Proceedings

- C1. Q. Kang, X. Li, K. Zhao, W. Cui, Y. Zhao, W. Deng, and W. P. Tay, "Efficient training of neural fractional-order differential equation via adjoint backpropagation," in *Proc. AAAI Conference on Artificial Intelligence*, Philadelphia, USA, Feb. 2025



- C2. W. Cui, Q. Kang, X. Li, K. Zhao, W. P. Tay, W. Deng, and Y. Li, "Neural variable-order fractional differential equation networks," in *Proc. AAAI Conference on Artificial Intelligence*, Philadelphia, USA, Feb. 2025
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## 2.5 Book Chapters and Monographs

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- B2. F. Ji, W. Tang, J. Yang, and W. P. Tay, "Online information spreading and source identification," in *Online Social Networks: Perspectives, Applications and Developments*, C. W. Tan, Ed. Hauppauge, NY: Nova Science Publishers, Inc., 2020, ch. 4
- B3. R. Rabiee, I. Bajaj, and W. P. Tay, "Vehicle localization in GNSS-denied environments," in *Cooperative Localization and Navigation: Theory, Research, and Practice*, C. Gao, G. Zhao, and H. Fourati, Eds. Boca Raton, FL: CRC Press, 2019, ch. 11, pp. 199 – 222
- B4. M. Leng and W. P. Tay, "Fundamental limits of self-localization for cooperative robotic platforms using signals of opportunity," in *Cooperative Robots and Sensor Networks 2015*, ser. Studies in Computational Intelligence, A. Koubâa and J. R. M. de Dios, Eds. Cham: Springer, 2015, vol. 604, pp. 159 – 181
- B5. W. P. Tay and J. N. Tsitsiklis, "Error exponents for decentralized detection in tree networks," in *Networked Sensing Information and Control*, V. Saligrama, Ed. Boston, MA: Springer, 2008, pp. 73 – 92

## 2.6 Thesis

1. W. P. Tay, "Decentralized detection in resource-limited sensor network architectures," Ph.D. dissertation, Massachusetts Institute of Technology, Dec. 2007

## 2.7 Other Publications

- O1. Z. Madadi, F. Quitin, and W. P. Tay, "Vehicle localization using periodic transmissions from an RSU in GNSS denied environments," in *Proc. ITS Asia-Pacific Forum*, Nanjing, China, Apr. 2015
- O2. Y. Nijsure, W. P. Tay, and E. Gunawan, "An impulse radio ultra wideband system for contactless non-invasive respiratory monitoring," *Asia Pacific BioTech News*, vol. 16, no. 10, pp. 28–31, Oct. 2012, *invited paper*

## 2.8 Patents and Disclosures

### 2.8.1 Patents Filed

- PF1. S. Wang, R. She, Q. Kang, T. Geng, and W. P. Tay, "AGPlace: Multi-modal place recognition in the aerial-ground cross view with differential geometry," Singapore Provisional Patent 10 202 401 872S, Jun. 25, 2024
- PF2. R. She, Q. Kang, S. Wang, W. P. Tay, N. D. Navarro, and A. Hartmannsgruber, "Computer-implemented method for estimating a position and/or pose of a vehicle," Germany Patent Application PCT/EP2024/061 019, Apr. 23, 2024
- PF3. S. Wang, Q. Kang, R. She, W. P. Tay, N. D. Navarro, and A. Hartmannsgruber, "A computer-implemented method for camera pose regression in a challenging traffic environment," UK Patent Application 2 216 510.4, Nov. 7, 2022
- PF4. K. V. Ling, K. K. Sin, and W. P. Tay, "Method to improve localization based on 5G signal fingerprinting," Singapore Provisional Patent 10 202 250 199J, June 16, 2022
- PF5. Q. Kang, R. She, W. P. Tay, R. Khurana, N. D. Navarro, S. Wang, and A. Hartmannsgruber, "Method for image segmentation matching," Singapore Provisional Patent 10 202 205 141P, May 17, 2022
- PF6. C. X. Wang, Y. Xu, Y. Song, and W. P. Tay, "Privacy-aware service provisioning in V2X networks," Singapore Provisional Patent 10 202 106 300S, Jun. 11, 2021
- PF7. C. Jin, I. Bajaj, K. Zhao, W. P. Tay, and K. V. Ling, "5G positioning using code phase and carrier phase receiver," Singapore Provisional Patent 10 202 011 842U, Nov. 27, 2020

### 2.8.2 Patents Granted

- PG1. C. Jin, W. P. Tay, K. Zhao, K. V. Ling, and J. Lu, "Device, positioning system and method of determining a position of the device for vehicular communication," Singapore PCT Patent WO 2024/072 324 A1, Sep. 19, 2023
- PG2. Q. Kang, R. She, W. P. Tay, N. D. Navarro, R. Khurana, A. Hartmannsgruber, and Y. L. Guan, "Position determination of a vehicle using image segmentations," Singapore PCT Patent PCT/EP2023/063 085, May 16, 2023
- PG3. F. Ji, Pratibha, and W. P. Tay, "Methods and systems for recovering folded signals," Singapore PCT Patent WO2021/091 486, May 14, 2021
- PG4. Y. Wang, W. P. Tay, J. S. Kee, and K. Thangamariappan, "Wireless sensor network, parameter optimization method thereof and warehouse system," China Patent 111 148 109, May 12, 2020
- PG5. Y. Wang, W. P. Tay, J. S. Kee, and K. Thangamariappan, "Wireless sensor network and parameter optimization method thereof, and warehouse system," U.S. Patent 20 200 146 103A1, May 7, 2020



### 2.8.3 Technology Disclosures

- TD1. W. Wang, M. Yang, Y. L. Guan, and W. P. Tay, "Intelligent transportation system runtime middleware," Singapore Technology Disclosure NTU Ref: 2021-269, May 31, 2021
- TD2. C. Wang, Q. Zhang, and W. P. Tay, "Energy efficient decentralized real-time multi-camera multi-target recognition and tracking system," Singapore Technology Disclosure NTU Ref: 2020-388, Dec. 1, 2020
- TD3. C. Yang, M. Yang, Y. L. Guan, and W. P. Tay, "Intelligent transportation system use-case software package," Singapore Technology Disclosure NTU Ref: 2020-028, Feb. 6, 2020
- TD4. W. P. Tay, X. Zhong, R. Rabiee, and Y. Yan, "Lane-level vehicle tracker for V2X communication systems," NTU Copyright TD/206/17, Oct. 12, 2017
- TD5. X. He, W. P. Tay, and M. Sun, "Privacy engine for IoT device networks," NTU Copyright TD/071/16, May 26, 2016
- TD6. W. P. Tay, F. Quitin, and Z. Madadi, "Geolocation using virtual TDOA with asynchronous clocks," NTU Copyright TD/249/14, Jan. 9, 2015
- TD7. W. P. Tay and F. Quitin, "Localization of non-cooperative RF targets in cluttered environments," NTU Copyright TD/078/14, Jun. 24, 2014
- TD8. W. Hu and W. P. Tay, "A generalized diffusion adaptation strategy for energy-constrained estimation," NTU Copyright TD/077/14, May 30, 2014
- TD9. W. P. Tay, E. Gunawan, and Y. L. Guan, "Method for contactless respiratory monitoring using multiple UWB transceivers," NTU Copyright TD/215/12, Feb. 26, 2012

## 2.9 Selected Invited Talks

- "Advanced graph signal processing," IEEE International Conference on Acoustics, Speech and Signal Processing, May 2022, tutorial
- "Data-driven privacy sanitization with regularization," invited talk at Kookmin University, South Korea, Feb. 2022
- "Privacy for IoT: Signal processing theories and methods," 7th IEEE World Forum on the Internet of Things, New Orleans, USA, Jun. 2021, tutorial
- "COSMO: Next gen V2X architecture & ecosystem for smart mobility," Advanced Manufacturing and Engineering Day, Feb. 2021, invited presentation
- "Generalized graph signal processing," 7th IEEE Global Conference on Signal and Information Processing (GlobalSIP), Ottawa, Canada, Nov. 2019, keynote speaker (distinguished presentation)
- "Inference and data privacy in IoT networks," IEEE Workshop on Signal Processing Advances in Wireless Commun., Hokkaido, Japan, Jul. 2017, invited presentation
- "Posterior Cramér-Rao lower bound for mobile emitter tracking based on a TDOA-FDOA multi-measurement model," IEEE Int. Conf. on Ubiquitous Wireless Broadband, Nanjing, China, Oct. 2016, invited presentation
- "TDOA-FDOA multiple target detection and tracking in the presence of measurement errors and biases," IEEE Workshop on Signal Proc. Advances in Wireless Commun., Edinburgh, UK, Jul. 2016, invited presentation
- "Joint resource segmentation and transmission rate adaptation in cloud RAN with caching as a service," IEEE Workshop on Signal Proc. Advances in Wireless Commun., Edinburgh, UK, Jul. 2016, invited presentation
- "Algorithms for network infection sources estimation," Chongqing University, Jun. 2016, invited presentation
- "Proof of concept study using DSRC, IMU and map fusion for vehicle localization in GNSS-denied environments," Chongqing University of Posts and Telecommunications, Jun. 2016, invited presentation

- “Towards information privacy for the Internet of Things,” International Conference on Communications and Networking in China (Chinacom), Chonqing, China, Jun. 2016, invited presentation
- “Towards system cost minimization in cloud radio access network,” Asilomar Conf. on Signals, Systems and Computers, Asilomar, USA, Nov. 2015, invited presentation
- “Network infection sources estimation,” University of Illinois at Urbana-Champaign, USA, Jul. 2015, Tan Chin Tuan Fellow seminar
- “Asymptotics in social learning”, University of Illinois at Urbana-Champaign, USA, Jul. 2015, Tan Chin Tuan Fellow seminar
- “Joint scheduling and localization in UWB networks,” IEEE Int. Conf. on Commun., London, UK, Jun. 2015, invited presentation
- “Whose opinion to follow in social learning?”, IEEE Taiwan-Hong Kong Joint Workshop on Information Theory and Communications, Hong Kong, Jan. 2015, invited presentation
- “Cross-layer resource allocation in cloud radio access network,” IEEE Global Conf. on Signal and Information Processing, Atlanta, US, Dec. 2014, invited presentation
- “GPS-free localization using asynchronous beacons,” IEEE Int. Conf. on Mobile Ad-hoc and Sensor Networks, Chengdu, China, Dec. 2012, invited presentation
- “Identifying multiple infection sources in a network,” Asilomar Conf. on Signals, Systems and Computers, Asilomar, USA, Nov. 2012, invited presentation
- “Randomized rumor spreading in non-static networks,” IEEE Int. Conf. on ICT Convergence, Seoul, Korea, Sep. 2011, invited presentation

### 3 Educational Activities

#### 3.1 Completed Ph.D. Dissertation Supervisions

1. Luo Wuqiong, 08/2010 – 08/2014, “Identifying infection sources in a network.”
2. Tang Jianhua, 01/2011 – 01/2015, “Elastic service scaling optimization in cloud-based communication systems.”
3. Muhammad Sibtain Hamayun, 08/2010 – 08/2015, “Exploiting statistical side information to optimize secondary spectrum access.”
4. Zhang Yi, 01/2011 – 01/2015, “Learning methods for temporal-spatial opportunistic spectrum access in cognitive radio networks.”
5. Sun Meng, 08/2014 – 08/2018, “Privacy-preserving decentralized detection in sensor networks.”
6. Wang Yuan, 08/2012 – 08/2018, “Cooperative inference and learning for Internet-of-Things with limited resources.”
7. Ho Jun Feng Jack, 08/2012 – 11/2018, “Learning models in social networks.”
8. Yang Jielong, 08/2015 – 08/2019, “On truth finding in multi-agent networks.”
9. Tang Wenchang, 08/2015 – 08/2019, “Identifying misinformation and their sources in social networks.”
10. Kang Qiyu, 08/2015 – 08/2019, “Sequential crowdsourcing and recommendation strategies.”
11. Lau Tze Siong, 08/2015 – 01/2020, “Operationally constrained quickest change detection with multiple post-change distributions.” Commendation for EEE Doctorate Research Excellence Award.
12. Wang Chongxiao, 08/2016 – 12/2021, “Inference privacy preservation in linear and computational systems.”

### 3.2 Current Ph.D. Dissertation Supervisions

1. Lu Yiqi, 08/2018 – present, “Machine learning for inference in graphs.”
2. Lee See Hian, 08/2019 – present, “E-commerce knowledge graphs.”
3. Vivek Mohan, 01/2020 – present, “Unconventional sampling algorithms and hardware for brain-machine interfaces.”
4. Jian Xingchao, 08/2020 – present, “Processing stochastic time-varying signals over graphs.”
5. Zhao Kai, 01/2021 – present, “Graph neural networks for multi-sensor pattern recognition.”
6. Wang Sijie, 08/2021 – present, “Segmentation in autonomous driving environment.”
7. Zhang Purui, 08/2022 – present, “High-order graph signal processing and neural networks.”
8. Li Disheng, 01/2023 – present, “Machine learning methods for urban localization.”
9. Liang Wenfei, 01/2023 – present, “Federated learning for graph neural networks.”
10. Zhao Yanan, 01/2023 – present, “Generalized graph signal processing over simplicial complexes.”

### 3.3 Completed M.Eng. Dissertation Supervisions

1. Cheng Chi, 08/2011 – 05/2015, “Exploring the use of signals-of-opportunity for practical localization.”

### 3.4 Courses Taught

- EE7401, Probability and Random Processes (about 70 students per course).
- IE4497, Pattern Recognition and Deep Learning (about 25 students per course).
- IE0005, Introduction to Data Science and Artificial Intelligence (about 500 students per course).
- EE2008/IM1001, Data Structures and Algorithms (about 300 students per course).
- EE4105/IM4105, Cellular Communication System Design (about 110 students per course).
- EE6713, Network Design and Simulation (about 40 students per course).
- EE7101, Fundamentals of Information Theory (about 10 students per course).

### 3.5 Courses Developed

- 2012, proposed and developed new course EE7101 – Fundamentals of Information Theory.
- 2015, developed new course materials for EE2008/IM1001 – Data Structures and Algorithms due to increase of weekly lecture hours from 2 hours to 3 hours.
- 2015, developed Technology Enabled Learning video lectures and online learning activities for EE2008/IM1001 – Data Structures and Algorithms.
- 2015, coordinated and developed online assessment and practice (OASIS) for EE2008/IM1001 – Data Structures and Algorithms.
- 2021, revamped and developed new course materials for EE4497 Pattern Recognition and Machine Learning.

## 4 Professional Activities

### 4.1 University/National Committee Activities

- Member, Technical Committee on Intelligent Transport System, Enterprise Singapore, Jul. 2022 – Dec. 2024.
- Member, Academic Institutions Curriculum Advisory Committee, Singapore 5G & Telecoms Academy, Jun. 2021 – Dec. 2023.
- Associate Chair (Academic), School of Electrical and Electronic Engineering, Feb. 2020 – present.
- Assistant Chair (Academic), School of Electrical and Electronic Engineering, Jun. 2017 – Jan. 2020.
- Member, NTU Presidential Postdoctoral Fellowship 2023 Evaluation Committee, Jun. 2023.
- Cluster Director, Cyber Physical System for Critical Information Infra-structure Research Program, Energy Research Institute, Apr. 2019 – 31 Mar. 2025.
- Program Director, Advanced Sensing Technologies, Centre for Information Sciences and Systems, Jan. 2020 – present.
- Program Director, Cyber and Network Security, INFINITUS, Centre for Infocomm Technology, Jan. 2015 – Sep. 2016.
- Program Director, Communications and Network Systems, INFINITUS, Centre for Infocomm Technology, Jan. 2013 – Dec. 2014.
- Member, School of EEE outreach committee Jan. 2013 – Dec. 2013.

### 4.2 Professional Society Activities

- Subject Editor, Signal Processing, Elsevier, 2024 – present.
- Associate Editor, IEEE Internet of Things Journal, 2023 – present.
- Associate Member, Signal Processing Theory and Methods Technical Committee, IEEE Signal Processing Society, 2023 – present.
- Associate Editor, IEEE Transactions on Signal and Information Processing over Networks, 2019 – 2024.
- Editor, IEEE Open Journal of Vehicular Technology, 2019 – 2023.
- Editor, IEEE Transactions on Wireless Communications, 2017 – 2023.
- Associate Editor, IEEE Transactions on Signal Processing, 2015 – 2019.
- Guest Editor, IEEE Transactions on Signal and Information Processing over Networks Special Issue on Distributed Information Processing in Social Networks, 2016 – 2017.
- Member, Machine Learning for Signal Processing Technical Committee, IEEE Signal Processing Society, 2015 – 2020.
- Member, Internet of Things Special Interest Group, IEEE Signal Processing Society, 2015 – 2019.
- Chair, Interest Group on Distributed and Sensor Networks for Mobile Media Computing and Applications, IEEE Communications Society Technical Committee on Multimedia Communications, 2014.
- Vice-Chair, Interest Group on Green Multimedia Communications, IEEE Communications Society Technical Committee on Multimedia Communications, 2012 – 2014.

### 4.3 Conference Organizing Committees

- Program Co-Chair, International Conference on Signal Processing and Information Communications (ICSPIC), 2023.
- Signal Processing Grand Challenges Co-chair, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022.
- Web Chair, IEEE Global Communications Conference (Globecom), 2017.
- Tutorial Chair, International Conference on Information, Communications and Signal Processing, 2015.
- Organizer of special session on “Signal processing for social networks” in IEEE Conference on Digital Signal Processing, 2015.
- Publicity Chair, International Conference on Information, Communications and Signal Processing, 2013.
- Organizer of special session on “Emerging technologies in cooperative communication networks” in IEEE International Conference on Information, Communications and Signal Processing, 2011.
- Session chair
  - IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2015, 2016, 2017, 2018, 2019, 2020, 2022
  - IEEE Global Conference on Signal and Information Processing (GlobalSIP) 2018, 2019

### 4.4 Technical Program Committees

- International Conference on Machine Learning (ICML) 2024 – present
- International Conference on Learning Representations (ICLR) 2024 – present
- Neural Information Processing Systems (NeurIPS) 2023 – present
- International Joint Conference on Artificial Intelligence (IJCAI) 2022 – present
- AAAI Conference on Artificial Intelligence 2021 – present
- European Signal Processing Conference (EUSIPCO) 2017 – present
- IEEE Global Conference on Signal and Information Processing (GlobalSIP) 2017, 2018, 2019
- IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2016 – present
- IEEE International Workshop on Machine Learning for Signal Processing (MLSP) 2015 – present