PENGGAO YAN

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EDUCATION

The Hong Kong Polytechnic University, Dept. of Aeronautical and Aviation Engineering — Hong Kong, China
Doctor of Philosophy — May 2025
Awardee of PolyU Presidential PhD Fellowship 2021/22
Advisor: Li-Ta Hsu

Wuhan University, School of Remote Sensing and Information Engineering — Wuhan, China
Master of Engineering in Pattern Recognition and Intelligent System — June 2021
Awardee of Postgraduate Scholarship

Wuhan University, Electronic Information School — Wuhan, China
Bachelor of Engineering in Communication Engineering — June 2018
Awardee of Excellent Bachelor's Thesis, National Encouragement Scholarship

SELECTED HONORS & AWARDS

1. Best Student Paper Award in ION GNSS+ 2024 (International level) — 2024
2. PolyU Presidential PhD Fellowship — 2021
3. Excellent Bachelor's Thesis — 2018
4. First Price in National Undergraduate Electronics Design Contest (National level) — 2017
5. Second Price in National Undergraduate Intelligent Car Race (National level) — 2017

RESEARCH INTEREST

Robust estimation and integrity monitoring in dynamic environments
Non-Gaussian error modeling, fault detection and integrity monitoring for localization systems
Collaborative positioning and integrity monitoring in urban areas
Control-aided localization for autonomous vehicles in extreme conditions

Five Most Representative Journal Papers (*Corresponding author, †Supervisor)

1. **Yan, P.**, Zhong, Y., & Hsu, L. T. (2025). Principal Gaussian Overbound for Heavy-tailed Error Bounding. *IEEE Transactions on Aerospace and Electronic Systems*, 61(1), 829–852, doi: 10.1109/TAES.2024.3448405. **[SCI, JCR Q1, 5/52 (Engineering, Aerospace), IF: 5.1]**
2. **Yan, P.**, Hu, Y., Wen, W., & Hsu, L. T. (2025). Isolation of Multiple Faults for GNSS Positioning: An Incrementally Expanding Approach. *IEEE Sensors Journal*, 25(4), 6967–6981, doi: 10.1109/JSEN.2024.3524434. **[SCI, JCR Q1, 15/76 (Instruments & Instrumentation), IF: 4.3]**
3. **Yan, P.**, Li, Z., Huang, F., Wen, W., & Hsu, L. T. (2025). Fault Detection Algorithm for Gaussian Mixture Noises: An Application in LiDAR/IMU Integrated Localization Systems. *NAVIGATION: Journal of the Institute of Navigation*, 72(1), doi: 10.33012/navi.684. **[SCI, JCR Q1, 9/52 (Engineering, Aerospace), IF: 3.1]**
4. **Yan, P.**, Wen, W., & Hsu, L. T. (2023). Integration of Vehicle Dynamic Model and System Identification Model for Extending the Navigation Service Under Sensor Failures. *IEEE Transactions on Intelligent Vehicles*, 9(1), 2236–2248, doi: 10.1109/TIV.2023.3273185. **[SCI, JCR Q1, 5/353 (Engineering, Electrical & Electronic), IF: 14.0]**
5. **(Co-first author)** †Jia, T., & **Yan, P.** (2021). Predicting Citywide Road Traffic Flow Using Deep Spatiotemporal Neural Networks. *IEEE Transactions on Intelligent Transportation Systems*, 22(5), 3101–3111, doi: 10.1109/TITS.2020.2979634. **[SCI, JCR Q1, 5/182 (Engineering, Civil), IF: 7.9]**

PATENTS (†Supervisor)

1. †Jia, T. & **Yan, P.** Self-Adaptive Compact Image Segmentation Method of Vector Road Network. China Patent CN111815636B, Feb. 2, 2024.
2. †Jia, T. & **Yan, P.** Urban Road Traffic Flow Prediction Method and Device Based on Space-Time Deep Learning Mode. China Patent CN111009129B, June 15, 2021.

SERVICES

Journal Reviewer: NAVIGATION: Journal of the Institute of Navigation, IEEE Transactions on Aerospace and Electronic Systems, IEEE Transactions on Industrial Electronics, IEEE Transactions on Instrumentation and Measurement
Student Helper: The 25th HKSTS Conference, Hong Kong, 2021

FULL LIST OF PUBLICATIONS (*Corresponding author, †Supervisor)

Journal Papers

1. **Yan, P.**, Zhong, Y., & Hsu, L. T. (2025). Principal Gaussian Overbound for Heavy-tailed Error Bounding. *IEEE Transactions on Aerospace and Electronic Systems*, 61(1), 829–852, doi: 10.1109/TAES.2024.3448405. **[SCI, JCR Q1, 5/52 (Engineering, Aerospace), IF: 5.1]**
2. **Yan, P.**, Hu, Y., Wen, W., & Hsu, L. T. (2025). Isolation of Multiple Faults for GNSS Positioning: An Incrementally Expanding Approach. *IEEE Sensors Journal*, 25(4), 6967–6981, doi: 10.1109/JSEN.2024.3524434. **[SCI, JCR Q1, 15/76 (Instruments & Instrumentation), IF: 4.3]**
3. **Yan, P.**, Li, Z., Huang, F., Wen, W., & Hsu, L. T. (2025). Fault Detection Algorithm for Gaussian Mixture Noises: An Application in LiDAR/IMU Integrated Localization Systems. *NAVIGATION: Journal of the Institute of Navigation*, 72(1), doi: 10.33012/navi.684. **[SCI, JCR Q1, 9/52 (Engineering, Aerospace), IF: 3.1]**
4. **Yan, P.**, Xia, X., Brizzi, M., Wen, W., & Hsu, L. T. (2024). Subspace-based Adaptive GMM Error Modeling for Fault-Aware Vehicular GNSS Positioning in Urban Canyons. *IEEE Transactions on Intelligent Vehicles*, doi: 10.1109/TIV.2024.3450198. **[SCI, JCR Q1, 5/353 (Engineering, Electrical & Electronic), IF: 14.0]**
5. Luo, X., ***Yan, P.**, Yan, R., & Wang, S. (2024). Covariate Balancing for High-Dimensional Samples in Controlled Experiments. *Journal of the Operational Research Society*, 1–15, doi: 10.1080/01605682.2024.2423362. **[SCI, JCR Q2, 37/106 (Operations Research & Management Science), IF: 2.7]**
6. **Yan, P.**, Wen, W., & Hsu, L. T. (2023). Integration of Vehicle Dynamic Model and System Identification Model for Extending the Navigation Service Under Sensor Failures. *IEEE Transactions on Intelligent Vehicles*, 9(1), 2236–2248, doi: 10.1109/TIV.2023.3273185. **[SCI, JCR Q1, 5/353 (Engineering, Electrical & Electronic), IF: 14.0]**
7. **(Co-first author)** †Jia, T., & **Yan, P.** (2021). Predicting Citywide Road Traffic Flow Using Deep Spatiotemporal Neural Networks. *IEEE Transactions on Intelligent Transportation Systems*, 22(5), 3101–3111, doi: 10.1109/TITS.2020.2979634. **[SCI, JCR Q1, 5/182 (Engineering, Civil), IF: 7.9]**
8. Li, X., Li, Z., Jia, T., **Yan, P.**, Wang, D., & Liu, G. (2021). The Sense of Community Revisited in Hankow, China: Combining the Impacts of Perceptual Factors and Built Environment Attributes. *Cities*, 111, 103108, doi: 10.1016/j.cities.2021.103108. **[SCI, JCR Q1, 5/77 (Urban Studies), IF: 6.0]**
9. **Yan, P.**, & Jia, T. (2021). Compact 2D Image Representation Method for Urban Road Networks. *Computer Engineering and Applications*, 14, 194–200, doi: 10.3778/j.issn.1002-8331.2004-0300. **[EI, IF: 3.7]**
10. Jia, T., Yang, S, Li, X., **Yan, P.**, Yu, X., Luo, X., & Chen K. (2020). Computation of Carbon Emissions of Residential Buildings in Wuhan and Its Spatiotemporal Analysis. *Journal of Geo-information Science*, 22(5), 1063–1072, doi: 10.12082/dqxxkx.2020.190727. **[EI, IF: 1.7]**

Conference Paper

1. **Yan, P.** (2024). Jackknife Test for Faulty GNSS Measurements Detection under Non-Gaussian Noises. In *Proceedings of the 37th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2024),* pp. 1619–1641, doi: 10.33012/2024.19837. **[Best Student Paper Award]**
2. **Yan, P.**, Zhong, Y., & Hsu, L. T. (2024). Bounding the Heavy-tailed Pseudorange Error by Leveraging Membership Weights Analysis of Gaussian Mixture Model. In *Proceedings of the ION 2024 Pacific PNT Meeting,* pp. 541–555, doi: 10.33012/2024.19604.
3. **Yan, P.**, Wen, W., Huang, F., & Hsu, L. T. (2024). A Fault Detection Algorithm for LiDAR/IMU Integrated Localization Systems with Non-Gaussian Noises. In *Proceedings of the 2024 International Technical Meeting of The Institute of Navigation*, pp. 561–574, doi: 10.33012/2024.19564. **[Invited Paper]**
4. Zhang, Y., Wen, W., & **Yan, P.** (2024). Safe-assured Learning-based Deep SE(3) Motion Joint Planning and Control for UAV Interactions with Dynamic Environments. In *Proceedings of 27th IEEE International Conference on Intelligent Transportation Systems (ITSC).*
5. **Yan, P.**, Hsu, L. T., & Wen, W. (2023). Extending Navigation Service under Sensor Failures: An Approach by Integrating System Identification and Vehicle Dynamic Model. In *2023 IEEE/ION Position, Location and Navigation Symposium (PLANS)*, pp. 630–636, doi: 10.1109/PLANS53410.2023.10140089.
6. **Yan, P.**, Hsu, L. T., & Wen, W. (2023). Integration of Vehicle Dynamic Model and System Identified Model for Navigation in Autonomous Mobile Robots. In *Proceedings of the 2023 International Technical Meeting of The Institute of Navigation*, pp. 153–160, doi: 10.33012/2023.18637.