NAME: XU Bing
Date of birth: 13 Jun 1988

E-mail: pbing.xu@poly.edu.hk
Phone: +852 34008010
Address: QR832, Department of Aeronautical and Aviation Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon, HK

ACADEMIC POSITIONS

04/2020-Present   **Research Assistant Professor**, Interdisciplinary Division of Aeronautical and Aviation Engineering, The Hong Kong Polytechnic University, Hong Kong

08/2018-04/2020   **Postdoctoral Fellow**, Interdisciplinary Division of Aeronautical and Aviation Engineering, The Hong Kong Polytechnic University, Hong Kong (work with **Dr. Li-Ta Hsu**)

EDUCATION

09/2012-06/2018   **PhD** in **Navigation, Guidance and Control** (Nanjing University of Science and Technology, Nanjing, China. Advisor: **Prof. Lei Dou**)

09/2008-06/2012   **BSc** in **Network Engineering** (Nanjing University of Science and Technology, Nanjing, China)

RESEARCH INTERESTS

- Signal processing with application to localization and wireless communications
- Global navigation satellite system receiver design
- Mitigation of radio frequency interference including jamming and spoofing

TEACHING EXPERIENCE

- **Flight Mechanics and Control Systems** (**AAE4006**), The Hong Kong Polytechnic University, 2020-2021 Semester II
- **Dynamical Systems and Control** (**AAE3004**), The Hong Kong Polytechnic University, 2020-2021 Semester I, 2021-2022 Semester I
- **Advanced Avionics Systems** (**ME583**), The Hong Kong Polytechnic University (Teaching Assistant), 2018-2019 Semester I and 2019-2020 Semester I

PROFESSIONAL MEMBERSHIPS

- IEEE (US), **Professional Member**
- ION (Institute of Navigation, US), **Professional Member**

ACADEMIC ACTIVITIES

- **Guest editor** of special issue "All-Source Position and Navigation: An Alternative Solution for Resilient PNT" in *Applied Sciences*
- **Guest editor** of special issue "Advanced Technologies for Position and Navigation under GNSS Signal Challenging or Denied Environments" in *Remote Sensing*
- **Reviewer** for *IEEE Transactions on Aerospace and Electronic Systems*, *IEEE Communications Letters*, *International Journal of Communication Systems*, etc.

HONORS/AWARDS

- 2016   Outstanding Student Award, Nanjing University of Science and Technology, China
- 2012   Second Prize of 2012 National Post-Graduate Mathematical Contest in Modeling, China
- 2012   Star of Excellence Award, Nanjing University of Science and Technology, China
- 2011   National Encouragement Scholarship, Nanjing University of Science and Technology, China

RESEARCH PROJECTS INVOLVED

As the role of **PI**:

1. Research on direct position estimation based GNSS and 5G positioning and GNSS/5G deep integration mechanism, 1 Jan 2022~31 Dec 2024.
   − Funding body: National Natural Science Foundation of China (NSFC) 國家自然科學基金委員會
   − Funding scheme: NSFC for Young Scholar 國家自然科學基金委員會青年科學基金項目

2. Research on GNSS Vector Tracking based Anti-multipath Mechanism in Urban Environment, 1 Jan 2022~31 Dec 2024.
   − Funding body: 廣東省基礎與應用基礎研究項目 廣東省科學技術廳
   − Funding scheme: 廣東省基礎與應用基礎研究項目

3. Security reinforcement for high-precision fusion positioning, 1 Dec 2021 ~ 30 Nov 2022
   − Funding body: Huawei Technologies Co. Ltd.
   − Funding scheme: Huawei Technologies Co. Ltd. (Collaborative)

4. A-GNSS Based Direct Position Estimation: Modelling, Implementation and Performance Assessment, 15 Mar 2021~14 Mar 2023
   − Funding body: The Hong Kong Polytechnic University (UGC)
   − Funding scheme: Start-up Fund for RAPs under the Strategic Hiring Scheme

5. Detection and Localization of Radio Frequency Interference Source for GBAS Reference Stations in Terminal Area, 15 Jul 2020~13 Jul 2023.
   − Funding body: The Hong Kong Polytechnic University (UGC)
   − Funding scheme: Departmental Start-up Fund

6. Radio Frequency Interference Monitoring in Terminal Area, 1 Aug 2021 ~ 1 Oct 2022
   − Funding body: The Hong Kong Polytechnic University (UGC)
   − Funding scheme: Undergraduate Research and Innovation Scheme (URIS)

As the role of **Co-PI**:

1. Reliable Multiagent Collaborative Global Navigation Satellite System Positioning for Intelligent Transportation Systems, 2022~2024,
  - Funding body: RGC
  - Funding scheme: Research Impact Fund (RIF)

As the role of **Co-I**:

1. Unlocking the potential of AI edge intelligence and cloud-edge computing for flexible robotic and facility control system, 2 Jul 2021 ~ 1 Jul 2023
  - Funding body: Innovation and Technology Commission
  - Funding scheme: Innovation and Technology Fund - Partnership Research Programme (ITF-PRP)

2. Factor Graph Optimization for GNSS Positioning, 30 Jun 2021 ~ 29 Apr 2022
  - Funding body: Huawei Technologies Co. Ltd.
  - Funding scheme: Huawei Technologies Co. Ltd. (Collaborative)

3. Ultra-Tightly Coupled GNSS/INS Integration for Smartphone, 25 Dec 2018 ~ 24 Jan 2020
  - Funding body: Huawei Technologies Co. Ltd.
  - Funding scheme: Huawei Technologies Co. Ltd. (Collaborative)

As the role of **Member**:

1. Map Aided GNSS Urban Positioning Phase II, 12 Aug 2019 - 31 Dec 2020
  - Funding body: Huawei Technologies Co. Ltd.
  - Funding scheme: Huawei Technologies Co. Ltd. (Collaborative)

JOURNAL PUBLICATIONS

1. Jiang, C., **Xu, B.***. Hsu, L.-T. (**2021**) Probabilistic Approach to Detect and Correct GNSS NLOS Signals Using an Augmented State Vector in the Extended Kalman Filter, ***GPS Solutions*** 25(72):1-14 2021.

2. Qiongqiong Jia, Li-Ta Hsu, **Bing Xu**, Renbiao Wu (**2021**) A cost-effective beam forming structure for global navigation satellite system multipath mitigation and its assessment, ***The Journal of Navigation*** 74(2):425-445

3. Dou, J.; **Xu, B.**; Dou, L. (**2021**) Impact Assessment of the Asynchronous Clocks Between Reference and User Receivers in Differential Pseudolite Navigation System, ***IEEE Sensors Journal*** 21(1): 403 – 411.

4. Zhang, G., **Xu, B.**, Ng, H.-F., Hsu, L.-T. (**2021**) GNSS RUMS: GNSS Realistic Urban Multiagent Simulator for Collaborative Positioning Research, ***Remote Sensing*** 13(4): 544.

5. **Xu, B.**; Jia, Q.; Hsu, L.-T. (**2020**) Vector Tracking Loop-Based GNSS NLOS Detection and Correction: Algorithm Design and Performance Analysis, ***IEEE Transactions on Instrumentation and Measurement*** 69(7):4604-4619.

6. El-Mowafy, A.; **<u>Xu, B.</u>**; Hsu, L.-T. (**2020**) Integrity monitoring using multi-GNSS pseudorange observations in the urban environment combining ARAIM and 3D city models, *Journal of Spatial Science*, DOI: 10.1080/14498596.2020.1734109.

7. Zhang, G.; Wen, W.; **<u>Xu, B.</u>**; Hsu, L.-T. (**2020**) Extending Shadow Matching to Tightly-Coupled GNSS/INS Integration System, *IEEE Transactions on Vehicular Technology* 69(5):4979-4991.

8. **<u>Xu, B.</u>**; Hsu, L.-T. (**2019**) Open-source MATLAB code for GPS vector tracking on a software-defined receiver, *GPS Solutions* 23:46.

9. **<u>Xu, B.</u>**; Jia, Q.; Luo, Y.; Hsu, L.-T. (**2019**) Intelligent GPS L1 LOS/Multipath/NLOS Classifiers Based on Correlator-, RINEX- and NMEA-Level Measurements. *Remote Sensing* 11:1851.

10. Dou, J.; **<u>Xu, B.</u>**; Dou, L. (**2020**) An intelligent joint filter for vector tracking loop considering noise interference, *Optik* 22:164984.

11. Meng, Q.; Hsu L.-T., **<u>Xu, B.</u>**; Luo, X.; El-Mowafy, A. (**2019**) A GPS Spoofing Generator Using an Open Sourced Vector Tracking-Based Receiver, *Sensors* 19:3993.

12. Luo, Y.; Li, J.; Yu, C.; **<u>Xu, B.</u>**; Li, Y.; Hsu L.-T., El-Sheimy, N. (**2019**) Research on Time-Correlated Errors Using Allan Variance in a Kalman Filter Applicable to Vector-Tracking-Based GNSS Software-Defined Receiver for Autonomous Ground Vehicle Navigation, *Remote Sensing* 11:1026.

13. Dou, J.; **<u>Xu, B.</u>**; Dou, L. (**2019**) Performance assessment of GNSS scalar and vector frequency tracking loops, *Optik* 202:163552.

14. **<u>Xu, B.</u>**; Dou, L. (**2018**) GNSS IF Signal Simulation Considering Oscillator Phase Noise, *Journal of Navigation* 71(4): 805-820.

15. **<u>Xu, B.</u>**; Dou, L. (**2018**) Benefits of long coherent integration for CZT-based GPS signal acquisition, *Electronics Letters* 54(16):995-997.

16. **<u>Xu, B.</u>**; Dou, L. (**2017**) Novel acquisition of global positioning system signals based on parameter prediction and the chirp z-transform, *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering* 231(8):1391-1401.

CONFERENCE PAPERS

17. **<u>Xu, B. (</u>**Presenter**)**; Hsu, Li-Ta; Suzuki, Taro (**2020**), Intermediate Frequency Level GPS Multipath Simulator based on Vector Tracking and Ray-tracing, *ION ITM 2020, San Diego, California, January 21-24, 2020*.

18. **<u>Xu, B. (</u>**Presenter**)**; Hsu, L.-T. (**2019**), NLOS Detection and Compensation using a Vector Tracking-based GPS Software Receiver, *Proceedings of the 2019 Pacific PNT Meeting, ION*

PNT 2019, Honolulu, Hawaii, April 8-11, 2019.

19. Luo, Y.; Yu, C.; **Xu, B.**; Tsai, G.-J.; Li, J.; Li, Y.; El-Sheimy, N. (**2019**), Assessment of Ultra-Tightly Coupled GNSS/INS Integration System towards Autonomous Ground Vehicle Navigation Using Mobile-Phone IMU, *IEEE International Conference on Signal, Information and Data Processing 2019, Chongqing, China, December 11-13, 2019.*

20. **Xu, B. (Poster)**; Hsu, L.-T. (**2019**), NLOS signal detection and correction based on vector tracking in urban environments, *Proceedings of the CSNC 2019, Beijing, China, May 2019.*

21. Xu, H.; Zhang, G.; **Xu, B.**; Hsu, L.-T. (**2018**), GNSS Shadow Matching based on Intelligent LOS/NLOS Classifier, *IAIN 2018, Japan.*

22. **Xu, B. (Presenter)**; Dou, L. (**2016**), Performance of the Vector Tracking Loop Assisted by Desired Trajectory during Short Signal Outages, *Proceedings of 2016 IEEE Chinese Guidance, Navigation and Control Conference August 12-14, 2016 Nanjing, China.*