Qi Liu

E-mail: Qi.Liu@uab.cat | Tel.: +34 672016346

Address: Universitat Autònoma de Barcelona, Bellaterra 08193, Barcelona (Spain)

WORK EXPERIENCE

Universitat Autònoma de Barcelona (UAB)   Barcelona, Spain | **2025 – Present**

Title: Postdoc

Cooperative supervisor: Prof. Gonzalo Seco-Granados, Prof. Jose A. Lopez-Salcedo

Research interests: Satellite and terrestrial positioning using GNSS and 5G technologies, extended with the use of LEO satellites, either for dedicated PNT or as a source of signals of opportunity (SOP).

EDUCATION

Universitat Autònoma de Barcelona (UAB)   Barcelona, Spain | **2023 –2024**

Visiting student in the Department of Telecommunication and Systems Engineering

- Major: Research on GNSS and 5G hybrid positioning algorithm in challenging environments
- Cooperative supervisor: Prof. Gonzalo Seco-Granados, Prof. Jose A. Lopez-Salcedo

Southeast University   Nanjing Jiangsu, China | **2021 –2024**

PhD Candidate in School of Transportation **(Successive Postgraduate and Doctoral Program)**

- Major: Traffic Mapping and Information Technology
- Supervisor: Prof. Chengfa Gao

Southeast University   Nanjing Jiangsu, China | **2019 –2021**

Master in School of Transportation **(Postgraduate Candidates Exempt from Admission Exam)**

- Major: Geomatics Science and Technology
- Supervisor: Prof. Chengfa Gao

Southeast University   Nanjing Jiangsu, China | **2015 –2019**

Bachelor in School of Transportation

- Major: Geomatics Engineering

PUBLICATIONS

[1] **Liu, Q.**, Reus-Bergas, A., Lopez-Salcedo, J. A., & Seco-Granados, G. (2026) An Enhanced Outer-Loop LEO Doppler Positioning Framework Incorporating Propagation Time. Proc. ESA Workshop on Satellite Navigation User Equipment Technologies (NAVITEC), May 2026.

[2] **Liu, Q.**, Reus-Bergas, A., Lopez-Salcedo, J. A., & Seco-Granados, G. (2026) An Innovative Outer-Loop Positioning Framework for LEO Doppler Observations Considering Propagation Time. Satellite Navigation. (Accepted for publication)

[3] **Liu, Q.,** Gao, C., Shang, R., Gao, W., López-Salcedo, J. A., & Seco-Granados, G. (2025). GNSS/IMU/5G fusion positioning based on factor graph in urban environment. Measurement Science and Technology, 36(6), 066304.

[4] **Liu, Q.,** Gao, C., Shang, R., Gao, W., Lopez-Salcedo, J. A., & Seco-Granados, G. (2024). Hybrid GNSS+5G Position and Rotation Estimation Algorithm based on TOA and Unit Vector of Arrival in Urban Environment. IEEE Transactions on Instrumentation and Measurement, 73, 1-8.

[5] **Liu, Q.**, Gao, C., Xhafa, A., Gao, W., Lopez-Salcedo, J. A., & Seco-Granados, G. (2023). Performance Analysis of GNSS+ 5G Hybrid Positioning Algorithms for Smartphones in Urban Environments. IEEE Transactions on Instrumentation and Measurement, 73, 1-9.

[6] **Liu, Q.,** Gao, C., Shang, R., Gao, W., & Zhang, R. (2023). Multifrequency signal characterization and assessment of GNSS positioning in smartphone. IEEE Transactions on Instrumentation and Measurement, 72, 1-9.

[7] **Liu, Q.,** Gao, C., Shang, R., Gao, W., & Zhang, R. (2023). Smartphone pseudorange multipath extraction based on variational mode decomposition and wavelet transform. IEEE Transactions on Instrumentation and Measurement, 72, 1-9.

[8] **Liu, Q.,** Gao, C., Shang, R., Peng, Z., Zhang, R., Gan, L., & Gao, W. (2023). NLOS signal detection and correction for smartphone using convolutional neural network and variational mode decomposition in urban environment. GPS Solutions, 27(1), 31.

[9] **Liu, Q.,** Gao, C., Shang, R., Peng, Z., Zhang, R., & Gan, L. (2022). Environment Perception Based Seamless Indoor and Outdoor Positioning System of Smartphone. IEEE Sensors Journal, 22(17), 17205-17215.

[10] **Liu, Q.,** Gao, C., Peng, Z., Zhang, R., & Shang, R. (2021). Smartphone positioning and accuracy analysis based on real-time regional ionospheric correction model. Sensors, 21(11), 3879.

[11] Wang, J., **Liu, Q.,** Ma, D., Zhang Y., Yu X. (2025). An integrated VKA-LSTM model for GNSS height time series prediction. GPS Solutions, 30(1), 29.

[12] Shang, R., Xu, Z., Gao, C., Meng, X., Gao, W., & **Liu, Q**. (2025). A Continuous B2b-PPP Model Considering Interruptions in BDS-3 B2b Orbits and Clock Corrections as Well as Signal-in-Space Range Error Residuals. Remote Sensing, 17(4).

[13] Shang, R., Gao, C., Meng, X., Xu, Z., **Liu, Q.**, Chen, Q., & An, X. (2024). Lightweight seamless lane-level positioning with the integration of BDS-3 PPP-B2b and VINS: a case study using smartphone. GPS Solutions, 28(4), 185.

[14] Xu, Z., Shang, R., Gao, C., Gao, W., **Liu, Q.**, Long, F., & Xu, D. (2024). Temporal Characteristics Based Outlier Detection and Prediction Methods for PPP-B2b Orbit and Clock Corrections. Remote Sensing, 16(13), 2337.

[15] Peng, Z., Gao, C., Zou, H., Shang, R., **Liu, Q.**, & Zhao, W. (2023). Characterisation and position-aiding performance analysis of Doppler observation from android smartphones. The Journal of Navigation, 76(2-3), 375-393.

RESEARCH PROJECTS

Core Member, GERMINAL – Connectivity: Enabling Next-Generation Nav/Com Hybrid Terminal, European Union Agency for the Space Program (EUSPA). **2024 - 2026**

- Develop a unified hybrid user terminal capable of supporting communications from both terrestrial networks (TN) and non-terrestrial networks (NTN).
- Provide navigation capabilities by means of GNSS, LEO-PNT and LEO signals of opportunity.

Core Member, Ministry of Education-China Mobile Research Fund: Research on high-precision positioning technology **2020 - 2023**

- Proposed a 5G observation model based on unit vectors;
- Designed a program to achieve GNSS and 5G hybrid positioning and verified the reliability of the proposed model.

Core Member, Indoor and Outdoor Integrated Fusion Positioning Algorithm Technical Support Service for Smartphone, China Mobile (Shanghai) Industry Research Institute **2020 - 2021**

- Collected and analyzed the data characteristics of each sensor of the mobile phone in different scenarios;
- Proposed an indoor and outdoor environment perception model based on HMM.

AWARDS & HONORS

- Merit Student of Southeast University **Sep. 2021**
- **Second prize** of the Fifth Jiangsu innovation and Entrepreneurship Competition **Nov. 2020**
- **First prize** of the Fourth Jiangsu innovation and Entrepreneurship Competition **Oct. 2019**
- Outstanding graduates of Department of Transportation **Jun. 2019**