

# CURRICULUM VITAE



## Zhe Yang

Associate Professor

College of Surveying and Geo-Informatics

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Dr. Yang is currently working as an associate professor in the College of Surveying and Geo-Informatics at Tongji University. Before joining Tongji in 2020, she worked as a postdoctoral associate for the Satellite Navigation and Sensing Laboratory at the University of Colorado, Boulder, CO, USA. She received her Ph.D. from The Hong Kong Polytechnic University. Her research interests focus on remote sensing of the Earth's ionosphere using multi-constellation Global Navigation Satellite System (GNSS) signals and ionospheric scintillation impacts and mitigations on GNSS. She currently serves as Guest Editor for the Topical Collection "Influences of Space Weather on GNSS Operations" of GPS Solutions and as Associate Editor for the Journal of the Institute of Navigation.

## Research Interests

- Ionospheric irregularities monitoring (algorithm, validation, and applications)
- Ionospheric scintillation impacts and mitigation
- Space Weather monitoring with GNSS

## Education

- Ph.D., 2014-2018, The Hong Kong Polytechnic University, Hong Kong SAR
- M.Sc., 2010-2013, Astrometry and Celestial Mechanics, CAS, Shanghai, China
- B.Eng., 2006-2010, Survey Engineering, Central South University, Changsha, China

## Professional Experience

- **Associate/Assistant Professor**  
2020-present, College of Surveying and Geo-Informatics, Tongji University, Shanghai, China
- **Postdoctoral Researcher**  
2018-2020, Aerospace Engineering Science, University of Colorado, Boulder, USA  
Advisor: Jade Morton (IEEE Fellow, ION Fellow, RIN Fellow)

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- **Research Associate**  
2017-2018, LSGI, The Hong Kong Polytechnic University, Hong Kong SAR  
Advisor: George Zhizhao Liu (Professor)
- **Visiting PhD Student**  
01/2017-06/2017, Electrical Engineering, Colorado State University, Fort Collins, USA  
Advisor: Jade Morton (IEEE Fellow, ION Fellow, RIN Fellow)
- **Trainee** (Funded by organizer)  
07/2020, ISR Summer School, MIT, USA  
11/2017, International Reference Ionosphere 2017 Workshop, Taiwan  
11/2015, International Reference Ionosphere 2015 Workshop, Bangkok, Thailand
- **Research Assistant**  
2013-2014, LSGI, The Hong Kong Polytechnic University, Hong Kong SAR  
Advisor: George Zhizhao Liu (Professor)

## Professional Service

- **Co-Chair**, IAG Sub-Commission WG 4.3.5 “Ionosphere and space weather monitoring using ground and spaceborne GNSS”, 2024-2027
- **Co-Chair**, Session “Ionosphere Monitoring with GNSS” at ION Pacific PNT 2024
- **Associate Editor**, Journal of the Institute of Navigation: NAVIGATION, 04/2022-present.
- **Guest Editor**, Topical Collection "Influences of Space Weather on GNSS operations", GPS Solutions
- **Editorial Board Member**, GPS Solutions, 10/2019-present.
- **Co-Chair, Session** “Ionosphere Monitoring with GNSS” at ION Pacific PNT 2021
- **Co-Chair, Session** “Atmospheric Effects on GNSS” at ION GNSS+2021
- **Co-Chair, Session** “Atmospheric Effects” at IEEE/ION PLANS 2020
- **Conference Secretary** for the 2017 International Symposium on GNSS
- **Journal Referee (selected)**  
GPS Solutions/Journal of Geodesy/NAVIGATION  
Space Weather/Journal of Geophysical Research: Space Physics  
IEEE Transactions on Aerospace and Electronic Systems  
IEEE Transactions on Geoscience and Remote Sensing  
IEEE Geoscience and Remote Sensing Letters  
Journal of the Institute of Navigation: Navigation  
Journal of Surveying Engineering
- **Teaching Assistant** for Engineering Surveying, The Hong Kong Polytechnic University  
-2014/15 2nd semester  
-2015/16 1st semester
- **Technical Assistant**, The Hong Kong Polytechnic University, 2014-2018  
-Installation of two Ionospheric Scintillation Monitors at Sanya and Hong Kong

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## Research Projects (Selected)

- 2023-2026, Principal Investigator, Modelling and Applications of Low-latitude Ionospheric Amplitude Scintillation Index Based on Geodetic GNSS Receivers, National Natural Science Foundation of China (NSFC), Project No: 42274027, 4 years, 2023.01-2026.12. (RMB\$550,000)
- 2020-2025, Principal Investigator, Fundamental Research Funds for the Central Universities. 5 years, 2020.11-2025.11. (RMB\$2,000,000)
- 2019-2020, Participant, HEARTBEAT–Heliosphere to Earth Atmosphere Rendering Through Building Excellent Artificial-Intelligence Training. DARPA.
- 2014-2018, Participant, Investigating the Ionospheric Scintillation Characteristics using Space- and Ground-Based GNSS Observations in Hong Kong during Solar Maximum, Hong Kong Research Grant Council (RGC) General Research Fund (GRF), 3 years, 2014.01-2016.12. (HK\$645,500)
- 2014-2018, Participant, A new method based on ionospheric TEC rate (TECR) for weight determination and outlier detection for GNSS pseudoranges, National Natural Science Foundation of China (NSFC), Project No: 41274039, 4 years, 2013.01-2016.12. (RMB\$700,000)

## Publications (Journals)

- J24. **Z. Yang**, J. Morton (2025). Impacts of the May 2024 extreme geomagnetic storm on global high-accuracy GPS positioning solutions. *Space Weather*, 23(10), p. e2025SW004547.
- J23. J. H. Du, **Z. Yang**, P. Guo, M. Wu, J. Dong, H. Li, F. Zuo (2025). 3D reconstruction of equatorial plasma bubbles using EOF and GNSS radio occultation data from MSS-1 and COSMIC-2. *Earth and Space Science*, 12, e2024EA003885. <https://doi.org/10.1029/2024EA003885>
- J22. J. H. Du, **Z. Yang**. (2025). Ionospheric response to the May 2024 geomagnetic storm within the SAA region: Analysis with MSS-1, COSMIC-2, and ground-based GNSS data. *Earth Planet. Phys.*, 9(3), 719–730. DOI: 10.26464/epp2025059
- J21. Y. Sui, **Z. Yang**, W. Zhan (2024). Revealing Inconsistencies in ROTI Index Using Multi-GNSS Constellation Measurements: Impact of Sampling Rates and Time Window. *Radio Science*, <https://doi.org/10.1029/2024RS007982>
- J20. **Z. Yang**, J. Morton (2024). Time-lagged effects of ionospheric response to severe geomagnetic storms on GNSS kinematic precise point positioning. *Space Weather*, e2024SW003946. <https://doi.org/10.1029/2024SW003946>
- J19. H. Jia, **Z. Yang**, B. Li (2024) ROTI-based statistical regression models for GNSS precise point positioning errors associated with ionospheric plasma irregularities. *GPS Solutions*. <https://doi.org/10.1007/s10291-024-01648-0>
- J18. **Z. Yang**, J. Morton, Y. Liu (2023), Time Lags Between Ionospheric Scintillation Detection at Northern Auroral Latitudes and Onset of Geomagnetic Storms. *Journal of Geophysical Research: Space Physics*. DOI: 10.1029/2023JA031491
- J17. Liu, Y., **Z. Yang**, Morton, Y. J., Li, R. (2023). Spatiotemporal Deep Learning Network for High-Latitude Ionospheric Phase Scintillation Forecasting. *NAVIGATION: Journal of the Institute of Navigation*, 70(4).

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- J16. Xu, W., Gu, X., Ni, B., Wang, S., **Z. Yang**, Cheng, W., ... & Hu, H. Q. (2023). Measurements and Modelling of the Responses of VLF Transmitter Signals to X-Class Solar Flares at the Great Wall Station in Antarctica. *Space Weather*, 21(4), e2022SW003249.
- J15. J. Yu, **Z. Yang**, B. Breitsch, L. Wu (2022). Fast determination of geometric matrix in ionosphere tomographic inversion with unevenly spaced curvilinear voxels. *GPS Solutions*, (2022) 26:27  
<https://doi.org/10.1007/s10291-021-01211-1>
- J14. X. Song, R. Yang, X. Zhan, N. Fu, **Z. Yang**, and X. Yu (2021). Vertical characterization on global ionospheric variations during the magnetic storm in September 2017 with hierarchical subtraction method. *Advances in Space Research*. <https://doi.org/10.1016/j.asr.2021.11.034>
- J13. **Z. Yang**, J. Morton (2020), Low-Latitude GNSS Ionospheric Scintillation Dependence on Magnetic Field Orientation and Impacts on Positioning. *Journal of Geodesy*. DOI: 10.1007/s00190-020-01391-7
- J12. **Z. Yang**, J. Morton, I. Zakharenkova, I. Cherniak, S. Song, W. Li (2020), Global View of Ionospheric Disturbances Impacts on Kinematic GPS Positioning Solutions during the 2015 St Patrick's Day Storm. *Journal of Geophysical Research: Space Physics*. DOI: 10.1029/2019JA027681
- J11. Z. Liu, **Z. Yang**, D. Xu, J. Morton (2019), On Ionospheric Irregularities Characterized by Inconsistent ROTI Derived from Multi-Constellation GNSS Measurements Based on Globally Distributed GNSS Receivers. *Radio Science*. DOI: 10.1029/2018RS006596
- J10. **Z. Yang**, and Z. Liu (2018), Low-Latitude Ionospheric Density Irregularities and Associated Scintillations Investigated by Combining COSMIC Radio Occultation and Ground-Based GPS Observations during a Solar Active Period, *Journal of Geophysical Research: Space Physics*. DOI:10.1029/2017JA024199
- J9. **Z. Yang**, N. Ssessanga. L. Tran, D. Bilitza, P. Kenpankho (2016), On improvement in representation of foE in IRI, *Advances in Space Research*. <http://dx.doi.org/10.1016/j.asr.2016.11.008>
- J8. **Z. Yang**, and Z. Liu (2016), Investigating the Inconsistency of Ionospheric ROTI Indices Derived from GPS Modernized L2C and Legacy L2 P(Y) Signals at Low-Latitude Regions, *GPS Solutions*. DOI: 10.1007/s10291-016-0568-3
- J7. **Z. Yang**, and Z. Liu (2016), Observational study of ionospheric irregularities and GPS scintillations associated with the 2012 tropical cyclone Tembin passing Hong Kong, *Journal of Geophysical Research: Space Physics*. DOI: 10.1002/2016JA022398
- J6. **Z. Yang**, S. Song, W. Jiao, G. Chen, J. Xue, W. Zhou, and W. Zhu (2016), Ionospheric tomography based on GNSS observations of the CMONOC: performance in the topside ionosphere, *GPS Solutions*. DOI:10.1007/s10291-016-0526-0
- J5. **Z. Yang**, and Z. Liu (2015), Correlation between ROTI and Ionospheric Scintillation Indices using Hong Kong low-latitude GPS data, *GPS Solutions*. DOI: 10.1007/s10291-015-0492-y
- J4. Z. Liu and **Z. Yang** (2015), Anomalies in broadcast ionospheric coefficients recorded by GPS receivers over the past two solar cycles (1992-2013), *GPS Solutions*. DOI: 10.1007/s10291-015-0448-2
- J3. **Z. Yang**, S. Song, J. Xue, W. Zhu (2012), Accuracy Assessment of Klobuchar Model and NeQuick Model in China. *Geomatics and Information Science of Wuhan University*, 37(6):704-708
- J2. **Z. Yang**, W. Dai, W. Yu, J. Liao (2010), Quality analysis of GNSS data based on TEQC in different environments. *Journal of Geodesy and Geodynamics*, 30(5):135-139
- J1. W. Yu, W. Dai, **Z. Yang** (2010), GNSS data analysis & pre-processing software design based on TEQC. *Journal of Geodesy and Geodynamics*, 30(5):81-85

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## Publications (Conferences)

- C8. H. Jia, **Z. Yang**, B. Li (2023), Global Mapping of Ionospheric ROTI Index and Its Preliminary Application in Analysis of Precise Positioning Degradation, CSNC 2024, VOL III, LNEE 1094
- C7. **Z. Yang**, Y. Morton (2021), On Geolocation Uncertainty in Radio Occultation Observations for Ionospheric Scintillation Monitoring at Alaska, Proceedings of the 34th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2021), St. Louis, Missouri, September 2021, pp. 3878-3885. <https://doi.org/10.33012/2021.18047>
- C6. Y. Liu, **Z. Yang**, Y. Morton, R. Li (2021), Spatiotemporal Deep Learning Network for High-Latitude Ionospheric Phase Scintillation Forecasting," Proceedings of the 34th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2021), St. Louis, Missouri, September 2021, pp. 3920-3931. <https://doi.org/10.33012/2021.18061>
- C5. **Z. Yang**, J. Morton (2020), Time lags in Ionospheric Scintillation Response to Geomagnetic Storms: Alaska Observations, Proceedings of the 33rd International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2020), September 2020. pp. 3494-3501.
- C4. **Z. Yang**, Sebastijan Mrak, J. Morton, Geomagnetic Storm Induced Mid-latitude Ionospheric Plasma Irregularities and Their Implications for GPS Positioning over North America: A Case Study, IEEE/ION Position, Location, And Navigation Symposium (IEEE/ION PLANSx 2020), St. Louis, Missouri, USA. DOI: 10.1109/PLANS46316.2020.9110132
- C3. **Z. Yang**, J. Morton, Kinematic PPP Errors Associated with Ionospheric Plasma Irregularities during the 2015 St. Patrick's Day Storm, Proceedings of the 32nd International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2019), Miami, Florida, September 2019, pp. 3666-3674.
- C2. Z. Liu, **Z. Yang**, W. Chen, A Study on Ionospheric Irregularities and Associated Scintillations Using Multi-Constellation GNSS Observations, Proceedings of the ION 2017 Pacific PNT Meeting, Honolulu, Hawaii, USA, May 2017, pp. 851-865.
- C1. Z. Liu, **Z. Yang**, W. Chen, J. Morton, X. Ding, M. Aquino, A. Dodson, A Comparative Analysis of GPS Ionospheric Scintillations Observed in Northern and Southern Equatorial Anomaly Regions in 2013-2014, *Proceedings of the ION 2015 Pacific PNT Meeting*, Honolulu, Hawaii, April 2015, pp. 25-47

## Book Chapter

J. Morton, **Z. Yang**, B. Breitsch, H. Bourne, D. Xu, C. Rino, "Chapter 31: Ionospheric Effects, Monitoring, and Mitigation Techniques," in Position, Navigation, and Timing Technologies in the 21st Century, ed. Y. J. Morton, F. van Diggelen, J. J. Spilker, B. Parkinson, Wiley-IEEE Press, 2020.

## Oral Presentations (Selected)

- P13. **Z. Yang**, Initial Results from MSS-1: Ionospheric Irregularities and Scintillation at Equatorial and Low Latitudes, Geomagnetic Twin Satellites MSS-1: Progress and Future Plans, 13 October 2023, RAS, London, UK (**Invited talk**)
- P12. **Z. Yang**, Time-Lag Effects on GNSS Kinematic Precise Point Positioning of Ionospheric Response to Severe Geomagnetic Storms, URSI GASS 2023, 19-26 August 2023, Sapporo, Japan (**Contributed**)

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- P11. **Z. Yang**, ROTI Mapping towards Real-time Ionospheric Plasma Irregularities Monitoring at Middle and Low Latitudes, *IWGI2022*, 26-27 September 2022, DLR, Germany (Online, **Contributed**)
- P10. **Z. Yang**, New discoveries about time lags for solar wind-geospace connections in Global Navigation Satellite Signal (GNSS) data. Data Science (virtual) session, 23 June 2020, 2020 *CEDAR Workshop* (**Contributed**)
- P9. **Z. Yang**, J. Morton, I. Zakharenkova, I. Cherniak, S. Song, W. Li, Global View of Ionospheric Response Impacts on Kinematic GPS Positioning during the 2015 St. Patrick's Day Storm, AGU Fall Meeting 2019, 9-13 December, San Francisco, CA, USA (**Poster**)
- P8. **Z. Yang**, Global View of Ionospheric Response Effects on GPS during Severe Space Weather Events, Remote Sensing Seminar Series, November 22, 2019, CU, Boulder, USA (**Invited**)
- P7. **Z. Yang**, Data and Machine Learning Challenges via an analysis of GNSS Network Position Errors during the March 2015 St. Patrick Storm, *2019 CEDAR Workshop*, 16-21 June 2019, Santa Fe, New Mexico, USA (**Contributed**)
- P6. **Z. Yang**, J. Morton, A Global View of Ionospheric Response Impacts on Kinematic GPS Positioning during the 2015 St Patrick's Day Storm, *2019 CEDAR Workshop*, 16-21 June 2019, Santa Fe, New Mexico, USA (**Poster**)
- P5. **Z. Yang**, Observations of Ionospheric Irregularities and Their Impacts on Global Navigation Satellite Systems, July 16, 2019, Space Weather Prediction Center, NOAA, USA (**Invited**)
- P4. **Z. Yang**, A Global View of Ionospheric Response Impacts on Kinematic GPS Positioning during the 2015 St Patrick's Day Storm, *Women in Aerospace Symposium*, Massachusetts Institute of Technology, 28-29 May 2019, Boston, USA (**Funded by organizer**)
- P3. **Z. Yang**, Characterization of Ionospheric Scintillations by Combining COSMIC Radio Occultation and Ground-based GPS Observations over Hong Kong Region, International Symposium on Geodesy and Geodynamics 2018, Jul 30- Aug 2, 2018, Kunming, China (**Outstanding Youth Speaker, funded by organizer**)
- P2. **Z. Yang**, Post-processing Analysis of Ionospheric Scintillation Effects on RTK GPS Positioning at Low-Latitude Region, *International Symposium on GNSS 2017*, 10- 13 December 2017, Hong Kong, China (**Best Student Paper Award**)
- P1. **Z. Yang**, Improvement of the representation of foE in IRI-2012 in terms of using daily solar index, *International Reference Ionosphere 2015 Workshop*, 2-13 November 2015, KMITL, Bangkok, Thailand (**Funded by organizer**)

## Honors, Awards, and Scholarships (Selected)

- **Best Presentation Award**, ION GNSS+ 2020
- **FCE Awards for Outstanding PhD Theses**, The Hong Kong Polytechnic University, 2017/18
- **Outstanding Youth Speaker**, International Symposium on Geodesy and Geodynamics 2018
- **Best Student Paper Award**. International Symposium on GNSS 2017
- **Silver Prize of Presentation Award**. International Reference Ionosphere 2017 Workshop
- Outstanding Graduates of Hunan Province, 2010