

CURRICULUM VITAE



Dr. Zhe Yang

Assistant Professor (she, her, hers)
Surveying Building
College of Surveying and Geo-Informatics
1239 Siping Road
Shanghai, P. R. China, 200092

Email: zheyang@tongji.edu.cn
yeangzhe@gmail.com

Short Bio

Dr. Yang is an assistant professor in the College of Surveying and Geo-Informatics at Tongji University. Prior to joining Tongji in 2020, she worked as a postdoctoral associate for the Satellite Navigation and Sensing Laboratory (SeNSe Lab) <http://gnssrange.com/> at 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 space weather impacts on GNSS. She currently serves as editorial board member for GPS Solutions and guest editor for Topical Collection "Influences of Space Weather on GNSS Operations" of this journal.

Research Interests

- Ionospheric irregularities/Scintillations
- Ionospheric modelling
- Space Weather Impacts on GNSS

Education

- Ph.D., 09/2014-09/2018, The Hong Kong Polytechnic University, Hong Kong SAR
- M.Sc., 09/2010-09/2013, Astrometry and Celestial Mechanics, Shanghai Astronomical Observatory, Chinese Academy of Sciences, Shanghai, China
- B.Eng., 09/2006-06/2010, Survey Engineering, Central South University, Changsha, China

Professional Experience

- Assistant Professor
 - 11/2020-present, College of Surveying and Geo-Informatics, Tongji University, Shanghai
- Postdoctoral Researcher
 - 11/2018-10/2020, Aerospace Engineering Science, University of Colorado, Boulder, USA
Advisor: Jade Morton (IEEE Fellow, ION Fellow, RIN Fellow)
- Research Associate
 - 11/2017-04/2018, 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
Advisor, Elizabeth Kendall, SRI, USA
 - 11/2017, International Reference Ionosphere 2017 Workshop, Taiwan
Advisor: Ivan Galkin, University of Massachusetts Lowell, USA
 - 11/2015, International Reference Ionosphere 2015 Workshop, Bangkok, Thailand
Advisor: Prasert Kenpankho, KMITL, Thailand; Dieter Bilitza, GMU, NASA, USA
- Research Assistant
 - 10/2013-08/2014, LSGI, The Hong Kong Polytechnic University, Hong Kong SAR
Advisor: George Zhizhao Liu (Professor)

Professional Service

- **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 2017 International Symposium on GNSS
- **Journal Referee (selected)**
 - GPS Solutions
 - Journal of Geodesy
 - Journal of 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
 - Astrophysics and Space Science
- **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
(In charge of testing and visited the site for installation)
 - Maintenance of Ionospheric Scintillation Monitor, Hok Tsui, Hong Kong
(In charge of troubleshooting, e.g., power outage, data collection, network issue)

Research Projects (Selected)

- 2020-2025, Principal Investigator, Fundamental Research Funds for the Central Universities.
(RMB2,000,000)

- 2019-2020, Participant, HEARTBEAT – Heliosphere to Earth Atmosphere Rendering Through Building Excellent Artificial-intelligence Training. DARPA. (CU Boulder)
- 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, 2014.01.01-2016.12.31. (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, 2013.01.01-2016.12.31. (RMB700,000)

Publications

- 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 (Chinese)
- 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 (Chinese)
- 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 (Chinese)
- 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

- Jade 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)

- 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*
- 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 Mexican, USA
- 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 Mexican, 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
- 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**)

Membership

- **Member** of The Institute of Navigation
- **Member** of The American Geophysical Union
- **Member** of the Hong Kong Meteorological Society

Patent

WinTEQC GNSS Pre-processing Software, No. 2010SR075311

Honors, Awards and Scholarships

- **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
- First Prize in National College Students of Surveying and Mapping Scientific Papers Contest, 2009
- National Scholarship, 2008 and 2009