

Y. T. Jade Morton

University of Colorado, Boulder
Anne and H. J. Smead Aerospace Engineering Sciences
Department
Colorado Center for Astrodynamics Research
Satellite Navigation & Sensing Laboratory

Office: AERO N403, 3775 Discovery Dr.
Tel: (303) 492-8630
Email: jade.morton@colorado.edu
URL: ccar.colorado.edu/sense

CAREER SUMMARY

Dr. Jade Morton is a professor, Thomas Austin Faculty Fellow, the Director for Colorado Center for Astrodynamics Research (CCAR), and the head of the Satellite Navigation and Sensing (SeNSE) Laboratory in the Aerospace Engineering Sciences Department at the University of Colorado (CU), Boulder. Prior to joining CU in 2017, she was an electrical engineering professor at Colorado State University and at Miami University where she led the creation of the Electrical and Computer Engineering Department. Dr. Morton's research interests lie at the intersection of satellite navigation technologies and remote sensing of the Earth's space environment, atmosphere, and surface. She is an author of over 270 technical publications and the lead editor of a two-volume set on position, navigation, and timing technologies under production to be published by Wiley-IEEE Press in 2020. She has lead and participated in more than 40 projects with a total amount over \$15M sponsored by AFOSR, AFRL, ARMY, DARPA, DHS, NASA, NSF, ONR, Lockheed Martin, Septentrio, etc.. She has advised and mentored more than 40 graduate students and post-docs, delivered nearly 50 short courses and tutorials for government labs, industry partners, and at professional conferences and workshops. She has provided numerous services to the navigation and the space science research communities, including being the Technical Editor of Navigation Systems for IEEE Transactions on Aerospace and Electronics Systems, an editor for Beidou Special Issue for Navigation, Journal of Institute of Navigation (ION), President of the ION, Program Chair and General Chair of numerous international conferences, and a founding member of the Consortium of Ohio Universities on Navigation and Timekeeping (COUNT). Dr. Morton is a fellow of IEEE, ION, and the Royal Institute of Navigation (RIN).

EDUCATION

Ph.D. (1991), Electrical Engineering, the Pennsylvania State University, University Park, PA
M.S. (1987), Electrical Engineering, Case Western Reserve University, Cleveland, OH
B.S. (1983), Physics, Nanjing University, Nanjing, China

PROFESSIONAL POSITIONS

University of Colorado, Boulder, CO, Smead Aerospace Engineering Sciences Department
Professor, Thomas F. Austin Faculty Fellow (2017 – Present)
Director, Colorado Center for Astrodynamics (CCAR) (2019 – Present)
Associate Chair for Graduate Programs (2018 – 2019)

Colorado State University, Fort Collins, CO, Electrical & Computer Engineering Department
Professor (2014 – 2017)

Miami University, Oxford, OH, Electrical & Computer Engineering Department
Professor (2009 – 2014), Associate Professor (2006 – 2009), Assistant Professor (2000 – 2006)

The University of Michigan, Ann Arbor, MI
Post-Doctoral Research Fellow (1991-1993), Space Physics Research Laboratories

The Pennsylvania State University, University Park, PA
Research Assistant (1987-1991), Electrical & Computer Engineering Department

Case Western Reserve University, Cleveland, OH

Research Assistant (1986-1987), Electrical Engineering & Applied Physics Department
Nanjing University, Nanjing, China
Faculty (1983-1985), Physics Department

PROFESSIONAL MEMBERSHIPS AND SERVICES

- Affiliations and Membership
 - American Geophysical Union (AGU)
 - Institute of Electrical and Electronics Engineering (IEEE), Fellow (2014)
 - * IEEE Aerospace and Electronic Systems Society
 - * IEEE Geoscience and Remote Sensing
 - * IEEE Signal Processing
 - * IEEE Women in Engineering Society
 - Institute of Navigation (ION), Fellow (2015)
 - International Union of Radio Science (URSI)
 - Royal Institute of Navigation, Fellow (2019)
- Offices/Positions Held
 - Advisory Board Member, High Frequency Active Auroral Research Program (2020-present)
 - ION President (2019-21)
 - Advisory Committee Member, Jicamarca Radio Observatory (2018-present)
 - ION Pacific Rim Collaboration Liaison (2014-20)
 - ION Executive Vice President (2017-19)
 - ION Award Committee Member (2017-19)
 - ION Satellite Division Executive Committee (2010-16)
 - Chair, ION GNSS+ Student Paper Award Committee (2014-16)
 - Chair, ION Satellite Division (2012-14)
 - Technical Committee Member, IEEE MTT Soc., Digital Signal Proc. Subgroup (2004-14)
 - Vice Chair, ION Satellite Division (2010-12)
 - Eastern Region Member-at-Large, ION (2012, 2009)
 - President, Chinese Professional in Global Positioning Systems (2010)
 - Chair, ION Outreach (2010-12)
 - Chair, Brad Parkinson Thesis Award Committee, ION (2008)
 - Chair, Award Committee, New Navigation Tech.& Innovations Conf., Beijing, China (2008)
 - Member, ION Council (since 2006)
 - Chair, ION Dayton Section (2006-7)
- Conference Organization
 - General Chair, ION Pacific Position, Navigation, & Timing Conf., 2019
 - Session Co-Chair, USNC-URSI National Radio Science Meeting, 2019
 - Session Co-Chair, Coupling, Energetics, & Dynamics of Atmospheric Regions (CEDAR) Workshop, 2018, 2019
 - Session Co-Chair, ION International Technical Meeting, 2008, 2009, 2010, 2012, 2013, 2019
 - Session Co-Chair, URSI Atlantic Radio Science Meeting, 2018
 - Session Co-Chair, AGU Meeting, 2018
 - Program Co-Chair, ION Pacific Position, Navigation, & Timing Conf., 2013, 2015, 2017
 - ION Technical Representative, GNSS+R Workshop, 2017
 - Session Co-Chair, ION Global Navigation Satellite Systems+ Conf., 2005, 2009, 2015
 - Conference Committee and Navigation Systems Track Chair, IEEE Radar Conf., 2014
 - Scientific Committee, Ubiquitous Positioning, Indoor Nav., & Location Based Services, 2014
 - General Chair, ION GNSS Conference, 2013
 - Program Chair, ION GNSS Conference, 2012
 - Section Co-Chair, Chinese Satellite Navigation Conference, 2011, 2012
 - General Chair, ION International Technical Meeting, 2012

- Program Committee, Int. Conf. Ubiquitous Pos., Indoor Nav., & Location Based Service, 2012
- Program Chair, ION International Technical Meeting, 2011
- Co-Chair, Compass Workshop at ION GNSS Conference, 2010
- Session Co-Chair, CPGPS International Technical Forum, 2010
- Organizer, Focused Session on Adv. in Positioning Sys., IEEE Int. Microwave Sym., 2009
- Track Chair, ION GNSS Conference, 2007
- Session Co-Chair, ION Annual Meeting, 2003, 2007
- Session Co-Chair, ION National Technical Meeting, 2006, 2007
- Workshop Co-Organizer, IEEE International Microwave Symposium, 2005
- Workshop Organizer, AFOSR Communication & Navigation Program Review, 2005
- Session Co-Chair, IEEE Position, Location, & Navigation System (PLANS) Conf., 2004
- Session Chair, American Control Conference, 2002
- Panel/Working Group Services
 - NASA Space Weather Operation-to-Research Review Panel, 2020.
 - NASA Living With A Star Institute, Working Group 5 Leader, 2018-19.
 - Co-Chair, US-ION Panel, Chinese Satellite Navigation Conference, 2012, 2013, 2014, 2018, 2019.
 - NASA, Space Geodesy Research Review Panel, Washington DC, 2016.
 - NSF, National Center for Atmospheric Research Observing Facilities Review Panel, 2016.
 - NSF, Management and Operations of the Arecibo Observatory Review Panel, 2014.
 - NSF, Coupling, Energetics, & Dynamics of Atmospheric Regions Prog. Review Panel, 2014.
 - White House Office of Science and Technology Policy, Auroral Research Workshop, 2014.
 - National Academies of Science, The Role of High-Power, High Frequency-Band Transmitters in Advancing Ionospheric/Thermospheric Committee Panel, 2013.
 - NSF, ECS – Integrative, Hybrid & Complex Systems Panel, 2005.
- Editorial Services
 - Co-Editor, Special Issue on Beidou Satellite Navigation System, Journal of Navigation, 2019
 - Technical Editor, Navigation Systems, IEEE Trans. Aero. & Elec. Sys., 2014-18
 - Associate Editor, IEEE Trans. Aero. & Elec. Sys., 2008-18
 - Editorial board, Springer journal GPS Solutions, Since 2006
- Journal Review: *EURASIP Journal on Advances in Signal Processing; Geophysical Research Letters; GPS Solutions; Journal of Aircraft; IEEE Communications Letters; IEEE Transactions on Aerospace & Electronic Systems; IEEE Transactions on Signal Processing; IEEE Transactions on Wireless; Journal of Atmospheric and Solar-Terrestrial Physics; Journal of Geophysical Research; Journal of Global Positioning Systems; Navigation, Journal of Institute of Navigation; Radio Science.*
- Book Review:
 - Kaplan, E. and C. Hegarty, Understanding GPS, Principles and Applications, 3rd ed., 2017.
 - Betz, J. W., *Engineering Satellite-Based Navigation and Timing: Global Navigation Satellite Systems, Signals, and Receivers*, Wiley-IEEE, 2016.
 - Tsui, J. B. Y., *Global Positioning System Receivers, A Software Approach*, 2nd edition, Wiley & Sons, 2004.
- Proposal Review: NSF, AFOSR, AFRL, NASA
- Tutorials and Short Courses Offered to Universities, Industries, and Government Agencies:
 - Consortium of Ohio Universities on Navigation and Timekeeping (COUNT) Short Courses:
 - Advanced GNSS Receivers, Northrop Grumman, CA, 2019
 - Advanced GNSS Receivers, Dayton, OH, 2018, 2019
 - Ionospheric Scintillation Monitoring Receivers, Dayton, OH, 2016, 2017
 - Ionospheric Scintillation and GNSS Receivers, Dayton, OH, 2015
 - GNSS Remote Sensing, Dayton, OH, 2014

- GNSS and Space Weather, Dayton, OH, 2013
 - High Sensitivity GNSS, Rockwell Collins, Cedar Rapids, IW, 2012
 - High Sensitivity GNSS Receivers, Dayton, OH, 2012
 - Ionospheric Scintillation, Honeywell, Minneapolis, MN, 2011
 - Ionospheric Scintillation, Dayton, OH, 2011
 - Ionospheric Effects on GNSS, Columbus, OH, 2009, 2010
 - Software Receiver Technologies, Dayton, OH, 2007, 2008
- Position, Navigation, and Time (PNT) Workshop, South Korea, Seoul, 2016
 - Introduction to GNSS, Part 2: Receiver Processing
 - Ionosphere Effects
 - Remote Sensing Using GNSS Networks
- Nanyang Technological University, Singapore, 2015
 - Software GNSS Receiver Algorithms
 - Atmospheric Remote Sensing Using GNSS
- US-Singapore PNT Workshop, Maui, HI, 2014
 - Magnetic Field Modeling
 - Ionosphere Modeling
 - Introduction to Software-Defined Radio
- Croucher Foundation, Hong Kong
 - Ionosphere Scintillation Monitoring Receivers, 2018
 - GNSS Software Receiver Algorithms and Applications, 2014
- ION GNSS+ Conference
 - Beidou Navigation Satellite System (co-taught), Miami, FL, 2018
 - High Sensitivity GNSS, Nashville, TN, 2012
 - High Sensitivity GNSS, Portland, OR, 2011
- IEEE National Aerospace & Electronics Conference
 - High Sensitivity GNSS, Dayton, OH, 2012
 - Software Receivers, Dayton, OH, 2008
- Polar Aeronomy & Radio Science Workshop, HAARP, AK.
 - Ionospheric Effects on GNSS, 2008, 2009, 2010, 2011, 2012
- AFOSR Singapore PNT Workshop, Honolulu, HI, 2010
 - GPS 101
 - High Sensitivity GPS
- African GNSS Outreach Workshop, Trieste, Italy
 - Software-defined GNSS Receivers for Ionospheric Monitoring, 2017
 - Autonomous Vehicle GNC, 2009, 2010
 - Robotics Laboratory, 2009, 2010
- Space Weather Effects on GNSS Operations at Low Latitudes, Trieste, Italy, 2018
 - GNSS for Ionosphere and Space Weather Monitoring
 - Introduction to GNSS Receivers
 - GNSS Software Receiver Laboratory
- Ionospheric Forecasting for GNSS Operation in Developing Countries, Trieste, Italy, 2019
 - GNSS for Ionosphere and Space Weather Monitoring
- Air Force Research Laboratory, Wright Patterson Air Force Base, OH
 - Software Receiver Technologies, 2008, 2009

SELECTED UNIVERSITY COMMITTEES AND SERVICES

- University of Colorado at Boulder
 - Director for Colorado Center for Astrodynamics Research (CCAR), 2019 - Present
 - Associate Chair for Graduate Programs, Aerospace Engineering Sciences Dept., 2018- 2019

- Aerospace Engineering Science Department Research Strategic Vision Committee, 2018
- Executive Committee Member, Aerospace Engineering Sciences Dept., 2017-Present
- Search Committee Member, Aerospace Engineering Sciences Dept., 2017-18
- Committee member, Joint AES-EE MS degree program, 2017-18
- Promotion and Tenure Evaluation Committee member, 2017-18
- Faculty Mentoring, 2017-18
- Senior Project Advisory Board, 2017-18
- Colorado State University
 - College of Engineering Strategic Plan Committee, Initiative 5 Enhance the Diversity of COE Students, Faculty and Staff, and Promote A Culture of Inclusiveness, 2016
 - Electrical and Computer Engineering Department, Faculty Promotion and Tenure (PNT) Committee, 2014-2017
- Miami University Electrical & Computer Engineering Department
 - Promotion & Tenure Committee, 2006-14
 - Chair, ECE Scholarship Committee, 2011-12
 - ABET Accreditation Committee, 2001-2011
 - Faculty Search Committee Chair, 2004-5, 2008-9
 - Undergraduate Curriculum Committee member, 2004-5, 2008-9
 - Faculty Search Committee member, 2000-2003, 2006-7
 - Chair, ECE Undergraduate Curriculum Committee, 2005-6
 - ECE Program Director Search Committee member, 2004-5
 - New ECE Programs Undergraduate Curriculum Committee, 2000-2
- Miami University School of Engineering & Applied Science
 - Mentor for Women Faculty, 2010-2014
 - Research Award Committee, 2005-7, 2009-13
 - Curriculum Committee, 2012-13
 - Advisor, Society of Woman Engineers, 2008-2010
 - Administrator Evaluation Committee, 2006-7
 - Research Council Member, 2005-7
 - Promotion and Tenure Committee, Mechanical & Manufacturing Eng. Department, 2011-12
- Miami University-wide Services
 - Speaker for numerous alumni, open house, advisory board, and outreach events, 2002-14
 - President 2020 Plan Target Goal Team Member, 2012-13
 - Sigma Xi Researcher of Year Award Committee Member, 2011-12
 - Sigma Xi Researcher of Year Award Committee Chair, 2011
 - Panel member, Academic Success Workshop for International Students, 2010, 2011
 - Search Committee Member, Vice President for Institutional Diversity, 2007
 - Search Committee Member, Associate Provost and Dean of Graduate School, 2005-6
 - Search Committee, Assistant to the President and Associate Provost for Diversity, 2004-5
 - Principle Investigator, the Presidential Fusion Project, 2001-2
- Community Outreach
 - URSI National Radio Science Meeting Student Paper Awards Judge, 2019
 - AGU Outstanding Student Presentation Awards Judge, 2018
 - Co-host and organizer, STEM First Abilities outreach to high school female students, 2011-12
 - Coach, Talawanda High School Robotics Competition Team, 2008-2010
 - Speaker and workshop organizer for numerous Girl Scouts events, 2002-2010

AWARDS AND HONORS

- Fellowship and General Recognition

- Distinguished Performance Award, Aerospace Engineering Sciences Department, University of Colorado Boulder, 2019
- IEEE Aerospace and Electronic Systems Society Distinguished Lecturer, 2019-20
- Thomas F. Austin Faculty Fellow, University of Colorado Boulder, 2017-Present
- Fellow, Royal Institute of Navigation (RIN), 2019
- Fellow, Institute of Navigation (ION), 2015
- GPS World Leadership Service Award, GPS World Magazine, 2015
- Fellow, IEEE, 2014
- Tan Chin Tuan Faculty Fellow, Nanyang Technological University, Singapore, 2014
- Woman's Leadership Award, Miami University, 2013
- Jennie Elder Suel Distinguished Woman of Color Award, Miami University, 2013
- National Research Council/AFOSR Summer Faculty Fellow, 2002, 2003, 2004
- Chinese Ministry of Education, Graduate Fellowship for Studying Abroad, 1985
- Research Awards
 - Richard B. Kerschner Award, IEEE Aerospace and Electronic Systems Society, 2020
 - Best session paper, ION GNSS+ Conference, 2004, 2007, 2011, 2014, 2015, 2016, 2017(2), 2018, 2019
 - Best student presentation co-author, International Sym. GNSS, 2017
 - Samuel M. Burka Award, Editorial Board, Navigation, Journal of ION, 2017
 - Best paper and best presentation, ION Autonomous Snowplow Competition, 2014
 - Thurlow Award, ION, 2013
 - Distinguished Scholar, Miami University, 2013
 - Best paper, Colloquium Sci. Fundamental Aspects Galileo Program, 2013
 - Best paper in track, IEEE/ION PLANS Conference, 2012
 - Outstanding Researcher, School of Eng. & Applied Sci., Miami U., 2005, 2011
 - Best paper, IEEE NAECON, 2011
 - Sigma Xi Researcher of the Year, Miami U., 2009
 - Shoupp Award, Miami University Research Advisory Council, 2001, 2006
 - Charles Ryan Award Nominee, AFRL, WPAFB, 2005
 - Best student paper award, CPGPS International Technical Forum, 2007
 - First place, Annual Graduate Research Exhibition, Penn State University, 1990
- Teaching Awards
 - Finalist, Outstanding Professor Award, Associated Student Gov., Miami Univ., 2012
 - Outstanding Professor Nominee, Associated Student Gov., Miami U., 2004, 2006, 2011
 - Teaching Excellence award, School of Engineering & Applied Sci., Miami U., 2007
 - Teaching Effective Award Nominee, Miami University Alumni Association, 2006, 2007
 - Teaching Excellence Award, Committee for Enhancement of Learning, Miami Univ., 2005
- Advisor for Student Team Competitions Awards
 - 3rd place team advisor, AIAA Student Paper Competition, 2018
 - 1st place team advisor, ION Autonomous Snowplow Competition, 2014
 - 5th place Design Award, Intelligent Ground Vehicle Competition, 2013
 - 2nd place team advisor, ION Autonomous Snowplow Competition, 2013
 - 2nd place team advisor, ION Autonomous Lawnmower Competition, 2012
 - 2nd place team advisor, ION Autonomous Snowplow Competition, 2012
 - 1st place team advisor, Miami U. Interdisciplinary Tech. Dev. Competition (MUITDC), 2012
 - 2nd place advisor, Int. Waveform Diversity & Design Conf. Student Paper Competition, 2012
 - 1st place team mentor, MUITDC, 2011
 - 2nd place team advisor, ION Autonomous Snowplow Competition, 2011
 - 2nd place team mentor, ION MiniUrban Challenge Ohio Competition, 2010
 - 1st place team mentor, ION MiniUrban Challenge Ohio Competition, 2009
 - 2nd place & Best Production Plan advisor, ION Autonomous Lawnmower Competition, 2004

SELECTED FUNDED RESEARCH PROJECTS

- Air Force Office for Scientific Research (AFOSR):
 1. PI: DURIP – Distributed small multi-GNSS arrays for ionospheric and space weather research. *\$430K. 2019-20.*
 2. PI: DURIP - Acquisition of a multi-constellation GNSS data collection array for high latitude ionospheric and space weather research. *\$146K. 2016-17.*
 3. PI: High latitude ionospheric scintillation studies using multi-constellation multi-band software GNSS receivers. *\$396K. 2014-17.*
 4. PI: Developing satellite signal parameter estimation algorithms for high-accuracy applications. *\$650K. 2010-13.*
 5. Co-PI: Precise GPS signal tracking in interference and multipath environment using a multi-channel software receiver. *\$288K. 2008-10.*
 6. PI: Three-frequency based high precision GPS receiver for navigation applications. *\$285K. 2007-10.*
 7. PI: DURIP - A multi-channel dual frequency radio frequency front end for anti-jamming software GPS receiver research. *\$223K. 2007-8.*
 8. PI: Integrated reconfigurable aperture, digital beam forming, and software GPS receiver for UAV navigation. *\$263K. 2004-7.*
 9. PI: Developing signal processing algorithms for weak GPS signal acquisition in urban environment. *\$50K. 2003-4.*
- Air Force Research Laboratory (AFRL):
 10. Co-PI: On-Demand PNT, *\$3.4M. 2020-23.*
 11. PI: Assured PNT through all modalities, *\$1M. 2019-22.*
 12. PI: Investigation of ionospheric effects on new satellite navigation signals. *\$450K. 2019-22.*
 13. PI: Capturing and characterization of the effects of plasma turbulence. *\$66K. 2018-19.*
 14. PI: Advanced novel spectrum warfare environment research. *\$1.521M. 2015-19.*
 15. Co-PI: Software-defined multi-functional LPI/LPD adaptive radar for network-centric applications. *\$255K. 2015-18.*
 16. PI: Collaborative research and development program on navigation and time-keeping with AFRL/RYRN. *\$890K. 2008-15.*
 17. Co-PI: Adaptive radar imaging with knowledge-based SAR. *\$58K. 2012-13.*
 18. PI: LADAR EO GPS/INS Atomic Clock Navigation Demonstration and Worldwide Accurate Sensor Positioning System technical support. *\$120K. 2007-8.*
 19. PI: An integrated spatial digital beam forming and adaptive periodogram technique for interference and jamming cancellation. *\$15K. 2006.*
 20. PI: Integrated navigation reference systems for micro-UAV information applications. *\$65K. 2005-6.*
 21. PI: Algorithm development for GPS interference cancellation. *\$10K. 2002.*
- Air Force Asian Office of Aerospace Research and Development (AOARD):
 22. Co-PI: Determination of precise satellite orbital position using multi-band GNSS signals. *\$100K. 2015-17.*
- Army:
 23. PI: Networked PNT solution (PNT-Net) for GPS-denied navigation, Phase I, \$40K subcontract from QuNav, 2020.
- DARPA:
 24. Co-PI: HEARTBEAT – Heliosphere to Earth Atmosphere Rendering Through Building Excellent Artificial-intelligence Training. *\$1.245M. 2019-22.*
- Dayton Area Graduate Studies Institute:

- 25. PI: Multi-domain analysis of GNSS signals. *\$43.5K. 2013-14.*
- 26. PI: Space weather effects on GNSS. *\$43.5K. 2013-14.*
- 27. Co-PI: Physics-based modeling of sensor environment. *\$43.5K. 2013-14.*
- 28. PI: Advanced GPS receiver algorithms for assured navigation. *\$80K. 2011-13.*
- 29. Co-PI: Cognitive radar for autonomous systems. *\$95K. 2011-13.*
- 30. PI: High accuracy GPS receiver algorithms for navigation. *\$73K. 2008-10.*
- 31. PI: Multi-channel RF receiver/exciter systems. *\$59K. 2006-7.*
- 32. PI: Intelligent sensing and control for autonomous vehicles. *\$43K. 2005-6.*
- DHS:
 - 33. PI: Networked GPS spoofing detection for power systems. Subcontract from University of Illinois Urbana-Champaign. *\$40K. 2017-18.*
- NASA:
 - 34. Co-PI: Phase-delay altimetry from reflected GNSS signals for resolving mesoscale ocean circulation features. *\$623K, 2019-22.*
 - 35. PI: Multi-GNSS radio occultation algorithms development for ionosphere irregularity studies with augmentation from ground-based GNSS networks. *\$800K. 2015-20.*
- NSF:
 - 36. PI: MRI - Acquisition of multi-constellation GNSS data collection arrays for low latitude ionospheric effects studies. *\$253K. 2014-17.*
 - 37. Co-PI: A study on the circulation and structure of metallic ions in the mid-latitude ionosphere. *\$342K. 2007-12.*
 - 38. Co-PI: Dual-beam incoherent scatter radar study of the mesosphere. *\$210K. 2003-6.*
- Office of Naval Research (ONR):
 - 39. Co-PI: STTR – Novel Nanosat Payloads for Naval Weather Needs. Subcontract from ASTRO. Phase I, *\$45K. 2017-18.* Phase II, *\$250K, 2019-21.*
- Private Industries
 - 40. PI: GPS Signal monitoring via machine learning, Lockheed Martin, *\$100K. 2019-20.*
 - 41. PI: Septentrio, Corporate Gift, *\$13K. 2020.*
 - 42. PI: Consortium of Ohio Universities on Navigation and Timekeeping (COUNT) industrial affiliates. *\$230K. 2007-Present.*
 - 43. PI: Honeywell, Ionosphere error research for Ground-Based Augmentation Systems (GBAS). Corporate Gift, *\$35K. 2016-17.*
 - 44. PI: Equipment donations from Freewave Technologies, John Deere/NavCom, Novetal, NPC, Snapper, Symmetricom (now Microsemi), Topcon, and Trimble Navigation. *~\$400K. 2004 - Present.*

CONSULTING SERVICES:

- Honeywell
- General Dynamics
- Quantum Dimension, Inc.

SELECTED invited PRESENTATIONS:

1. IEEE International Geoscience and Remote Sensing Symposium (IGARSS), Invited Presentation: Coherent GNSS Reflection Signal Processing, Big Island, Hawaii, July 2020.
2. European Navigation Conference, Invited Presentation: Expected and unexpected findings in mining massive GNSS data for ionospheric effects, Dresden, Germany, May 2020
3. Zonta District 12, Amelia Earhart Event: Navigating Beyond Borders with GPS, Feb. 2020.

4. IEEE AESS Distinguished Lecture: Satellite Navigation and Sensing, Singapore, January 2020.
5. International Navigation Conference, Keynote presentation: Satellite Navigation and Sensing – A Match Made in Heaven, Edinburgh, UK, 2019.
6. AFOSR: Satellite Navigation and Sensing – A Match Made in Heaven, Washington DC, November 2019.
7. NASA Earth Surface and Interior Workshop Lightning Talk: Multi-GNSS for Remote Sensing Applications, San Diego, CA, November 2019.
8. Stanford PNT Symposium: Synergy between Satellite Navigation and Remote Sensing, Palo Alto, CA, October 2019.
9. NASA Living With A Star Institute: Ionospheric Effects, Impacts, and Mitigation, Jackson, WY, October 2019.
10. Tsinghua University: “Position, Navigation, and Timing Technologies in the 21st Century: Update on the New PNT Books,” Beijing, China, May 2019.
11. Workshop on Ionospheric Forecasting for GNSS Operations in Developing Countries - Findings and Challenges: GNSS for ionosphere and scintillation monitoring, Trieste, Italy, May 2019.
12. University of Michigan: Satellite Navigation and Sensing – A Match Made in Heaven, Ann Arbor, MI, March 2019.
13. Nanyang Technological University: Advanced GNSS Receiver Technologies for Radio Occultation Signals Propagating through Ionosphere and Troposphere Structure, Singapore, January 2019.
14. Joint GEM-CEDAR Workshop: GNSS Data Processing Techniques for Ionosphere Monitoring. Santa Fe, NM, June 2018.
15. CEDAR Workshop: What Are the Goals of Predicting Ionospheric Disturbances from A GPS Perspective? Santa Fe, NM, June 2018.
16. URSI Atlantic Radio Science Meeting: Scintillation Monitoring and Analysis Using Multi-Frequency GNSS Measurements, Gran Canaria, May 2018.
17. Chinese Satellite Navigation Conference, CSNC-ION Panel: Satellite Navigation and Sensing – A Match Made in Heaven, Harbin, China, May 2018.
18. Politecnico di Torino, Natural and Artificial Threats to GNSS Workshop, Keynote Presentation: Satellite Navigation and Sensing – A Match Made in Heaven, Torino, Italy, May 2018.
19. Future Engineering and Global Women’s Symposium: A Better Future Created by Engineering – Ethical Implications of Scientific and Engineering Advances, Changsha, China, April 2018.
20. University of Arizona: Satellite Navigation and Sensing – A Match Made in Heaven, Tucson, AZ, February 2018.
21. URSI National Radio Science Meeting, Plenary Presentation: Radio Navigation Systems – New Challenges and Opportunities, Boulder, CO, January 2018.
22. International Technical Symposium on Navigation and Timing, keynote presentation: Satellite Navigation and Ionosphere Monitoring – Turning a Threat into Signals-of-Opportunity, Toulouse, France, November 2017.
23. URSI General Assembly: Advances in Ionospheric Remote Sensing Using New GNSS Signals. Montreal, Canada, August 2017.
24. Stanford University: Satellite-based Navigation and Sensing – A Match Made in Heaven. Stanford, CA, March 2017.
25. NOAA: GNSS for Space Weather Monitoring. Boulder, CO, Feb. 2017.
26. Science Highlight Presentation at NSF Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR) Workshop: GNSS for Ionosphere Remote Sensing. Santa Fe, NM, June 2016.
27. Stanford University: GNSS for Remote Sensing Applications. Palo Alto, CA, May 2016.
28. AFRL, GNSS Remote Sensing, Kirkland AFB, NM, May 2016.
29. AFRL, Ionospheric Correction for GPS, Kirkland AFB, NM, May 2016.
30. AFRL, Novel Satellite Navigation Signals Design, Albuquerque, NM, May 2016.

31. HAARP Workshop: Ionosphere Heating Effects on Space-Based System. Albuquerque, NM. May 2016.
32. RF Ionosphere Interaction Workshop: Capturing Artificial Heating Effects on GPS Signals and Their Potential Applications. Albuquerque, NM. May 2016.
33. University of Colorado Boulder, Aerospace Engineering Science Department: GNSS for Remote Sensing. Boulder, CO. April 2016.
34. American Geophysical Union (AGU) Meeting: Multi-GNSS for Space Weather Monitoring and Forecasting. San Francisco, CA. December 2015.
35. ION Southern California Section: Multi-GNSS for Distributed Atmospheric Remote Sensing. Los Angeles, CA. November 2015.
36. International Symposium on Equatorial Aeronomy: Longitudinal Dependence of Equatorial Ionospheric Effects Based on an Event-Driven Multi-GNSS Data Collection System. Bahir Dar, Ethiopia. October 2015.
37. CEDAR Workshop: Comparative Characteristics of Equatorial Scintillation Based on Measurements from Jicamarca, Hong Kong, Singapore, Alaska, and Ascension Island. Seattle, WA. June 2015.
38. UNAVCO: Multi-GNSS for Ionospheric Monitoring. Boulder, CO. June 2015.
39. Ionospheric Effects Symposium: High-latitude and Equatorial Ionospheric Scintillation Based on an Event-Driven Multi-GNSS Data Collection System. Alexandria, VA. May 2015.
40. Colorado State University, College of Engineering: Global Navigation Satellite Signals for Space Weather Monitoring. Fort Collins, CO, May 2015.
41. Singapore DSO: Software Defined GNSS Receivers for Atmospheric Remote Sensing. Singapore, January 2015.
42. Jet Propulsion Laboratory: Challenges and Opportunities in Using GNSS for Ionosphere Monitoring. Pasadena, CA, September 2014.
43. The International Union of Radio Science (URSI) General Assembly and Scientific Symposium (GASS): Multi-constellation GNSS observations of equatorial ionospheric scintillation. Beijing, China, August 2014.
44. NAECOM Keynote Presentation: Sensing and Navigation Using Global Navigation Satellite Systems Signals. Dayton, OH, July 2014.
45. The 20th Annual RF Ionospheric Interactions Workshop: GNSS - A Diagnostics Tool for Ionosphere Modification Effects. Arecibo Observatory, Puerto Rico, April 2014.
46. Arecibo Observatory Seminar: Challenges and Opportunities of GNSS in Ionosphere Measurements. Arecibo Observatory, Puerto Rico, April 2014.
47. White House Office for Science and Technology Auroral Workshop: Research and Education on Global Navigation Satellite Signals (GNSS) using HAARP. Washington DC, January 2014.
48. The International Union of Radio Science (URSI) National Radio Science Meeting: Multi-constellation Multi-frequency GNSS Scintillation. Boulder, CO, January 2014.
49. Stanford University PNT Symposium: International Monitoring of Ionosphere. Palo Alto, CA, November 2013.
50. National Academy of Science: Overview of Basic Issues Related to Ionospheric Modification: GNSS Scintillation. Washington DC, May 2013.
51. NOAA: Satellite Navigation Signals for Ionospheric Remote Sensing Applications. Washington DC, May 2013.
52. Plenary Presentation at the Chinese Satellite Navigation Conference: Global Navigation Satellite Signals for Space Weather Research. Wuhan, China, May 2013.
53. Colorado State University: Global Navigation Satellite Systems and Ionospheric Remote Sensing. Fort Collins, CO, April 2013.
54. The Ohio State University: GNSS for Space Weather Studies. Columbus, OH, Feb. 2013.
55. American Geophysical Union (AGU) Meeting: Characteristics of High Latitude Ionosphere Scintillations. San Francisco, CA, Dec. 2012.

56. Stanford University, GPS Lab: Ionosphere Scintillation - Measurement and Analysis, Palo Alto, CA, Dec. 2012.
57. Jicamarca Radio Observatory: Ionosphere Effects on GNSS. Apartado, Peru, Nov. 2012.
58. Illinois Institute of Technology: Ionosphere Scintillation of GNSS Signals. Chicago, IL, Oct. 2012.
59. Polar Aeronomy and Radio Science Workshop: GPS research at HAARP. HAARP, AK, Aug. 2012.
60. AFRL/RYP: GPS Multipath - A Nuisance or Signals-Of-Opportunity? Dayton, OH, July 2012.
61. Coupling, Energetics, and Dynamics of Atmospheric Regions Workshop: Time-Frequency Analysis of GPS Scintillations at HAARP. Santa Fe, NM, June, 2012.
62. New GNSS Algorithms and Techniques for Earth Observations Workshop: How GNSS Signal Processing Alters Signal Parameters: A Cautionary Tale in Using GNSS for Remote Sensing Applications. Hong Kong, May 2012.
63. Ionosphere Interactions Workshop: Capturing GNSS Scintillations at HAARP. Santa Fe, NM, April 2012.
64. Nanyang Technical University: Ionosphere Scintillation of GNSS Signals. Singapore, March 2012.
65. Hong Kong Polytechnic University: GNSS Research at Miami University. Hong Kong, January 2012.
66. ION North Star Section: Ionosphere Effects and other GNSS and RF Navigation Research at Miami. November 2011.
67. CEDAR Workshop: Multiband GNSS Scintillation. Santa Fe, NM, June 2011.
68. AFOSR Program Review: Ionosphere Scintillation Effects on GNSS Receivers. Eglin AFB, June 2011.
69. Chinese Satellite Navigation Conference: GNSS Receivers for Ionosphere Scintillation Studies. Shanghai, China, May 2011.
70. Miami University Farmer Business School: Chinese Science and Technology - History, Recent Development, and Future Outlook. Oxford, OH, Feb. 2011.
71. AFOSR Singapore PNT Workshop: Ionosphere Effects. Honolulu, Hawaii, Dec. 2010.
72. Washington University, Electrical and Systems Engineering Department: A GPS Multipath Estimation and Mitigation Technique for High Accuracy Applications. St. Louis, MO, Oct. 2010.
73. AFRL, Next Generation Radar Workshop: Overview of Miami University Current Radar and Navigation Research Efforts. Dayton, OH, Aug. 2010.
74. CEDAR Workshop: GPS Receivers Measurements of L-Band Ionosphere Scintillations at HAARP, Alaska. Boulder, CO, June 2010.
75. AFOSR Program Review: GPS Multipath Detection, Estimation, and Mitigation Using Multi-Channel Software Receivers. Waltham, MA, June 2010.
76. International Antarctic Science Workshop: Arctic GPS. Albany, NY, May 2010.
77. Virginia Tech: Ionosphere Effect on GPS Measurements and GPS Receiver Algorithms for High Accuracy Applications. Blacksburg, VA, Dec. 2009.
78. Miami University Sigma Xi Researcher of the Year Presentation: The Global Positioning System - Past, Present, and Future. Oxford, OH, Sep. 2009.
79. Johns Hopkins University Applied Physics Research Laboratory: Higher Order Ionosphere Error in GPS Measurements. Laurel, MD, Aug. 2009.
80. University of Calgary: GPS Self-Interference and Mitigation. Calgary, Canada, Jun. 2009.
81. Istituto Superiore Mario Boella: Recent Position, Location, and Navigation Research Activities at Miami University. Torino, Italy, Apr. 2009.
82. Miami University SEAS 50th Anniversary: Position, Location, and Navigation – Anywhere, Anytime. Oxford, OH, Apr. 2009.
83. Stanford University, GPS Lab: Navigation Research at Miami. Palo Alto, CA, May 2008.

84. NAVAIR: Second Order Ionosphere Error Assessment and Low Power Short Delay Multipath Detection. Paxton River, MD, May 2008.
85. ION Dayton Section, Dayton: High Order Ionosphere Error. Dayton, OH, Mar. 2008.
86. IEEE IMS Workshop on Quality of Automotive RF Systems: Evaluation of GPS receivers. San Francisco, CA, Jun. 2006.
87. Department of Mathematics, Miami University: Some Applied Mathematical Problems in Navigation. Oxford, OH, Apr. 2006.
88. Pi Mu Epsilon National Mathematics Society, Miami Chapter: Integrating Digital Beam Forming and Software Receivers for UAV Application. Oxford, OH, Sept. 2005.
89. Nanjing University: Software GPS Receiver. Nanjing, China, June 2005.
90. IEEE IMS Workshop on Software Defined Radio: Integrating Beam Forming and A Software GPS Receiver. Long Beach, CA, Jun. 2005.
91. Miami University Research Advisory Council: Software-Based Global Positioning Systems Receiver and Applications. Oxford, OH, Apr. 2005.
92. Illinois Institute of Technology, ECE Distinguished Speaker Seminar Series: Software GPS Receivers and Applications. Chicago, IL, Dec. 2004.
93. IEEE Cincinnati Chapter: The Miami Red Blade - An Autonomous Lawn Mower. Cincinnati, OH, Oct. 2004.
94. Embry Riddle Aeronautics University: Software GPS Receiver. Daytona Beach, FL., Feb. 2003.
95. Embry Riddle Aeronautics University: Modeling and Measurements of the Upper Atmosphere Electron Density Irregularities. Daytona Beach, FL., Feb. 2003.

PUBLICATONS (Students, post-docs, and research staff names are italicized)

Publications are organized in 3 areas for *journal*, *magazine*, and *conference* papers:

Aera 1. Satellite Navigation Receivers and Signal Processing

Aera 2. GNSS Remote Sensing

Aera 3. Navigation Sensors, System Integration, and Applications

Journal and Magazine Papers in *Area 1. Satellite Navigation Receivers and Signal Processing*:

- J1. *Liu, Y., Y. Morton*, "Automatic detection of ionospheric scintillation-like GNSS satellite oscillator anomaly using a machine leaning algorithm," submitted to *Navigation, J. Institute of Navigation*, 2020.
- J2. *Wang, Y., Y. Morton*, "Coherent GNSS reflection signal processing for high-precision and high-resolution spaceborne applications," accepted, *IEEE Trans. Geosci. Remote Sensing*, 2020.
- J3. *Wang, Y., R. Yang, Y. Morton*, "Kalman filter-based robust closed-loop carrier tracking of airborne GNSS radio-occultation signals," *IEEE Trans. Aero. Elec. Sys.*, 10.1109/TAES.2020.2972248, 2020.
- J4. *Yang, R., D. Xu, Y. Morton*, "Generalized multi-frequency GPS carrier tracking architecture: design and performance analysis," *IEEE Trans. Aero. Elec. Sys.*, DOI:[10.1109/TAES.2019.2948535](https://doi.org/10.1109/TAES.2019.2948535), 2019.
- J5. *Xu, D., Y. Morton*, "GPS navigation data bit decoding error during strong equatorial scintillation," *GPS Solutions*, 22:110, <https://doi.org/10.1007/s10291-018-0775-1>, 2018.
- J6. *Jiao, Y., J. Hall, Y. Morton*, "Performance evaluation of an automatic GPS ionospheric phase scintillation detector using a machine-learning algorithm," *Navigation, J. Institute of Navigation*, 64(3):391-402, DOI: 10.1002/navi.188, Summer 2017.
- J7. *Jiao, Y., J. Hall, Y. Morton*, "Automatic equatorial GPS amplitude scintillation detection using a machine learning algorithm," *IEEE Trans. Aero. Elec. Sys.*, 53(1): 405-418, DOI:10.1109/TAES.2017.2650758, Online ISSN 1557-9603, 2017.

- J8. Lee, J., Y. Morton, J. Lee, H-S. Moon, J. Seo, “Monitoring and mitigation of ionospheric anomalies for GNSS-based safety critical systems: A review of up-to-date signal processing techniques,” Special issue on Advances in Signal Processing for Global Navigation Satellite Systems, *IEEE Signal Proc. Magazine*, 34(5):96-110, DOI: 10.1109/MSP.2017.2716406, 2017.
- J9. Xu D., Y. Morton, “Semi-open loop estimation of GPS carrier phase variations during deep amplitude fading of equatorial ionospheric scintillation,” *IEEE Trans. Aero. Elec. Sys.*, DOI: 10.1109/TAES.2017.2764778, PP(99), 2017.
- J10. Yang, R., K. Ling, E. Poh, Y. Morton, “Generalized GNSS signal carrier tracking in challenging environments: part I – modeling and analysis,” *IEEE Trans. Aero. Elec. Sys.*, 53(4):1782-1797, DOI:10.1109/TAES.2017.2673998, 2017.
- J11. Yang, R., Y. Morton, K. Ling, E. Poh, “Generalized GNSS signal carrier tracking in challenging environments: part II - optimization and implementation,” *IEEE Trans. Aero. Elec. Sys.*, 53(4):1798-1811, DOI:10.1109/TAES.2017.2674198, 2017.
- J12. Chen, X., Y. Morton, “Iterative subspace alternating projection method for GNSS multipath DOA estimation,” *IET Radar, Sonar & Navigation*, DOI: 10.1049/iet-rsn.2015.0508, Online ISSN 1751-8792, 2016.
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- J14. Liu, X., M. Liang, Y. Morton, P. Closas, T. Zhang, and Z. Hong, “Performance evaluation of MSK and OFDM modulations for future GNSS signals,” *GPS Solutions*, doi 10.1007/s10291-01400368-6, 1-13, 2014.
- J15. Kou, Y., Y. Morton, “Oscillator frequency offset impact on software GPS receivers and correction algorithms,” *IEEE Trans. Aero. Elec. Sys.*, 49(4), 2158-2178, 2013.
- J16. Chen, X., Y. Morton, F. Doyis, “A computationally efficient iterative MLE for GPS AOA estimation,” *IEEE Trans. Aero. Elec. Sys.*, 49(4), 2707-2716, 2013.
- J17. Chen, X., F. Doyis, S. Peng, Y. Morton, “Comparative studies of GPS multipath mitigation methods performance,” *IEEE Trans. Aero. Elec. Sys.*, 49(3), 1555-1568, 2013.
- J18. Zhang, L., Y. Morton, “GPS carrier phase spectrum estimation for ionospheric scintillation studies,” *NAVIGATION, J. Institute of Navigation*, 60(2), 113-122, Summer 2013.
- J19. Peng, S., Y. Morton, “A USRP2-based reconfigurable multi-constellation multi-frequency GNSS software receiver front end,” *GPS Solutions*, DOI: 10.1007/s10291-012-0263-y, 2012.
- J20. Brennehan, M., Y. Morton, “Functional bandwidth criterion for adaptive array performance,” *IEEE Trans. Aero. Elec. Sys.*, 46(3), 1226-1235, 2010.
- J21. Brennehan, M., Y. Morton, Q. Zhou, “GPS multipath detection with ANOVA for adaptive arrays,” *IEEE Trans. Aero. Elec. Sys.*, 46(3), 1171-1185, 2010.
- J22. Brennehan, M., Y. Morton, “False alarm rate estimation for information-theoretic-based source enumeration methods,” *EURASIP J. Adv. Signal Processing*, Article ID 697451, doi:10.1155/2009/697451, 2009.
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Journal and Magazine Papers in *Area 2. GNSS Remote Sensing*:

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- J25. Yang, Z., Y. Morton, I. Zakharenkova, I. Cherniak, S. Song, W. Li, “Global view of ionospheric disturbances impacts on kinematic GPS positioning solutions during the 2015 St. Patrick’s Day storm,” revision submitted, *J. Geophys. Res., Space Sci.*, 2020.
- J26. Yang, Z., Y. Morton, “Low-latitude ionospheric scintillations of multi-constellation GNSS signals in relation to magnetic field orientation,” Revision under review, *J. of Geodesy*, 2020.

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- J31. Liu, Y., I. Collett, Y. Morton, "Application of neural network to GNSS-R wind speed retrieval," *IEEE Trans. Geosci. Remote Sensing*, 57(12), 9756-9766, DOI:10.1109/TGRS.2019.2929002, 2019.
- J32. Wang, J., Y. Morton, "A hybrid correlation model for the space-receiver technique," *Radio Sci.*, 54(3), 281-297, <https://doi.org/10.1029/2018RS006662>, 2019.
- J33. Han, B., Y. Morton, E. Gunawan, D. Xu, "Planetary boundary layer height detection using mountain-based radio occultation signal amplitude," *IEEE Trans. Geosci. Remote Sensing*, 57(7), 4332-4348, DOI: 10.1109/TGRS.2018.2890676, 2019.
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- J38. Jiao, Y., C. Rino, Y. Morton, "Ionospheric scintillation simulation on equatorial GPS signals for dynamic platforms," *Navigation, J. Institute of Navigation*, 65(2), 263-274, doi:10.1002/navi.231, 2018.
- J39. Wang, J., Y. Morton, "Ionospheric irregularity drift velocity estimation using multi-GNSS spaced-receiver array during high latitude phase scintillation," *Radio Sci.*, DOI: 10.1002/2017RS006470, 2018.
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- J41. Jiao, Y., D. Xu, Y. Morton, C. Rino, "Equatorial scintillation amplitude fading characteristics across the GPS frequency bands," *Navigation, J. Institute of Navigation*, 63(3), 267-281, 2016. (*Burka Award Winner*)
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- J49. Xu, R., Z. Liu, M. Li, Y. Morton, W. Chen, "An analysis of low-latitude ionospheric scintillation and its effects on precise point positioning," *J. Global Positioning Sys.*, 11(1), 22-32, doi:10.5081/jgps.11.1.22, 2012.
- J50. Matteo, N., Y. Morton, "Ionosphere geomagnetic field: comparison of IGRF model prediction and satellite measurements 1991-2010," *Radio Sci.*, 46, RS4003, doi:10.1029/2010RS004529, 2011.
- J51. Moore, R., Y. Morton, "Magneto-ionic polarization and GPS signal propagation through the ionosphere," *Radio Sci.*, 46, RS1008, doi:10.1029/2010RS004380, 2011.
- J52. Park, J., R. Frese, D. Grejner-Brzezinska, Y. Morton, L. Gaya-Pique, "Ionospheric detection of the 25 May 2009 North Korean underground nuclear test," *Geophys. Res. Lett.*, 38, L22802, doi:10.1029/2011GL049430, 2011.
- J53. Zhou, Q., Y. Morton, C. Huang, N. Aponte, M. Sulzer, and S. Gonzalez, "Incoherent scatter radar observation of E-region vertical electric field at Arecibo," *Geophys. Res. Lett.*, 38, L01101, doi:10.1029/2010GL045549, 2011.
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Journal and Magazine Papers in *Area 3. Navigation Sensors, System Integration, and Applications*:

- J73. Wang, P., Y. Morton, "Performance comparison of time-of-arrival estimation techniques for LTE signals in realistic multipath propagation channels," Revision under review, *Navigation, J. of ION*, 2019.
- J74. Wang P., Y. Morton, "Multipath estimating delay lock loop for LTE signal TOA estimation in indoor and urban environments," accepted, *IEEE Trans. Wireless Comm.*, 2020.
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Conference Papers in *Area I. Satellite Navigation Receivers and Signal Processing*:

- C1. Lu, X., X. Guo, S. Guo, X. Li, K. Jiang, J. Morton, "Update on BeiDou Navigation Satellite System and PNT System," Proc. IEEE/ION PLANS, 2020.
- C2. Chen, X., Y. Morton, D. He, "GPS L1CA/BDS B1I NLOS signal measurements and modeling in dense urban area," Proc. ION ITM/PTTI, San Diego, CA, 2020.
- C3. Liu, Y., Y. Morton, "Machine learning-based automatic detection and characterization of GNSS satellite clock anomaly using dual frequency signals," Proc. ION ITM/PTTI, San Diego, CA, 2020.
- C4. Yang, R., X. Zhan, Y. Wang, Y. Morton, J. Hasse, "Hybrid tracking and position determination using low elevation satellite signals," Proc. ION ITM/PTTI, San Diego, CA, 2020.
- C5. Breitsch, B., Y. Morton, "Robust estimation of diffraction-induced phase transitions and cycle slips during strong ionospheric scintillation," Proc. ION GNSS+, Miami, FL, 2019.
- C6. Liu, Y., Y. Morton, "Automatic detection and characterization of ionospheric scintillation-like GNSS satellite and receiver oscillator anomaly," Proc. ION GNSS+, Miami, FL, 2019.
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- C8. Wang, Y., Y. Morton, "Coherent reflections using closed-loop PLL processing of CYGNSS IF data," Proc. 2019 IEEE Int. Geosci. Remote Sensing Sym., Yokohoma, Japan, July 2019.
- C9. Yang, R., Y. Morton, "Hybrid carrier tracking and position determination using low elevation satellite signals," Proc. ION GNSS+, Miami, FL, Sept. 2018.
- C10. Wang, Y., Y. Morton, R. Yang, F. van Graas, J. Hasse, "Robust closed-loop tracking of airborne low-elevation GPS radio-occultation signals," Proc. ION GNSS+, Miami, FL, Sept. 2018.
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