Andrew Kiyoung **Sun**

kiyoungsun@kaist.ac.kr | **Citizenship:** South Korea & United States

Education

KAIST (Korea Advanced Institute of Science and Technology) — *Daejeon, KR*

Ph.D. in Aerospace Engineering, Advisor: Jiyun Lee, GPA 3.96/4.30 — *Aug. 2020 - Aug. 2025 (Expected)*

- Thesis: GBAS Integrity under Ionospheric Scintillation: Error Characterization, Modeling, and Performance Evaluation

KAIST (Korea Advanced Institute of Science and Technology) — *Daejeon, KR*

M.S. in Aerospace Engineering, Advisor: Jiyun Lee, GPA 3.95/4.30 — *Feb. 2018 - Feb. 2020*

- Thesis: Availability Assessment of Dual-Frequency GNSS based Aviation Applications under Ionospheric Scintillation

KAIST (Korea Advanced Institute of Science and Technology) — *Daejeon, KR*

B.S. in Aerospace Engineering, GPA 3.73/4.30, Cum laude — *Mar. 2013 - Aug. 2017*

Experience

University of Colorado Boulder — *Boulder, CO, US*

Visiting Student Researcher (Smead Aerospace Engineering Sciences, SeNSe Lab, Prof. Jade Morton) — *Apr. 2023 - Oct. 2023*

- Analyzed scintillation effects on LEO-transmitted signals across various carrier frequency bands using a physics-based simulator.
- Evaluated the limitations of the phase screen modeling of scintillation under extreme conditions.

NASA Jet Propulsion Laboratory — *Remote*

Visiting Student Researcher (Ionospheric and atmospheric remote sensing, Dr. Xiaoqing Pi) — *Oct. 2020 - Oct. 2021*

- Analyzed uncertainty in frequency dependence of scintillation index under equatorial ionospheric scintillation.

KAIST (Korea Advanced Institute of Science and Technology) — *Daejeon, KR*

Research Assistant (GNSS Lab, Prof. Jiyun Lee) — *Mar. 2020 - Aug. 2020*

- Develop a Markov chain-based model to generate correlated signal fading processes under ionospheric scintillation.

DLR (German Aerospace Center) — *Oberpfaffenhofen, Bayern, DE*

Visiting Student Researcher (Institute of Communications and Navigation) — *Apr. 2016 - Jul. 2016*

- Analyzed the effects of ionospheric scintillation on GBAS smoothed pseudorange errors.

Honors & Awards

2024	**Best Presentation Award**, ION GNSS+ 2024, Session B2: Trends in GNSS Augmentation Systems	*Baltimore, MD, US*
2019	**Best TA Award**, KAIST, Department of Aerospace Engineering	*Daejeon, KR*
2015, 2017	**Boeing Scholarship**, Boeing Korea & KAIST, Department of Aerospace Engineering	*KR*
2013–2016	**National Excellence Scholarship** , Korea Student Aid Foundation (KOSAF)	*KR*

Journal Papers

Impact of diffraction-induced cycle slips on GNSS augmentation systems under ionospheric scintillation

Sun, A. K., Pullen, S. & Lee, J. — *under revision*

IEEE Transactions on Aerospace and Electronic Systems

Ionospheric Scintillation Effects on LEO-Transmitted Signals Across Multiple Frequency Bands

Sun, A. K., Morton, Y. J., Rino, C., & Lee, J. — *under revision*

NAVIGATION

Do Solar Eclipses Generate Propagating Ionospheric Perturbations?

Sun, A. K., Kil, H., Chang, H., Lee, W. K., & Lee, J. — *Jun. 2025*

Journal of Geophysical Research: Space Physics, 130(6). https://doi.org/10.1029/2025JA033746

Assessment of the Origin of a Plasma Depletion Band Over the United States During the 8 September 2017 Geomagnetic Storm

Kil, H., **Sun, A. K.**, Lee, W. K., Chang, H., & Lee, J., — *Apr. 2024*

Geophysical Research Letters, 51(7). https://doi.org/10.1029/2024gl108334

Statistical Uncertainty in the Frequency Dependence of the Intensity Scintillation Index (S4)

Sun, A. K., Pi, X., Rino, C., & Lee, J. *Jun. 2023*

Radio Science, 58(7). https://doi.org/10.1029/2023rs007659

The Origin of Midlatitude Plasma Depletions Detected During the 12 February 2000 and 29 October 2003 Geomagnetic Storms

Kil, H., Chang, H., Lee, W. K., Paxton, L. J., **Sun, A. K.**, & Lee, J. *Mar. 2022*

Journal of Geophysical Research: Space Physics, 127(3). https://doi.org/10.1029/2021ja030169

Ionospheric Disturbances in Low-and Midlatitudes During the Geomagnetic Storm on 26 August 2018

Chang, H., Kil, H., **Sun, A. K.**, Zhang, S. -R., & Lee, J. *Jan. 2022*

Journal of Geophysical Research: Space Physics, 127(2). https://doi.org/10.1029/2021ja029879

Markov Chain-Based Stochastic Modeling of Deep Signal Fading: Availability Assessment of Dual-Frequency GNSS-Based Aviation Under Ionospheric Scintillation

Sun, A. K., Chang, H., Pullen, S., Kil, H., Seo, J., Morton, Y. J., & Lee, J. *Jun. 2021*

Space Weather, 19(9). https://doi.org/10.1029/2020sw002655

Conference Proceedings

A Method of Estimating Residual Bending Error in GNSS-RO Absolute TEC *Oral*

Chang, J., **Sun, A. K.**, Park, J., Lee, J., & Morton, J. *Jan. 2025*

ION ITM 2025, Long Beach, CA, US, pp. 151-160. https://doi.org/10.33012/2025.20005

Estimation of the Residual Error due to Ionospheric Bending in Relative TEC using COSMIC-2 GPS-RO Measurements *Oral*

Chang, J., **Sun, A. K.**, Lee, J., Chang, H., Wan,g Y., Liu, L., Morton, J., & Hunt, D. *Apr. 2024*

ION PNT 2024, Honolulu, HI, US, pp. 22-35. https://doi.org/10.33012/2024.19607

Ionospheric Scintillation Effects across Multiple Carrier Frequency Bands Transmitted from LEO Satellites *Oral*

Sun, A. K., Morton, Y. J., & Lee, J. *Jan. 2024*

ION ITM 2024, Long Beach, CA, US, pp. 109-125. https://doi.org/10.33012/2024.19525

A Method for Simulating Dynamic Ionosphere Scintillation *Oral*

Breitsch, B., **Sun, A. K.**, & Morton, J. *Jan. 2024*

ION ITM 2024, Long Beach, CA, US, pp. 126-134. https://doi.org/10.33012/2024.19526

Availability Assessment of Dual-Frequency GNSS-Based Augmentation Systems Under Equatorial Ionospheric Scintillations *Oral*

Sun, A. K., Chang, J., Lee, J., Breitsch, B., & Morton, Y. J. *Jan. 2023*

ION ITM 2023, Long Beach, CA, US, pp. 937-949. https://doi.org/10.33012/2023.18617

Network-Based Augmentation System (NBAS) Architectures Optimized to Support Urban Air Mobility (UAM) *Oral*

Lee, J., Nam, G., Min, D., **Sun, A. K.**, & Pullen, S. *Jan. 2023*

ION ITM 2023, Long Beach, CA, US, pp. 441-453. https://doi.org/10.33012/2023.18603

Networked UAV Detection and Alerting of Ionospheric Anomalies within LADGNSS Navigation Framework *Oral*

Nam, G., **Sun, A. K.**, Lee, J., & Pullen, S. *Sep. 2022*

ION GNSS+ 2022, Denver, CO, US, pp. 1529-1536. https://doi.org/10.33012/2022.18424

Performance Benefit from Dual-Frequency GNSS-based Aviation Applications under Ionospheric Scintillation: A New Approach to Fading Process Modeling *Oral*

Sun, K., Chang, H., Lee, J., Seo, J., Morton, Y. J., & Pullen, S. *Jan. 2020*

ION ITM 2020, San Diego, CA, US, pp. 889-899. https://doi.org/10.33012/2020.17184

Conference Presentations

Phase Screen Model for Extreme Scintillations: Evaluating Theoretical Limits in Propagation Approximations — *Oral*

Sun, A. K., Rino, C., Morton, J., Breitsch, B., & Lee, J. — *Dec. 2024*

AGU24, Washington, D.C., US, SA54B-07

Investigation of the Development of Traveling Ionospheric Disturbances during the Total Solar Eclipses on 21 August 2017 and 8 April 2024 — *Poster*

Sun, A. K., Kil, H., Chang, H., Lee, W. K., & Lee, J. — *Dec. 2024*

AGU24, Washington, D.C., US, SH51D-2920

Impact of Phase Transitions Due to Ionospheric Scintillation on GBAS Integrity — *Oral (Best Presentation Award)*

Sun, A. K., Lee, J., & Pullen, S. — *Sep. 2024*

ION GNSS+ 2024, Baltimore, MD, US, B2-5

Assessment of Ionospheric Perturbations during Total Solar Eclipses — *Oral*

Sun, A. K., Kil, H., Chang, H., Lee, W. K., & Lee, J. — *Jul. 2024*

COSPAR 2024, Busan, KR, C1.3-0005-24

Study of the Characteristics and Sources of Late-Night Equatorial Electron Density Irregularities — *Oral*

Sun, A. K., Kil, H., Chang, H., & Lee, J. — *Dec. 2023*

AGU23, San Francisco, CA, US, SA51A-07

Preliminary Assessment of the Residual Error due to Ionospheric Bending in the COSMIC-2 Radio Occultation Total Electron Content by Comparing Results from Single- and Dual-frequency Methods — *Poster*

Chang, J., **Sun, A. K.**, Chang, H., Wang, Y., Liu, L., Hunt, D., Morton, J., & Lee, J. — *Dec. 2023*

AGU23, San Francisco, CA, US, A13I-2273

Performance Assessment of Ionospheric Electron Density Profiles Retrieved from KOMPSAT-5 by Comparing with Ground-based and Space-based Observations — *Poster*

Chang, H., Chang, J., **Sun, A. K.**, Lee, W., Kil, H., & Lee, J. — *Dec. 2023*

AGU23, San Francisco, CA, US, SA23C-2742

Preliminary Assessment of Scintillation Data from the Spire Global and PlanetIQ Radio Occultation Constellation — *Poster*

Chang, H., Lei, L., Morton, J., Durgonics, T., Wang, J., Fuller-Rowell, D. J., Hunt, D., Braun, J., Weiss, J., Chang, J., **Sun, A. K.**, & Lee, J. — *Dec. 2023*

AGU23, San Francisco, CA, US, IN31D-0680

Mid-Latitude Ionospheric Scintillation Impact on Availability of Dual-frequency GNSS Augmentation Systems — *Oral*

Sun, A. K., Chang, J., Lee, J., Breitsch, B., Morton, Y. J., & Pullen, S. — *Sep. 2023*

ION GNSS+ 2023, Denver, CO, US, B1-2

Characteristics and sources of electron density irregularities near and after midnight in the equatorial F region — *Poster*

Kil, H., **Sun, K. A.**, Chang, H., Paxton, L. J., Romina, N., & Lee, J. — *Dec. 2022*

AGU22, Chicago, IL, US, SA55A-03

Study of the drivers of the equatorial ionization anomaly using ICON and COSMIC2 data — *Poster*

Kil, H., Chang, H., **Sun, K. A.**, & Lee, J. — *Dec. 2022*

AGU22, Chicago, IL, US, SA56A-01

Preliminary Results of Electron Density Profiles Retrieved from KOMPSAT-5 Radio Occultation Data — *Poster*

Chang, H., Chang, J., **Sun, K. A.**, Lee, W. K., & Lee, J. — *Dec. 2022*

AGU22, Chicago, IL, US, P42G-2486

GNSS Carrier Frequency Dependence of Ionospheric Scintillation Index in Equatorial Regions — *Oral*

Sun, A. K., Lee, J., Pi, X., Kriegel, M., & Berdermann, J. (Oral) — *Aug. 2021*

URSI GASS 2021, Remote, We-G08-PM3-2

Development of GNSS Ionospheric Impact Analysis and Application Tool *Poster*

Chang, H., Yoon, M., Lee, J., Kim, D., Choi, P. H., **Sun, K. A.**, & Lee, J. *Dec. 2019*

AGU19, San Francisco, CA, US, SA33D-3176

Ionospheric Scintillation Effects on GBAS Ground Station Pseudorange Errors *Poster*

Sun, K. A., Yoon, M., Felux, M., & Lee, J. *Dec. 2018*

AGU18, Washington, D.C., US, SA13C-2790