# Dr. Junsoo Lee

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**Contact Information**

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**Professional Positions**

**Assistant Professor** 2022 – Present
Department of Mechanical Engineering, University of South Carolina

**Graduate Research Assistant** 2019 – 2022
School of Aerospace Engineering, Georgia Institute of Technology

**Graduate Teaching Assistant** 2018 – 2019
School of Aerospace Engineering, Georgia Institute of Technology

**Graduate Research Assistant** 2016 – 2018
Department of Aerospace Engineering, Seoul National University

**Education**

**Ph.D. in Aerospace Engineering**
Georgia Institute of Technology, 2022

**M.S. in Mathematics**
Georgia Institute of Technology, 2021

**M.S. in Aerospace Engineering**
Seoul National University, 2018

**B.S. in Mechanical and Aerospace Engineering**
Seoul National University, 2016

**Publications**

**Archival Journal Publications:**

J1. S. Jadhav and **J. Lee**, "Review on Dual Process Theory: Long-term Autonomous Mission," *IEEE Systems, Man and Cybernetics: Applications and Reviews*, under review.

J2. J. Park, S. Lee, and **J. Lee**, "Motion Planning of Quadrotor UAV via Reinforcement Learning in Unknown Obstacle Environment," *International Journal of Control, Automation and Systems*, vol. 23, no. 10, pp. 3035-3047, 2025.

J3. K. Bojappa, and **J. Lee**, "Review on Particle Swarm Optimization: Application Toward Autonomous Dynamical Systems," *Automatica Sinica*, to appear.

J4. **J. Lee**, S. P. Bhat, and W. M. Haddad, "Nontangency-Based Lyapunov Tests for Convergence and Stability in Discrete-Time Systems," *SIAM Journal of Applied Dynamical Systems*, vol. 24, no. 2, pp. 1711-1751, 2025.

J5. D. Handrick, M. Eckenrode, and **J. Lee**, "Review of Tethered Unmanned Aerial Vehicles: Building Versatile and Robust Tethered Multirotor UAV System", *Dynamics*, vol. 5, no. 2, 2025.

J6. **J. Lee**, W. M. Haddad and M. Lanchares, "Correction to "Finite Time Stability and Optimal Finite Time Stabilization for Discrete-Time Stochastic Dynamical Systems"," *IEEE Transactions on Automatic Control*, vol. 70, no. 8, pp. 5624-5626, 2025.

J7. **J. Lee**, "Geometric semistability for ultimately bounded semistability of discrete-time dynamical systems," *Systems & Control Letters*, vol. 188, article no. 105787, 2024.

J8. **J. Lee** and W. M. Haddad, "Fixed Time Stability of Discrete-Time Stochastic Dynamical Systems," *Automatica*, vol. 163, article no. 111553, 2024.

J9. **J. Lee** and W. M. Haddad, "Fixed Time Stability and Stabilization of Discrete Autonomous Systems," *International Journal of Control*, vol. 96, no. 9, pp. 2341-2355, 2023.

J10. **J. Lee**, W. M. Haddad, and M. Lanchares, "Finite Time Stability and Optimal Finite Time Stabilization for Discrete-Time Stochastic Dynamical Systems," *IEEE Transactions on Automatic Control*, vol. 68, no. 7, pp. 3978-3991, 2023.

J11. W. M. Haddad and **J. Lee**, "Finite-Time Stabilization and Optimal Feedback Control for Nonlinear Discrete-Time Systems," *IEEE Transactions on Automatic Control*, vol. 68, no. 3, pp. 1685-1691, 2023.

J12. W. M. Haddad, **J. Lee**, and S. P. Bhat, "Asymptotic and Finite Time Semistability for Nonlinear Discrete-Time Systems with Application to Network Consensus," *IEEE Transactions on Automatic Control*, vol. 68, no. 2, pp. 766-781, 2023.

J13. W. M. Haddad and **J. Lee**, "Lyapunov Theorems for Stability and Semistability of Discrete-Time Stochastic Systems," *Automatica*, vol. 142, article no. 110393, 2022.

J14. **J. Lee** and W. M. Haddad, "On Finite-Time Stability and Stabilization of Nonlinear Hybrid Dynamical Systems," in *AIMS Mathematics*, vol. 6, no. 6, pp. 5535-5562, 2021.

J15. W. M. Haddad and **J. Lee**, "Finite-Time Stability of Discrete Autonomous Systems," *Automatica*, vol. 122, article no. 109282, pp. 1-8, 2020.

**Conference Proceedings:**

C1. K. Bojappa and **J. Lee**, "Distributed Particle Swarm Optimization Rendezvous for Multi-agent System in Unknown Environment," in proceedings of *Modeling, Estimation and Control Conference*, vol. 59, no. 30, pp. 461-466, 2025.

C2. **J. Lee**, "Lyapunov-like Theorems for Ultimately Bounded Discrete-Time Stochastic Systems," in proceedings of *Modeling, Estimation and Control Conference*, vol. 59, no. 30, pp. 881-886, 2025.

C3. **J. Lee**, S. P. Bhat, and W. M. Haddad, "Nontangency-Based Stability Tests for Discrete-Time Dynamical Systems," in proceedings of *IEEE American Control Conference*, pp. 2368 - 2373, Denver, CO, 2025.

C4. **J. Lee** and W. M. Haddad, "Fixed Time Stability of Discrete-Time Stochastic Dynamical Systems," in proceedings of *IEEE American Control Conference*, pp. 4001-4006, San Diego, CA, 2023.

C5. **J. Lee**, S. P. Bhat, and W. M. Haddad, "Nontangency-Based Lyapunov Tests for Convergence in Discrete-Time Dynamical Systems," in proceedings of *IEEE American Control Conference*, pp. 2424-2429, San Diego, CA, 2023.

C6. **J. Lee** and W. M. Haddad, "Lyapunov Theorems for Finite Time and Fixed Time Semistability of Discrete-Time Stochastic Systems," in proceedings of *IEEE Aerospace Conference*, pp. 1-10, Big Sky, MT, 2023.

C7. **J. Lee** and W. M. Haddad, "Finite and Fixed Time Semistability and Consensus for Discrete-Time Network Systems," in proceedings of *IEEE Mediterranean Conference on Control and Automation*, pp. 809-814, Athens, Greece, 2022.

C8. **J. Lee** and W. M. Haddad, "Fixed Time Stability of Discrete Autonomous Systems," in proceedings of *IEEE Mediterranean Conference on Control and Automation*, pp. 526-531, Athens, Greece, 2022.

C9. **J. Lee**, W. M. Haddad, and M. Lanchares, "Optimal Finite Time Control for Discrete-Time Stochastic Dynamical Systems," in proceedings of *IEEE American Control Conference*, pp. 3500-3505, Atlanta, GA, 2022.

C10. **J. Lee**, W. M. Haddad, and S. P. Bhat "Stochastic Finite Time Stability of Discrete-Time Systems," in proceedings of *IEEE Conference on Decision and Control*, pp. 6646-6651, Austin, TX, 2021.

C11. W. M. Haddad and **J. Lee**, "A Thermodynamic-Based Control Architecture for Semistability and Consensus of Discrete-Time Nonlinear Multiagent Systems," in proceedings of *IEEE Conference on Control Technology and Applications*, pp. 499-504, San Diego, CA, 2021.

C12. W. M. Haddad and **J. Lee**, "Finite-Time Stabilization and Optimal Feedback Control for Nonlinear Discrete-Time Systems," in proceedings of *IEEE Conference on Control Technology and Applications*, pp. 202-207, San Diego, CA, 2021.

C13. W. M. Haddad and **J. Lee**, "Lyapunov Theorems for Semistability of Discrete-Time Stochastic Systems with Application to Network Consensus with Random Communication Noise," in proceedings of *IEEE Mediterranean Conference on Control and Automation*, pp. 892-897, Bari, Italy, 2021.

C14. W. M. Haddad and **J. Lee**, "Asymptotic and Finite Time Semistability for Nonlinear Discrete-Time Systems," in proceedings of *IEEE Mediterranean Conference on Control and Automation*, pp. 1281-1286, Bari, Italy, 2021.

C15. W. M. Haddad and **J. Lee**, "Finite-Time Stability of Discrete Autonomous Systems," in proceedings of *American Control Conference*, pp. 5188-5193, Denver, CO, 2020.

C16. **J. Lee**, N. Cho, and Y. Kim, "Smooth Trajectory Generation and Control of Multirotor with Slung Payload," Asian Pacific International Symposium on Aerospace Technology, Seoul, Republic of Korea, 2017.

C17. **J. Lee**, S. Lee, S.H. Lee and Y. Kim, "Modelling and Simulation of a 6-DOF Quadrotor," Korean Society for Aeronautical and Space Sciences Conference, pp.204-205, Samcheok, Republic of Korea, April 2017.

C18. **J. Lee** and Y. Kim, "Fault Tolerant Controller of Quadrotor Propeller Failure Using Sliding Mode Control Scheme," Korean Society for Aeronautical and Space Sciences Conference, pp. 215-216, Jeju, Republic of Korea, November 2016.

**Textbooks and Monographs**

B1. W. M. Haddad, Q. Hui, and **J. Lee**, *Network Information Systems: A Dynamical Systems Approach,* Philadelphia, PA: Society for Industrial and Applied Mathematics, 2023.

**Book Chapters**

BC1. W. M. Haddad and **J. Lee**, "Lyapunov Theorems for Semistability of Discrete-Time Stochastic Systems with Application to Network Consensus with Random Communication Noise," in *Smarter Cyber Physical Systems: Enabling Methodologies and Applications*, K. Vamvoudakis and F. L. Lewis, Eds., CRC Press, 2025.

**Poster Presentations**

P1. H. Lutz and J. Lee, "Finite Time High Precision Control of Robotic Arm Manipulator," USC Discover, Columbia, SC, April 2026.

P2. S. Yadav, D. Handrick, and J. Lee, "Robust Control Framework for Retractable Tether Multirotor UAVs (RTMUAV)," USC Discover, Columbia, SC, April 2026.

P3. A. Spina and J. Lee, "Flywheel Mechanism-Based Human-Mounted Fixed-Wing Unmanned Aerial Vehicle Launch Platform," USC Discover, Columbia, SC, April 2026.

P4. H. Lutz and J. Lee, "Finite Time Control and Set Valued Map," Modeling, Estimation and Control Conference, Pittsburgh, PA, October 2025.

P5. S. Yadav, D. Handrick, and J. Lee, "Retractable Tether Multirotor Unmanned Aerial Vehicle," Modeling, Estimation and Control Conference, Pittsburgh, PA, October 2025.

P6. K. Bojappa and J. Lee, "Thermodynamic Particle Swarm Optimization for Multi-agent System in Unknown Environment," USC Discover, Columbia, SC, April 2025.

P7. H. Lutz and J. Lee, "Realizing Digital Finite Time Control by Implicit Discretization," USC Discover, Columbia, SC, April 2025.

P8. M. Eckenrode, D. Handrick, and J. Lee, "Collaborative Tethered Unmanned Aerial Vehicle," USC Discover, Columbia, SC, April 2025.

P9. K. Bojappa and J. Lee, "Particle Swarm Optimization for Rendezvous Point Selection for Multi-Agent Systems in an Unknown Environment," USC Discover, Columbia, SC, April 2024.

P10. D. Handrick and J. Lee, "Tethered Unmanned Aerial Vehicles: Cable Dynamics and Collaborative Controls," USC Discover, Columbia, SC, April 2024.

P11. J. Lee, "Fixed Time Semistability for Discrete-Time Network Systems," UKC, Washington DC, August 2022.

## Invited Talks & Workshops

### Invited Talks

T1. **J. Lee**, "Designing Autonomous Networked Systems," Universidad San Francisco de Quito, Online, February 2026.

T2. **J. Lee**, "Achieving Finite Time Stability," *Smart Air Mobility Seminar*, Korea Aerospace University, Online, July 2024.

T3. **J. Lee**, "Application of Dynamical System Theory to Stochastic Dynamical System," *Smart Air Mobility Seminar*, Korea Aerospace University, Online, July 2023.

T4. **J. Lee**, "Networked Control System: Dynamical Systems Approach," *University of South Carolina Research Seminar Series*, Columbia, SC, US, March 2023.

T5. **J. Lee**, "Research Outside of Boundary," *BC-UofSC exploreCSR 2022-2023*, Columbia, SC, US, February 2023.

T6. **J. Lee**, "Navigating Graduate School Admissions and Challenges of Academia," *KSEA Ygnite*, San Jose, CA, US, January 2023.

T7. **J. Lee**, "Dynamical Systems Approach on Network Systems," *SNU Aerospace Seminar*, Seoul National University, Seoul, Republic of Korea, December 2022.

T8. **J. Lee**, "Dynamical Systems Approach on Network Systems," *CNU Aerospace BK21 & Colloquium Series*, Chung-Nam University, Daejeon, Republic of Korea, December 2022.

T9. **J. Lee**, "Dynamical Network Systems: Consensus Problem," *Smart Air Mobility Seminar*, Korea Aerospace University, Online, July 2022.

**Professional Services**

**Professional Societies:**

Member, Institute of Electrical and Electronics Engineers (IEEE)

- Member, IEEE Control Systems Society (CSS)
- Member, IEEE Systems, Man, and Cybernetics Society (SMCS)

Member, American Institute of Aeronautics and Astronautics (AIAA)

Member, Society for Industrial and Applied Mathematics (SIAM)

- Member, SIAM Activity Groups on Control & Systems Theory (SIAG CST)
- Member, SIAM Activity Groups on Dynamical Systems (SIAG DS)

Member, The American Society of Mechanical Engineers (ASME)

Member, Korean-American Scientists and Engineers Association (KSEA)

**Reviewers:**

**Archival Journals**

- Automatica
- IEEE Transactions on Automatic Control (IEEE TAC)
- IEEE Transactions on Systems, Man and Cybernetics: Systems (IEEE TSMC: Systems)
- IEEE Control Systems Letters (IEEE L-CSS)
- IEEE Transactions on Control of Network Systems (IEEE TCNS)
- International Journal of Robust and Nonlinear Control
- International Journal of Control (IJC)
- European Journal of Control (EJC)
- SIAM Journal on Control and Optimization (SICON)
- Nonlinear Analysis: Hybrid Systems (NAHS)
- Systems & Control Letters (SCL)
- Journal of Spacecraft and Rockets (JSR)
- Philosophical Transactions of The Royal Society A
- Applied Mathematics and Computation (AMC)
- The Journal of the Franklin Institute (JFI)
- Asian Journal of Control (AJC)
- IEEE/CAA Journal of Automatica Sinica (JAS)
- Aerospace Science and Technology (AESCTE)
- Mathematics

**Research grants**

- NSF Electrical, Communications and Cyber Systems (ECCS)
- NSF Foundational Research in Robotics (FRR)
- NSF Dynamics, Control and Systems Diagnostics (DCSD)

**Conferences**

- IEEE American Control Conference (ACC)
- IEEE Conference on Control Technology and Applications (CCTA)
- IEEE Conference on Decision and Control (CDC)
- AIAA SciTech

**Conference organization:**

- Associate Editor, 2024 International Conference on Unmanned Aircraft Systems (ICUAS)
- Session Chair, 2023 IEEE American Control Conference (ACC)
- Associate Editor, 2023 International Conference on Unmanned Aircraft Systems (ICUAS)
- Session Co-Chair, 2021 IEEE Conference on Control Technology and Applications (CCTA)

**Teaching Experience**

**Instructor, University of South Carolina**
AESP420: Flight & Orbital Mechanics
AESP466: Flight Dynamics & Control
EMCH367: Controls
EMCH792: Nonlinear Control

**Teaching Assistant, Georgia Institute of Technology**
Dynamics and Control Laboratory Fall 2018, Spring 2019, Fall 2019

**Teaching Assistant, Seoul National University**
Theory of Flight Vehicle Guidance and Control Spring 2017, Fall 2017