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ACADEMIC AFFILIATION

September 2021 - Present Assistant Professor, Department of Mechanical and Aerospace Engineering,
University of Florida

EDUCATION

August 2021 Ph.D., Mechanical Engineering, Cornell University
December 2019 M.S., Mechanical Engineering, Cornell University
February 2017 B.S., Naval Architecture and Ocean Engineering, Seoul National University
Summa Cum Laude

PUBLICATION

Journal Articles

1. M. Jeon, H. Kang, H.-S. Jin, G. R. Cho, J. Shin, and S. Lee, “A Learning Framework for Detecting Underwater Glare Areas Using Pixel Clustering and Color-Based Segmentation with Pseudo-Labels,” (Under review)
2. A. Pulido, J. Sforza, J. Parker, A. Diaz, N. Sardinia, B. Sanders, S. Ali, A. Baker, A. Theophanis, D. Minogue, T. Chase, A. Baker, P. Ifju, and J. Shin, “Autonomous Bathy-drone: An Autonomous Aerial-Aquatic Robotic System for Bathymetric Mapping with Input-Driven Path Planning and Surface Navigation and Control,” (Under review)
3. H. Jeon, E.-h. Lee, J. Shin, and S. Lee, “Image Inpainting-Based Point Cloud Restoration for Enhancing Tactical Classification of Unmanned Surface Vehicles,” *Sensors*, vol. 26, no. 5, 2026, ISSN: 1424-8220. DOI: 10.3390/s26051637
4. A. Penumarti, H. Ramos, K. Waters, K. Brink, and J. Shin, “Real-Time Uncertainty-Aware Motion Planning for Magnetic-Based Navigation,” *IEEE Access*, vol. 14, pp. 23 824–23 834, 2026. DOI: 10.1109/ACCESS.2026.3661848
5. D. Jung, A. Pulido, J. Shin, and S.-W. Kim, “Point Cloud Structural Similarity-Based Underwater Sonar Loop Detection,” *IEEE Robotics and Automation Letters*, vol. 10, no. 4, pp. 3859–3866, 2025. DOI: 10.1109/LRA.2025.3547304

6. J. Kim, H.-J. Park, A. Penumarti, and J. Shin, "Fast Marching Based Rendezvous Path Planning for a Team of Heterogeneous Vehicles," *IEEE Access*, vol. 12, pp. 122 609–122 623, 2024. DOI: 10.1109/ACCESS.2024.3444314
7. M. J. Bays, T. A. Wettergren, J. Shin, S. Chang, and S. Ferrari, "Persistent Schedule Evaluation and Adaptive Re-planning for Maritime Search Tasks," *Journal of Intelligent & Robotic Systems*, vol. 110, no. 2, pp. 1–18, 2024
8. A. Paradise, S. Surve, J. C. Menezes, M. Gupta, V. Bisht, K. R. Jang, C. Liu, S. Qiu, J. Dong, J. Shin, and S. Ferrari, "RealTHASC-A Cyber-Physical XR Testbed for AI-Supported Real-Time Human Autonomous Systems Collaborations," *Frontiers in Virtual Reality*, vol. 4, p. 1 210 211, 2023
9. A. L. Diaz, A. E. Ortega, H. Tingle, A. Pulido, O. Cordero, M. Nelson, N. E. Cocoves, J. Shin, R. R. Carthy, B. E. Wilkinson, and P. G. Ifju, "The Bathy-Drone: An Autonomous Uncrewed Drone-Tethered Sonar System," *Drones*, vol. 6, no. 10, 2022, ISSN: 2504-446X. [Online]. Available: <https://www.mdpi.com/2504-446X/6/10/294>
10. J. Shin, S. Chang, J. Weaver, J. C. Isaacs, B. Fu, and S. Ferrari, "Informative Multiview Planning for Underwater Sensors," *IEEE Journal of Oceanic Engineering*, vol. 47, no. 3, pp. 780–798, 2022. DOI: 10.1109/JOE.2021.3119150

Conference Papers

1. Z.-H. Zhang, A. Pulido, K. Volle, and J. Shin, "Multi-Target Tracking under Intermittent Measurements using Motion Model Learning and Information-driven Guidance," (Under review)
2. Y. Park and J. Shin, "A Hybrid Model-Based and Model-Free Framework for Active Multi-View Viewpoint Optimization in Sonar Target Recognition," (Under review)
3. Y.-L. Wu and J. Shin, "An End-to-End Radar-Camera Pipeline for Real-Time State Estimation," (Under review)
4. G. Puthumanaim, A. Penumarti, M. Vora, P. Padrao, J. Fuentes, L. Bobadilla, J. Shin, and M. Ornik, "Belief-Conditioned One-Step Diffusion: Real-Time Trajectory Planning with Just-Enough Sensing," in *Conference on Robot Learning*, PMLR, 2025, pp. 68–92
5. Z.-H. Zhang, E. B. Herrin, J. Guo, A. Penumarti, Z. He, A. Pulido, and J. Shin, "Action Recognition for Underwater Gesture Communication in Human Diver and Robot Teaming," in *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2025, pp. 16 939–16 946
6. A. Pulido, K. Volle, Z. I. Bell, and J. J. Shin, "Transformer-based Motion Model for Robust Target Tracking under Intermittent and Noisy Measurements," in *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2025, pp. 21 333–21 338
7. Z.-H. Zhang, J. K. Scheuller, and J. Shin, "Integrated observer-based Kalman filter and LQR control with Lyapunov stability analysis for tractor-trailer systems," in *Canadian Society for Bioengineering/ASABE Annual International Meeting*, Toronto. 13-16 July, 2025, Paper No. 2500936

8. E. B. Herrin, A. Penumarti, A. Pulido, N. Iyer, Y.-L. Wu, K. Lewellen, T. Fitzsimmons, and J. Shin, “Lessons from RAITE: Real-World Evaluation of Robust Multi-Modal Target Detection and Tracking under Adversarial Attacks,” in *Disruptive Technologies in Information Sciences IX*, M. Blowers and B. T. Wysocki, Eds., International Society for Optics and Photonics, vol. 13480, SPIE, 2025, p. 134800I. DOI: 10.1117/12.3053971. [Online]. Available: <https://doi.org/10.1117/12.3053971>
9. A. Penumarti, N. Iyer, L. Park, K. L. Waters, J. H. Ramos, and J. Shin, “Neural Network-Based Magnetometer Sensor Model for Virtual Magnetic-Based Navigation Testbed,” in *AIAA SCITECH 2025 Forum*, 2025, p. 0562
10. A. Pulido, K. Volle, K. Waters, Z. I. Bell, P. Ganesh, and J. Shin, “Uncertainty-Aware Guidance for Target Tracking subject to Intermittent Measurements using Motion Model Learning,” in *2025 American Control Conference (ACC)*, 2025, pp. 3140–3145. DOI: 10.23919/ACC63710.2025.11107429
11. S. Koo, S. Youm, and J. Shin, “Cycle-GAN-based Synthetic Sonar Image Generation for Improved Underwater Classification,” in *Ocean Sensing and Monitoring XVI*, SPIE, vol. 13061, 2024, pp. 69–83
12. A. Pulido, B. Sanders, N. Sardinia, A. Diaz, H. Tingle, P. Ifju, and J. Shin, “Coverage Path Planning of a Drone-Tethered Boat for Bathymetry Mapping from Remote Sensing Imagery,” in *AIAA SCITECH 2024 Forum*, 2024, p. 1204
13. B. Herrin, V. Close, N. Berner, J. Hebert, E. Reussow, R. James, C. Woodward, J. Mindlin, S. Paez, N. Bretas, *et al.*, “Modularis: Modular Underwater Robot for Rapid Development and Validation of Autonomous Systems,” in *OCEANS 2023-MTS/IEEE US Gulf Coast*, IEEE, 2023, pp. 1–7
14. A. Pulido, A. Diaz, A. Ortega, P. Ifju, and J. Shin, “Trajectory Planning and Control of Bathy-drone: A Drone Towing a Boat equipped with Sonar for Bathymetry Mapping,” in *AIAA SCITECH 2023 Forum*, 2023, p. 1811
15. J. H. Ramos, J. Shin, K. Volle, P. Buzaud, K. Brink, and P. Ganesh, “Information-Aware Guidance for Magnetic Anomaly based Navigation,” in *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022, pp. 6347–6354. DOI: 10.1109/IROS47612.2022.9981709
16. J. Shin, S. Chang, M. J. Bays, J. Weaver, T. A. Wettergren, and S. Ferrari, “Synthetic Sonar Image Simulation with Various Seabed Conditions for Automatic Target Recognition,” in *OCEANS 2022, Hampton Roads*, 2022, pp. 1–8. DOI: 10.1109/OCEANS47191.2022.9977275
17. A. Pulido, R. Qin, A. Diaz, A. Ortega, P. Ifju, and J. J. Shin, “Time and Cost-Efficient Bathymetric Mapping System using Sparse Point Cloud Generation and Automatic Object Detection,” in *OCEANS 2022, Hampton Roads*, 2022, pp. 1–8. DOI: 10.1109/OCEANS47191.2022.9977073
18. J. Shin, F. Kim, and S. Ferrari, “Deep Generative Model and Reinforcement Learning Solutions to Traveling Salesman Problems with Unit Circles,” in *AIAA SCITECH 2022 Forum*, 2022, p. 2209. DOI: 10.2514/6.2022-2209

19. S. Chang, J. Isaacs, B. Fu, J. Shin, P. Zhu, and S. Ferrari, “Confidence Level Estimation in Multi-Target Classification Problems,” in *Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XXIII*, International Society for Optics and Photonics, vol. 10628, 2018, p. 1062818

GRANT AND CONTRACT SUPPORT

1. “FRR: Underwater Robot Navigation and Localization During Recovery by Optical Homing and Penning”
Sponsor: National Science Foundation (NSF)
Institutions: University of Florida
PI: Jahid Islam (UF) Co-PIs: Sanjeev Koppal (UF), Jane Shin (UF)
Total Award: \$599,503 (Shin share: \$93,793)
Project Dates: January 1, 2024 - December 31, 2026
2. “Information-driven Trajectory Planning for Multi-Agent Target Tracking under Uncertainty”
Sponsor: Air Force Research Laboratory (AFRL)
Institutions: University of Florida
PI: Jane Shin (sole PI)
Total Award: \$573,976
Project Dates: February 1, 2023 - January 31, 2026
3. “The “Bathy-drone” for Underwater Survey, Mapping and Inspection”
Sponsor: AURIGO SOFTWARE TECHNOLOGIES
Institutions: University of Florida
PI: Peter Ifju (UF), Co-PI: Jane Shin
Total Award: \$575,452 (Shin share: \$181,890)
Project Dates: November 1, 2022 - October 31, 2024
4. “The “Bathhydrone” for Underwater Survey, Mapping and Inspection”
Sponsor: AURIGO SOFTWARE TECHNOLOGIES
Institutions: University of Florida
PI: Peter Ifju (UF), Co-PI: Jane Shin
Total Award: \$50,000 (Shin share: \$16,667)
Project Dates: July 13, 2022 - December 31, 2022
5. “I-Corps: Real-time intelligent sensor path planning based on information value estimation”
Sponsor: National Science Foundation (NSF) Division Of Industrial Innovation & Partnerships
Institutions: Cornell University
PI: Silvia Ferrari, Entrepreneurial Lead: Jane Shin, Technical Lead: Carlos Diaz-Ruiz, Mentor: Nathan Cook (Cornell University)
Total Award: \$50,000
Project Dates: August 1, 2020 – January 31, 2023

AWARDS

2025-2026 2025	IEEE Oceanic Engineering Society (OES) Young Professional (YP)-Boost Laureate Won, as Team Vatn Systems, the UUV Autonomous Mission Operations Development: Tire Detection Challenge, which is sponsored by Naval Undersea Warfare Center (NUWC) Division, Keyport in conjunction with the Office of Naval Research (ONR)/NavalX
2020	Cornell Commercialization Fellowship
2019	Scientific Rigor, Sibley Graduate Research Symposium, Cornell University, Ithaca, NY
2014-2017	National Science & Technology Scholarship, South Korea
2014	SNU Tomorrow's Edge Membership, College of Engineering, Seoul National University
2013-2014	Semester Honor Scholarship, Seoul National University

PROFESSIONAL AND HONOR SOCIETY MEMBERSHIPS

- Member, Institute of Electrical and Electronics Engineers (IEEE)
- Member, American Institute of Aeronautics and Astronautics (AIAA)
- Member, The International Society for Optics and Photonics (SPIE)

TEACHING

Spring 2026	EML6934/4930: Sensor-based Robot Planning <i>Instructor, University of Florida</i> Course covers the theory on classical robot path and motion planning algorithms and advanced topics on sensor-based robot planning algorithms.
Spring 2025	EML4312: Control of Mechanical Engineering Systems <i>Instructor, University of Florida</i> Course covers the fundamentals of classical control theory, including system analysis in frequency-domain, controller design, and state space systems. Instructor evaluation: 4.74/5.00 (response rate was 109/113 (96.5%))
Fall 2024	EML4312: Control of Mechanical Engineering Systems <i>Instructor, University of Florida</i> Instructor evaluation: 4.61/5.00 (response rate was 79/80 (98.8%))
Spring 2024	EML6934/4930: Sensor-based Robot Planning <i>Instructor, University of Florida</i> Instructor evaluation: 4.63/5.00 (response rate was 32/32 (100%))
Fall 2023	EML4312: Control of Mechanical Engineering Systems <i>Instructor, University of Florida</i> Instructor evaluation: 4.85/5.00 (response rate was 48/48 (100%))
Spring 2023	EML4312: Control of Mechanical Engineering Systems <i>Instructor, University of Florida</i> Instructor evaluation: 4.84/5.00 (response rate was 39/40 (98%))
Fall 2022	EML4312: Control of Mechanical Engineering Systems

Instructor, University of Florida
 Instructor evaluation: 4.67/5.00 (response rate was 30/40 (75%))
 Spring 2022 EML4312: Control of Mechanical Engineering Systems
Instructor, University of Florida
 Instructor evaluation: 4.29/5.00 (response rate was 88/102 (86%))
 Spring 2020 MAE6780/ECE6780: Multivariable Control
Teaching Assistant, Cornell University
 Fall 2020 MAE6790/ECE6960: Intelligent Sensor Planning and Control
Teaching Assistant, Cornell University

PRESENTATIONS AND INVITED TALKS

2025 Presented the invited talk “Active Perception in Dynamic and Uncertain Environment” at the Korean Academy of Marine Science / SUN 10-10 Initiative 2025 Regular Symposium, November 21, 2025

2025 Presented the invited talk “Active Perception in Dynamic and Uncertain Environment” as a Keynote Speaker at Korean Marine Robot Technology Society (KMRTS) 2025 Fall Workshop, November 20, 2025

2025 Presented invited the talk “Active Perception in Dynamic and Uncertain Environment” at Kongju National University Workshop, November 14, 2025

2025 Presented the talk “Uncertainty-Aware Active Perception with Heterogeneous Sensing” at the ONR Science of Autonomy Program Review Meeting, August 5, 2025

2025 Presented the invited talk “Active Perception in Dynamic and Uncertain Environment” at Korea Research Institute of Ships and Ocean Engineering (KRISO), June 22, 2025

2024 Presented the invited talk “Robot planning for underwater sensing and perception” at Avikus.ai, December 21, 2024

2024 Presented the invited talk “Robot planning for underwater sensing and perception” at KAIST Kim’s Lab, December 18, 2024

2024 Presented the invited talk “Robot planning for underwater sensing and perception” at the Chungnam National University, December 18, 2024

2024 Presented the invited talk “Robot planning for underwater sensing and perception” at the University of Maryland Maryland Robotics Center, October 4, 2024.

2024 Presented the invited talk “Sensing-based Robot Planning in Large and Uncertain Environment” at the AFOSR MURI: Fast Lexicographic Agile Perception (FLAP) Review meeting, September 19, 2024

2024 Presented the talk “Robot planning for underwater sensing and perception” at the ONR Science of Autonomy Program Review Meeting, July 30, 2024.

2024 Presented the talk “AI in Underwater Robotics” at Korean-American Scientists and Engineers Association (KSEA) Southeastern Regional Conference SERC 2024, March 30, 2024.

2023 Presented the invited talk “Sensor-Based Planning for Autonomous Underwater Robotics Systems” at Naval Research Laboratory (NRL) Virtual Machine Learning (ML) Seminar, September, 2023.

- 2023 Presented the invited talk “Sensor-Based Planning for Autonomous Underwater Robotics Systems” at a departmental seminar inviting outstanding female scholars in Naval Architecture and Ocean Engineering at Seoul National University, July, 2023.
- 2023 Presented the invited talk “Information-Driven Sensor Planning for Underwater Target Identification” at Underwater Surveillance Workshop at the 18th Korea Robotics Society Annual Conference (KRoC), February, 2023.
- 2023 Presented the invited talk “Active Sensing and Perception in Uncertain and Dynamic Environment” at Seoul National University, January, 2023.
- 2022 Presented the talk “Information Fusion for Automatic Target Acquisition using Heterogeneous Sensors” at AIAA Local Chapter and UF REEF’s End of Summer Talk Series, August, 2022
- 2022 Presented the invited talk “Information-Driven Sensor Planning for Underwater Target Identification” at AFRL/RW’s 2022 Summer Faculty Fellowship Program (SFFP) Seminar Series, July, 2022
- 2022 Presented the invited talk “Information-Theoretic Approach for Active Perception” at Amazon Lab 126, May, 2022.
- 2022 Presented the invited talk “Active Sensing and Perception for Autonomous Underwater Missions” at an Eco-friendly Smart Ship Seminar at Seoul National University, May, 2022.
- 2021 Presented the talk “Active Perception: Intelligent Search and Survey” at the MAE Department Seminar at the University of Florida, March, 2021.

OUTREACH

- 2022 Led a round table discussion with female students in the department of Naval Architecture and Ocean Engineering at Seoul National University about careers for women in STEM, June, 2022.

PROFESSIONAL EXPERIENCE

- August 2020 **NSF I-Corps**
Entrepreneur Lead, 2020 Summer Cohort, Austin, TX
 Developed a business model canvas to commercialize my research on information-driven planning by interviewing more than 100 professionals in autonomous driving industry for customer discovery
- 2020 **Cornell Commercialization Fellowship**
2020 Cohort, Cornell University, Ithaca, NY
 Led a team of five MBA students to further develop business model after NSF I-Corps, focusing on intellectual properties, partnership, and minimal viable product development
- 2017-2021 **Laboratory for Intelligent Systems and Controls**
Research Assistant, Cornell University, Ithaca, NY

	Collaboration with Naval Surface Warfare Center (NSWC) Panama City on a mine-countermeasure project to develop information-driven path planning algorithms and perform sea-trials
2016-2017	Marine Control Robotics Laboratory <i>Undergraduate Research Intern</i> , Seoul National University, Seoul, Korea Thesis: Real-time hardware-in-the-loop simulation (HILS) of dynamic positioning of a rig
January 2016	Lloyd's Register <i>Intern</i> , Singapore, Singapore
Jan.-Jul. 2015	Fluid Structure Interaction Laboratory <i>Research Intern</i> , Polytechnique Montréal, Montreal, Canada
August 2014	Samsung Heavy Industry <i>Intern</i> , Geoje, Korea
July 2014	Hyundai Heavy Industry <i>Intern</i> , Seoul, Korea

GRADUATE STUDENT SUPERVISION

Ph.D. Dissertations Supervised and Funded

1. Zi-Hao Zhang, "Robust and Active Perception in Underwater Systems via Perceptual State Representations," Department of Mechanical and Aerospace Engineering, University of Florida, degree expected in Spring 2030.
2. Aditya Penumarti, "Magnetic-based Long-duration Navigation, Localization, and Mapping," Department of Mechanical and Aerospace Engineering, University of Florida, degree expected in Spring 2028.
3. Andres Pulido, "Sensor-based Uncertainty-aware Planning under Intermittent and Uncertain Sensing Environment," Department of Mechanical and Aerospace Engineering, University of Florida, December 2025.

Masters Theses Supervised

1. You-Long Wu, "Multi-modal Active Sensing for Target Tracking in Adversarial Environments," Department of Mechanical and Aerospace Engineering, University of Florida, degree expected in Spring 2026.
2. Yongkyoon Park, "Hybrid Model based and Model Free Framework for Active Multiview Viewpoint Optimization in Sonar Target Recognition," Department of Electrical and Computer Engineering, University of Florida, degree expected in Spring 2026.
3. Seonbeom Kim, "Enhancing Robust Perception in Adversarial Environments via Retraining using Attack Data," Department of Mechanical and Aerospace Engineering, University of Florida, degree expected in Spring 2026.
4. Nico de Jung, "Insect-inspired perception and planning for an efficient navigation system in dim light conditions," Department of Mechanical and Aerospace Engineering, University of Florida, December 2025.

5. Sunmo Koo, “Enhancing Underwater Automatic Target Recognition through Cycle-GAN-Based Synthetic Sonar Image Generation,” Department of Mechanical and Aerospace Engineering, University of Florida, August 2024.
6. Ruoyao Qin, “Computational and Physical Experiments on Autonomous Underwater Object Detection with Low-cost Imaging sonar and Computer Graphics Simulations,” Department of Mechanical and Aerospace Engineering, University of Florida, December 2022.

Undergraduate Honors Theses Supervised (AI Scholars)

1. Nikhil Iyer, “A Neural Approach for Magnetic Anomaly Field Mapping for Magnetic-based Navigation,” Department of Electrical and Computer Engineering, University of Florida, degree expected in Spring 2026.