

Jongseok Lee

Curriculum Vitae

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Research Interests

My research focuses on three interconnected themes: *uncertainty-aware robot perception*, *robust robotic manipulation under uncertainty*, and the *deployment of advanced robotic systems in real-world applications*. My long-term vision is to establish a probabilistic foundation for the perception-action loop and validate it through industrial applications and deployments, enabling robotic systems that are highly capable, safe, and trustworthy.

Keywords: Probabilistic Robotics · Robotic Manipulation · Field Robotics

Appointments

- Since 2026 **Nanyang Assistant Professor**, *School of Mechanical and Aerospace Engineering*, Nanyang Technological University (NTU), Singapore
- 2017–2026 **Research Scientist** (Full-time Position), *Institute of Robotics and Mechatronics*, German Aerospace Center (DLR), Germany

Education

- 2020–2025 **Ph.D. in Computer Science**, *Karlsruhe Institute of Technology*, Germany
- Ph.D. Thesis: *Uncertainty in Deep Learning: A Probabilistic Robotics Perspective*, supervised by Rudolph Triebel and Tamim Asfour
 - Graduated with Summa Cum Laude (highest distinction)
- 2015–2017 **M.Sc. in Robotics, Systems and Control**, *ETH Zürich*, Switzerland
- Master Thesis: *High Fidelity Modelling for High Altitude Long Endurance Solar Powered Aircraft*, supervised by Roland Siegwart
- 2011–2014 **B.Sc. in Aerospace Engineering**, *Delft University of Technology*, Netherlands

Honors & Awards

- 2026 **Georges Giralt PhD Finalist Award**
Top-3 best European thesis in robotics from 2025; European-level dissertation prize
- 2024 **KUKA Innovation Finalist Award**
Awarded for a project on collaborative robots in textile manufacturing (Team Yantra)
- 2023 **KUKA Innovation Finalist Award**
Awarded for a project on aerial manipulation called SPIRIT (Team Leader)
- 2023 **HIDA Trainee Network Grant**
Funding for a three-month research stay at Helmholtz research centers

- 2020–2023, **Leistungsprämie – DLR Department of Perception and Cognition**
 2025 Merit-based performance award for selected scientists
- 2017 **ETH Scholarship – Birkigt Scholarship Fonds**
 Stipend for international master students at ETH Zürich
- 2017 **Swiss-European Mobility Program (SEMP) Scholarship**
 Stipend for visiting student research at a European institution
- 2016 **IARU - Santander Scholarship**
 Stipend for summer exchange at the University of Tokyo
- 2015 **Rotary International Global Grant Scholarship**
 Full scholarship for master studies at ETH Zurich

Research Projects & Funding

University Lab Grant Acquisition & Projects (NTU)

- 2026–
Present **NAP (Nanyang Assistant Professorship Startup Grant)**, *NTU*, Principal Investigator (PI), S\$1,300,000
 Fundamental funding for establishing the Laboratory for Robots under Uncertainties.
- 2026–
Present **WSF (White Space Funding)**, *NTU*, Principal Investigator (PI), S\$180,000
 Seed funding for explorative research directions in robotics and AI.
- Institutional Grants & Project Management (DLR)
- 2024–2025 **NEWTON**, *DLR Tech Transfer Grant*, Principal Investigator (PI), €40,392
 Market study and technology transfer strategy for aerial manipulation research.
- 2025–2026 **SKIAS 2.0**, *DLR Synergy Project*, Project Manager & Technical Lead, €620,912
 Managing research on AI safety and uncertainty quantification for robotics.
- 2024–2026 **AISAC**, *Korean MOTIE Project*, Project Manager & Technical Lead, €989,135
 Co-authored winning proposal (Formal PI: Prof. Jinoh Lee). Managed project and executed technical direction on AI-based shared autonomy.
- Executed National & International Projects (DLR)
- 2024–2026 **INVERSE**, *European Union Horizon Europe*, Technical Contributor
 Contributed to a system for interactive human-robot collaboration using active learning.
- 2021–2024 **SKIAS 1.0**, *DLR Cross-Institutional Project*, Technical Lead
 Led the development of probabilistic models for AI safety in aerospace applications.
- 2019–2023 **RIMA**, *European Union Horizon 2020*, Technical Lead
 Led experimental campaigns and flight testing for cable-suspended aerial manipulators.
- 2020–2023 **HAICU**, *Helmholtz Association*, Technical Lead & AI Consultant
 Led computer vision development for experimental aerodynamics of helicopter flights.
- 2018–2022 **ARCHES**, *Helmholtz Association*, Technical Contributor
 Contributed to perception pipeline for DLR ARDEA and space demonstration mission.
- 2017–2019 **AUTOPILOT**, *European Union Horizon 2020*, Technical Contributor
 Contributed to perception algorithms for IoT-powered automated valet parking.
- 2017–2019 **AEROARMS**, *European Union Horizon 2020*, Technical Contributor
 Contributed to system integration and field experiments for aerial manipulation.

Other Academic & Industrial Experience

- 2023–2024 **Visiting Researcher**, *High Performance Humanoid Technologies*, Karlsruhe Institute of Technology (KIT), Germany
- 2016–2017 **Visiting Student Researcher**, *Institute of Robotics and Mechatronics*, German Aerospace Center (DLR), Germany
- 2016 **Research Assistant**, *Product Development Group*, ETH Zürich, Switzerland
- 2014–2015 **Engineering Intern**, *ROBOTIS*, South Korea

Teaching Experiences

- 2023–2026 **Teaching Assistant**, *Autonomous Learning for Intelligent Robot Perception*, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany
- 2021 **Teaching Assistant**, *Machine Learning for Computer Vision*, Technical University of Munich (TU Munich), Munich, Germany

Mentorship & Supervision

Nanyang Technological University (NTU)

- 2026–2027 **M.Sc. Dissertation Supervision**, *RIS Master Program*, NTU
Supervisor of individual master dissertations: Rishabh Dang. Academic year 2026-2027.
- 2026–2027 **URECA Undergraduate Research**, *RUNES Lab*, NTU
Supervisor of individual projects for Lim Jia Hui, Wang Rui Xian, Chloe Sin Zhi, and Tasnag Zhi Ho. Academic year 2026-2027.
- German Aerospace Center (DLR)
- 2026– **Andres Yubero**, Supervisor, M.Sc. Thesis (University of Zaragoza)
- Present *Perspective-n-Point Problem with Normalizing Flows* | University Examiners: Prof. Javier Civera, Dr. Seong Hun Lee
- 2026– **Marc Halschka**, Supervisor, M.Sc. Thesis (KIT)
- Present *Uncertainty Quantification in Flow-matching Models* | University Examiners: Prof. Rudolph Triebel, Prof. Tamim Asfour
- 2025–2026 **Manuel Westermann**, Supervisor, M.Sc. Thesis (KIT)
Probabilistic SPLIT: Uncertainty-aware 3D Scene-to-Pose-Set Matching with Diffusion Models | University Examiners: Prof. Rudolph Triebel, Prof. Michael Heizmann
- 2025 **Baptiste Lardinois**, Supervisor, M.Sc. Thesis (École Centrale Nantes)
Stein PnP for Uncertainty Estimation in the Perspective-n-Point Problem | University Examiner: Prof. Said Moussaoui
- 2025 **Leonhard Chen**, Supervisor, M.Sc. Thesis (TU Munich)
Uncertainty-Aware Inter and Intra Detection of Mobile Robots for Planetary Exploration | University Examiner: Prof. Alin Albu-Schäffer
- 2024–2025 **Johannes Gaus**, Supervisor, M.Sc. Thesis (KIT)
Studying the Explainability of Uncertainties in Point Cloud Registration for Robotic Systems | University Examiners: Prof. Rudolph Triebel, Prof. Tamim Asfour
- 2023–2024 **Jyotirmaya Patra**, Supervisor, M.Sc. Thesis (RWTH Aachen)
Active Learning of Image Classifier for Applications in Robotics | University Examiner: Prof. Sebastian Trimpe

- 2023–2024 **David Valencia**, Supervisor, M.Sc. Thesis (Aalto University)
Integration of Continual Learning and Semantic Segmentation in a Vision System for Mobile Robots | University Examiner: Prof. Pekka Marttinen
- 2021 **Dominik Schnaus**, Supervisor, M.Sc. Thesis (TU Munich)
Progressive Bayesian Neural Networks | University Examiners: Prof. Daniel Cremers, Prof. Rudolph Triebel
- 2021 **Kai Zhang**, Supervisor, M.Sc. Thesis (ENSTA Paris)
Aerodynamics Analysis Tools for Flying Robots: Automated Tuft Recognition using Deep Learning | University Examiner: Prof. David Filiat
- 2019–2020 **Kashmira Shinde**, Supervisor, M.Sc. Thesis (TU Dortmund)
Uncertainty-Aware Attention Guided Sensor Fusion for Monocular Visual-Inertial Odometry | University Examiner: Prof. Aydin Sezgin
- 2019–2020 **Patrick Krömer**, Supervisor, M.Sc. Thesis (Leibniz Univ. Hannover)
Pose Estimation by Detection and Tracking of Artificial Markers for Planetary Exploration | University Examiner: Prof. Franz Rottensteiner
- 2019 **Matthias Humt**, Supervisor, M.Sc. Thesis (TU Munich)
Laplace Approximation for Uncertainty Estimation of Deep Neural Networks | University Examiner: Prof. Rudolph Triebel
- 2025–2026 **Youngmin Song**, Co-Supervisor, Research Intern (Seoul National Univ.)
 Co-supervisor: Prof. Jinoh Lee (DLR & KAIST)
- 2024–2025 **Hojune Kim**, Co-Supervisor, Research Intern (Seoul National Univ.)
 Co-supervisor: Prof. Jinoh Lee (DLR & KAIST)
- 2024–2025 **Leonhard Chen**, Supervisor, Student Research Assistant (TU Munich)
- 2022–2023 **Manuel Schaus**, Supervisor, Student Research Assistant (TU Munich)
- 2021 **Dominik Schaus**, Supervisor, Student Research Assistant (TU Munich)
- 2021 **Omar Hedeya**, Supervisor, Student Research Assistant (TU Munich)
- 2020–2021 **Seok Jun Kim**, Supervisor, Research Intern (ETH Zürich)
- 2019 **Kashmira Shinde**, Supervisor, Research Intern (TU Dortmund)

Invited Talks

- 2025 **Invited Talk**, European Robotics Forum, Georges Giralt PhD Award Session
- 2025 **Invited Talk**, Robotics Institute Germany, Workshop on Trustworthy AI
- 2025 **Invited Tutorial**, Conference on Advances in Robotics
- 2024 **Invited Talk**, Seoul National University, Robotics Seminar
- 2024 **Invited Talk**, KAIST, Robotics Seminar
- 2024 **Invited Talk**, Nanyang Technological University, MAE Seminar
- 2023 **Invited Talk**, International Conference on Intelligent Robots and Systems, Workshop on Differential Probabilistic Robotics
- 2022 **Invited Talk**, Technical University in Munich, AI4EO Symposium

Selected Media Coverage

- 2025 **Automation Interntional / München tv / Heise Online**, TORO Demonstration at Automatica 2025 [Link 1] [Link 2] [Link 3]
- 2023 **IEEE Video Friday**, Video Friday: Robot vs. Door [Link]
- 2023 **IEEE Video Friday**, Video Friday: RoboCup 2023 [Link]
- 2022 **World Economic Forum**, Lunar Robots Tested On Mount Etna [Link]
- 2022 **MIT Technology Review**, Almost like being in space [Link]
- 2022 **PRO ROBOTS**, IROS 2022 Kyoto - Japan's largest conference [Link]

Service to Profession

Service as a Workshop Organizer

- 2026 **Beyond the Lab: Hardware-Validated Telepresence in Challenging Environments**, IEEE Conference on Telepresence, Role: Co-organizer
- 2024 **Back to the Future: Robot Learning Going Probabilistic**, IEEE International Conference on Robotics and Automation (ICRA), Role: Lead organizer
- 2022 **Probabilistic Robotics in the Age of Deep Learning**, IEEE International Conference on Intelligent Robots and Systems (IROS), Role: Lead organizer

Service as a Reviewer

- Robotics: Science and Systems (RSS)
- Conference on Robot Learning (CoRL)
- IEEE International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE Robotics and Automation Letters (RAL)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- IEEE Transactions on Robotics (TRO)
- IEEE Transactions on Field Robotics (TFR)
- Association for the Advancement of Artificial Intelligence (AAAI)
- International Conference on Learning Representations (ICLR)
- Neural Information Processing System (NeurIPS)
- International Conference on Machine Learning (ICML)

Languages

- **English:** Proficient
- **Korean:** Native
- **German:** Basic

Publications

First authorship

1. **Jongseok Lee**, Ribin Balachandran, Harsimran Singh, Jianxiang Feng, Hrishik Mishra, Marco De Stefano, Rudolph Triebel, Alin Albu-Schäffer, and Konstantin Kondak, "SPIRIT: Perceptive Shared Autonomy for Aerial Manipulation under

Uncertainty in Deep Learning,” *Under Review*.

2. Harsimran Singh*, **Jongseok Lee***, Ribin Balachandran, Wooyong Park, Byeonggi Yu, Junyoung Lee, Murim Kim, Konstantin Kondak, and Jinoh Lee, “First Results of the AISAC Project: Passivity Based Shared Control for Teleoperation of a Cable-Suspended Aerial Manipulator,” in *Proc. of the IEEE Conference on Telepresence*, 2026 (accepted).
3. **Jongseok Lee**, Timo Birr, Rudolph Triebel, and Tamim Asfour, “Stream-based Active Learning for Robust Semantic Perception from Human Instructions,” *IEEE Robotics and Automation Letters (RA-L)*, 2025.
4. **Jongseok Lee**, Ribin Balachandran, Konstantin Kondak, Andre Coelho, Marco De Stefano, Matthias Humt, Jianxiang Feng, Tamim Asfour, and Rudolph Triebel, “Introspective Perception for Long-term Aerial Telemanipulation with Virtual Reality,” *IEEE Transactions on Field Robotics (T-FR)*, 2024.
5. Dominik Schnaus*, **Jongseok Lee***, Daniel Cremers, and Rudolph Triebel, “Learning Expressive Priors for Generalization and Uncertainty Estimation in Neural Networks,” in *Proc. of the International Conference on Machine Learning (ICML)*, 2023.
6. **Jongseok Lee***, Jurrien Olsman*, and Rudolph Triebel, “Learning Fluid Flow Visualizations from In-flight Images with Tufts,” *IEEE Robotics and Automation Letters (RA-L)*, 2023.
7. **Jongseok Lee**, Ribin Balachandran, Konstantin Kondak, Andre Coelho, Marco De Stefano, Matthias Humt, Jianxiang Feng, Tamim Asfour, and Rudolph Triebel, “Virtual Reality via Object Pose Estimation and Active Learning: Realizing Telepresence Robots with Aerial Manipulation Capabilities,” *Field Robotics*, 2023.
8. **Jongseok Lee**, Jianxiang Feng, Matthias Humt, Marcus G. Müller, and Rudolph Triebel, “Trust Your Robots! Predictive Uncertainty Estimation of Neural Networks with Sparse Gaussian Processes,” in *Proc. of the Conference on Robot Learning (CoRL)*, 2021.
9. **Jongseok Lee**, Matthias Humt, Jianxiang Feng, and Rudolph Triebel, “Estimating Model Uncertainty of Neural Networks in Sparse Information Form,” in *Proc. of the International Conference on Machine Learning (ICML)*, 2020.
10. **Jongseok Lee**, Ribin Balachandran, Yuri S. Sarkisov, Marco De Stefano, Andre Coelho, Kashmira Shinde, Min Jun Kim, Rudolph Triebel, and Konstantin Kondak, “Visual-Inertial Telepresence for Aerial Manipulation,” in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2020.
11. **Jongseok Lee**, Tin Muskardin, Cristina Ruiz Paez, Philipp Oettershagen, Thomas Stastny, Inkyu Sa, Roland Siegwart, and Konstantin Kondak, “Towards Autonomous Stratospheric Flight: A Generic Global System Identification

Framework for Fixed-Wing Platforms,” in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2018.

Co-authorship

1. Baptiste Lardinois, **Jongseok Lee**, Andres Yubero, Seong Hun Lee, Javier Civera, and Rudolph Triebel, “SteinPnP: Non-Parametric Uncertainty Quantification in the Perspective-N-Point-Problem,” Under review.
2. Martin Schuster et al., “Autonomous Planetary Exploration with Robotic Teams – Results of the ARCHES Analog Campaign,” *npj Robotics*, 2026 (accepted).
3. Johannes A. Gaus, Loris Schneider, Yitian Shi, **Jongseok Lee**, Rania Rayyes, and Rudolph Triebel, “Human-Interpretable Uncertainty Explanations for Point Cloud Registration,” in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2026.
4. Jianxiang Feng, **Jongseok Lee**, Simon Geisler, Stephan Günnemann, and Rudolph Triebel, “Topology-Matching Normalizing Flows for Out-of-Distribution Detection in Robot Learning,” in *Proc. of the Conference on Robot Learning (CoRL)*, 2023.
5. Jakob Gawlikowski, Cedrique Rovile Njietcheu Tassi, Mohsin Ali, **Jongseok Lee**, Matthias Humt, Jianxiang Feng, Anna Kruspe, Rudolph Triebel, Peter Jung, Ribana Roscher, Muhammad Shahzad, Wen Yang, Richard Bamler, and Xiao Xiang Zhu, “A Survey of Uncertainty in Deep Neural Networks,” *Artificial Intelligence Review*, 2023.
6. Tin Muskardin, Georg Balmer, Linnea Persson, Sven Wlack, Maximilian Laiacker, **Jongseok Lee**, Anibal Ollero, and Konstantin Kondak, “Landing of Fixed-Wing Aircraft on Mobile Platforms,” *Handbook of Unmanned Aerial Vehicles*, Springer (Accepted).
7. Jianxiang Feng, **Jongseok Lee**, Maximilian Durner, and Rudolph Triebel, “Bayesian Active Learning for Sim-to-Real Robotic Perception,” in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022.
8. Armin Wedler et al., “Finally! Insights into the ARCHES Lunar Planetary Exploration Analogue Campaign on Etna in summer 2022,” in *Proc. of the International Astronautical Congress (IAC)*, 2022.
9. Dominik Schnaus, **Jongseok Lee**, Daniel Cremers, and Rudolph Triebel, “Kronecker-Factored Optimal Curvature,” in *NeurIPS Workshop on Bayesian Deep Learning (BDL)*, 2021.
10. Armin Wedler et al., “First Results from the Multi-Robot, Multi-Partner, Multi-Mission, Planetary Exploration Analogue Campaign on Mt. Etna in Summer 2021,” in *Proc. of the International Astronautical Congress (IAC)*, 2021.
11. Andre Coelho, Yuri S. Sarkisov, **Jongseok Lee**, Antonio Franchi, Konstantin Kondak, and Christian Ott, “Hierarchical Multi-Task Aerial Manipulation with

Enhanced Field of View,” in *Proc. of the International Conference on Unmanned Aircraft Systems (ICUAS)*, 2021.

12. Matthias Humt, **Jongseok Lee**, and Rudolph Triebel, “Bayesian Optimization Meets Laplace Approximation for Robotic Introspection,” in *IROS Workshop on Reliable Deployment of Machine Learning for Long-Term Autonomy*, 2020.
13. Kashmira Shinde, **Jongseok Lee**, Matthias Humt, Aydin Sezgin, and Rudolph Triebel, “Learning Multiplicative Interactions with Bayesian Neural Networks for Visual-Inertial Odometry,” in *ICML Workshop on AI for Autonomous Driving (AIAD)*, 2020.
14. Louis Touko Tcheumadjeu, Emi Mathews, Arjan Teerhuis, Qinrui Tang, Jorge Garcia Castano, Marcus Gerhard Müller, Thomas Lobig, Philipp Lutz, **Jongseok Lee**, and Robert Kaul, “Automated Valet Parking enabled by Internet of Things: A pilot site realization and validation at Brainport, the Netherlands,” in *13th ITS European Congress*, 2019.
15. Anastasios Petrou, Daniel Kuster, **Jongseok Lee**, Mirko Meboldt, and Marianne Schmid Daners, “Comparison of flow estimators for rotary blood pumps: An in-vitro and in-vivo study,” *Annals of Biomedical Engineering*, 2018.
16. Anastasios Petrou, **Jongseok Lee**, Gregor Ochsner, Seraina Dual, Mirko Meboldt, and Marianne Schmid Daners, “Standardized comparison of selected physiological controllers for rotary blood pumps: In-vitro study,” *Artificial Organs*, vol. 42, no. 3, 2018.

Technical Reports and Preprints

1. Jurrien Olsman and **Jongseok Lee**, “Visualization of flow inside the Fenestron,” *DLR Technical Report*, 2025.
2. Ziyuan Qin, **Jongseok Lee**, and Rudolph Triebel, “Towards Explaining Uncertainty in Point Cloud Registration,” *arXiv preprint*, 2025.

References

Available upon requests.

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