Jongseok Lee

Curriculum Vitae

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Current Position

Since 2017 **Research Scientist**, Institute for 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*," under supervision of 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*," under supervision of Roland Siegwart

2011–2014 **B.Sc. in Aerospace Engineering**, Delft University of Technology, Netherlands

Research Interests

Since 2017 **Trustworthy and Uncertainty-Aware AI**
for safety-critical applications of deep learning in robotic perception and beyond

Since 2017 **Real-world Robotic Manipulation / Field Robotics**
for industrial applications of inspection and maintenance with aerial manipulation systems

Since 2019 **Bayesian Machine Learning**
including Gaussian Processes, Bayesian Neural Networks and probabilistic inference

Since 2020 **Human-Robot Interaction / Shared Autonomy**
including blending strategies, uncertainty explanations, virtual fixtures and active learning

Honors & Awards

2026 **Georges Giralt PhD Award Finalist**
Amongst top-3 best European thesis in robotics from 2025; European-level dissertation prize

2024 **KUKA Innovation Award Finalist**
Awarded for a project on collaborative robots in textile manufacturing (as team Yantra)

2023 **KUKA Innovation Award Finalist**
Awarded for a project on aerial manipulation called SPIRIT; Role: team leader

2023 **HIDA Trainee Network Grant**
Funding for a three month research stay at different Helmholtz research centers

2020–2023, 2025 **Leistungsprämie - DLR Department of Perception and Cognition**
Merit-based performance award for selected scientists; Awarded several years

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**
Scholarship that fully funded my master studies at ETH Zurich

Past Positions

2023–2024 **Visiting Researcher**, High Performance Humanoid Technologies, Karlsruhe Institute of Technology (KIT), Germany

2016–2017 **Visiting Student Researcher**, Institute for Robotics and Mechatronics, German Aerospace Center (DLR), Germany

2016 **Research Assistant**, Product Development Group, ETH Zürich, Switzerland

2014–2015 **Engineering Intern**, ROBOTIS, South Korea

National & International Projects

Since 2025 **SKIAS 2.0**, *DLR Cross-Institutional Project*, Role: Project Manager
Developed AI safety methods for autonomous robots, including uncertainty quantification and explainable AI methods; Increasing TRL for use in Humanoid robots

Since 2024 **AISAC**, *Korean MOTIE Project*, Role: Research Scientist and Project Manager
Acquired €989,135; Responsible for writing proposals at DLR (PI is Prof. Jinoh Lee); On perceptive shared autonomy and dual-arm cable-Suspended Aerial Manipulator

Since 2024 **INVERSE**, *European Union Horizon 2020*, Role: Research Scientist
Contributed to the machine learning system that interacts with humans by asking help and learn online without catastrophic forgetting; Focus on fundamental research

2024 **NEWTON**, *DLR Technology Transfer Project*, Role: Principal Investigator
Market study for technology transfer of aerial manipulation research ; Acquired €40,392

2021–2024 **SKIAS 1.0**, *DLR Cross-Institutional Project*, Role: Research Scientist
Developed AI safety methods for autonomous robots, including uncertainty quantification and explainable AI methods; Focus on fundamental research

2021–2024 **ReBAR**, *DLR Cross-Institutional Project*, Role: Research Scientist / Consultant
ReBAR connected different DLR institutes to machine learning researchers for cross-domain synergy; Collaboration with the DLR Institute of Maintenance, Repair and Overhaul

2019–2023 **RIMA**, *European Union Horizon 2020*, Role: Research Scientist / Consultant
Contributed to increasing the TRL of the DLR cable-Suspended Aerial Manipulator and conducted several flight experiments, including field robotic campaigns

2020–2023 **HAICU**, *Helmholtz Association*, Role: Research Scientist / Consultant
Contributed to the computer vision system for experimental fluid dynamics; Close collaboration with the DLR Institute of Aerodynamics and Flow Technology

2018–2022 **ARCHES**, *Helmholtz Association*, Role: Research Scientist
Contributed to the computer vision system of DLR ARDEA for planetary exploration and conducted several flight experiments, including a space demonstration mission

2017–2019 **AUTOPILOT**, *European Union Horizon 2020*, Role: Research Scientist
Contributed to the computer vision system of DLR ARDEA for IoT-powered automated parking and conducted several flight experiments, including field robotic campaigns

2017–2019 **AEROARMS**, *European Union Horizon 2020*, Role: Research Scientist
Contributed to the development of the DLR cable-Suspended Aerial Manipulator and conducted several flight experiments, including field robotic campaigns

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, Munich, Germany

Mentorship Experiences

Master Thesis Supervision

2026 **DLR Supervisor**, *Probabilistic SPLIT: Uncertainty-aware 3D Scene- to-Pose-Set Matching with Diffusion models*, Manuel Westermann, KIT
University Advisors: Rudolph Triebel and Michael Heizmann

2025 **DLR Supervisor**, *Stein PnP for Uncertainty Estimation in the Perspective-n-Point Problem*, Baptiste Lardinoit, Ecole Centrale Nantes
University Advisor: Said Moussaoui

2025 **DLR Supervisor**, *Uncertainty-Aware Inter and Intra Detection of Mobile Robots for Planetary Exploration* , Leonhard Chen, TU Munich
University Advisor: Alin Albu-Schaeffer

2024–2025 **DLR Supervisor**, *Studying the Explainability of Uncertainties in Point Cloud Registration for Robotic Systems*, Johannes Gaus, KIT
University Advisors: Rudolph Triebel and Tamim Asfour

2023–2024 **DLR Supervisor**, *Active Learning of Image Classifier for Applications in Robotics* , Jyotirmaya Patra, RWTH Aachen
University Advisor: Sebastian Trimpe

2023–2024 **DLR Supervisor**, *Integration of Continual Learning and Semantic Segmentation in a Vision System for Mobile Robots*, David Valencia, Alto University
University Advisor: Pekka Marttinen

2021 **DLR Supervisor**, *Progressive Bayesian Neural Networks*, Dominik Schnaus, TU Munich
University Advisors: Daniel Cremers and Rudolph Triebel

2021 **DLR Supervisor**, *Aerodynamics Analysis Tools for Flying Robots: Automated Tuft Recognition using Deep Learning*, Zhang Kai, ENSTA Paris
University Advisors: David Filiat

2019–2020 **DLR Supervisor**, *Uncertainty-Aware Attention Guided Sensor Fusion for Monocular Visual-Inertial Odometry*, Kashmira Shinde, TU Dortmund
University Advisor: Aydin Sezgin

2019–2020 **DLR Supervisor**, *Pose Estimation by Detection and Tracking of Artificial Markers for Planetary Exploration*, Patrick Kroemer, University of Hannover
University Advisors: Franz Rottensteiner

2019 **DLR Supervisor**, *Laplace Approximation for Uncertainty Estimation of Deep Neural Networks*, Matthias Humt, TU Munich
University Advisors: Rudolph Triebel

Internship Supervision

2025-2026 **DLR Internship**, Youngmin Song, Seoul National University
Lead DLR supervisor: Jinoh Lee

2024–2025 **DLR Internship**, Hojune Kim, Seoul National University
Lead DLR supervisor: Jinoh Lee

2020–2021 **DLR Internship**, Seok Jun Kim, ETH Zürich

2019 **DLR Internship**, Kashmira Shinde, TU Dortmund

2024–2025 **DLR Student Assistant**, Leonhard Chen, TU Munich

2022–2023 **DLR Student Assistant**, Manuel Schaus, TU Munich

2021 **DLR Student Assistant**, Dominik Schaus, TU Munich

2021 **DLR Student Assistant**, Omar Hedeya, TU Munich

Selected Invited Talks

2026 **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

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)

Selected Outreach & Community Engagement

2025 **Automatica 2025**, Public demonstrations at an industrial event

2024 **Hannover Messe**, Public demonstrations at an industrial event

2023 **Automatica 2023**, Public demonstrations at an industrial event

2019 **DLR Open Day**, Hosted at Oberpfaffenhofen campus for public outreach

Languages

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

Publications

First authorship

1. **Jongseok Lee**, Timo Birr, Rudolph Triebel and Tamim Asfour, 'Stream-based Active Learning for Robust Semantic Perception from Human Instructions', IEEE Robotics and Automation Letter (RA-L), 2025.

2. **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.

3. 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.

4. **Jongseok Lee***, Jurrien Olsman* and Rudolph Triebel, 'Learning Fluid Flow Visualizations from In-flight Images with Tufts', IEEE Robotics and Automation Letter (RA-L), 2023.

5. **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.

6. **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', Conference on Robot Learning (CoRL), 2021.

7. **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.

8. **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/RSJ International Conference on Robotics and Automation (ICRA), 2020.

9. **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. Johannes A Gaus, Loris Schneider, Yitian Shi, **Jongseok Lee**, Rania Rayyes, Rudolph Triebel, 'Human-Interpretable Uncertainty Explanations for Point Cloud Registration', In Proc. of the IEEE/RSJ International Conference on Robotics and Automation (ICRA), 2026.

2. Jianxiang Feng, **Jongseok Lee**, Simon Geisler, Stephan Günnemann, and Rudolph Triebel, 'Topology-Matching Normalizing Flows for Out-of-Distribution Detection in Robot Learning', Conference on Robot Learning (CoRL), 2023.

3. Jakob Gawlikowski, Cedrique Rovile Njieutcheu 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', Aritificial Intelligence Review, 2023.

4. 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'. Accepted to Handbook of Unmanned Aerial Vehicles.

5. 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.

6. Armin Wedler et al, 'Finally! Insights into the ARCHES Lunar Planetary Exploration Analogue Campaign on Etna in summer 2022', Proceedings of The International Astronautical Conference (IAC), 2022.

7. Dominik Schnaus, **Jongseok Lee**, Daniel Cremers and Rudolph Triebel, 'Kronecker-Factored Optimal Curvature', In Bayesian Deep Learning NeurIPS 2021 Workshop, 2021.

8. Armin Wedler et al, 'First Results from the Multi-Robot, Multi-Partner, Multi-Mission, Planetary Exploration Analogue Campaign on Mt. Etna in Summer 2021', Proceedings of The International Astronautical Conference (IAC), 2021.

9. Andre Coelho, Yuri S. Sarkisov, **Jongseok Lee**, Antonio Franchi, Konstantin Kondak and Christian Ott, 'Hierarchical Multi-Task Aerial Manipulation with Enhanced Field of View', The 2021 International Conference On Unmanned Aircraft Systems (ICUAS), 2021.

10. Matthias Humt, **Jongseok Lee** and Rudolph Triebel, 'Bayesian Optimization Meets Laplace Approximation for Robotic Introspection', In Workshop on Reliable Deployment of Machine Learning for Long-Term Autonomy, the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020

11. Kashmira Shinde, **Jongseok Lee**, Matthias Humt, Aydin Sezgin and Rudolph Triebel, 'Learning Multiplicative Interactions with Bayesian Neural Networks for Visual-Inertial Odometry', In Workshop on AI for Autonomous Driving (AIAD), the 37th International Conference on Machine Learning (ICML), 2020.

12. Louis Touko Tcheumadjeu1a, Emi Mathews, Arjan Teerhuis, Qinrui Tang1a, Jorge Garcia Castano, Marcus Gerhard Müller, Thomas Lobig, Philipp Lutz, **Jongseok Lee**, 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, Brainport, the Netherlands, 2019.

13. 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

14. Anastasios Petrou, **Jongseok Lee**, Gregor Ochsner, Seraina Dual, Mirko Meboldt, Marianne Schmid Daners, 'Standardized comparison of selected physiological controllers for rotary blood pumps: In-vitro study', Artificial Organs, 42 (3), 2018.

Technical Reports and Preprints

1. **Jongseok Lee**, Ribin Balachandran, Harsimran Singh, Jianxiang Feng, Hrishik Mishra, Marco De Stefano, Rudolph Triebel, Alin Albu Schaeffer and Konstantin Kondak, 'SPIRIT: Perceptive Shared Autonomy for Aerial Manipulation under Uncertainty in Deep Learning', Preprint on Arxiv.

2. Jurrien Olsman and **Jongseok Lee**, 'Visualization of flow inside the Fenestron', DLR Technical Report, 2025.

3. Ziyuan Qin, **Jongseok Lee**, and Rudolph Triebel, ‘Towards Explaining Uncertainty in Point Cloud Registration’, Preprint on Arxiv.

References

Available upon request