Liding Zhang, Ph.D.candidate (Dr.rer.nat)

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Employment History

2022 – · · · ·
- **Research Assistant**
  Chair of Robotics, Artificial Intelligence and Real-Time Systems, TUM School of Computation, Information and Technology (CIT), Technical University of Munich (TUM).
- **Scientific Researcher**
  TUM School of Munich Institute of Robotics and Machine Intelligence (MIRMI), Technical University of Munich (TUM).
- **Project Associate**
  Bavarian State Ministry for Economic Affairs, Regional Development and Energy (StMWi) for the Lighthouse Initiative KI.FABRIK (AI.Factory), (Grant no. DIK0249).
- **Project Associate**
  Federal Ministry of Education and Research of Germany (BMBF) in the programme of "Souverän. Digital. Vernetzt." Joint project 6G-life, (Grant no. 16KISK002).

2021 – 2022
- **Project Associate**
  E-Bicycle ergometer in the laboratory for the biomechanics project, Institute of Mechanical Engineering, Technical University of Clausthal.

2019 – 2020
- **Assistant Mechanical Engineer**
  Noise, vibration, and harshness (NVH) group of Volkswagen Automatic Transmission (Tianjin) Co. Ltd. · Full-time.

2016 – 2017
- **Mechanical Engineer Intern**
  Industrial Manufacturing group of Kisters-Stiftung gemeinnützige GmbH · Part-time.

Education

2022 – · · · ·
- **Ph.D., Technical University of Munich (DE) - Computer Science - Robotics**.
  Thesis title: *Multi-Robot Collaborative Intelligence: A Unified Framework for Optimal Task and Motion Planning. (Heterogeneous Robotic Manipulation)*

2020 – 2022
- **M.Sc., Technical University of Clausthal (DE) - Automation Technology**.
  Thesis title: *Vibration Measurement in the Gigahertz Range at Frequencies Exceeding the Bandwidth of Photodetectors in the Visible Frequency Range (about >2.5 GHz).*

2016 – 2020
- **B.Sc., Rhine-Waal University of Applied Science (DE) - Mechanical Engineering**.
  Thesis title: *Comprehensive Analytic and Numerical Inverse Dynamics Approaches to the Classic Sliding-Rod Problem.*

Selected Research Publications (*Equal Contribution)

Journal Articles

1. **L. Zhang**, K. Cai, Y. Zhang, Z. Bing, C. Wang, F. Wu, S. Haddadin, and A. Knoll, "Estimated informed anytime search for sampling-based planning via adaptive sampler," *IEEE Transactions on Automation Science and Engineering (T-ASE)*, vol. 22, pp. 18 580–18 593, 2025, **[JCR Q1, IF: 6.4]**. DOI: 10.1109/TASE.2025.3590084.

2. K. Cai*, **L. Zhang***, X. Su, K. Chen, C. Wang, S. Haddadin, A. Knoll, A. Ajoudani, and L. Figueredo, "Just in time informed trees: Manipulability-aware asymptotically optimized motion planning," *IEEE/ASME Transactions on Mechatronics (T-Mech)*, pp. 1–12, 2025, **[JCR Q1, IF: 7.3]**. DOI: 10.1109/TMECH.2025.3570573.

3. **L. Zhang**, K. Cai, Z. Bing, C. Wang, and A. Knoll, "Genetic informed trees (GIT*): Path planning via reinforced genetic programming heuristics," *Biomimetic Intelligence and Robotics*, vol. 5, no. 3, p. 100 237, 2025, **[JCR Q1, IF: 5.5]**, ISSN: 2667-3797. DOI: 10.1016/j.birob.2025.100237.

4. **L. Zhang**, K. Cai, Z. Sun, Z. Bing, C. Wang, L. Figueredo, S. Haddadin, and A. Knoll, "Motion planning for robotics: A review for sampling-based planners," *Biomimetic Intelligence and Robotics*, vol. 5, no. 1, p. 100 207, 2025, **[JCR Q1, IF: 5.5]**, ISSN: 2667-3797. DOI: 10.1016/j.birob.2024.100207.

5. **L. Zhang**, Y. Ling, Z. Bing, F. Wu, S. Haddadin, and A. Knoll, "Tree-based grafting approach for bidirectional motion planning with local subsets optimization," *IEEE Robotics and Automation Letters (RA-L)*, vol. 10, no. 6, pp. 5815–5822, 2025, **[JCR Q1, IF: 5.3]**. DOI: 10.1109/LRA.2025.3562369.

6. **L. Zhang**, S. Wang, K. Cai, Z. Bing, F. Wu, C. Wang, S. Haddadin, and A. Knoll, "APT*: Asymptotically optimal motion planning via adaptively prolated elliptical r-nearest neighbors," *IEEE Robotics and Automation Letters (RA-L)*, vol. 10, no. 10, pp. 10 242–10 249, 2025, **[JCR Q1, IF: 5.3]**. DOI: 10.1109/LRA.2025.3598616.

Conference Proceedings

1. **L. Zhang**, K. Chen, K. Cai, Y. Zhang, Y. Dang, Y. Wu, Z. Bing, F. Wu, S. Haddadin, and A. Knoll, "Direction informed trees (DIT*): Optimal path planning via direction filter and direction cost heuristic," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, 2025, pp. 1766–1772. DOI: 10.1109/ICRA55743.2025.11127725.

2. **L. Zhang**, Z. Li, K. Cai, Z. Bing, and A. Knoll, "Language-exclusive mobile manipulation for efficient object search in indoor environments," in *2025 IEEE International Conference on Cyborg and Bionic Systems (CBS) Accepted*, 2025.

3. **L. Zhang**, S. Wang, K. Cai, Z. Bing, and A. Knoll, "Multi-sets trees (MST*): Accelerated asymptotically optimal motion planning optimization informed by multiple domain subsets," in *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Accepted*, 2025.

4. **L. Zhang**, Y. Wei, K. Cai, Z. Bing, Y. Meng, F. Wu, S. Haddadin, and A. Knoll, "CIT*: Context-based biased batch-sampling for almost-surely asymptotically optimal motion planning," in *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Accepted*, 2025.

5. **L. Zhang**, Q. Zong, Y. Zhang, Z. Bing, and A. Knoll, "Deep fuzzy optimization for batch-size and nearest neighbors in optimal robot motion planning," in *2025 IEEE International Conference on Cyborg and Bionic Systems (CBS) Accepted*, 2025.

6. M. Schewe*, **L. Zhang***, and C. Rembe, "Signal processing scheme for broadband heterodyne gigahertz interferometry with a broadband and a second low-noise photodetector with limited bandwidth," in *Journal of Physics: Conference Series*, vol. 2698, 2024, p. 012 012. DOI: 10.1088/1742-6596/2698/1/012012.

7. **L. Zhang**, Z. Bing, K. Chen, L. Chen, K. Cai, Y. Zhang, F. Wu, P. Krumbholz, Z. Yuan, S. Haddadin, and A. Knoll, "Flexible informed trees (FIT*): Adaptive batch-size approach in informed sampling-based path planning," in *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024, pp. 3146–3152. DOI: 10.1109/IROS58592.2024.10802466.

8. **L. Zhang**, Z. Bing, Y. Zhang, K. Cai, L. Chen, F. Wu, S. Haddadin, and A. Knoll, "Elliptical k-nearest neighbors - path optimization via coulomb's law and invalid vertices in c-space obstacles," in *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024, pp. 12 032–12 039. DOI: 10.1109/IROS58592.2024.10802280.

Skills

Languages	Proficient in reading, writing, and speaking English, Chinese (native), and German.
Coding	C++, C, Python, MATLAB/Simulink, JSON, XML, URDF, XACRO, LaTeX, Arduino …
Drafting	Solidworks, AutoCAD, Catia, ANSYS, PLC (Ladder/Functional block diagrams) …
Robot Dev.	ROS1/ROS2, Git, Linux, Docker, Moveit!, CoppeliaSim, Gazebo, Mujoco, OMPL …
Misc.	Academic research, teaching, training, consultation, LaTeX typesetting, and publishing.

Miscellaneous Experience

Awards and Achievements

2025 **Editor's Choice (Biomimetic Intelligence and Robotics) [JCR Q1, IF: 5.5]**,
The top selected papers from the Survey on Robotic Motion Planning in the Issue 1, 2025.

2023 **China Scholarship Council (CSC)**,
Full-Scholarship funded by the Ministry of Education of the People's Republic of China.

2022 **Department Prize of Applied Metrology**,
Recommendation letter from Prof. Dr.-Ing Christian Rembe (Chairman of the German University Lecturers), Institute of Electrical Information Technology, Technical University of Clausthal.

Department Prize for Outstanding Student Performance,
Recommendation letter from Dr.-Ing. Marvin Schewe (Postdoctoral researcher at NIST, USA) , Institute of Electrical Information Technology, Technical University of Clausthal.

2019 **Department Prize of Noise, Vibration, and Harshness (NVH)**.
Recommendation letter from Mr. Vollrath Andreas (Head of quality assurance) and Mrs. Stefanie Wangemann (Head of org. & education) , Volkswagen Automatic Transmission (Tianjin) Co. Ltd.

Certification

2022 **Certified Deutsch (German) C1/2 (highest-level)**,
Awarded by Dr. Jörg Schröder (Stellv. Leiter des Sprachenzentrums), Stufe nach Gemeinsamen Europäischem, Technical University of Clausthal.

2010 **1st Prize of National Trumpet Junior Group**,
Awarded by China Musical Instruments Association (Western Musical Instruments), China.

2009 **Certified Profession Level 9 in Trumpet**.
Awarded by Wuhan Conservatory Of Music Association, China.

Community Service

Chair: ▷ 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS),
Teaser Session of Robot Motion Planning IV, ADNEC in Abu Dhabi, UAE.
▷ 2025 IEEE International Conference on Cyborg and Bionic Systems (CBS),
Teaser Session of Motion Planning and Control T2, Empark Grand in Beijing, China.

Reviewer: IEEE Transactions on Robotics (T-RO),
IEEE Transactions on Automation Science and Engineering (T-ASE),
IEEE/ASME Transactions on Mechatronics (T-Mech),
IEEE Robotics and Automation Letters (RA-L),
IEEE Transactions on Neural Networks and Learning Systems (TNNLS),
IEEE International Conference on Robotics and Automation (ICRA),
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS),