Yitaek Kim

"Ordinary daily life comes from the extraordinary efforts hidden behind it"
- Dasan's Last Study

SDU Robotics
Mærsk Mc-Kinney Møller Instituttet
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Research Fields

Topics Safety-Critical Control, In-Hand Manipulation, Robotics

Work Experiences

05.2024 – Present **Postdoctoral Researcher, Robotics**, *SDU Robotics, MMMI, University of Southern Denmark*, Odense, Denmark.
Research in in-hand manipulation and safety-critical systems, Advisor: ***Prof. Christoffer Sloth***

09.2023 – 12.2023 **Visiting Student Researcher, Safety-Critical Systems**, *AMBER Lab, the Department of Mechanical and Civil Engineering, California Institute of Technology (Caltech)*, Pasadena, USA.
Research in safety-critical systems and hand manipulation, Advisor: ***Prof. Aaron D. Ames***

Education

2021 – 2024 **Doctor of Philosophy, Robotics**, *SDU Robotics, MMMI, University of Southern Denmark*, Odense, Denmark.
Thesis: Fast Setup of Robotic Material Processing with Quality Guarantees using Set Invariance, Advisor: ***Prof. Christoffer Sloth***

2017 – 2019 **Master of Science in Department of Interdisciplinary Engineering Systems**, *Hanyang University*, Seoul, South Korea.
Thesis: The Development of the Preview-Control Walking Method for a Stable Bipedal Walking of an Adult Size Humanoid Robot, Advisor: ***Prof. Jeakweon Han***

2011 – 2017 **Bachelor of Science in Information and Control Major**, *School of Robotics, College of Electronics & Information Engineering, Kwangwoon University*, Seoul, South Korea.

CGPA 11.2/12

Publications

2025 **Yitaek Kim** and Christoffer Sloth. Robust adaptive time-varying control barrier function with application to robotic surface treatment. In *2025 European Control Conference (ECC) (Accepted)*, 2025.

2025 **Yitaek Kim**, Jeeseop Kim, Albert H. Li, Aaron D. Ames, and Christoffer Sloth. Robust adaptive safe robotic grasping with tactile sensing. In *2025 European Control Conference (ECC) (Accepted)*, 2025.

2025 **Yitaek Kim**, Iñigo Iturrate, Christoffer Sloth, and Hansoul Kim. Safety-ensured robotic control framework for cutting task automation in endoscopic submucosal dissection. *IEEE Access*, volume 13, pages 102803–102814, 2025.

2025 **Yitaek Kim**, Ersin Daş, Jeeseop Kim, Aaron D. Ames, Joel W. Burdick, and Christoffer Sloth. Minimizing conservatism in safety-critical control for input-delayed systems via adaptive delay estimation. In *2025 European Control Conference (ECC) (Accepted)*, 2025.

2025 Haegu Lee, **Yitaek Kim**, Victor Melbye Staven, and Christoffer Sloth. Trajectory optimization for in-hand manipulation with tactile force control. In *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (Accepted)*, 2025.

2024 **Yitaek Kim**, Jeeseop Kim, Aaron D. Ames, and Christoffer Sloth. Robust safety-critical control for input-delayed system with delay estimation. In *2024 European Control Conference (ECC)*, pages 2218–2223, 2024.

2024 **Yitaek Kim**, Iñigo Iturrate, Jeppe Langaa, and Christoffer Sloth. Safe robust adaptive control under both parametric and nonparametric uncertainty. *Advanced Robotics*, pages 1–10. Taylor & Francis, 2024.

2024 Rasmus Laurvig Haugaard, **Yitaek Kim**, and Thorbjørn Mosekjær Iversen. Fixture calibration with guaranteed bounds from a few correspondence-free surface points. In *2024 IEEE International Conference on Robotics and Automation (ICRA)*, pages 6718–6724, 2024.

2023 **Yitaek Kim**, Aljaz Kramberger, Anders Glent Buch, and Christoffer Sloth. Contact-based pose estimation of workpieces for robotic setups. *2023 IEEE International Conference on Robotics and Automation (ICRA)*, pages 12324–12330, 2023.

2023 Iñigo Iturrate, **Yitaek Kim**, Aljaz Kramberger, and Christoffer Sloth. In-hand pose refinement based on contact point information. *2023 International Conference on Robotics in Alpe-Adria Danube Region*, 2023.

2022 **Yitaek Kim**, Christoffer Sloth, and Aljaz Kramberger. Skill transfer for surface finishing tasks based on estimation of key parameters. *2022 IEEE 18th International Conference on Automation Science and Engineering (CASE)*, pages 2148–2153, 2022.

2022 **Yitaek Kim**, Christoffer Sloth, and Aljaz Kramberger. A framework for transferring surface finishing skills to new surface geometries. *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 7650–7655, 2022.

2022 Cheonyu Park, Baekseok Kim, **Yitaek Kim**, Younseal Eum, Hyunjong Song, Dongkuk Yoon, Jeongin Moon, and Jeakweon Han. Carved turn control with gate vision recognition of a humanoid robot for giant slalom skiing on ski slopes. *Sensors*, volume 22, page 816. Multidisciplinary Digital Publishing Institute, 2022.

2021 **Yitaek Kim** and Christoffer Sloth. Imitation learning-based path generation for the complex assembly of deformable objects. *Robotics Science and Systems 2021 Workshop on Integrating Planning and Learning*. RSS, 2021.

2020 **Yitaek Kim** and Christoffer Sloth. Assembly strategy for deformable ring-shaped objects. *IROS 2020 Workshop on Managing Deformation: A Step Towards Higher Robot Autonomy*, pages 357–358. IROS, 2020.

2019 Younseal Eum, Hyunjong Song, **Yitaek Kim**, Injoon Min, Dongha You, and Jeakweon Han. A study on the appearance design and behavior of a humanoid robot to receive donations effectively. *The Journal of Korea Robotics Society*, volume 14, pages 163–169. Korea Robotics Society, 2019.

2018 **Yitaek Kim**, Hyunjong Song, Baekseok Kim, Jeong-In Moon, and Jeakweon Han. Inverse kinematics analysis and the development of the motion simulator for skiing robot based on ros. *The 13th Korea Robotics Society Annual Conference*. KRoC, 2018.

2018 **Yitaek Kim**, Cheonyu Park, Baekseok Kim, Hyunjong Song, and Jeakweon Han. The development of the zmp control system to improve the stability of a skiing robot. *Proceedings of KSPE 2018 Spring Conference*, pages 73–73. KSPE, 2018.

2018 Cheonyu Park, **Yitaek Kim**, Baek Seok Kim, Dong Kuk Yoon, and Jeakweon Han. The research of the way to make an arrangement of ultrasonic sensor to measure the distance of gates on alpine ski tournament. *The 13th Korea Robotics Society Annual Conference*. KRoC, 2018.

2018 Jeakweon Han, Dongkuk Yoon, Hyunjong Song, Baekseok Kim, **Yitaek Kim**, Cheonyu Park, Younseal Eum, and Jeong-In Moon. Research on carved turns of a skiing humanoid robot on a real-world slope. *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1–9. IROS, 2018.

2017 Dong-Hoon Baek, **Yitaek Kim**, Han-Soul Kim, Su-Yeon Lee, Hyeon-Seok Lee, Tae-Min Hwang, Gun-Woo Park, and JuHoon Back. Development of the rescue robot for earthquake zone. *The 12th Korea Robotics Society Annual Conference*. KRoC, 2017.

Invited Talks

06.2025 Workshop: Safe Control and Learning in Autonomous Systems (ECC2025), Thessaloniki, Greece

12.2023 Robust Delay Adaptive Control Barrier Functions, California Institute of Technology (Caltech), Pasadena, USA

12.2023 Introduction to SDU Robotics, University of Illinois Urbana-Champaign (UIUC), Illinois, USA

10.2023 Introduction to SDU Robotics, University of Nevada (UNLV), Las Vegas, USA

Activities

10.2020 Won the first prize in IROS2020 Robotic Grasping and Manipulation Competition.

07.2019 Qualified team in Robocup Sydney 2019 Humanoid Soccer Adult Size League.

06.2018 Qualified team in Robocup Montreal 2018 Humanoid Soccer Adult Size League.

02.2018 2nd place at Ski Robot Challenge Remote Control Competition, Pyeongchang.

04.2015 – 07. 2016 **Team Leader** of a rescue robot designing club, RoManSa.

06.2016 Qualified team in Robocup Leipzig 2016 Rescue Robot League and the thirteenth grade of total 19 teams.

04.2016 Qualified team in Robocup Teheran 2016 Rescue Robot League Open Competitions.

11.2015 The excellent prize in Mini DRC (Disaster Relief Challenge) of the International Robot Contest.

11.2015 Displayed a Mini DRC robot at the 2015 IEEE-RAS International Conference on Humanoid Robots.

11.2011 Grand prize at the creative design competition utilizing TRIZ in Kwangwoon University.

Awards

2016 **The Excellent Prize, "Development of the Rescue Robot for Earthquake Zone"** in Kwangwoon Univ. Paper Contest, KWIX, Seoul, South Korea.

2017 **Best Paper Award, "Development of the Rescue Robot for Earthquake Zone"** in 12^{th} ***Korea Robotics Society Annual Conference*** **(KRoC 2017)**, Pyeongchang, South Korea.

Skills

Programming Languages MATLAB, C, C++, Python, PyTorch.

Platforms Xenomai, Pre_empt_RT, ROS, Gazebo.

Teaching Assistantship

Spring, 2022 : **F22: Project in Advanced Robotics**, Co-Supervision.

Spring, 2023 : **F23: Project in Advanced Robotics**, Co-Supervision.

Spring, 2024 : **F24: Project in Advanced Robotics**, Co-Supervision.

Fall, 2024 : **Master Thesis**, Co-Supervision.

Spring, 2025 : **F25: Project in Advanced Robotics**, Co-Supervision.