

PERSONAL INFORMATION

Affiliation	Assistant Professor, Electrical Engineering, KAIST
Address	E3-2 3234, 291 Daehak-ro, Yuseong-gu, Daejeon 34141, Republic of Korea
Tel.	+82 (0)42 350 7464 / +82 (0)10 9978 6953
Web	https://sites.google.com/view/kaist-roboticslab
E-mail	minjun.kim (at) kaist.ac.kr

EDUCATION

2010.03- 2016.02	Pohang University of Science and Technology (POSTECH) , Pohang, Korea <i>Ph.D., Mechanical Engineering</i> Thesis title: On the nonlinear h-infinity optimal control of robotic systems using two-loop control structure and applications Advisor: Prof. Wan Kyun Chung
2006.03- 2010.02	Korea University , Seoul, Korea <i>B.S., Mechanical Engineering</i> Thesis title: <i>Development of a sensorless wall-following robot</i> Advisor: Prof. Woojin Chung

CAREER

2020.08 - present	Korea Advanced Institute of Science and Technology (KAIST) , Daejeon, Korea <i>Assistant professor</i>
2016.06 - 2020.07	German Aerospace Center (DLR) , Wessling, Germany <i>Research scientist</i>
2016.03 - 2016.05	Pohang University of Science and Technology (POSTECH) , Pohang, Korea <i>Postdoctoral researcher</i> Director: Prof. Wan Kyun Chung

RESEARCH INTEREST

My research interest includes, but not confined to,

- robust nonlinear control, passivity-based control
- impedance and admittance control for physical interactions
- elastic actuators and flexible joint robots
- aerial manipulation, manipulation on a floating base
- control of under-actuated systems
- Geometric methods
- AI-based robotics

- [J11] **M. J. Kim**, A. Werner, F. Loeffl, and C. Ott, "Passive Impedance Control of Robots with Viscoelastic Joints via Inner-loop Torque Control", *IEEE Transactions on Robotics (T-RO)*, *accepted*.
- [J10] W. Lee, **M. J. Kim**, and W. K. Chung, "Asymptotically stable disturbance observer-based compliance control of electro-hydrostatic actuators", *IEEE/ASME Transactions on Mechatronics (T-MECH)*, 15(1): pp. 195-206, February 2020.
- [J9] **M. J. Kim**, F. Beck, C. Ott, and A. Albu-Schäffer, "Model-free friction observers for flexible joint robots with torque measurements", *IEEE Transactions on Robotics (T-RO)*, 35(6): pp. 1508-1515, December 2019.
- [J8] **M. J. Kim**, W. Lee, J. Choi, G. Chung, K.-L. Han, C. Ott, and W. K. Chung, "A passivity-based nonlinear admittance control with application to powered upper-limb control under unknown environmental interactions", *IEEE/ASME Transactions on Mechatronics (T-MECH)*, 24(4): pp. 1473-1484, August 2019.
- [J7] **M. J. Kim**, K. Kondak, and C. Ott, "A Stabilizing Controller for Regulation of UAV with Manipulator", *IEEE Robotics and Automation Letters (RA-L)*, 3(3): pp. 1719-1726, February 2018.
- [J6] Y. J. Heo, J. Kang, **M. J. Kim**, and W. K. Chung, "Tuning-free robust control of flow rates for complicated microfluidic networks", *Scientific reports*, 6: pp. 23273, March 2016.
- [J5] **M. J. Kim**, and W. K. Chung, "Disturbance-observer-based pd control of flexible joint robots for asymptotic convergence", *IEEE Transactions on Robotics (T-RO)*, 31(6): pp. 1508-1516, December 2015.
- [J4] **M. J. Kim**, Y. Choi, and W. K. Chung, "Bringing nonlinear H^∞ optimality to robot controllers", *IEEE Transactions on Robotics (T-RO)*, 31(3): pp. 682-698, June 2015.
- [J3] H. Yu, I. S. Choi, **M. J. Kim**, Y. J. Park, W.K. Chung, and K. Kim, "Development of a hydraulic shroud nozzle manipulator with robust force control in continuous casting process", *The Iron and Steel Institute of Japan (ISIJ) International*, 55(5): 1025-1034, May 2015.
- [J2] **M. J. Kim**, Y. J. Park, and W. K. Chung, "Design of a momentum-based disturbance observer for rigid and flexible joint robots", *Intelligent Service Robotics (ISR)*, 8(1): 57-65, January 2015.
- [J1] T. Wang, Q. Li, P. Xiao, J. Ahn, Y. E. Kim, Y. Park, **M. J. Kim**, M. Song, E. Chung, W. K. Chung, G. Ahn, S. Kim, P. Kim, S. Myung, and K. H. Kim, "Gradient index lens based combined two-photon microscopy and optical coherence tomography", *Optics Express*, 22(11): 12962-12970, June 2014.

- [C25] C. Gabellieri, Y. Sarkisov, A. Coelho, L. Pallottino, K. Kondak, **M. J. Kim**, “Compliance Control of Cable-Suspended Aerial Manipulator Using Hierarchical Control Framework”, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, USA, October 2020.
- [C24] **M. J. Kim**, F. Beck, C. Ott, and A. Albu-Schäffer, “Model-free friction observers for flexible joint robots with torque measurements”, *IEEE International Conference on Robotics and Automation (ICRA)*, Paris, France, May 2020 (T-RO paper).
- [C23] J. Lee, R. Balanchandran, Y. Sarkisov, M. De Stefano, A. Coelho, K. Shinde, **M. J. Kim**, R. Triebel, K. Kondak, “Visual-inertial telepresence for aerial manipulation” , *IEEE International Conference on Robotics and Automation (ICRA)*, Paris, France, May 2020.
- [C22] Y. Sarkisov, **M. J. Kim**, A. Coelho, D. Tsetserukou, C. Ott, K. Kondak, “Optimal oscillation damping control of cable-suspended aerial manipulator with a single imu sensor”, *IEEE International Conference on Robotics and Automation (ICRA)*, Paris, France, May 2020.
- [C21] Y. Sarkisov, **M. J. Kim**, D. Bicego, D. Tsetserukou, C. Ott, A. Franchi, K. Kondak, “Development of sam: cable-suspended aerial manipulator”, *IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, May 2019.
- [C20] **M. J. Kim**, R. Balachandran, M. De Stefano, K. Kondak, C. Ott, “Passive compliance control of aerial manipulators”, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Madrid, Spain, October 2018.
- [C19] **M. J. Kim**, J. Lin, K. Kondak, D. Lee, and C. Ott, “Oscillation damping control of pendulum-like manipulation platform using moving masses”, *IFAC Symposium on Robot Control (SYROCO)*, Budapest, Hungary, August 2018.
- [C18] **M. J. Kim**, K. Kondak, and C. Ott, “A Stabilizing Controller for Regulation of UAV with Manipulator”, *IEEE International Conference on Robotics and Automation (ICRA)*, Brisbane, Australia, May 2018 (RA-L paper).
- [C17] W. Lee, **M. J. Kim**, and W. K. Chung, “Disturbance-observer-based pd control of electro-hydrostatically actuated flexible joint robots”, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, September 2017.
- [C16] **M. J. Kim**, A. Werner, F. Loeffl, and C. Ott, “Enhancing joint torque control of series elastic actuators with physical damping”, *IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, May 2017.
- [C15] **M. J. Kim**, W. Lee, C. Ott, and W. K. Chung, “A passivity-based admittance control design using feedback interconnections”, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Daejeon, Korea, October 2016.
- [C14] W. Lee, **M. J. Kim**, and W. K. Chung, “Joint Torque Servo Control of Electro-Hydrostatic Actuators for High Torque-to-Weight Ratio Robot Control”, *IEEE/RSJ International Conference*

on *Intelligent Robots and Systems (IROS)*, Daejeon, Korea, October 2016.

[C13] **M. J. Kim**, W. Lee, J. Y. Choi, Y. S. Park, S. H. Park, G. Chung, K.-L. Han, I. S. Choi, I. H. Suh, and W. K. Chung, "Powered upper-limb control using passivity-based nonlinear disturbance observer for unknown payload carrying applications", *IEEE International Conference on Robotics and Automation (ICRA)*, Stockholm, Sweden, May 2016.

[C12] W. Lee, **M. J. Kim**, and W. K. Chung, "A Model-Free Joint Torque Control Strategy for Hydraulic Robots", *IEEE International Conference on Robotics and Automation (ICRA)*, Stockholm, Sweden, May 2016.

[C11] **M. J. Kim**, and W. K. Chung, "Applying disturbance observer to the motor side of flexible joint robots with pd control", *The 12th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, Goyang, Korea, October 2015.

[C10] **M. J. Kim**, W. Lee, J. Park, and W. K. Chung, "Carrying heavy payload with limited sensory information using high order disturbance observer", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Hamburg, Germany, October 2015.

[C9] W. Lee, **M. J. Kim**, and W. K. Chung, "An approach to development of electro hydrostatic actuator (EHA)-based robot joints", *IEEE International Conference on Industrial Technology (ICIT)*, Sevilla, Spain, March 2015.

[C8] **M. J. Kim**, and W. K. Chung, "Robust control of flexible joint robots based on motor-side dynamics reshaping using disturbance observer (dob)", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Chicago, USA, September 2014.

[C7] **M. J. Kim**, and W. K. Chung, "Development of disturbance observer for uncertainty estimation of euler-lagrange systems" (in Korean), *The 9th Korea Robotics Society Annual Conference (KRoC)*, Buyeo, Korea, June 2014.

[C6] **M. J. Kim**, and W. K. Chung, "Design of nonlinear H^∞ optimal impedance controllers", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Tokyo, Japan, November 2013.

[C5] **M. J. Kim**, and W. K. Chung, "On the behavior of nonlinear robust internal loop compensator in linear systems" (in Korean), *The 8th Korea Robotics Society Annual Conference (KRoC)*, Gangchon, Korea, May 2013.

[C4] **M. J. Kim**, S. Park, and W. K. Chung, "Nonlinear robust internal loop compensator for robust control of robotic manipulators", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vilamoura, Portugal, October 2012.

[C3] **M. J. Kim**, and W. K. Chung, "Nonlinear disturbance observer design for euler-lagrange systems: an initial study", *The 8th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, Incheon, Korea, November 2011.

[C2] J. Lee, S. Kim, Y. S. Kim, W. K. Chung, and **M. J. Kim**, "Automated surgical planning and evaluation algorithm for spinal fusion surgery with three-dimensional pedicle model", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, San Francisco, USA,

September 2011.

[C1] **M. J. Kim**, K. Lee, and W. K. Chung, "Enhancement of VFH algorithm" (in Korean), *The 5th Korea Robotics Society Annual Conference (KRoC)*, Jeonju, Korea, July 2010.

Honors and Awards

- Cheong-am fellowship, \$25,000/year, 2010.03-2013.02
- Outstanding paper award in Department of Mechanical Engineering, POSTECH, 2015

Academic Services

- Served/ing as a reviewer for
 - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
 - IEEE International Conference on Robotics and Automation (ICRA)
 - IEEE International Conference on Automation Science and Engineering (CASE)
 - IEEE Transactions on Robotics (T-RO)
 - IEEE Robotics and Automation Letters (RA-L)
 - IEEE Transactions on Industrial Electronics (T-IE)
 - IEEE Transactions on Neural Systems & Rehabilitation Engineering (TNSRE)
 - International Journal of Control, Automation and Systems (JCAS)
 - Mathematical Problems in Engineering
 - European Journal of Control
 - Intelligent Service Robotics
- Served/ing as an associated editor for
 - IEEE RA-L, 2017, 2018, 2019
 - IEEE/RSJ IROS 2018, 2019, 2020
 - IEEE ICRA 2019, 2020, 2021, 2022
- Served as an organizing committee
 - 9th International Conference on Robot Intelligence Technology and Applications, RiTA 2021

Invited Talks & Lectures

- Mar/2016, H-infinity optimal control of robotic systems and joint torque control of hydraulic joints, Doosan Robotics

- Nov/2018, From ground manipulation to aerial manipulation, KAIST CEE
- July/2019, Passivity-based control of flexible joint robots, Neuromeka
- July/2019, Passivity-based control of flexible joint robots, Seoul National University GSCST
- Oct/2019, Towards safe aerial manipulation in industrial scenarios, KAIST EE
- Dec/2020, Towards safe aerial manipulation in industrial scenarios, POSTECH ME
- Apr/2021, Passivity-based Robot Control, Invited lecture at POSTECH MECH739 Advanced Robotics
- May/2021, Introduction to Differential Geometry for Robot Control, Invited lecture at POSTECH MECH739 Advanced Robotics
- Oct/2021, Towards safe aerial manipulation in industrial scenarios, ICCAS 2021 Frontiers Session
- Dec/2021, TBD, Dongguk University AI Department