

YOUNGSHIK KIM, Ph.D.

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MECHANICAL ENGINEERING
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Education

Doctor of Philosophy, Mechanical Engineering

University of Utah, Salt Lake City, UT, USA, 2008

- Dissertation: "Kinematic Motion Control of Compliantly Coupled Multi-Robot Systems Subject to Physical Constraints," August 2008, Advisor: Dr. Mark A. Minor.
- Coursework GPA: 4.0/4.0

Master of Science, Mechanical Engineering

University of Utah, Salt Lake City, UT, USA, 2003

- Thesis: "Control Prototyping System: From DSP to Microcontroller (Case Study: Throwing Robot Arm)," May 2003, Advisor: Dr. Mark A. Minor.
- Coursework GPA: 3.91/4.0

Bachelor of Engineering, Mechanical Engineering

Inha University, Incheon, Korea, 1996

- Concentrations in System Dynamics, Modeling, Mechanics and FEM/Computational Methods.
- Class Rank: 10/216, GPA: 3.52/4.0,

Professional Experience

Associate Professor

Department of Mechanical Engineering, Hanbat National University, Daejeon, Korea, 2011-Present

Senior Researcher

DGIST (Daegu Gyengbuk Institute of Science and Technology), Daegu, Korea, 2009-2011

- Biologically Inspired Robots

Deputy Director (5th ranked government official)

DAPA (Defense Acquisition Program Administration), Seoul, Korea, 2009

Postdoctoral Researcher

Robotics System Laboratory, Mechanical Engineering, University of Utah, August 2008-March 2009

- Calibration-less trailer backing

Robotics Instructor

Juan Diego Catholic High School, Draper, Utah, August 2008-December 2008

Research Assistant

Robotics System Laboratory, Mechanical Engineering, University of Utah, 2001-2008

- DARPA URBAN CHALLENGE 2007
- Nonholonomic control and motion planning: funded by NSF
- A ball-throwing robot arm: funded by University of Utah
- Proposal Written: “Traction control, planning, and localization for terrain sensing mobile robots”
 - Collaborated with the advisor to submit proposals to NSF.
- Student Mentoring

Guest Lecturer

Mechanical Engineering, University of Utah

- Nonlinear Controls (ME7200, graduate course), taught some fundamental properties and Lyapunov stability theorem, September 2008.
- Mechatronics II (ME3210, undergraduate course), taught stability and steady state errors, March 2008.
- Advanced Modeling and Controls (ME6200, graduate course), taught frequency response and Bode plots, November 2004.

Teaching Assistant

Mechanical Engineering, University of Utah

- Mechatronics (ME3200 & 3210, undergraduate course), Fall 2007-Spring 2008
- Engineering Design and Visualization (ME1000, undergraduate course), Fall 2006
- Robot Controls (ME6960-004, senior and graduate course), Spring 2005

Graduate Assistant

Mechanical Engineering, University of Utah, August 2001-May 2003

- Mechatronics I & II (ME3200 & 3210), Advanced Modeling and Controls (ME6200), State Space Methods (ME6210)

Tutor

Tutoring Center, University of Utah, 2001

- Taught computer essentials: MS OFFICE (Word, Excel, PowerPoint, Access, and FrontPage).

Assistant Engineer

Calibration Service Center, Korea Research Institute of Standards and Science (KRISS), Daejeon, Korea, February-August 2000

Selected Grants

1. Co-Principal Investigator, Deep Learning-based Road Friction Estimation Using Multi-Sensors, 2018-2021
2. Principal Investigator, LabVIEW Software Development for GOODSEN equipment, 2018
3. Principal Investigator, Biologically-inspired soft robots with advanced mobility and manipulation using bio-inspired modular shape memory alloy smart actuators, 2017-2021
4. Principal Investigator, Attitude Estimation Method Based on Kalman Filter Considering External Acceleration and Bias Effect, 2017-2018
5. Principal Investigator, Ka/Ku multi-band vehicle-mounted satellite antenna system, 2014-2015

6. Principal Investigator, Design and Control of Wheeled Mobile Robots, 2013-2014
7. Principal Investigator, Design and motion control of biologically inspired compliantly coupled modular mobile robots, 2012-2015
8. Principal Investigator, Development of vehicle-mounted antenna positioner for Ka-band satellite communication, 2012-2013
9. Principal Investigator, Design and motion control of biologically inspired compliantly coupled modular mobile robots, 2011-2012

Publications

Book

- Xiaorui Zhu, **Youngshik Kim**, Mark A. Minor, Chunxin Qiu, “Autonomous Mobile Robots in Unknown Outdoor Environments,” Publisher: CRC Press; December 22, 2017.

Journal Articles

1. **Y. Kim**, T. Jang, H. Gurung, N. Mansour, B. Shin, B. Ryu, "Bidirectional Rotating Actuators Using Shape Memory Alloy Wires," *Sensors and Actuators A: Physical*, Volume 295, Pages 512-522, 15 August 2019. (SCI/SCIE indexed)
2. B. Shin, **Y. Kim**, J. Paik, and K.-m. Lee, “Miniaturized twin-legged robot with an electromagnetic oscillatory actuator,” *Journal of Bionic Engineering*, vol. 15, no. 1, pp. 106-113, January, 2018. (SCI/SCIE indexed)
3. Bu Hyun Shin, Taesoo Jang, Bong-Jo Ryu, **Youngshik Kim**, “A Modular Torsional Actuator Using Shape Memory Alloy Wires,” *Journal of Intelligent Material Systems and Structures*, vol. 27, no. 12, pp. 1658-1665, July 2016. (SCI/SCIE indexed)
4. Bong-Jo Ryu, **Youngshik Kim**, and Soonbae Chung, “Plant Production System Based on Heliostats and LEDs Using Automatic Sliding Cultivation Shelves,” *International Journal of Smart Home*, Vol. 10, No. 3, pp.63-74, March 2016. (Scopus indexed)
5. **Youngshik Kim**, “Motion state estimation for an autonomous vehicle-trailer system using Kalman filtering-based multisensor data fusion,” *Asia Life Sciences*, supplement 11, pp. 79-90, 2015. (SCI/SCIE indexed)
6. Kyung-min Lee, **Youngshik Kim**, Jamie K. Paik, and Buhyun Shin, “Clawed Miniature Inchworm Robot Driven by Electromagnetic Oscillatory Actuator,” *Journal of Bionic Engineering*, Vol. 12, Issue 4, pp. 519–526, 2015. (SCI/SCIE indexed)
7. **Youngshik Kim**, "Investigation of Parameter Estimation of a Car-Trailer System Using Condition Numbers." *International Journal of Software Engineering and Its Applications*, Vol.8, No.5, pp.231-242, 2014. (Scopus indexed)
8. Bu Hyun Shin, Kyung-min Lee, and **Youngshik Kim**, "Miniaturized Dual Electromagnetic Oscillatory Actuator for Legged Locomotion of Micro Mobile Robots" *International Journal of Control and Automation*, Vol.7, No.8, pp.245-256, 2014. (Scopus indexed)
9. **Youngshik Kim** and Mark A. Minor, “Coordinated Kinematic Control of Compliantly Coupled Multi-Robot Systems in an Array Format,” *IEEE Transactions on Robotics*, Vol. 26, Issue 1, pp. 173-180, 2010. (SCI/SCIE indexed)

10. **Youngshik Kim** and Mark A. Minor, "Distributed Kinematic Motion Control of Multi-Robot Coordination Subject to Physical Constraints," *International Journal of Robotics Research*, Vol. 29, Issue 1, pp. 92-109, 2010. (SCI/SCIE indexed)
11. Xiaorui Zhu, **Youngshik Kim**, Roy Merrell and Mark A. Minor, "Cooperative Motion Control and Sensing Architecture in Compliant Framed Modular Mobile Robots," *IEEE Transactions on Robotics*, Vol. 23, Issue 5, pp. 1095-1101, 2007. (SCI/SCIE indexed)
12. **Youngshik Kim** and Mark A. Minor, "Path Manifold Based Kinematic Control of Wheeled Mobile Robots Considering Physical Constraints," *International Journal of Robotics Research*, Vol. 26, Issue 9, pp. 955-975, 2007. (SCI/SCIE indexed)

Domestic Journal Articles (in Korean)

1. 유봉조, **김영식**, 오부진, 신부현, "무인기 구동 제어기의 열 온도해석," 한국디지털콘텐츠학회 논문지, 20(5), 1061-1067, May. 2019. (KCI indexed)
2. 장태호, **김영식**, 장태수, "외부가속도와 바이어스 효과를 고려한 칼만필터 기반 자세추정 방법비교 (Comparison of Attitude Estimation Method Based on Kalman Filter with Considering External Acceleration and Bias Effect)," 한국정밀공학회지(J. Korean Soc. Precis. Eng.), Vol. 35, No. 8, pp. 745-752, August 2018. (Scopus indexed)
3. 장태호, **김영식**, 류봉조, "FPE 방식을 활용한 이족 로봇 균형 유지 3 차원 시뮬레이션 연구 (3D Simulation Study of Biped Robot Balance Using FPE Method)," 디지털콘텐츠학회논문지 (Journal of Digital Contents Society), Vol. 19, No. 4, pp. 815-819, Apr. 2018. (KCI indexed)
4. 유봉조, **김영식**, 오부진, 신부현, "무인기 제동장치 제어기의 온도 및 유동해석," 디지털콘텐츠학회논문지 (Journal of Digital Contents Society), Vol. 19, No. 11, pp. 2167-2172, Nov. 2018. (KCI indexed)
5. 유봉조, **김영식**, 신부현, 구경완, "자전거 주차 자동화 및 모니터링 시스템 개발," 디지털콘텐츠학회논문지 (Journal of Digital Contents Society), Vol. 19, No. 10, pp. 1861-1869, Oct. 2018. (KCI indexed)
6. 유봉조, **김영식**, 구경완, "당뇨병성 신경병증의 정량적 진동 감각 측정 시스템," 디지털콘텐츠학회논문지 (Journal of Digital Contents Society), Vol. 19, No. 4, pp. 615-620, Apr. 2018. (KCI indexed)
7. 정덕원, 강현모, 이태훈, 지홍배, 정준혁, **김영식**, "자전거 교통사고 방지를 위한 후방차량감지기," 한밭대학교 생산융합연구소 논문지, 2018.
8. **김영식**, 심현호, 이경민, 신부현, "소형 2 자유도 전자기 구동기 모듈 개발," 제어로봇시스템학회 논문지 (Journal of Institute of Control, Robotics and Systems), 23(7), pp. 546-551, July 2017. (Scopus indexed)
9. 최봉문, 류봉조, **김영식**, 구경완, "차단판에 의해 운동이 제한된 외팔보의 혼돈 진동," 전기학회논문지, 66(12), pp. 1852-1865, Dec. 2017. (Scopus indexed)

10. 김영식, 장태수, "형상기억합금 응용 스마트 액추에이터-제어기 설계 (Smart Actuator-Control System Design Using Shape Memory Alloys)," 디지털콘텐츠학회 논문지 (Journal of Digital Contents Society), Vol. 18, No. 7, pp. 145-1456, Nov. 2017. (KCI indexed)
11. 장태호, 김영식, 장태수, 류봉조, "LabView 소프트웨어를 활용한 파이프 절단 파워 측정 및 검증 (Measurement and verification of pipe cutting power using LabView software)," 디지털콘텐츠학회 논문지 (Journal of Digital Contents Society), Vol. 18, No. 7, pp. 1387-1391, Nov. 2017. (KCI indexed)
12. 박기완, 남재현, 강재영, 김영식, 이재복, 유봉조, "브레이크 디스크 표면 패턴에 따른 FE 스킵 및 진동해석," 한국기계기술학회지, 제 19 권 제 6 호, pp. 899-905, 12 월, 2017. (KCI indexed)
13. 박기완, 남재현, 강재영, 김영식, 이재복, 유봉조, "구조 형상에 따른 벤틸레이티드 디스크 브레이크 열 유동 해석 연구," 한국기계기술학회지 제 19 권 제 1 호, pp. 134~140, 2017. (KCI indexed)
14. 유봉조, 오부진, 김영식, "능동 파괴 방호 구동제어기의 열 유동 해석," 한국산학기술학회논문지, Vol. 18, No. 2 pp. 235-242, 2017. (KCI indexed)
15. 장태호, 김영식, 경민영, 이현빈, 윤동환, "모바일 로봇 자세 안정화를 위한 칼만 필터 기반 센서 퓨전 (Kalman Filter-based Sensor Fusion for Posture Stabilization of a Mobile Robot)," 대한기계학회논문집 A (Trans. Korean Soc. Mech. Eng. A), Vol. 40, No. 8, pp. 703~710, August 2016. (Scopus indexed)
16. 장태호, 김영식, 김현태, "모바일 로봇 구동 시스템 제어를 위한 선형 및 비선형 모델 기반 PID 제어기 성능 비교 (Comparison of PID Controllers by Using Linear and Nonlinear Models for Control of Mobile Robot Driving System)," 한국정밀공학학회지(Journal of the Korean Society of Precision Engineering), Vol. 33, No. 3, pp. 183-190, 2016. (Scopus indexed)
17. 구경완, 김태진, 김영식, 유봉조, "식물공장의 헬리오스탯을 이용한 태양광 추적성능 및 LED 균일광 조사," 전기학회논문지, vol. 64, No. 12, pp. 1761-1767, 2015. (Scopus indexed)
18. 윤지환, 유봉조, 김영식, "다층 재배선반을 갖는 하이브리드 식물공장의 열유동 특성," 한국산학기술학회지 (Journal of the Korea Academia-Industrial cooperation Society), Vol. 16, No. 11 pp. 7990-8000, 2015. (KCI indexed)
19. 김인우, 유봉조, 김영식, "불균일 단면을 갖는 단순지지 보의 모달해석 및 실험," 한국산학기술학회지, Vol. 16, No. 12 pp. 8654-8664, 2015. (KCI indexed)
20. 장태호, 김영식, "차량 탑재형 안테나 포지셔너의 반사판 지지대 최적설계 (Design Optimization of Support Frame of Antenna Positioner Mounted on a Vehicle)," 한국정밀공학학회지(Journal of the Korean Society of Precision Engineering), vol. 31 no. 5, pp.411 - 416, 2014. (Scopus indexed)
21. 장태호, 김영식, "모바일 로봇 모션 제어에 있어 샘플링 시간의 효과 (Effects of the Sampling Time in Motion Controller Implementation for Mobile Robots)," 한국산업경영시스템 학회지(Journal of Society of Korea Industrial and Systems Engineering), vol. 37 no. 4, pp.154 - 161, 2014. (KCI indexed)

International Conference Articles

The following publications reflect competitive peer reviewed conference with low acceptance rates (typically lower than 40~60%):

1. **Youngshik Kim** and Mark A. Minor, "Coordinated Kinematic Motion Control of Compliant Framed Modular Wheeled Mobile Robots," Proc. *2008 IEEE/RSJ International Conference on Intelligent Robots and Systems*, Nice, France, 22-26 September, 2008.
2. **Youngshik Kim** and Mark A. Minor, "Kinematic Motion Control of Wheeled Mobile Robots Considering Curvature Constraints," Proc. *2008 IEEE International Conference on Robotics and Automation*, Pasadena, CA, USA, 19-23 May, pp. 2527 - 2532, 2008.
3. **Youngshik Kim** and Mark A. Minor, "Decentralized Kinematic Motion Control for Multiple-Axle Compliant Framed Modular Wheeled Mobile Robots," Proc. *2006 IEEE/RSJ International Conference on Intelligent Robots and Systems*, Beijing, China, 9-15 October, pp. 392-397, 2006.
4. **Youngshik Kim** and Mark A. Minor, "Bounded Smooth Time Invariant Motion Control of Unicycle Kinematic Models," Proc. *2005 IEEE International Conference on Robotics and Automation*, Barcelona, Spain, 18-22 April, pp. 3676 -81, 2005.
5. Mark A. Minor, Kent Jensen, and **Youngshik Kim**, "Design and Control of a Three-Link Serial Manipulator for Lessons in Particle Dynamics," Proc. *2002 IEEE International Conference on Robotics and Automation*, Washington DC, USA, 11-15 May, Vol. 4, pp. 3435-41, 2002.
6. Xiaorui Zhu, **Youngshik Kim** and Mark A. Minor, "Cooperative Distributed Robust Control of Modular Mobile Robots with Bounded Curvature and Velocity," Proc. *2005 IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Monterey, California, USA, 24-28 July, pp. 1151-57, 2005.

The following publications' acceptance rates are not announced:

7. Buhyun Shin, Hyunho Shim, **Youngshik Kim**, "Development of a novel 2-D.o.F electromagnetic actuator for a 6-legged mobile robot," The 5 Annual Conference on Engineering and Information Technology, Kyoto, Japan, March 27-29, 2018.
8. **Youngshik Kim**, Taesoo Jang, Bong-Jo Ryu, and Bu Hyun Shin, "Temperature and Resistance of Shape Memory Alloy Torsional Actuator," 15th International Conference on Electrorheological Fluids and Magnetorheological Suspensions (ERMR), Incheon, Korea, July 4–8 2016.
9. **Youngshik Kim**, Taesoo Jang, Bong-Jo Ryu, and Bu Hyun Shin, "Bidirectional Shape Memory Alloy Torsional Actuator," 15th International Conference on Electrorheological Fluids and Magnetorheological Suspensions (ERMR), Incheon, Korea, July 4–8 2016.
10. **Youngshik Kim**, Bong-Jo Ryu, and Soonbae Jung, "A Hybrid-Type Plant Factory Using Sliding Cultivation Shelves," *Advanced Science and Technology Letters*, Vol.120 (GST 2015), Jeju, Korea, Dec. 16-19, pp.476-480, 2015.
11. Bu Hyun Shin, **Youngshik Kim**, and Bongjo Ryu, "2-DoF Electromagnetic Actuator," Proceedings of the 6th International Conference on Manufacturing, Machine Design and Tribology (ICMDT), Okinawa, Japan, April 22-25, pp. 472-473, 2015.

12. **Youngshik Kim** and Jinsul Kim, "Linear Kinematic Model-based Least Squares Methods for Parameter Estimation of a Car-Trailer System Considering Sensor Noises," 2014 Fifth International Conference on Information Science and Applications, Seoul, Korea, 6–9 May 2014.
13. **Youngshik Kim**, "Condition number for Parameter Estimation of a Car-Trailer System," Proceedings of 2014 International Workshop on Mobile and Wireless, Jeju, Korea, April 15-18, 2014.
14. Shin, Bu Hyun, Kyung-min Lee, and **Youngshik Kim**. "Miniaturized Dual Electromagnetic Oscillatory Actuator." Proceedings of 2014 International Workshop on Mobile and Wireless, Jeju, Korea, April 15-18, 2014.
15. **Youngshik Kim**. "Path Curvature Sensing Methods for a Car-like Robot," Proceedings of 2014 International Workshop on Mobile and Wireless, Jeju, Korea, April 15-18, 2014.
16. Bong-Jo Ryu and **Youngshik Kim**, "Comparison of Compliant One-Segmented and Two-Segmented Leg Dynamics For a Wheel-Leg Hybrid Mobile Robot Using a Mass-Spring Model," Proceedings of 15th Asia Pacific Vibration Conference (APVC), Jeju, Korea, May 29-31, pp. 235-240,-2013.
17. Bong-Jo Ryu, Kil-Young Ahn, and **Youngshik Kim** "Development of a molded case circuit breaker with a spring-actuated linkage based on multi-body dynamics analysis," Proc. of International Conference on Manufacture Engineering, Quality and Production System, Hong Kong, Feb. 27-28, 2013.
18. Bong-Jo Ryu, Hee-Jung Kim, and **Youngshik Kim**, "Dynamic response and vibration of a cantilevered beam under an accelerated moving mass," Proc. of International Conference on Manufacture Engineering, Quality and Production System, Hong Kong, Feb. 27-28, 2013.
19. Bong-Jo Ryu, **Youngshik Kim**, Kyeong-Rok Ha, Nam-Kyu Park, and Kyeong-Lak Jeon, "Vibration characteristics of a fuel rod depending on spring stiffness variations of spacer grids," Proceedings of 19th International Congress on Sound and Vibration (ICSV 19), Vilnius, Lithuania, July 08-12, 2012.
20. Bong-Jo Ryu, **Youngshik Kim**, Jin-Kyu Kang, Boo-Jin Oh, and Young-Sik Yoon, "Semi-active vibration control of a rail-track supported by discrete springs and Magneto-Rheological dampers under a travelling mass," Proceedings of 19th International Congress on Sound and Vibration (ICSV 19), Vilnius, Lithuania, July 08-12, 2012.
21. **Youngshik Kim**, Dong-Hwan Shin, "Running Model for a Compliant Wheel-Leg Hybrid Mobile Robot by Using a Mass-Spring Model," Applied Mechanics and Materials, Volumes 110 - 116, pp. 2762-2767, 2012.
22. Dong-Hwan Shin, **Youngshik Kim**, Seungmin Jeong, and Jinung An, "The Mechanical Analysis of a Legged Filed Robot for the Reduction of Longitudinal Mass-drift Amounts," 28th International Symposium on Automation and Robotics in Construction (ISARC2011), Seoul, Korea, June 29 - July 2, 2011.
23. **Youngshik Kim**, Dong-Hwan Shin, and Jinung An, "Running of a Compliant Wheel-Leg Hybrid Mobile Robot by Using a Simple Mass-Spring Model," 2nd International Conference on Mechanical, Industrial, and Manufacturing Technologies (MIMT), Singapore, February 2011.
24. Dong-Hwan Shin, **Youngshik Kim**, Seungmin Jeong, and Jinung An, "Design of a Biologically Inspired Robot Using CAD/CAE/CP," Int. Conf. Computer-aided Manufacturing and Design (CMD), Hong Kong, November 2010.

25. Dong-Hwan Shin, **Youngshik Kim** and Jinung An, "Effects of torsional stiffness, knee angle, and link ratio on the design of a biologically inspired mobile robot with two-segment legs," Int. Conf. Control, Automation and Systems (ICCAS), Goyan-si, Korea, October 2010.
26. Dong-Hwan Shin, **Youngshik Kim**, and Jinung An, "Hip-torque limit for no-slop conditions and estimation of frictional coefficients for legged robots," IASTED Int. Conf. Robotics (ROBO), Phuket, Thailand, November 2010.

Non-refereed Korean Conference Articles

1. 신부현, 백중환, **김영식**, "전자기 구동기를 이용한 워 로봇," 대한기계학회 2018년도 학술대회, 강원도 정선군, 12월 12일 ~ 12월 15일, 2018.
2. 장태호, **김영식**, "2자유도를 갖는 생체모방형 휠레그 로봇 개발 (Development of the biomimetic wheel-leg robot having 2 DOF)", 대한기계학회 충청지회 2017 춘계학술대회, 대전, 5월26일, 2017.
3. 장태호, 신부현, 류봉조, **김영식**, "생체모방형 다개체 휠레그 로봇 개발 (Development of The Biomimetic Multiple Wheel-leg Robot)," 한국지식정보기술학회 2017 춘계학술발표대회, 06, 2017.
4. 류봉조, 박기완, 남재현, 강재영, **김영식**, 이재복, "브레이크 디스크 표면에 따른 진동 특성", 한국정밀공학회 2017년도 춘계학술대회, 제주도, 05.17~05.19, 2017.
5. **김영식**, 장태수, 유재국, 류봉조, 이재복, "차량용 탄소사 열선 시트를 위한 특성 연구(Characterization of a car heated seat using carbon fibers)", 한국정밀공학회 2017년도 춘계학술대회, 제주도, 포스터, 05.17~05.19, 2017.
6. 오부진, 유봉조, **김영식**, "구동제어기의 열 해석," 2016년도 춘계 소음진동 학술대회, 4월 20일~23일, 경주, 2016.
7. 남재현, 박기완, 유봉조, **김영식**, 강재영, "자동차 브레이크 디스크의 열 해석," 2016년도 춘계 한국소음진동공학회 학술대회, 4월 20일~23일, 경주, 2016.
8. 김인우, 류봉조, **김영식**, 신부현, 임채욱, "불연속 단면을 갖는 단순지지 보의 모달해석 및 실험," 2015년도 추계 한국소음진동공학회 학술대회, 10월 28일~30일, 용평, 2015.
9. 유봉조, **김영식**, 신부현, 정순배, 명병수, "다층 미끄럼 재배 선반을 갖는 하이브리드 식물공장," 한국농업기계학회 2015 추계학술대회 논문집 20(2), 10.29-10.30, 변산, pp. 185-186, 2015.
10. 장태호, **김영식**, "Path Manifold 모션 제어기를 적용한 자세 안정화 (Posture Stabilization using a Path Manifold Motion Controller)," 2015 한국지식정보기술학회 춘계학술대회, 광주, 5월29~30일, 2015.
11. 류봉조, 양윤영, **김영식**, 신부현, 김상활, "유체에 잠겨있는 다공 원판의 진동 해석," 2015 한국소음진동공학회 학술대회, 제주도, 4월22일-4월25일, 2015.
12. 장태수, **김영식**, "형상기억합금 와이어 액추에이터를 적용한 자벌레 로봇 (Inchworm

- Robot by Using a Shape Memory Alloy Torsional Spring Actuator),” 2015 30회 제어로봇시스템학회 학술대회(ICROS), 대전 0.5.06-0.5.08, 2015.
13. 신부현, 김영식, “무빙코일 타입의 2 자유도 전자기 구동기 모듈 개발,” 2015 30회 제어로봇시스템학회 학술대회(ICROS), 대전, 0.5.06-0.5.08, 2015.
 14. 장태호, 김영식, 김현태, “선형 및 비선형 DC모터 시스템 모델에 대한 PID 제어기 성능 비교 (Comparison of PID controllers for Linear and Nonlinear Motor System Models),” 2015 30회 제어로봇시스템학회 학술대회(ICROS), 대전, 0.5.06-0.5.08, 2015.
 15. 장태수, 김영식, “형상기억합금 와이어 액추에이터의 온도 특성 (Temperature Characteristics of a Shape Memory Alloy Wire Actuator),” 한국정밀공학회 2015년도 춘계 학술대회, 제주도, 5월 13일~5월 15일, 2015.
 16. 장태호, 김영식, 김현태, “DC모터의 시스템 모델링 및 식별 결과 비교 (DC Motor Model-Based Parameter Estimation),” 한국정밀공학회 2015년도 춘계학술대회, 제주도, 5월 13일~5월 15일, 2015.
 17. 박정진, 장태호, 김영식, “3D Printing 기술을 이용한 일체형 휠-레그 모바일 로봇설계 (3D Printing-based Design of an Integrated Wheel-Leg for a Mobile Robot),” 2015 한국 CAD/CAM학회 동계학술대회, 강원도 평창, 2월 4일~2월 6일, 2015.
 18. 이경민, 이승엽, 김영식, 신부현, “전자기 구동기를 이용한 소형 스틱-슬립 이동 메커니즘,” 29회 제어로봇시스템학회(ICROS) 학술대회, 5월 29일~30일, 대구, 2014.
 19. 장태호, 김영식, “극 좌표 모션 컨트롤러의 수렴 경로 반경 범위 연구 (A Study on a Converging Path Radius of a Motion Controller derived in Polar Coordinates),” 2014 한국지식정보기술학회 춘계학술대회, 대전, 5월23~24일, 2014.
 20. 장태호, 김영식, “Path Manifold Motion Control 다개체 모바일 로봇 적용 및 결과 분석 (Path Manifold Motion Controller for a Real Multi-Robot and Its Analysis),” 2014 한국지식정보기술학회 추계학술대회, 대전, 10월31-11월1일, 2014.
 21. 박정진, 김영식, “바퀴와 Wheel-Leg를 적용한 모바일 로봇의 주행 비교 (Mobility Comparison of Wheeled and Wheel-Legged Mobile Robots),” 2014 한국지식정보기술학회 추계학술대회, 대전, 10월31-11월1일, 2014.
 22. 장태수, 김영식, “형상기억합금 와이어를 응용한 양방향 액추에이터 (Shape-Memory Alloy Wire-based Duplex Actuator),” 2014 한국지식정보기술학회 추계학술대회, 대전, 10월31-11월1일, 2014.
 23. 박정진, 김영식, 류봉조, “3D Printer를 활용한 Wheel-Leg 설계 및 모바일 로봇에 적용 (Design and Application of Wheel-Legs for a Mobile Robot Using a 3D Printer),” 한국정밀공학회 2014년도 추계학술대회, 창원, 10월 29일-31일, 2014.
 24. 장태호, 김영식, “모바일 로봇 제어를 위한 PID 컨트롤러 설계 (PID Controller Design for Mobile Robot Control),” 한국정밀공학회 2014년도 추계학술대회, 창원, 10월 29일-31일, 2014.
 25. 장태수, 김영식, “형상기억합금 와이어를 응용한 양방향 액추에이터 (New Shape-

- Memory Alloy Wire-based Actuator),” 한국정밀공학회 2014년도 추계학술대회, 창원, 10월 29일-31일, 2014.
26. 김영식, 문기택, 류봉조, “소금쟁이 로봇의 Wire다리 길이와 적재하중 실험 (Load Experiment by Changing Wire Leg Lengths of a Water Strider Robot),” 한국정밀공학회 2014년도 추계학술대회, 창원, 10월 29일-31일, 2014.
 27. 류봉조, 김영식, 양운영, 김상활, “태양광을 이용한 하이브리드 다개층 식물 생산 시스템,” 한국소음진동공학회 학술대회, 목포, 10월 29일-10월 31일, 2014.
 28. 김영식, “최소제곱법 기반 파라미터 추정 알고리즘을 위한 트레일러 로봇 모델 (Trailer Robot Model for Ordinary Least Squares-based Parameter Estimation Algorithm),” 2013 한국지식정보기술학회 추계학술대회, 천안, 11.22-11.23 pp. 135-138, 2013.
 29. 장태호, 김영식, “안테나 포지셔너 방위각 구동 미케니즘 구조 해석 (Structural Analysis of a Mechanism for Driving Azimuth of an Antenna Positioner),” 한국정밀공학회 2013년도 춘계학술대회, 제주도, 05.29-05.31, 2013
 30. 장태호, 김영식, “안테나 포지셔너 방위각 구동 미케니즘 설계 (Mechanism Design for Driving Azimuth of an Antenna Positioner),” 한국정밀공학회 2013년도 춘계학술대회, 제주도, 05.29-05.31, 2013
 31. 김지용, 신우창, 박경배, 김영식, “ANSYS를 이용한 컴플라이언스 모바일 로봇 최적 설계에 관한 연구 (Research on Design Optimization for Compliant Mobile Robots Using ANSYS),” 한국정밀공학회 2012년도 추계학술대회, 광주, 10.24-10.26, 2012.
 32. 조도연, 장태호, 전상욱, 김영식, “풍속을 고려한 안테나 포지셔너 시스템의 해석과 설계 방안 (Finite Element Analysis and Design Approach for Antenna Positioner Systems Considering Wind Speed),” 한국정밀공학회 2012년도 추계학술대회, 광주, 10.24-10.26, 2012.
 33. 박경배, 김영식, “인휠 방식을 적용한 안테나 포지셔너 개념 설계 (Concept Design of an Antenna Positioner Using an In-Wheel Motor System),” 한국정밀공학회 2012년도 추계학술대회, 광주, 10.24-10.26, 2012.
 34. 류봉조, 김영식, 임경빈, 윤지환, “화재로 인해 시간 종속 열원에 따른 사장교의 안전성 예측,” 2012년도 한국방재학회 학술발표대회, 2012.
 35. 류봉조, 오부진, 윤지환, 이규섭, 김효준, 김영식, “주행질량 하의 스프링-댐퍼 이산지 지된 보의 동적응답 해석,” 한국소음진동공학회 2011년도 춘계학술대회, 강원도, 04.27-04.29, pp. 675-676, 2011.
 36. **Youngshik Kim**, “Mass-Spring Model based Running of Robots with One-Segment and Two-Segment Compliant Legs,” *Daejeon-Chungchung Conference of Institute of Control and Robot Systems*, December, 2011.
 37. **Youngshik Kim** and Kyungbae Park, “Concept Design of Biologically-Inspired Compliant Frame Links for Mobile Robots,” *Daejeon-Chungchung Conference of Institute of Control and Robot Systems*, December, 2011.
 38. **Youngshik Kim**, “Trajectory Tracking Control for Backing of a Car-Trailer System,” *Proc.*

Korean Society for Precision Engineering Fall Conference, October, 2011.

39. Kyungbae Park and **Youngshik Kim**, "Concept Design of an Automated Coating System for Expandable Polystyrene Honeybee Hives," *Proc. Korean Society for Precision Engineering Fall Conference*, October, 2011.
40. **Youngshik Kim**, "Car-Trailer System Identification Using Nonlinear Least Square Techniques," *Proc. Korean Society for Precision Engineering Spring Conference*, May, 2010. (in English)
41. **Youngshik Kim**, Dong-Hwan Shin, Oh Seok Kwon, and Jinung An, "A Leg-Swing Controller for Compliant Legged Robot Running Based on Mass-Spring Model (질량-스프링모델 응용 보행로봇 달리기를 위한 다리 스윙 제어기)," *Proc. Korean Society for Precision Engineering Fall Conference*, November, 2010.
42. Dong-Hwan Shin, **Youngshik Kim**, Oh Seok Kwon, Donguk Kong, and Jinung An, "A Study of Two Segment Leg for A Biologically Inspired Mobile Robot for Rugged Terrain," *Proc. Korean Society for Precision Engineering Spring Conference*, May, 2010.
43. Seungmin Jeong, Dong-Hwan Shin, **Youngshik Kim**, and Jinung An, "Leg static guide for impact reduction of robot main body," *Proc. Korean Society for Precision Engineering Fall Conference*, November, 2010.
44. Oh Seok Kwon, Dong-Hwan Shin, **Youngshik Kim**, and Jinung An, "Design study of 3 segment leg with stable region at low and high speed running," *Proc. Korean Society for Precision Engineering Fall Conference*, November, 2010.
45. Oh Seok Kwon, **Youngshik Kim**, and Jinung An, "A Study for Locomotion Control of Compliant Legged Robot," *Proc. Korean Society for Precision Engineering Fall Conference*, November, 2010.
46. Dong-Hwan Shin, Seungmin Jeong, **Youngshik Kim**, and Jinung An, "The mechanism for the reduction of pitch due to acceleration and deceleration of legged robots (다리형 로봇의 가속 속에 기인한 Pitch 저감을 위한 메커니즘)," *Proc. Korean Society for Precision Engineering Fall Conference*, November, 2010.

Korea Patents (Registered)

1. **Youngshik Kim**, Taesoo Jang, "INCHWORM ROBOT USING TORSIONAL ACTUATOR," 2018.
2. **Youngshik Kim**, Taesoo Jang, "Shape memory alloy (SMA) torsional actuator-based snake robot," 2017.
3. **Youngshik Kim**, Taesoo Jang, "ROBOTIC HAND USING TORSIONAL SHAPE-MEMORY-ALLOY ACTUATORS," 2017.
4. **Youngshik Kim**, Taeho Jang, Jinseok Lee, Moohong Lee, "AN ANTENNA ASSEMBLY FOR A VEHICLE," 2017
5. **Youngshik Kim**, Taesoo Jang, "SPHERICAL TRAVELLING DEVICE USING SHAPE MEMORY ALLOY WIRES," 2016.
6. **Youngshik Kim**, "Transformable Wheel-Leg Assembly," 2016
7. **Youngshik Kim**, "METHOD FOR PARAMETER CALIBRATION OF TWO-LINK NONHOLONOMIC ROBOTS," 2015.
8. **Youngshik Kim**, "POSITIONER FOR AN ANTENNA USING THE IN-WHEEL MOTOR," 2014.
9. **Youngshik Kim**, KyungBae Park, "VARIABLE HEIGHT TYPE COATING APPARATUS,"

- 2013.
10. **Youngshik Kim**, KyungBae Park, "AUTOMATIC CONVEYOR APPARATUS AND COATING," 2013.
 11. **Youngshik Kim**, KyungBae Park, "Frame Links Module," 2014.
 12. Dong-Hwan Shin, **Youngshik Kim**, Jinung An, Seungmin Jeong, "ROBOT PLATFORM WITH A MULTI-JOINT MANIPULATOR," 2013.
 13. Dong-Hwan Shin, **Youngshik Kim**, Jinung An, "NONSLIP HIP JOINT TORQUE RANGE OF THE LEGGED ROBOT WITH HIP JOINT ACTUATORS AND ESTIMATION METHOD FOR FRICTIONAL COEFFICIENT BETWEEN ROBOT FEET AND GROUND," 2012.
 14. Dong-Hwan Shin, **Youngshik Kim**, Jinung An, "PITCH-BALANCING WALKING MULTI-PEDED ROBOT," 2013.

Korea Patents (Pending)

15. **Youngshik Kim**, Donghwan Yoon, Suhyun Kwon, Joowan Lyu, Taesoo Jang, "SEGWAY EQUIPPED WITH WHEEL-LEG ASSEMBLY," 2016.
16. **Youngshik Kim**, Taeho Jang, Taesoo Jang, Chanmi Jung, Donghwan Yoon, "A FOLLOWING SEGWAY," 2016.

Dissertation/Thesis

- Youngshik Kim, "Kinematic Motion Control of Compliantly Coupled Multi-Robot Systems Subject to Physical Constraints," PhD Dissertation, University of Utah, August 2008
- Youngshik Kim, "Control Prototyping System: From DSP to Microcontroller (Case Study: Throwing Robot Arm)," Master Thesis, University of Utah, May 2003

Invited Presentations/Lectures

1. "Introduction to Engineering and Mechanical Engineering," National Science Museum, Daejeon, Korea, November 30, 2018
2. "Bio-inspired Robots," Electrical and Electronic Engineering, Yonsei University, Seoul, Korea, August 9, 2017
3. "Feedback Control of a DC Motor," Mechanical Engineering, Kongju National University, April 6, 2017
4. "Mobile robot for surveillance and reconnaissance," Defense Agency for Technology and Quality, Changwon, Korea, March 23, 2016
5. "Feedback Control of a DC Motor," Electronics and Computer Engineering, Chonnam National University, Kwangju, Korea, 2015
6. "Motion Control of Mobile Robots," Mechanical Engineering, Inha University, Incheon, Korea, July 2011
7. "Motion Control of Mobile Robots," Mechanical Engineering, Kumoh National Institute of Technology, Korea, 2010
8. "Motion Control of Mobile Robots," Mechanical Engineering, Pukyong National University, Korea, 2010
9. "Motion Control of Mobile Robots," Division of Robotics, Kwangwoon University, Korea, 2010
10. "Motion Control of Mobile Robots," Mechanical Engineering, Kyung Hee University, Korea, 2009

11. “Kinematic Control of Wheeled Mobile Robots,” Agency for Defense Development, Daejeon, Korea, January 2008
12. “Kinematic Control of Mobile Robots Subject to Physical Constraints,” Robotics Seminar (CS7939), School of Computing, University of Utah, USA, April 19, 2006

Research and Student Advising

Supervisor for Post-Docs and Research Fellows

Controls and Robotics Lab, Mechanical Engineering, Hanbat National University

1. Dr. Hussein F. M. Ali, Post-doctoral Researcher, 2019-Present
2. Dr. Nader A. Mansour, Postdoctoral Researcher, 2018-Present
3. Dr. Hema Gurung, Postdoctoral Researcher, 2017-2018, currently Lecturer, Thapar Institute of Engineering and Technology, India
4. Taeho Jang, Research Associate, 2015-2019
5. Taesoo Jang, Research Associate, 2017-2019

Graduate Student Advisor

Mechanical Engineering, Hanbat National University

1. Hyunho Shim, MS 2018, Thesis: “Design of 6-legged mobile robot using 2-DOF electro-magnetic actuator” (co-advised)
2. Taeho Jang, MS 2015, Thesis: “Design and Control of a Mobile Robot Platform for Unstructured Environment”

Advisor for Undergraduate Research Assistants

Controls and Robotics Lab, Mechanical Engineering, Hanbat National University

1. 주현수, Mechanical Engineering, 2019-Present
2. 오세웅, Mechanical Engineering, 2017-Present
3. 류주완, Mechanical Engineering, 2016-2018
4. 김운식, Electrical and Control Engineering, 2017
5. 임유락, Mechanical Engineering, 2017-2019
6. 김준식, Mechanical Engineering, 2017
7. 장태수 (Taesoo Jang), Electrical Engineering, 2013-2017
8. 차현미, Computer Science/Mechanical Engineering, 2014-2016
9. 윤동환, Mechanical Engineering, 2012-2018
10. 권수현, Mechanical Engineering, 2012-2018
11. 김현태, Electrical and Control Engineering, 2014-Present
12. 백주혁, Mechanical Engineering, 2015-2016
13. 박정진 (Jungjin Park), Mechanical Engineering, 2013-2015
14. 문기택, Mechanical Engineering, 2013-2015
15. 김수진, Creative Convergence Engineering, 2015-Present
16. 우광식, Computer Science, 2014-2015
17. 공영호, Mechanical Engineering, 2014
18. 김현중, Mechanical Engineering, 2014
19. 전상욱, Mechanical Engineering, 2012-2014

20. 신우창, Mechanical Engineering, 2012-2014
21. 장태호 (Taeho Jang), Mechanical Engineering, 2012-2013
22. 조도현, Mechanical Engineering, 2013
23. 김수경, Mechanical Engineering, 2012-2014
24. 박경배 (Kyungbae Park), Mechanical Engineering, 2011-2013
25. 김지웅 (Jiwoong Kim), Mechanical Engineering, 2011-2013
26. 황진철 (Jincheol Hwang), Mechanical Engineering, 2011-2013
27. 김재진 (Jaejin Kim), Mechanical Engineering, 2011-2013

Student Advising/Discussion

Mechanical Engineering, University of Utah

- Kulkarni, Sandip, PhD student, helped analysis of discrete time controls for the Tread Port Active Wind Tunnel (TPAWT), 2007.
- Engeberg, Erik D., PhD student, aided backstepping controller development for a prosthetic hand, 2007.
- Kim, Jungkyu, PhD student, guided design and modeling of micro fluidic channels and structures, 2006-2008.
- Lee, Sungkyu, PhD student, instructed dynamic modeling and analysis in impact hammer testing, 2006.
- Hetrick, Andrew, MS student, helped kinematic modeling of a car-like vehicle, 2007.
- Flickinger, Dan, MS student, “Planning and coordination of mobile robot behavior for medium scale distributed wireless network experiments,” 2006.
- Terry, Jared, MS student, guided control of the Compliant Framed Modular Mobile Robot, 2006.
- Vowels, Marty, “Embedded control and autonomy of compliant framed wheeled modular mobile robots”, NSF Research Experiences for Undergraduates (REU) Program Student, 2005.

Teaching

Undergraduate Courses

- Statics, Fall Semester
- Dynamics
- Mechanical Engineering Laboratory I, Fall Semester
- Engineering Mathematics
- Programming Language II (LabVIEW)
- Mechanical Measurements
- Automatic Controls, Fall Semester
- Introduction to Robotics, Spring Semester
- Capstone Design I and II (Senior Design Projects)

Graduate Courses

- Advanced Robotics
- Linear Control System

Awards and Certificates

Best Paper Awards

- The Korean Institute of Electrical Engineers (KIEE), Korea, Oct. 2018

- ICROS (Institute of Control, Robotics and Systems) Conference, Seoul, Korea, March 2016
- KKITS (Korea Knowledge Information Technology Society) Conference, Daejeon, Korea, Oct. 2014

Travel Funding Awards

- IEEE Robotics and Automations Society (RAS), ICRA 08
- US National Science Foundation (NSF), IROS 06
- Associated Students of University of Utah (ASUU), ICRA 05 and IROS 06

Certificate of Achievement in Oracle Database Administration (DBA)

Oracle Korea Education Center, Seoul, Korea, July 2000

Certificate of Training in Database

Technical and Information Center, Korea Research Institute of Standards and Science, Daejeon, Korea, May 2000

First Class Engineer in Construction Equipment

National Technical Qualification Certificate, Human Resources Development Service of Korea, June 1995

Honors Scholarship Awards (Top 1%)

Mechanical Engineering, Inha University, Inchon, Korea, 1995

Tuition Benefit Awards by Class Rank

Mechanical Engineering, Inha University, Inchon, Korea, 1992-1995

Service Activities

Reviewer

- IEEE Transactions on Robotics
- International Journal of Robotics Research
- ASME Journal of Dynamic Systems, Measurement and Control
- International Journal on Mechatronics
- Journal of Intelligent and Robotic Systems
- IEEE International Conference on Robotics and Automation
- IEEE/RSJ International Conference on Intelligent Robots and Systems
- Journal of Korean Society for Precision Engineering
- Transactions of Korean Society for Mechanical Engineers

Membership

- IEEE (Institute of Electrical and Electronics Engineers, Inc.), 2004-Present
- Korean Society for Precision Engineering, 2010-Present
- Institute of Control and Robot Systems, 2010-Present
- Korea Knowledge Information Technology Society, 2014-Present
- Korean Society of Mechanical Engineers (KSME), 2015- Present
- ASME (American Society of Mechanical Engineers), 2004-2008

Department and University Service

Hanbat National University

- Thesis Committee, Mechanical Engineering, 2011-Present
- Undergraduate Admission Officer, Mechanical Engineering, 2011-Present
- Graduate Admission Committee, Mechanical Engineering, 2011-Present

- Advisory Committee, TFT for University Contribution to High School Education, 2018
- Director of Graduate Program, Mechanical Design Engineering, 2014-2015
- Committee for Lab Safety, Center for Research Facilities, 2014-2016
- TFT Committee member for Undergraduate Research Program, Mechanical Engineering, 2015
- Committee, General Faculty Council, 2014-2016
- Chair of Dynamics, Solid Mechanics, Controls, and Robotics Division, Mechanical Engineering, 2013-2015
- Department Director for ABEEK (Accreditation Board for Engineering Education of Korea), 2012-2014, 2017
- Advisor, MIRACLE Team for Baja SAE Korea, 2011
- Member, University Election Commission, 2011
- Department Director for Advanced College of Education (ACE) Program, Winter 2011

Professional Service

- Advisory Committee for Preliminary Research on a Small Reconnaissance Robot, Defense Agency for Technology and Quality, 2019
- Advisory Committee for Robot R&BD Plan, Daejeon Techno-Park(TP), Korea, 2018-2019
- Chair, Robot Division Committee, Daejeon-Sejong Human Resource Development Council, Korea, 2017
- Applicant Selection Committee, Ministry of Personnel Management, 2016
- Chair, Robot R&BD Planning Committee, Daejeon Techno-Park(TP), Korea, 2014-2016
- Referee, Creative and Intelligent Robot Contest (CIRO 2014), 2014
- Robot Division, Roadmap Committee for Small and Medium-sized Enterprises, Small and Medium Business Administration, 2012-2015
- Advisor, LabVIEW Student Club supported by NI, Korea, 2012-Present
- Referee and Committee Member, Baja SAE Korea, 2011
- Member, Korea Robot Forum, Korea, 2011-2013
- Robot Division, Roadmap Committee for Development of Fundamental Technology for Industrial Convergence, Korea Institute of Advancement of Technology (KIAT), Korea, 2010
- Advisory Committee, Robot Industry Cluster TFT for Daegu City, Korea, 2010

Grant Reviewer and Technical Evaluation Committee Service

- Samsung Research Funding & Incubation Center for Future Technology
- Yonsei University
- Korea Institute for Robot Industry Advancement
- National Research Foundation of Korea
- The Ministry of Small and Medium-sized Enterprises (SMEs) and Startups
- Korea Evaluation Institute of Industrial Technology (KEIT),
- KIAT (Korea Institute for Advancement of Technology)
- TIPA (Korea Technology and Information Promotion Agency for SMEs)
- Institute for Information & communications Technology Planning & Evaluation (IITP)
- Daejeon Techno-Park(TP)
- INNOPOLIS Foundation