KYUNG-TAEK YOON (윤 경 택)

Doctoral student at Ajou University

Curriculum Vitae (July 2022)

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Suwon, Gyeonggi-do, 16499

Objective: Improve the quality of human life and solve social problems practically through advanced mechatronics technologies.

Research interest:

- Mechatronics system design
- Precision engineering
- Instrumentation, control, and robotics
- Sensors and actuators

EDUCATION

Ph.D. Ajou University, *Suwon*, S. Korea — 2019 ~ present
Mechanical Engineering

M.S. Ajou University, *Suwon*, S. Korea — 2017 ~ 2019
Mechanical Engineering
Thesis: "Design of Highly Efficient Knee-Joint Motion based Energy Harvester"
Advisor: Prof. Young-Man Choi

B.S. Ajou University, *Suwon*, S. Korea — 2011~ 2017
Mechanical Engineering

RESEARCH EXPERIENCE

Graduate Student Researcher, Ajou University, *Suwon*, S. Korea — 2017 ~ present
Advanced Mechatronics Lab
Supervisor: Prof. Young-Man Choi

- Designed a wearable biomechanical energy harvester with regenerative braking principle
- Developed a high-precision variable flow rate measurement system based on a gravimetric method
- Developed an ultra-precision axis-symmetric electromagnetic force compensation weighing cell for Kibble Balance
- Developed a magnetically levitated weighing balance for dynamic check weighing system

PUBLICATIONS

Journal Publications

1. J-H. Bae, **K-T. Yoon**, H-H. Lim, and Y-M. Choi, "Development of an Optical Position Sensor for High-Precision Electromagnetic Force Compensation Balance," *Journal of the Korean Society for Precision Engineering*, vol. 38, no. 8, 2021, pp. 567-574. (Written in Korean) [Link]

2. H-H. Lee, **K-T. Yoon**, and Y-M. Choi, "Checkweigher using an EMFC weighing cell with magnetic springs and air-bearings," *Metrology and Measurement Systems*, vol. 28, no. 3, 2021. [Link]

3. **K-T. Yoon**, S-Y. Park, and Y-M. Choi, "Electromagnetic Force Compensation Weighing Cell with Magnetic Springs and Air Bearings," *Measurement Science and Technology*, vol. 32, no. 1, 2021. [Link]

Journal Papers in Accepted

1. **K-T. Yoon**, H-H. Lim, J-H. Bae, W. Lee, D. Kim, and Y-M. Choi, "Novel Multi-electromagnetic Force Compensation Weighing Cell with Axis-Symmetric Structure," *IEEE/ASME Transactions on Mechatronics*, 2022. [Link]

2. **K-T. Yoon**, and Y-M. Choi, "Biomechanical Regenerative Braking Energy Harvester: A Systematic Analysis." *International Journal of Precision Engineering and Manufacturing-Green Technology*, 2022.

Journal Papers in Review

1. J-H. Jeong, **K-T. Yoon**, and Y-M. Choi, "Stochastic Evaluation of Quasi-Zero Stiffness Magnetic Spring Using a Reluctance-Corrected Analytical Model."

Conference Papers

(Peer-Reviewed)

1. **K-T. Yoon**, D. Kim, M-G. Lee, and Y-M. Choi, "Weighing Performances of a Novel EMFC Weighing Cell with Axis- Symmetric Structure," *Proceedings of euspen 22nd International Conference*, May. 31-June. 03, 2022.

2. **K-T. Yoon**, H-H. Lim, M-G. Lee, and Y-M. Choi, "Design and Analysis of Compliant Mechanism for EMFC Weighing Cell with Axis-Symmetric Structure," *Proceedings of euspen 21st International Conference*, June. 07-10, 2021.

3. H-H. Lim, **K-T. Yoon**, S-H. Kang, and Y-M. Choi, "Modified Matrix Method for Modelling of Multi Degree-of-freedom Flexure Stage," *Proceedings of euspen 19th International Conference*, June. 03-07, 2019.

4. **K-T. Yoon**, D. Kim, S-H. Kang, H-H. Lim, and Y-M. Choi, "A Novel Weighing Cell for KRISS Kibble Balance," *Proceedings of euspen 19th International Conference*, June. 03-07, 2019.

(Abstract-Reviewed)

1. **K-T. Yoon**, and Y-M. Choi, "Experimental Evaluation of Knee Exoskeleton for Assisting Eccentric Contraction of Lower Limb Muscles," *Proceedings of Korean Society for Precision Engineering*, Nov. 24-26, 2021, pp. 87.

2. **K-T. Yoon**, Y-H. Jeon, and Y-M. Choi, "Experimental Analysis of Wearable Energy Harvester Using Regenerative Braking," *Proceedings of Korean Society for Precision Engineering*, Oct. 30-Nov. 01, 2019, pp. 216.

3. **K-T. Yoon**, Y-G. Jeong, H-H. Lee, Y-H. Jeon, and Y-M. Choi, "Design Optimization of Knee-Joint-Motion-Based Energy Harvester," *Proceedings of Korean Society for Precision Engineering*, May. 15-17, 2019, pp. 69.

4. H-H. Lee, **K-T. Yoon**, and Y-M. Choi, "Dynamic Weight Measurement using a Checkweigher based on Magnet Springs," *Proceedings of Korean Society for Precision Engineering*, May. 15-17, 2019, pp. 50.

5. **K-T. Yoon**, and Y-M. Choi, "High-Efficiency Exoskeleton with Energy Regeneration," *International Conference on Energy and Sustainability*, 2018.

6. Y-M. Choi, J-H. Jeong, **K-T. Yoon**, H-H. Lim, S-Y. Park, and M-G. Lee, "Design Optimization of Knee-Joint-Motion-Based Energy Harvester," *Advanced Intelligent Mechatronics (AIM)*, 2018.

7. **K-T. Yoon**, H-H. Lim, and Y-M. Choi, "Study on Design of Knee Joint Motion based Electromagnetic Energy Harvester," *Proceedings of Korean Society for Mechanical Engineering*, Nov. 1-3, 2017, pp. 2374-2376.

8. H-H. Lim, **K-T. Yoon**, and Y-M. Choi, "An Optical Triangulation Sensor for Double Compound Flexure Stages," *Proceedings of Korean Society for Mechanical Engineering*, Nov. 1-3, 2017, pp. 2650-2652.

PATENTS

1. **K-T. Yoon**, D. Kim, Y-M. Choi, "Axially Symmetric Weight Measuring Apparatus," 2020, Korea Patent (granted), No. 10-2167080-00-00

TEACHING EXPERIENCE

Ajou University, Suwon, S. Korea — September 2017 to June 2021
Teaching Assistant, Mechanical Engineering

- Advanced Mechanical Engineering Laboratory – Lab Instructor
- Engineering Mechanics (Dynamics) – TA
- Microprocessor Application – TA
- Mechanical Elements –TA
- Motors and Generators –TA

HONORS AND AWARDS

HEIDENHAIN Scholarship 2022
European Society for Precision Engineering and Manufacturing

Best poster award 2018
International Conference on Energy and Sustainability

Volunteer Scholarship 2015
Ajou University

Academic Excellent Scholarship 2011
Ajou University

LANGUAGES

Korean: Native Language

English: Intermediate Listener, Novice Speaker, Advanced Reading and Writing

SKILLS

Hardware:

- Biomechanical Analysis: Motion capture camera, Surface electromyography sensor, Force plate
- Controllers: Arduino, ARM-Cortex M-series (STM32nucleo), dSPACE-Microlabox, Speedgoat, NI-CompactRIO
- Actuators: DC & BLDC Motors, Voice coils, Piezo actuators, Shape memory actuators
- Sensors: Encoders, Interferometers, Capacitive sensors, Strain gauges, Optical position sensors, LDV, LVDT, IMU
- Manufacturing: 3D printer, Laser cutter

Software: ANSYS Mechanical, ANSYS Maxwell, COMSOL Multiphysics, LaTeX, Solidworks, Simulink, LabVIEW, Microsoft Office, OrCAD, Visual3D, OptiTrack

Programming: MATLAB, Python, C/C++

ADDITIONAL INFORMATION

Exchange student
Bayreuth University, Germany August 2015 to February 2016

Military Service March 2012 to December 2013
Republic of Korea Army

Volunteer work
Ajou University Graduate school of International Studies – Student buddy and help foreign graduate students March 2014 to August 2015

English mentor program in Kosaek high school September 2014 to December 2014

Interests
Cycling, Tennis