

Hyeongkeun KIM

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EDUCATION

B.S. in Mechanical Engineering and B. S. in Bio and Brain Engineering (*Cum laude expected*) Feb. 2013 – Feb. 2020
Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea Cumulative GPA: 3.78/4.30

- Recipient of Korea Presidential Science Scholarship: One of 123 students chosen by the President of Korea.
- Dean's List for Creative Excellence(Fall 2014): One of the top 1% students who have shown significant creativity.
- Exchange student at INSA Lyon under Mirae Asset Scholarship for Overseas Exchange Students. (Spring 2015)

PROFESSIONAL EXPERIENCE

NAVER Corp., NAVER LABS Robotics Group – Research Intern Aug. 2016 – Feb. 2017
Advisor: Dr. Sangok Seok, current CEO of NAVER LABS Corp.; Dr. Dongil Choi Seongnam, Republic of Korea

- Designed and optimized an indoor service robot (TuskBot), compatible with most stairs in existence.
- Improved structural components and remote data collection system of the autonomous personal transporter.
- Work involved STM32F4 programming, SolidWorks/SolidEdge modeling, LabView (including FPGA), RTOS, Webots, Kinect-based point cloud processing, Qt toolkit, OpenCV and MATLAB.
- Work was featured in the corporate developer conference (*DEVVIEW 2017*), was presented in the *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017)*, and was approved for patent (2019).

RESEARCH EXPERIENCE

KAIST, Biomicrofluidics Lab – Research Assistant Jun. 2016 – Present
Advisor: Prof. Jessie S. Jeon Daejeon, Republic of Korea

- Currently developing an organ-on-a-chip that remotely applies stimuli to cells using surface acoustic waves.
- Designed an automated system that measures *in-situ* bacterial growth using vision markers.
- Developed a script for generating 3D printable models of master templates for lab-on-a-chips using a sandbox game 'Minecraft.' Demonstrated its equivalence to a conventional CAD system for building lab-on-a-chips.
- Work involved fabrication of lab-on-a-chips using soft lithography, MATLAB for image processing, Arduino programming for developing automated system and cell culture/banking, and photolithography.

KAIST, Neuro-Rehabilitation Engineering Lab – Research Assistant Dec. 2015 – Feb. 2016
Advisor: Prof. Hyung-soon Park Daejeon, Republic of Korea

- Optimized control performance on wearable gait assisting device for cerebral palsy patients with crouch gait.
- Improved sensor resolution from 10 to 14 bits and acquisition speed from 10kHz to 200kHz via the redesign.

TEACHING EXPERIENCE

KAIST School of Computing, Introduction to Programming (CS101) – Teaching Assistant Fall 2015, Spring 2016
- Advised and mentored freshmen in lab sessions. Provided technical support, graded exams, and assignments.

KAIST School of Freshman, Introduction to Programming, General Chemistry 1 – Tutor Spring 2014, Fall 2015,
- Tutored students on freshman subjects. Provided mentorship regarding major choice. Spring 2019, Fall 2019

Jungni Middle School, Daejeon, Republic of Korea – Robotics Extracurricular Class Instructor May. 2014 – Dec. 2014
- Responsible for the entire curriculum. Developed an introductory course for robotics and programming.
- Taught the basic concept of programming and electronics in only one semester.
- Formulated an Arduino/Processing based curriculum for teaching basic robotics to gifted middle students.

PUBLICATIONS AND PATENTS

1. U. Kwon*, **H. Kim***, M. C. Nah*, J. Choe*, S. Seok, "ROBOT APPARATUS FOR CLIMBING STAIRS", Republic of Korea Patent No. 10-2068239, Jan. 14, 2020. [\[Link\]](#)
2. K. Kim*, J. Hyun*, **H. Kim**, H. Lim, H. Myung, "A Deep Learning-based Automatic Mosquito Sensing and Control System for Urban Mosquito Habitats" *Sensors* 19.12 (2019): 2785 [\[Link\]](#)
3. K. Kim*, **H. Kim***, S. Kim, J. S. Jeon, "MineLoC: A Rapid Production of Lab-on-a-Chip Biosensors Using 3D Printer and the Sandbox Game, Minecraft" *Sensors* 18.6 (2018): 1896 (**Co-first Author**) [\[Link\]](#)
4. K. Kim, **H. Kim**, and H. Myung, "Bio-inspired robot swarm control algorithm for dynamic environment monitoring." *Advances in Robotics Research* 2.1 (2018):1-11 [\[Link\]](#)

5. K. Kim, D. Choi, H. Lim, **H. Kim**, J. S. Jeon, "Vision Marker-Based *In-Situ* Examination of Bacterial Growth in Liquid Culture Media." *Sensors* 16.12 (2016): 2179 [\[Link\]](#)
6. K. Kim, **H. Kim**, H. Lim, H. Myung, "A Low Cost/Low Power Open Source Sensor System for Automated Tuberculosis Drug Susceptibility Testing." *Sensors* 16.6 (2016): 942 [\[Link\]](#)
7. Y. Kim, J. Hyun, E. Kong, **H. Kim**, S. Jeon, J. Lee, "SYSTEM FOR TUBERCULOSIS DIAGNOSIS", Republic of Korea Patent Application No. 10-2016-0070908, Jun. 8, 2016. [\[Link\]](#)

SELECTED CONFERENCE PRESENTATIONS

1. D. Choi, M. Kim, **H. Kim**, J. Choe, M. C. Nah, "Motion Planning of Autonomous Personal Transporter Using Model Predictive Control for Minimizing Non-Minimum Phase Behavior" in *15th International Conference on Ubiquitous Robots (UR 2018)*, Honolulu, HI, 2018, pp. 362-368. (**Best Application Paper Award**) [\[Link\]](#)
2. J. Choe*, U. Kwon*, M. C. Nah* and **H. Kim***, "Design Analysis of TuskBot: Universal Stair Climbing 4-Wheel Indoor Robot" in *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, BC, 2017, pp. 6908-6914. (**Corresponding Author**) [\[Link\]](#)
3. J. Choe*, M. C. Nah*, **H. Kim*** and U. Kwon*, "'TuskBot': Design of the Mobile Stair Climbing 2 By 2 Wheels Robot Platform with Novel Passive Structure 'Tusk'" in *2017 3rd International Conference on Control, Automation and Robotics (ICCAR)*, Nagoya, Japan, 2017, pp. 217-220. (**Co-first Author**) [\[Link\]](#)
4. U. Kwon, **H. Kim**, M. C. Nah, and J. Choe, "Rocker-Bogie with 'Tusk': Design of the mobile robot platform that can climb stairs with Tusk and rocker-bogie mechanism" in *12nd Korea Robotics Society Annual Conference*, Pyeongchang, 2017. (**Presenter**)
5. K. Kim, **H. Kim**, H. Roh, and H. Choi, "Flying BioLab: A CanSat platform for sampling and monitoring air bacteria in bio-hazardous area" in *Korea Society for Aeronautical & Space Sciences*, Jeju, 2014.
6. **H. Kim**, J. Hyun, S. Jo, J. Choe, and S. Hong, "A Study on the Remote Swarm Robot Control based on Flexible Master/Slave Relationship Algorithm" in *2014 Korea Computer Congress (KCC)*, Jeongseon, 2014. (**Poster**)

SELECTED AWARDS

Commendation , Military Manpower Administration Social Service Corps Training Center, Korea	Oct. 2018
Best Application Paper , 15 th International Conference on Ubiquitous Robots (UR 2018)	Jun. 2018
Creativity Prize (CEO of Intel Korea) , 2015 Intel Edison IoT Contest	Oct. 2015
Grand Prize (High-tech Medical Service) , World Embedded Software Contest	Dec. 2014
Grand Prize (CEO of Samsung SDS) , Samsung SDS Software Club Championship	Nov. 2014
Honorable Mention , Korea Wearable Computer Contest	Nov. 2014
Second Place (President of KAIST) , Korea CanSat Competition	Sep. 2014
Honorable Mention for Excellent Ideas , Korea Wearable Computer Contest	Nov. 2013
Special Prize (Commissioner of Korean Intellectual Property Office) , Korea STEAM Competition	Aug. 2013

LEADERSHIP & ACTIVITIES

National Social Service Corps Program, Changwon Dongbaek School – Social Service Agent Mar. 2017 – Feb. 2019

- Assisted elementary and middle school students with severe cerebral palsy, autism, and brain lesions.
- Managed IT infrastructure of the school, including troubleshooting, upgrading, and deploying new systems.
- Coordinated weekly meetings for all social service agents, worked as a liaison with the teachers and the administration as the lead agent.
- Awarded "Commendation" by the Military Manpower Administration of Korea for excellent service.

KAIST, Microrobot Research (Robotics Club) – Team Co-founder and Team Leader Mar. 2013 – Present

- Co-founded Team W5, a team for interdisciplinary projects between robotics and bioengineering.
- Developed a fully-automated tuberculosis drug susceptibility testing device, reducing the cost by 87%.
- Team was awarded 13 prizes across robotics and bioengineering competitions, featured in the keynote for the 2014 Intel Korea Year-End Press Conference, presented in six robotics conferences, and published five papers.
- Team leader for Honorary mention in Korea Wearable Computer Contest 2014 sponsored by Samsung.

SKILLS

Programming: MATLAB, Python, JAVA, LabView, embedded C/C++ with STM32F4, MSP430, and AVR series

Software: PyTorch, Matconvnet, OpenCV, COMSOL, SolidWorks, Solid Edge, AutoCAD, Linux, and Adobe InDesign

Mechanical/Electronics: Lathe, Mills, Laser cutter, 3D printing, Circuit board design, and Embedded systems

Laboratory Techniques: Soft lithography for microfluidics, mammalian cell culture, and biological image processing

Language: English (Fluent, iBT TOEFL - 109, GRE - V166/Q169/W4.0), Korean (Native), French (Basic)