

# Hyeongkeun 'Hugo' Kim

Curriculum Vitae

Name **Hyeongkeun Kim / 김형근 (金亨瑾)**  
Date of Birth **December 27<sup>th</sup>, 1994**  
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## Education

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**2013.03 - 2020.02(Expected)**

**B.S.(Expected), Mechanical Engineering (Bio-Brain Engineering as Double Major), KAIST**

- Cumulative GPA 3.77/4.3
- Dean's List in College of Engineering
- Recipient of the Presidential Science Scholarship (2013-2015) (KOSAF, Gov't of Korea)
- Compulsory civilian service (2017~2019, Changwon Dongbaek School for the students with disabilities)

**2015.01 - 2015.07**

**Exchange Student, Département Génie Mécanique Développement, INSA Lyon, France**

- Recipient of the 15<sup>th</sup> Mirae Asset Student Scholarship for Overseas Exchange Student

**2010.02 - 2013.02**

**Korea Science Academy of KAIST**

- Cumulative GPA 3.80/4.30

## Research Experiences

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**2016. 08 - 2017. 02** NAVER Labs Robotics Group, NAVER Corp. (Currently NAVER LABS Corp.)

**Full-time Research Intern** (Supervisor: Sangok Seok, Ph. D.)

A. TuskBot (Intern Project)

- Designed and optimized a robot platform(TuskBot) that is compatible with most stairs in existence, regardless of their dimensions and morphology (riser and nose) in team
- Achieved mobility in general indoor environment, while maintaining minimal cost.
- The designed platform and the optimization method had been presented in **IROS 2017** as an oral presentation..

B. Autonomous Personal Transporter (In-house Project)

- Designed structural components of the prototype
- Modified algorithm and interface of the control/sensing system of the prototype
- The result had been presented in **UR 2018 (Ubiquitous Robots)** and was awarded the **Best Application Paper Award**.

**2016. 06 - 2018. 06** Biomicrofluidics Lab., Department of Mechanical Engineering, KAIST

**2019. 06 - 2019.** **Undergraduate Student Researcher** (Supervisor: Prof. Jessie S. Jeon)

A. Vision Marker-Based In Situ Examination of Bacterial Growth in Liquid Culture Media (2016)

- Developed a simplified and automated system using a camera and a striped pattern marker, which can be used in macroscopic and microscopic environments.
- The system can be applied regardless of the variations in the type of bacterial carrier and vessels ranging from the culture tubes to the microfluidic devices.
- The developed system had been published in **Sensors (Indexed for SCIE)** as a journal article

B. MineLoC: A rapid production of lab-on-a-chip biosensors using 3D printer and the sandbox game, Minecraft (2018)

- Developed a pipeline to generate 3D printable models of master templates ('molds') for Lab-on-a-chip(LoC) biosensors by using a popular sandbox game 'Minecraft' with team members
- Conducted experiments on manufacturing the LoC using the pipeline and analyzed the performance
- The developed pipeline had been published in **Sensors** as a journal article

**2013. 10 - 2014. 07** Department of Knowledge Service Engineering, KAIST

**Research Assistant** (Supervisor: Research Prof. Seongyong Hong)

Participated in the "캠퍼스 CEO 발굴지원사업" (National Grant Project for uncovering future campus CEOs) organized by NIPA(National IT Industry Promotion Agency, Korea).

- "Design and Implementation of Auto Water Robot Module for Plant Care System" (with team members)
- Designed and programmed robot telecommunication system (Robot-PC-Server) and reactive web-based robot control system and aesthetic design of the product.

Participated in the research project for "Swarm Robots based on NXC Program and Experimental for Intelligent Control"

- "Swarm robots based on NXC program and experimental for intelligent control" (with team members)
- Designed and programmed for the remote swarm robot control system based on flexible Master/Slave relationship.

## Journal Articles

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|-------------|--|
| <b>2019</b> | Kyukwang Kim*, Jieum Hyun*, <b>Hyeongkeun Kim</b> , Hwijoon Lim, Hyun Myung, "A Deep Learning-based Automatic Mosquito Sensing and Control System for Urban Mosquito Habitats" <i>Sensors</i> 19.12 (2019): 2785, doi: 10.3390/s19122785 (Indexed for SCIE)  |
| <b>2018</b> | Kyukwang Kim*, <b>Hyeongkeun Kim*</b> , Seunggyu Kim, Jessie S. Jeon, "MineLoC: A Rapid Production of Lab-on-a-Chip Biosensors Using 3D Printer and the Sandbox Game, Minecraft" <i>Sensors</i> 18.6 (2018): 1896, doi: 10.3390/s18061896 ( <b>Co-first author, Indexed for SCIE</b> )<br>Kyukwang Kim, <b>Hyeongkeun Kim</b> and Hyun Myung, "Bio-inspired robot swarm control algorithm for dynamic environment monitoring". <i>Advances in Robotics Research</i> 2.1 (2018):1-11 doi: 10.12989/arr.2018.2.1.001 |
| <b>2016</b> | Kyukwang Kim, Duckyu Choi, Hwijoon Lim, <b>Hyeongkeun Kim</b> , Jessie S. Jeon, "Vision Marker-Based In-Situ Examination of Bacterial Growth in Liquid Culture Media". <i>Sensors</i> 16.12 (2016): 2179, doi: 10.3390/s16122179 (Indexed for SCIE)  |

Kyukwang Kim, **Hyeongkeun Kim**, Hwijoon Lim, Hyun Myung, "A Low Cost/Low Power Open Source Sensor System for Automated Tuberculosis Drug Susceptibility Testing." *Sensors* 16.6 (2016): 942, doi: 10.3390/s16060942 (Indexed for SCIE)

- 2012** Jooyoung Kim, Sooin Kim, Kyuyoung lee, **Hyeongkeun Kim**, Jaehyuk Jun, Yunjong Jeong, Muchan Kim, Jongrim Lee and Changwoo Lee, "Nano-size Study of Surface-modified Ag Anode for OLEDs", *Journal of the Korean Vacuum Society* v.21 n.1, January 2012, pp.12~16, doi: 10.5757/JKVS.2012.21.1.12

## Conference Publications and Presentations

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- 2018** D. Choi, M. Kim, **H. Kim**, J. Choe, Moses 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. doi: doi: 10.1109/URAI.2018.8442211 (**Best Application Paper Award**)
- 2017** 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, 2017, pp. 6908-6914. doi: 10.1109/IROS.2017.8206614 (**Corresponding Author, Co-first Author**)
- 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'" *Proc. 2017 3rd International Conference on Control, Automation and Robotics (ICCAR)*. IEEE, Apr. 2017, pp. 217-220, doi: 10.1109/ICCAR.2017.7942690 (**Co-First Author**)
- 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, Rep. of Korea, 2017
- 2014** Kyukwang Kim, **Hyeongkeun Kim**, Heekun Roh, Hanlim Choi, "Flying BioLab : A CanSat platform for sampling and monitoring air bacteria in bio-hazardous area", 2014 KSAS(Korea Society for Aeronautical & Space Sciences) Fall Conference, Organized Session, pp. 86.
- Hyeongkeun Kim**, Jieum Hyun, Seonghyeon Jo, Jonghun Cheo, Seongyong Hong, "A Study on the Remote Swarm Robot Control based on Flexible Master/Slave Relationship Algorithm", 2014 Korea Computer Congress(KCC), pp.1701-1703.[ISSN 1598-5164]
- Jieum Hyun, **Hyeongkeun Kim**, Seonghyeon Jo, Jonghun Cheo, Seongyong Hong, "A Design and Implementation of Auto Water Robot Module for Plant Care System", 2014 Korea Computer Congress(KCC), pp.1803-1805.[ISSN 1598-5164]
- 2012** **Hyeongkeun Kim**, Seoyon Park, Juha Park, In-ok Song, "Building H-R Diagram of Star Clusters with DSLR Camera and its Educational Application"(*Korean*: 카메라를 사용한 성단의 H-R도 작성 및 교육적 활용), *The Bulletin of the Korean astronomical society*, v. 37 no. 2, pp. 96, 2012.
- 2011** Jooyoung Kim, Sooin Kim, Kyuyoung lee, **Hyeongkeun Kim**, Jaehyuk Jun, Yunjong Jeong, Muchan Kim, Jongrim Lee and Changwoo Lee, "(*Korean*) Nano-indenter를 통한 유기발광소자(OLED)용 Ag전극의 표면처리에 따른 물성변화 연구", *Annual conference of the Korean Vacuum Society* v. 41, 2011, pp. 224

## Teaching and Mentorship Experiences

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**2015. 09 - 2016. 06** School of Computing, KAIST

**Undergraduate Teaching Assistant (CS101 - Fall 2015 and Spring 2016)**

Worked as a teaching assistant for <CS101 - Introduction to Programming> course. The work included lab session assistance, exam grading and office hours

**2014. 05 - 2014. 12** Jungni Middle School, Daejeon, South Korea

**Extracurricular Class Instructor (Robotics)**

Taught basic robotics for middle school students

- 2014. 05 - 08: Taught basic robotics based on RoboRobo<sup>®</sup> system
- 2014. 09 - Current: Taught intermediate robotics based on Arduino platform.

**2014. 03 - 2015. 12** School of Freshman, KAIST

**Tutor for Freshman Tutoring Program (Spring 2014 and Fall 2015)**

**2010. 02 - 2011. 5** Korea Science Academy of KAIST

**Student Mentor for International Students (International Student Buddy Program)**

**Selected Honors and Awards**

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|-----------------|---|
| <b>2018. 06</b> | <b>Best Application Paper Award</b> , 2018 15th International Conference on Ubiquitous Robots (UR)  |
| <b>2015. 10</b> | <b>Creativity Prize (CEO of Intel Korea)</b> , 2015 Intel Edison IoT Contest (Korean: 인텔 에디슨과 함께하는 IoT 경진대회)  |
| <b>2015. 07</b> | <b>3<sup>rd</sup> Prize (CEO of SK Hynix)</b> , 2015 Happy Science & Technology Contest<br>(Korean: 2015 행복한 과학기술공모전)   |
| <b>2015. 03</b> | <b>Dean's List (2014 Fall)</b> , College of Engineering, KAIST  |
| <b>2014. 12</b> | <b>Grand Prize(1<sup>st</sup>) in High-tech Medical Service (President of Wonju Biomedical Techno-Valley)</b> ,<br>World Embedded Software Contest 2014 (Korean: 제 12회 임베디드 소프트웨어 경진대회) |
| <b>2014. 11</b> | <b>Grand Prize(1<sup>st</sup>) (President of Samsung SDS)</b> , Samsung SDS S/W Club Championship   |
| <b>2014. 09</b> | <b>2nd Prize (President of KAIST)</b> , Korea CanSat Competition 2014 (Korean: 2014 캔위성경연대회)  |
| <b>2013. 11</b> | <b>Honorary Mention for Excellent Idea (the head of Korea Institute of Next Generation Computing)</b><br>Korea Wearable Computer Contest 2013   |
| <b>2013. 08</b> | <b>Special Award (Commissioner of Korean Intellectual Property Office)</b> , Korea STEAM Competition<br>2013 (Korean: 2013 융합과학(STEAM) 창작 경진대회)   |
| <b>2013. 02</b> | <b>Merits for Research and Scholarship (Korea Science Academy of KAIST)</b>   |
| <b>2012. 09</b> | <b>Grand Prize(1<sup>st</sup>) (Minster of Education, Science and Technology, Gov't of Korea)</b> ,<br>Korea CanSat Competition 2012 (Korean: 2012 캔위성경연대회)                             |

**Notable Grants and Scholarships**

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|----------------------------|--|
| <b>2018. 11 - 2019. 05</b> | <b>2018/2019 PyTorch Scholarship Challenge with Facebook</b> (Udacity) - Accepted for Scholarship  |
| <b>2015. 02 - 2015. 08</b> | <b>15<sup>th</sup> Mirae Asset Student Scholarship for Overseas Exchange Students (\$5,300)</b>  |
| <b>2014. 07 - 2014. 12</b> | <b>Grant for Supporting Sci/Tech University Student Clubs (\$3,500)</b><br>(Korean: 이공계대학생 과학기술동아리 지원사업, Korean Federation of Sci. and Tech. Societies)<br>Project: "Development of Standard BioLab System for CanSats", Club MR (Microrobot Research) |
| <b>2013. 09 - 2014. 06</b> | <b>National Grant Project for Uncovering Future Campus CEOs (\$44,000)</b><br>(Korean: 캠퍼스 CEO 발굴지원사업, National IT Industry Promotion Agency)<br>Project: "Design and Implementation of Auto Water Robot Module for Plant Care System"                 |
| <b>2013. 06 - 2013. 12</b> | <b>2013 National Science Convergence Grant (\$4,400)</b>   |

(Korean: 2013 과학융합지원사업, 청년 과학융합/창업 아이디어 창출활동 지원, KOFAC)

Project: "Project NeoPLaNet - Smartphone App Development for Legal-Counseling Platform"

2013. 02 - 2015. 02 Presidential Science Scholarship (KOSAF, Gov't of Korea) (\$2,200 per semester and Full Tuition)

## Leadership Experiences

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### Robotics

Participating in the Robotics Club in KAIST (**MR - Microrobot Research**) (2013.3 - Current)

- **Joint Founder** of Team **W5,KAIST**, that seeks seamless integration of robotics in biology research.
- **Automatic detection system for microbes in biohazard area ('14)**  
The work had been awarded **2<sup>nd</sup> prize** in Korea CanSat Competition 2014 and presented in **2014 KSAS Fall Conference** as an oral presentation.  
The derivative work (for aquaponics factories) had been awarded **Grand Prize** in 2014 Samsung SDS S/W Club Championship  
The derivative work (Vision-marker based detection system) had been published in **Sensors** journal as an article.
- **A low-cost automatic diagnostic system for Tuberculosis drug susceptibility test ('14 - '16)**  
The work had been awarded **Grand Prize in High-tech Medical Service** in 12<sup>th</sup> World Embedded Software Contest, and presented in **2014 Intel Korea Year-End Press Conference**.  
The work had been also published in **Sensors** journal as an article
- **Automatic tracking robot for bacterial contamination in biohazard area ('14 - '15)**  
The work had been awarded **3<sup>rd</sup> prize** in 2015 Happy Science & Technology Contest, and published in **Advances in Robotics Research** journal as an article.

**Joint Founder** of **UAV/CanSat Research Club** in Korea Science Academy of KAIST (2012.2 - 2013.2)

### Deep-Learning

**2018/2019 PyTorch Challenge with Facebook** (Udacity)

- **Student Leader** in #live-help
  - Assisted students with Python and basic CUDA/PyTorch
  - Participated as Study Jam volunteer and #sg-korea study group online meetup
- **Accepted for scholarship (Phase 2)**

### Compulsory

#### Civilian Service

**Changwon Dongbaek School for Students with Disabilities (창원동백학교)**

- **Lead Social Service Agent**
  - Assisted Students with severe cerebral palsy, brain lesion and autism
  - Led and coordinated other social service agents as a lead agent (2018.5 - 2019.3)
  - Awarded **commendation** from Military Manpower Administration Social Service Training Center

## Language

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| Foreign Language | Examination | Grade          | Organizing body |
|------------------|-------------|----------------|-----------------|
| English          | TOEFL       | 109 (B2)       | ETS             |
| English          | GRE         | V166/Q169/W4.0 | ETS             |