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# Ayoung Kim

## EDUCATION

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**University of Michigan** *Dec. 2012*  
Ph.D. in Mechanical Engineering  
Dissertation: “Visual SLAM with Exploration for Autonomous Underwater Navigation”  
Advised by Dr. Ryan M. Eustice

**University of Michigan** *Dec. 2011*  
M.S. in Electrical Engineering (Systems)

**Seoul National University (SNU)** *Feb. 2007*  
M.S. in Mechanical and Aerospace Engineering (MAE)  
Dissertation: “Stiffness Analysis and Hybrid Control for Parallel Manipulator”  
Advised by Dr. Frank C. Park

**Seoul National University (SNU)** *Feb. 2005*  
B.S. in Mechanical and Aerospace Engineering (MAE)  
Graduated *Summa cum laude*

## POSITIONS

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**Associate Professor** *Mar. 2020 - present*  
Dept. of Civil and Environmental Engineering & KI Robotics  
Korea Advanced Institute of Science Technology (KAIST)

**Associate Professor (Adjunct)** *Mar. 2020 - present*  
School of Computing  
Korea Advanced Institute of Science Technology (KAIST)

**Assistant Professor** *Sep. 2014 - Feb. 2020*  
Dept. of Civil and Environmental Engineering & KI Robotics  
Korea Advanced Institute of Science Technology (KAIST)

**Senior Researcher** *Nov. 2013 - Aug. 2014*  
IT Convergence Technology Research Laboratory  
Electronics and Telecommunications Research Institute (ETRI)

**Post-doctoral Research Fellow** *Oct. 2012 - Sep. 2013*  
Perceptual Robotics Laboratory (PeRL)  
Naval Architecture and Marine Engineering Department, University of Michigan

**Graduate Student Research Assistant***Sep. 2007 - Aug. 2012*

Perceptual Robotics Laboratory (PeRL)

Naval Architecture and Marine Engineering Department, University of Michigan

**Graduate Student Research Assistant***Mar. 2005 - Feb. 2007*

Robotics Lab

Mechanical and Aerospace Engineering (MAE), Seoul National University (SNU)

**Graduate Student Teaching Assistant***Spring 2005*

Introduction to Robotics

Mechanical and Aerospace Engineering (MAE), Seoul National University (SNU)

**FIELD OF INTEREST**

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Visual simultaneous localization and mapping (SLAM), Navigation, 3D reconstruction, Structure from Motion, Computer vision, Autonomous vehicles, Mobile robotics, Robotic perception, Spatial AI

**TEACHING & ADVISING**

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**[CE352] Signal and System for Construction IT***Spring*

Undergraduate Elective Major

Provided as Education 3.0 (Flipped Learning) since 2016

**[CE481] Special topics in CEE:***Spring/Fall***Optimal design and machine learning for construction IT**

Graduate/Undergraduate Elective Major

**[CE481] Special topics in CEE:***Spring***Sensor-based spatial intelligence**

Graduate/Undergraduate Elective Major

**[CE554] Mechanical Design of Civil Robot***Fall*

Graduate Elective Major

Provided as Education 4.0 (Active Learning) since 2018

**Ph.D. Students**

- Hyunchul Roh (Ph.D. in Robotics Program (RP), Feb 2017) CEO of DYPHI.
- Youngsik Shin (Ph.D. in Civil and Environmental Engineering (CEE)/RP, Feb 2020) KIMM
- Younggun Cho (Ph.D. in CEE/RP, Feb 2020) Post-doc, KAIST
- Youngji Kim (Ph.D. in CEE) 2016–
- Jinyong Jeong (Ph.D. in CEE, Aug 2020) Motion2AI
- Joowan Kim (Ph.D. in CEE) 2016–
- Yeong Sang Park (Ph.D. in CEE) 2017–
- Junho Lee (Master/Ph.D. in CEE) 2017–
- Giseop Kim (Ph.D. in CEE) 2019–
- Sungho Yoon (Ph.D. in RP) 2019–
- Younghun Cho (Master in CEE) 2020–
- MyungHwan Jeon (Master in RP) 2020–

## Master Students

- Giseop Kim (Master in CEE Feb 2019) 2017–2019
- Younghun Cho (Master in CEE) 2018–2020
- MyungHwan Jeon (Master in RP) 2018–2020
- Hyesu Jang (Master in CEE) 2018–

## Undergraduate Students

*KAIST Undergraduate Research Program (URP) & CEE URP*

- Younghun Cho & Hyesu Jang (**Encouragement Prize**) URP 2017
- Hyesu Jang (**Excellence Prize**) URP 2018
- Chaemin Na & Jongwon Lee CEE URP 2018

## Thesis Committee

*Chair / Co-chair*

- Hyunchul Roh (Ph.D. in RP) 2017
- Giseop Kim (Master in CEE) 2019
- Youngsik Shin (Ph.D. in CEE/RP) 2020
- Younggun Cho (Ph.D. in CEE/RP) 2020
- Younghun Cho (Master in CEE) 2019
- MyungHwan Jeon (Master in RP) 2019
- Jinyong Jeong (Ph.D. in CEE/RP)

## PUBLICATIONS

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### International Journal

1. MyungHwan Jeon and Ayoung Kim. Prima6d: Rotational primitive reconstruction for enhanced and robust 6d pose estimation. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 2020. Accepted. To appear
2. Kanghee Choi, Giyoung Byun, Ayoung Kim, and Youngchul Kim. Drivers' visual perception quantification using 3d mobile sensor data for road safety. *MDPI Sensors, Special Issue on Robotic Sensing for Smart Cities*, 2020. Accepted. To appear
3. Joowan Kim, Younggun Cho, and Ayoung Kim. Proactive camera attribute control using bayesian optimization for illumination-resilient visual navigation. *IEEE Transactions on Robotics*, 2020. Accepted. To appear
4. Younggun Cho, Hyesu Jang, Ramavtar Malav, Gaurav Pandey, and Ayoung Kim. Underwater image dehazing via unpaired image-to-image translation. *International Journal of Control, Automation and Systems*, 2020. Accepted. To appear
5. Young-Sik Shin, Yeong Sang Park, and Ayoung Kim. DVL-SLAM: Sparse depth enhanced direct Visual-LiDAR SLAM. *Autonomous Robots*, 44(2):115–130, 2019
6. Jinyong Jeong, Younghun Cho, and Ayoung Kim. The road is enough! extrinsic calibration of non-overlapping stereo camera and LiDAR using road information. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 4(3):2831 – 2838, 2019
7. Young-Sik Shin and Ayoung Kim. Sparse depth enhanced direct thermal-infrared SLAM beyond the visible spectrum. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 4(3):2918–2925, 2019
8. Jinyong Jeong, Younggun Cho, Young-Sik Shin, Hyunchul Roh, and Ayoung Kim. Complex urban dataset with multi-level sensors from highly diverse urban environments. *International Journal of Robotics Research*, 38(6):642–657, 2019

9. Giseop Kim, Byungjae Park, and Ayoung Kim. 1-day learning, 1-year localization: Long-term LiDAR localization using scan context image. *IEEE Robotics and Automation Letters (RA-L) (with ICRA)*, 4(2):1948–1955, 2019
10. Giseop Kim, Ayoung Kim, and Youngchul Kim. A new 3D space syntax metric based on 3D isovist capture in urban space using remote sensing technology. *Computers, Environment and Urban Systems*, 74:74–87, 2019
11. Seonghun Hong, Dongha Chung, Jinwhan Kim, Youngji Kim, Ayoung Kim, and Hyeon Kyu Yoon. In-water visual ship hull inspection using a hover-capable underwater vehicle with stereo vision. *Journal of Field Robotics*, 36(3):531–546, 2019
12. Younggun Cho and Ayoung Kim. Channel invariant online visibility enhancement for visual SLAM in a turbid environment. *Journal of Field Robotics*, 35(7):1080–1100, 2018
13. Younggun Cho, Jinyong Jeong, and Ayoung Kim. Model assisted multi-band fusion for single image enhancement and applications to robot vision. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 3(4):2822–2829, 2018
14. Hyunchul Roh, Jinyong Jeong, and Ayoung Kim. Aerial image based heading correction for large scale SLAM in an urban canyon. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 2(4):2232–2239, 2017
15. Hyunchul Roh, Jinyong Jeong, Younggun Cho, and Ayoung Kim. Accurate mobile urban mapping via digital map-based SLAM. *MDPI Sensors*, 16(8):1315, Aug. 2016
16. Stephen M. Chaves, Ayoung Kim, Enric Galceran, and Ryan M. Eustice. Opportunistic sampling-based active visual SLAM for underwater inspection. *Autonomous Robots*, 40(7):1245–1265, Jul. 2016
17. Paul Ozog, Nicholas Carlevaris-Bianco, Ayoung Kim, and Ryan M. Eustice. Long-term mapping techniques for ship hull inspection and surveillance using an autonomous underwater vehicle. *Journal of Field Robotics, Special Issue on Safety, Security and Rescue Robotics*, 33(3):265–289, May. 2016
18. Ayoung Kim and Ryan M. Eustice. Active visual SLAM for robotic area coverage: Theory and experiment. *International Journal of Robotics Research, Special Issue on Robot Vision*, 34(4-5):457–475, Apr. 2015
19. Ayoung Kim and Ryan M. Eustice. Real-time visual SLAM for autonomous underwater hull inspection using visual saliency. *IEEE Transactions on Robotics*, 29(3):719–733, Jun. 2013
20. Franz S. Hover, Ryan M. Eustice, Ayoung Kim, Brendan Englot, Hordur Johannsson, Michael Kaess, and John J. Leonard. Advanced perception, navigation and planning for autonomous in-water ship hull inspection. *International Journal of Robotics Research, Special Issue on 3D Exploration, Mapping, and Surveillance*, 31(12):1445–1464, Oct. 2012
21. Hunter C. Brown, Ayoung Kim, and Ryan M. Eustice. An overview of autonomous underwater vehicle research and testbed at PeRL. *Marine Technology Society Journal*, 43(2):33–47, 2009

## International Conference Proceedings

1. Jinyong Jeong, Younggun Cho, and Ayoung Kim. Hdmi-loc: Exploiting high definition map image for precise localization via bitwise particle filter. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, Oct. 2020. Accepted. To appear
2. Giseop Kim and Ayoung Kim. Remove, then revert: Static point cloud map construction using multiresolution range images. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, Oct. 2020. Accepted. To appear
3. Sungho Yoon and Ayoung Kim. Balanced depth completion between dense deep inference and sparse range measurements using kiss-gp. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, Oct. 2020. Accepted. To appear

4. Yeong Sang Park, Hyesu Jang, and Ayoung Kim. I-loam: Intensity enhanced lidar odometry and mapping. In *Proceedings of the IEEE International Conference on Ubiquitous Robots (UR)*, Kyoto, Jun. 2020. Accepted. To appear
5. Giseop Kim, Yeong Sang Park, Younghun Cho, Jinyong Jeong, and Ayoung Kim. Mulran: Multimodal range dataset for urban place recognition. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Paris, May 2020. Accepted. To appear
6. Younggun Cho, Giseop Kim, and Ayoung Kim. Unsupervised geometry-aware deep lidar odometry. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Paris, May 2020. Accepted. To appear
7. Yeong Sang Park, Young-Sik Shin, and Ayoung Kim. Pharao: Direct radar odometry using phase correlation. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Paris, May 2020. Accepted. To appear
8. Yeong Sang Park, Joowan Kim, and Ayoung Kim. Radar localization and mapping for indoor disaster environments via multi-modal registration to prior lidar map. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1307–1314, Macau, Nov. 2019
9. Younggun Cho, Ramavtar Malav, Gaurav Pandey, and Ayoung Kim. DehazeGAN: Underwater haze image restoration using unpaired image-to-image translation. In *IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles (CAMS)*, volume 52, Daejeon, Sep. 2019
10. MyungHwan Jeon, Yeongjun Lee, Young-Sik Shin, Hyesu Jang, and Ayoung Kim. Underwater object detection and pose estimation using deep learning. In *IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles (CAMS)*, volume 52, Daejeon, Sep. 2019
11. Sejin Lee, Byungjae Park, and Ayoung Kim. Deep learning based object detection via style-transferred underwater sonar images. In *IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles (CAMS)*, volume 52, Daejeon, Sep. 2019
12. Sejin Lee, Byungjae Park, and Ayoung Kim. A deep learning based submerged body classification using underwater imaging sonar. In *Proceedings of the IEEE International Conference on Ubiquitous Robots (UR)*, pages 106–112, Jeju, Jun. 2019
13. Jongwon Lee and Ayoung Kim. Neural network-based long-term place recognition from omnimages. In *Proceedings of the IEEE International Conference on Ubiquitous Robots (UR)*, pages 189–193, Jun. 2019
14. Alex Junho Lee, Younggun Cho, Sungho Yoon, Youngsik Shin, and Ayoung Kim. ViViD : Vision for Visibility Dataset. In *ICRA Workshop on Dataset Generation and Benchmarking of SLAM Algorithms for Robotics and VR/AR*, Montreal, May. 2019. (**Best paper award**)
15. Sejin Lee, Byungjae Park, and Ayoung Kim. Deep learning from shallow dives: Sonar image generation and training for underwater object detection. In *ICRA Workshop on Underwater Robotics Perception*, Montreal, May. 2019. (**Best paper award**)
16. Ramavtar Malav, Ayoung Kim, Soumya Ranjan Sahoo, and Gaurav Pandey. DHSGAN: An end to end dehazing network for fog and smoke. In *Asian Conference of Computer Vision (ACCV)*, Perth, Dec. 2018
17. Giseop Kim and Ayoung Kim. Scan context: Egocentric spatial descriptor for place recognition within 3D point cloud map. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 4802–4809, Madrid, Oct. 2018
18. Youngji Kim, Jinyong Jeong, and Ayoung Kim. Stereo camera localization in 3D LiDAR maps. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1–9, Madrid, Oct. 2018
19. Giseop Kim, Byungjae Park, and Ayoung Kim. Learning scan context toward long-term lidar localization. In *ICRA Workshop on Long-term Autonomy and Deployment of Intelligent Robots*

*in the Real-world*, Brisbane, May. 2018. (**Best paper award**)

20. Jinyong Jeong, Younggun Cho, Young-Sik Shin, Hyunchul Roh, and Ayoung Kim. Complex urban lidar data set. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 6344–6351, Brisbane, May. 2018
21. Joowan Kim, Younggun Cho, and Ayoung Kim. Exposure control using bayesian optimization based on entropy weighted image gradient. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 857–864, Brisbane, May. 2018
22. Young-Sik Shin, Yeong Sang Park, and Ayoung Kim. Direct visual slam using sparse depth for camera-lidar system. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 1–8, Brisbane, May. 2018
23. Alex J. Lee and Ayoung Kim. Event-based real-time optical flow estimation. In *Proceedings of the International Conference on Control, Automation and Systems*, Jeju, S. Korea, Oct. 2017
24. Youngji Kim and Ayoung Kim. On the uncertainty propagation: Why uncertainty on lie groups preserves monotonicity? In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, Sep. 2017. In print
25. Joowan Kim, Jinyong Jeong, Young-Sik Shin, Younggun Cho, Hyunchul Roh, and Ayoung Kim. LiDAR configuration comparison for urban mapping system. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 854–857, Jeju, S. Korea, Aug. 2017
26. Yeong Sang Park, Ayoung Kim, and Young Sam Lee. Path planning using flexible region sampling for arbitrarily-shaped obstacles. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 210–215, Jeju, S. Korea, Aug. 2017
27. Dae-Hyeon Gwon, Joowan Kim, Moon Hwan Kim, Ho Gyu Park, and Ayoung Kim Tae Yeong Kim. Development of a side scan sonar module for the underwater simulator. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 662–665, Jeju, S. Korea, Aug. 2017
28. Joowan Kim and Ayoung Kim. Light condition invariant visual SLAM via entropy based image fusion. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 529–533, Jeju, S. Korea, Aug. 2017
29. Jinyong Jeong, Younggun Cho, and Ayoung Kim. Road-SLAM : Road marking based SLAM with lane-level accuracy. In *Proceedings of the IEEE Intelligent Vehicle Symposium*, pages 1736–1473, Redondo Beach, CA, Jun. 2017
30. Younggun Cho and Ayoung Kim. Visibility enhancement for underwater visual SLAM based on underwater light scattering model. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 710–717, Singapore, May. 2017
31. Youngji Kim and Ayoung Kim. Comparison of point feature matching and graph matching for underwater scene matching. In *Proceedings of the International Conference on Control, Automation and Systems*, Gyeongju, S. Korea, Oct. 2016
32. Youngji Kim, Hwasup Lim, Sang Chul Ahn, and Ayoung Kim. Simultaneous segmentation, estimation and analysis of articulated motion from dense point cloud sequence. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1085–1092, Daejeon, S. Korea, Sep. 2016
33. Dae-Hyeon Gwon, Young-Sik Shin, Youngji Kim, Yeongjun Lee, Hyun-Taek Choi, and Ayoung Kim. Nontemporal relative pose estimation for opti-acoustic bundle adjustment. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–5, Monterey, CA, Sep. 2016
34. Younggun Cho, Young-Sik Shin, and Ayoung Kim. Online depth estimation and application to underwater image dehazing. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–7, Monterey, CA, Sep. 2016

35. Young-Sik Shin, Younggun Cho, Gaurav Pandey, and Ayoung Kim. Estimation of ambient light and transmission map with common convolutional architecture. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–7, Monterey, CA, Sep. 2016
36. Jinyong Jeong and Ayoung Kim. Adaptive inverse perspective mapping for lane map generation with SLAM. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 38–41, Xian, China, Aug. 2016
37. Young-Sik Shin, Yeongjun Lee, Hyun-Taek Choi, and Ayoung Kim. Bundle adjustment from sonar images and SLAM application for seafloor mapping. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–6, Washington, DC, Oct. 2015
38. Stephen M. Chaves, Ayoung Kim, and Ryan M. Eustice. Opportunistic sampling-based planning for active visual SLAM. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 3073–3080, Chicago, IL, USA, Sep. 2014
39. Ayoung Kim and Ryan M. Eustice. Perception-driven navigation: Active visual SLAM for robotic area coverage. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 3181–3188, Karlsruhe, Germany, May. 2013
40. Ayoung Kim and Ryan M. Eustice. Next-best-view visual SLAM for bounded-error area coverage. In *IROS Workshop on Active Semantic Perception*, Vilamoura, Portugal, Oct. 2012
41. Ayoung Kim and Ryan M. Eustice. Combined visually and geometrically informative link hypothesis for pose-graph visual SLAM using bag-of-words. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1647–1654, San Francisco, CA, USA, Sep. 2011
42. Ayoung Kim and Ryan M. Eustice. Toward AUV survey design for optimal coverage and localization using the cramer rao lower bound. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–7, Biloxi, MS, USA, Oct. 2009
43. Ayoung Kim and Ryan M. Eustice. Pose-graph visual SLAM with geometric model selection for autonomous underwater ship hull inspection. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1559–1565, St. Louis, MO, USA, Oct. 2009
44. Hunter Brown, Ayoung Kim, and Ryan Eustice. Development of a multi-AUV SLAM testbed at the University of Michigan. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–6, Quebec City, Quebec, Canada, Sep. 2008
45. Ryan M. Eustice, Hunter C. Brown, and Ayoung Kim. An overview of AUV algorithms research and testbed at the University of Michigan. In *Proceedings of the IEEE/OES Autonomous Underwater Vehicles Conference*, pages 1–9, Woods Hole, MA, USA, Oct. 2008
46. A-Young Kim, Sitae Kim, Jay-Il Jeong, Jongwon Kim, and F.C. Park. Exploiting redundant actuation to enhance the static stiffness of parallel mechanisms. In *The 13th International Conference on Advanced Robotics*, Jeju, Korea, Aug. 2007

## Dissertations

1. Ayoung Kim. *Active visual SLAM with exploration for autonomous underwater navigation*. PhD thesis, University of Michigan, Ann Arbor, MI, Aug. 2012
2. Ayoung Kim. Stiffness analysis and hybrid control for parallel manipulator. Master's thesis, Seoul National University, Seoul, Korea, Dec. 2007

## PRESENTATIONS

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1. KASIT School of Computing Colloquium, Apr., 2020.
2. Australian Centre for Field Robotics (ACFR), Sydney, Australia, Nov., 2019.
3. Keynote speech, AutoNUE Workshop International Conference on Computer Vision (ICCV), Seoul, Korea, Nov., 2019.
4. Keynote speech, International Conference on Control, Automation and Systems (ICCAS), Jeju, Korea, Oct., 2019.
5. Mechanical Engineering, KAIST, Daejeon, Korea, Oct., 2019.
6. Keynote speech, A Robotic State of Mind Workshop, Holomatic, Wuhan, China, Jun., 2019.
7. KAIST-NAVER Clova AI Workshop, KAIST, Daejeon, Korea, Jun., 2019.
8. Keynote speech, Workshop on Underwater Robotics Perception, ICRA, Montreal, Canada, May, 2019
9. AI+X Forum, School of Computing, KAIST, Daejeon, Korea, May., 2019.
10. SW Contents Research Laboratory, ETRI, Daejeon, Korea, May., 2019.
11. Mechanical Engineering, SNU, Seoul, Korea, May., 2019.
12. Czech technical university in Prague, Prague, Czech Republic, Apr., 2019.
13. Department of Naval Architecture & Ocean Engineering, Pusan National University (PNU), Busan, Korea, Feb., 2019.
14. Keynote speech, IEEE International Conference on Ubiquitous Robots, Honolulu, USA, Jun., 2018.
15. Women in Science and Engineering Session, ICROS Spring Conference, Institute of Control, Robotics and Systems (ICROS), May., 2017.
16. Civil and Environmental Engineering, Hong Kong University of Science and Technology (HKUST), Hong Kong, Jan., 2017.
17. Invited talk, Korea Intellectual Property Office, Daejeon, Aug., 2016.
18. Hyundai Engineering & Construction, Jul., 2016.
19. Korea Institute of Construction Technology (KICT), Seoul, Mar., 2016.
20. Autonomous Systems Lab, ETH Zurich, Feb., 2016.
21. Keynote speech, ICROS-KROS Joint Spring Conference, ICROS, Daejeon, May., 2015.
22. Daegu-Gyeongbuk Research Center, ETRI, Daegu, Korea, Feb., 2015.
23. Mechanical Engineering, PNU, Busan, Korea, Oct., 2014.
24. Digital Media Engineering, Busan University of Foreign Studies, Busan, Korea, Oct., 2014.
25. Civil and Environmental Engineering, KAIST, Daejeon, Korea, Apr., 2014.
26. Korea Institute of Ocean Science and Technology (KRISO), Daejeon, Korea, Nov., 2013.
27. Mechanical Engineering and Aerospace Engineering, SNU, Seoul, Korea, Sep., 2012.
28. Samsung Heavy Industries Research Institute, Daejeon, Korea, Sep., 2012.
29. Mechanical Engineering / Ocean and Resource Engineering, University of Hawaii, Honolulu, HI, USA, Sep., 2012.



30. Ocean Systems Engineering, KAIST, Daejeon, Korea, Nov., 2010.

## AWARDS AND HONORS

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2020	“Outstanding Lecturer Award”, CEE, KAIST
2019	“Young Researcher Award”, Korea Robotics Society (KROS)
2019	“Appreciation plaque”, Korean marine robot technology society (KMRTS)
2016	“Excellent Reviewer”, The ICROS
2016	“Young Scientist at Summer Davos Forum”, The World Economic Forum (WEF)
2015	“Excellence Award”, Ministry of Science, ICT and Future Planning (MSIP)
2015	“Best Presenter Award”, KMRTS
2015	“Young Researchers Award”, ICROS
2009, 2011	Rackham Travel Grant Award
2005 - 2007	Funding from Samsung Electronics, Inc.
2005	Graduated <i>Summa cum laude</i> , MAE, SNU.
2004	“Best Presentation Award of Bachelor Thesis”, MAE, SNU.

## PROFESSIONAL MEMBERSHIPS

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2014 -	Institute of Control, Robotics and Systems (ICROS)
2014 -	Women in Science, Engineering and Technology (WISET), Guest Mentor
2014 -	Korean Society of Ocean Engineering (KSOE)
2014 -	Korea Robotics Society (KROS)
2011 -	IEEE Robotics and Automation Society
2011 -	IEEE Women in Engineering
2011 -	IEEE Oceanic Engineering Society
2008 -	Institute of Electrical and Electronics Engineers (IEEE)

## SERVICES

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### Committee

#### *Academic Societies*

- Chapter Vice Chair, IEEE OES Korea Chapter, 2019.
- Publication Chair, IEEE Underwater Technology, 2017.
- Activity Funding Committee, IFAC, 2020–2023.
- Senior Program Committee, IROS, 2020.

### Editorial Board

- Senior Editor, IEEE UR, 2020.
- Associate Editor, IEEE IROS, 2020.
- Associate Editor, IEEE Robotics and Automation Letters (RA-L) 2019–2020.
- Editor, IFAC CAMS/WROCO, 2019.

### Workshop & Tutorial

- Workshop on Reliable Deployment of Machine Learning for Long-Term Autonomy, ICRA IROS 2020 (Workshop has postponed to IROS 2020 due to COVID-19).
- Workshop on Acoustic based Navigation for Marine Robots, IROS 2017.

### Reviewer

- IEEE Transactions on Robotics.
- IEEE Transactions on Mechatronics.

- IEEE Transactions on Industrial Electronics (TIE).
- IEEE Robotics and Automation Letters (RA-L).
- Journal of Field Robotics (JFR).
- AIAA Journal of Guidance, Control, and Dynamics.
- Elsevier Robotics and Autonomous Systems (RAS).
- Elsevier Ocean Engineering (OE).
- ASME Journal of Autonomous Vehicles and Systems.
- International Journal of Control, Automation and Systems (IJCAS).
- International Journal of Precision Engineering and Manufacturing.
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).
- IEEE International Conference on Robotics and Automation (ICRA).
- IEEE Intelligent Transportation Systems Conference (ITSC).
- Robotics: Science and Systems (RSS).
- International Conference on Control, Automation and Systems (ICCAS).

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