

INKYU SA

EDUCATION

Queensland University of Technology	08/2010 – 03/2014
<ul style="list-style-type: none"> PhD, Electrical Engineering and Computer Science. 	
Sung Kyun Kwan University	
<ul style="list-style-type: none"> M.S, School of Electrical and Computer Engineering B.S, School of Information and Communication Engineering B.S, Department of physics 	03/2003 – 02/2006 03/1999 – 02/2002 03/1999 – 02/2002

ACADEMIC ACTIVITIES

Professional academic activities

- 1 special session organizer, 1 workshop organizer, 1 special issue organizer

Publications

- 31 conference papers were published including 1st and co-authors.
- 5 workshops presentations.
- 9 journal papers were published including 1st and co-authors.
- 4 articles of technical review were published.
- 2 book chapters related to robot-navigation, mapping and service robot were published.

Peer-review experience

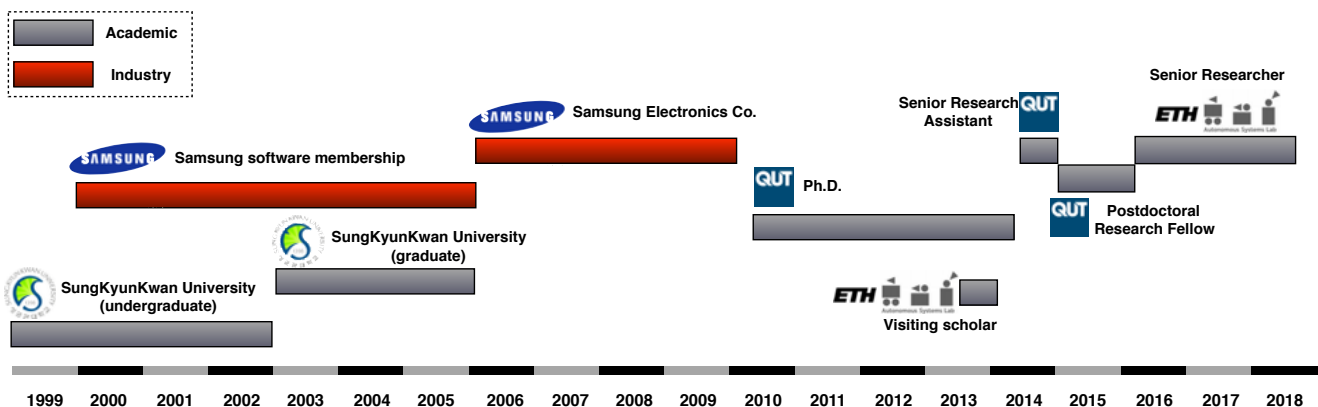
- Various journals (RA-L, RA-M, Nature (Scientific Reports)) and conferences (IROS, ICRA, SSRR)
- MDPI (remote sensing, sensors).

Projects

- 14 projects, commercial, government managed or research projects, were done.

EXPERIENCE

ETH Zurich, Autonomous Systems Lab.	07/2016 – Now
<ul style="list-style-type: none"> Postdoctoral Research Fellow 	
QUT Robotics and Autonomous Systems discipline, Agricultural robotics team	01/2015 – 06/2016
<ul style="list-style-type: none"> Postdoctoral Research Fellow 	
QUT ACRV	07/2014 – 10/2014
<ul style="list-style-type: none"> Senior Research Assistant 	
ETH Autonomous Systems Laboratory	09/2013 – 12/2013
<ul style="list-style-type: none"> Visiting scholar 	
Samsung Electronics Co.	02/2006 – 05/2009
<ul style="list-style-type: none"> Engineer of Advanced Terminals Laboratory 	
Samsung Software Membership	02/2000 – 01/2006
<ul style="list-style-type: none"> Software and hardware develop 	
Teaching Assistant Experience	
<ul style="list-style-type: none"> Teaching Lego-Mindstorm for kids (10-15 yrs.) QUT TA for ENB224 micro processor QUT Winter School, Practical session ETH Zurich, Autonomous Mobile Robot and Robot Dynamics, Exercise 	05/2004 – 05/2005 07/2011 – 10/2011 7,8/July/2015 March/2017, 2018



Educational and experience background

Senior Researcher at ETH Zurich (Supervisor: Prof. Roland Siegwart) The Flourish project is funded by the European Community's Horizon 2020 program under grant agreement no 644227-Flourish and from the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 15.0029.	07/2016 – Current
Postdoctoral Research Fellow at QUT (Supervisor: Prof. Tristan Perez) Queensland DAF Strategic Investment in Farm Robotics (SIFR), SIFR-MR-CropDet-June-2015 on Horticultural application.	01/2015 – 06/2016
Senior Research Assistant at QUT Persistent Robotic Navigation Hardware and software engineering and web-server system development.	07/2014 – 10/2014
Queensland University of Technology, Brisbane, Australia (Advisor: Prof. Peter Corke) Ph.D, Electrical Engineering and Computer Science. Thesis topic: Shared Autonomy for Close Quarter Navigation and Control of a VTOL Platform	08/2010 – 03/2014
Sung Kyun Kwan University, Suwon, Korea (Advisor: Prof. Tae-Yong Kuc) M.S, School of Electrical and Computer Engineering Thesis: Implementation of Simultaneous Localization and Mapping using Intelligent Hybrid Modular control Architecture.	08/2003 – 03/2005
Sung Kyun Kwan University B.S, School of Information and Communication Engineering Thesis: Design of an embedded image grabber Received Best graduation student paper award.	03/1999 – 02/2002
Sung Kyun Kwan University B.S, Department of physics	03/1999 – 02/2002

Technical expertise

- Agricultural robotics, multl- and hyper-spectral imagery processing for precision farming.
- Aerial robotics: path planning algorithm, self-localization, obstacle avoidance, 3D mapping
- Heterogeneous robots coordination: Robot soccer
- Sensor fusion and probabilistic state estimation.
- Real-time vision application such as Visual-Inertial odometry and visual-servoing
- Machine learning on deep Convolutional Neural Network, Reinforce and recurrent learning for robotics.
- Various software, hardware, and electronic engineering skills over 10 years.

Software programming capabilities

- Embedded software-programming skills: Microprocessors (MCS96 family, 8051, AVR series, VHDL, ARM-ASSEMBLE, X86-ASSEMBLE).
- Embedded system development: WinCE, Windows Mobile, Linux, BREW, and Google Android platform.
- Electrical and electronic engineering: microprocessors, sensors, and digital and analog system design.
- Computer Language skills: C++, C, Java, MATLAB and Python.
- ROS, PCL and OpenCV, Gazebo, V-REP friendly.
- Experiences on Machine learning frameworks: Caffe, Tensorflow, Keras, SciPy, scikit-learn, MATLAB NN toolbox.

Hardware programming capabilities

- Microprocessor circuit design and A/D circuit design including FPGA.
- Hardware design skills: A variety of hardware design tool are available.

Scholarship awarded

[4] QUT Write Up Scholarship, 3 month.

[3] Postgraduate Studentship from CSIRO, 3 years.

[2] QUT Postgraduate Research Award, 3 years.

[1] Full scholarship from Electrical Engineering Dept., Sungkyunkwan University, 2 years.

Publications

Journal

- [9] **Inkyu Sa**, Zetao Chen, Marija Popovic, Raghav Khanna, Frank Liebisch, Juan Nieto, and Roland Siegwart, "weedNet: Dense Semantic Weed Classification Using Multispectral Images and MAV for Smart Farming", 2017, IEEE Robotics and Automation Letters, DoI: 10.1109/LRA.2017.2774979
- [8] **Inkyu Sa**, Mina Kamel, Michael Burri, Michael Bloesch, Raghav Khanna, Marija Popovic, Juan Nieto, and Roland Siegwart, "Build your own visual-inertial odometry aided cost-effective and open-source autonomous drone", 2017, IEEE Robotics & Automation Magazine, (Accepted), Impact Factor 3.276 (2016), 5.607 (5-years avg.)
- [7] Jemin Hwangbo, **Inkyu Sa**, Roland Siegwart, Marco Hutter, "Control of a Quadrotor with Reinforcement Learning", 2017, IEEE Robotics and Automation Letters (RA-L), vol 2, no. 4, pp. 2096-2103, DoI: 10.1109/LRA.2017.2720851.
- [6] **Inkyu Sa**, Christopher Lehnert, Andrew English, Chris McCool, Feras Dayoub, Ben Upcroft, Tristan Perez, "Peduncle Detection of Sweet Pepper for Autonomous Crop Harvesting- Combined Colour and 3D information", 2016, IEEE Robotics and Automation Letters, DoI: 10.1109/LRA.2017.2651952.
- [5] **Inkyu Sa**, ZongYuan Ge, Feras Dayoub, Ben Upcroft, Tristan Perez, and Chris McCool, "DeepFruits: A Fruit Detection System Using Deep Neural Networks", Sensors, vol. 16, no. 8, pp. 1222, Aug, 2016, Impact Factor 2.033 (2015), DoI: 10.3390/s16081222
- [4] **Inkyu Sa**, Stefan Hrabar, and Peter Corke "Inspection of Pole-like Structures Using a Visual-Inertial Aided VTOL Platform with Shared Autonomy", Sensors, vol. 15, no. 9, pp. 22003, Aug, 2015, Impact Factor 2.245 (2014), 2.474 (5-years avg.), DoI: 10.3390/s150922003
- [3] **Inkyu Sa**, Ho Seok Ahn, "Visual 3D model-based tracking toward autonomous live sports broadcasting using a VTOL unmanned aerial vehicle in GPS-impaired environments", International Journal of Computer Applications, vol. 122, no. 7, pp. 1-7, Jul. 2015, Impact Factor 0.715 (2014), 0.795 (5-years avg.), DoI: 10.5120/21709-4825
- [2] Ho-Seok Ahn, **Inkyu Sa**, Dong-Wook Lee, Dongwoon Choi "A playmate robot system for playing the rock-paper-scissors game with humans," Artificial Life and Robotics, vol 16, Issue 2, pp 142-146, Sep., 2011, DoI: 10.1007/s10015-011-0895-y
- [1] Ho-Seok Ahn, **Inkyu Sa**, Jin-Young Choi "PDA based mobile robot system with remote monitoring for home environment," Transaction on consumer electronics, vol 55, no. 3, pp. 1487-1495 Aug., 2009, Impact Factor 1.045 (2015) DoI: 10.1109/TCE.2009.5278017

Book chapters

- [2] **In-Kyu Sa**, Ho-Seok Ahn, "Implementation of Home Automation System Using a PDA based Mobile Robot -PBMoRo" Cutting Edge Robotics 2010 (ISBN: 978-953-307-062-9), In-Teh, pp. 279-300), DoI: 10.5772/10303
- [1] Ho-Seok Ahn, **In-Kyu Sa**, Back-Young Min, Jin-Young Choi, "Intelligent Unmanned Store Service Robot PartTimer," Service Robotics, i-Tech Book, (ISBN 978-953-7619-02-2), In-Teh, pp. 1-26, Jul. 2008. DoI: 10.5772/5959

Professional academic activity

- [3] Ho Seok Ahn, **Inkyu Sa**, Feras Dayoub, "Robotics and Automation-Letter (RA-L) Special Issue on Precision Agricultural Robotics and Autonomous Farming Technologies" (IROS2018 conference option)
- [2] **Inkyu Sa**, Chris McCool, Chris Lehnert, Juan Nieto, and Cyrill Stachniss, ICRA 2018 Workshop on Robotic Vision and Action in Agriculture, 2018 IEEE International Conference on Robotics and Automation
- [1] **Inkyu Sa**, Andrew English, Felipe Gonzalez, Ho Seok Ahn, Bruce A. MacDonald, and Tristan Perez, "IROS 2016 special session on Autonomous Farming Technologies and Agricultural Robotics", 2016 IEEE International Conference on Intelligent Robots and Systems, Daejeon, South Korea.

Conferences

- [31] **Inkyu Sa**, Zetao Chen, Marija Popovic, Raghav Khanna, Frank Liebisch, Juan Nieto, Roland Siegwart, "weedNet: Dense Semantic Weed Classification Using Multispectral Images and MAV for Smart Farming" 2018 IEEE International Conference on Robotics and Automation (accepted)
- [30] Miguel I. Valls, Huubertus F.C. Hendriks, Victor J.F. Reijgwart, Fabio V. Meier, Renaud Dube, Abel Gawel, Mathias B'urki, Roland Siegwart and **Inkyu Sa**, "Design of an Autonomous Racecar: Perception, State Estimation and System Integration", 2018 IEEE International Conference on Robotics and Automation (accepted)
- [29] Zetao Chen, Fabiola Maffra, **Inkyu Sa**, Margarita Chli, "Only Look Once, Mining Distinctive Landmarks from ConvNet for Visual Place Recognition", IEEE International Conference on Intelligent Robots and Systems, Vancouver, 2017.
- [28] **Inkyu Sa** and Kamel, Mina and Khanna, Raghav and Popovic, Marija and Nieto, Juan and Siegwart, Roland, "Dynamic System Identification, and Control for a cost-effective and open-source Multi-rotor MAV", 2017 Field and Service Robotics, pp605-620, Springer
- [27] Amedeo Rodi Vetrella, **Inkyu Sa**, Marija Popovic, Raghav Khanna, Juan Nieto, Giancarmine Fasano, Domenico Accardo, Roland Siegwart, "Improved Tau-Guidance and Vision-Aided Navigation for Robust Autonomous Landing of UAVs", pp115-128, 2017 Field and Service Robotics, Springer
- [26] Zetao Chen, Fabiola Maffra, **Inkyu Sa**, Margarita Chli, "Only Look Once, Mining Distinctive Landmarks from ConvNet for Visual Place Recognition", IEEE International Conference on Intelligent Robots and Systems, Vancouver, 2017.
- [25] Marija Popovic, Teresa A. Vidal-Calleja, Gregory Hitz, **Inkyu Sa**, Roland Siegwart, Juan Nieto, "Multiresolution Mapping and Informative Path Planning for UAV-Based Terrain Monitoring", IEEE International Conference on Intelligent Robots and Systems, Vancouver, 2017.
- [24] Marija Popovic, Gregory Hitz, Juan Nieto, **Inkyu Sa**, Roland Siegwart, Enric Galceran, "Online Informative Path Planning for Active Classification Using UAVs", 2017 IEEE International Conference on Robotics and Automation
- [23] Raghav Khanna, **Inkyu Sa**, Juan Nieto, and Roland Siegwart, "On Field Radiometric Calibration for Multispectral Cameras", 2017 IEEE International Conference on Robotics and Automation
- [22] **Inkyu Sa**, Christopher Lehnert, Andrew English, Chris McCool, Feras Dayoub, Ben Upcroft, Tristan Perez, "Peduncle Detection of Sweet Pepper for Autonomous Crop Harvesting- Combined Colour and 3D information", 2017 IEEE International Conference on Robotics and Automation, **Finalist for ICRA 2017 Best Automation Paper Award**.
- [21] Christopher Lehnert, **Inkyu Sa**, Christopher Steven McCool, Ben Upcroft, and Tristan Perez, "Sweet Pepper Pose Detection and Grasping for Automated Crop Harvesting", 2016 IEEE International Conference on Robotics and Automation, **Finalist for ICRA 2016 Best Automation Paper Award**.
- [20] Christopher Steven McCool*, **Inkyu Sa***, Feras Dayoub, Christopher Lehnert, Tristan Perez, and Ben Upcroft, "Visual Detection of Occluded

-
- Crop: for automated harvesting”, 2016 IEEE International Conference on Robotics and Automation, * **indicates identical contributions**
- [19] Ribeiro T., Conceicao A., **Sa, I.**, and Corke P., “Nonlinear Model Predictive Formation Control for Quadcopters”. 2015 11th IFAC Symposium on Robot Control, Brazil.
- [18] **Sa, I.**, Hrabar S., and Corke P., “Inspection of Pole-Like Structure using Vision controlled VTOL UAV and Shared Autonomy”. 2014 IEEE International Conference on Intelligent Robots and Systems, Chicago, USA.
- [17] **Sa, I.** and Corke P., “Close-quarters Quadrotor flying for a pole inspection with Position Based Visual Servoing and High-Speed Vision”. 2014 IEEE International Conference on Unmanned Aircraft Systems, Orlando, Florida, USA.
- [16] **Sa, I.**, Hrabar S., and Corke P., “Outdoor Flight Testing of a Pole Inspection UAV Incorporating High-Speed Vision”. The 9th International Conference on Field and Service Robotics, Brisbane, QLD, Australia.
- [15] **Sa, I.** and Corke P., “Improved line tracking using IMU and Vision for visual servoing”. In Proceedings of the Australasian Conference on Robotics and Automation 2013, the University of New South Wales, Australia
- [14] **Sa, I.**, He H., Van H. and Corke P., “Monocular Vision based Autonomous Navigation for a Cost-Effective Open-Source MAVs in GPS-denied Environments”. In Proceedings of IEEE/ASME International Conference on Advanced Intelligent Mechatronics 2013, Wollongong, Australia.
- [13] **Sa, I** and Corke, P., “100Hz Onboard Vision for Quadrotor State Estimation”, In Proceedings of the Australasian Conference on Robotics and Automation 2012, Victoria University of Wellington, NZ
- [12] **Sa, I** and Corke, P., “Vertical Infrastructure Inspection using a Quadcopter and Shared Autonomy Control”, The 8th International Conference on Field and Service Robotics, Matsushima, Japan
- [11] **Sa, I** and Corke, P., “System Identification, Estimation and Control for a Cost Effective Open-Source Quadcopter”, 2012 IEEE International Conference on Robotics and Automation
- [10] **Sa, I** and Corke, P., “Estimation and control for an open-source quadcopter”, In Proceedings of the Australasian Conference on Robotics and Automation 2011, Monash University, Melbourne, Vic
- [9] **Sa, I** and Corke, P., “3D sensing and estimation for indoor quadcopter flight”, 2011 IEEE International Conference on Robotics and Automation workshop.
- [8] **Sa, I.**, Ho Seok Ahn, Kwang Moo Yi, Jin Young Choi, “Implementation of Home Automation System Using a PDA based Mobile Robot.” IEEE ISIE 2009 International Symposium on Industrial Electronics, July, 2009.
- [7] Ho-Seok Ahn, **In-Kyu Sa**, Back-Young Min, Jin-Hee Na, U-Sung Kang, Jin-Young Choi, “Design of Reconfigurable Heterogeneous Modular Architecture for Service Robot,” IROS2008, pp. 1313-1318, Sep., 2008.
- [6] Beck-Young Min, Ho-Seok Ahn, **In-Kyu Sa**, Min-yo Lee, Chang-Kyun Lee, Tae-Hyun Kim, Jun-Young Choi, “Vision-Based Robot Manipulator for Grasping Objects,” International Conference on Advanced Robotics (ICAR 2007), pp. 164-169, Aug., 2007.
- [5] **In-Kyu Sa**, Sung-Min Beck, Tae-Young Kuc, “A Robust Real-Time Mobile Robot Self-Localization with ICP Algorithm” SICE-ICASE International Joint Conference 2005 (ICCA 2005), Jun., 2005.
- [4] **In-Kyu Sa**, Ho-Seok Ahn, Hyung-Kyu Lee, Jun-Young Choi, “A real-time face tracking method using fuzzy controller.” 2008 Conference on Information and Control System(CICS2008), pp. 333-334, Oct., 2008.
- [3] **In-Kyu Sa**, Ho-Seok Ahn, Hyung-Kyu Lee, Jun-Young Choi, “A real-time path planning method for efficient movement of a mobile robot.” 2008 Conference on Information and Control System(CICS2008), pp. 331-332, Oct., 2008.
- [2] **Inkyu Sa**, “Implementation of Frame grabber board using Net ARM Processor” Sung Kyun Kwan University graduation, B.S degree thesis, Feb., 2004. (**Best Student Paper Award**)
- [1] **Inkyu Sa**, “Implementation of Simultaneous Localization and Mapping using Intelligent Hybrid Modular Control Architecture”, Sung Kyun Kwan University graduation, M.S degree thesis, Feb., 2006.

Students supervision

Bachelor students

- [4] Amir Hadzic, and Jamina Haseli, System Identification and Simulation of a pneumatic trunk
- [3] Philipp Andermatt, ETH Zurich, Voliro Bachelor Thesis, Use drone as Gimbal and implementation of a follow me mode. (2017)
- [2] Michael Sommerhalder, ETH Zurich, Studies on Mechatronics, 3D data compression: Survey and Comparisons. (2016)
- [1] Charlie Thien Phuoc Ho Si, Queensland University of Technology, BEB801, Visual detection of Capsicums using colour images (2015)

Master students

- [9] Sollich, Nicolas Robert, Semester thesis on Synthetic Weed Adversarial Generator (2018)
- [8] Nico Messikommer, Semester thesis on Place Recognition using a Capsule Network (2018)
- [7] Oliver Harley, and Twan van der Sijs, PLR project, Data-driven lateral velocity estimation of a quadrotor using only IMU and recurrent neural network
- [6] Jaeyoung Lim, ETH Zurich, Semester thesis on Model Free Obstacle Avoidance using Deep Reinforcement Learning on a MAV (2018)
- [5] Danusanth Srikantharupam, Master thesis on Autonomous airshow using variable pitch quadrotor (2017)
- [4] Antoni Rosinol Vidal, ETH Zurich, Semester thesis on Autonomous Navigation using Sparse Visual Inertial Maps with a Computationally Constrained MAV (2017)
- [3] Victor Reijgwart, ETH Zurich, Semester thesis on Visualization and fault detection of high-speed racing car (2017) , Focus project, Academic Motorsportverein Zurich (AMZ).
- [2] Miguel De la Iglesia Valls, ETH Zurich, Semester thesis on State estimation of high-speed racing car (2017) , Focus project, Academic Motorsportverein Zurich (AMZ).
- [1] Russell Buchanan, ETH Zurich, Semester thesis on Monocular Visual-inertial SLAM for MAVs (2017)

PhD students (co-supervising)

- [3] Vempati Anurag Sai, ETH Zurich, Dense 3D Reconstructions of Natural Environments using Aerial Vehicles (ongoing)
- [2] Marija Popovic, ETH Zurich, Informative path-planning for Micro Aerial Vehicles (ongoing)
- [1] Sebastian Verling, ETH Zurich, Hybrid Wing-Only Unmanned Aerial Robots (ongoing)

Visiting PhD students

- [3] Ciro Potena, Sapienza University of Rome - La Sapienza, "Collaborative UAV and UGV mapping in agricultural field", Nov/2017-May/2018
- [2] Michela Longhi, Sapienza University of Rome, Robust UAV localization using RF-ID, Jan-June/2018
- [1] Amedeo Rodi Vetrella, University of Naples "Federico II", Robust and precise UAV landing for precision agriculture, Jan-June/2017

Workshop papers

- [5] **Inkyu Sa**, Christopher McCool, Christopher Lehnert, and Tristan Perez, On Visual Detection of Highly-occluded Objects for Harvesting Automation in Horticulture, In IEEE International Conference on Robotics and Automation, (ICRA), May 30, 2015, Seattle, USA
- [4] Tristan Perez, **Inkyu Sa**, Christopher McCool and Christopher Lehnert, A Bayesian Framework for the Assessment of Vision-based Weed and Fruit Detection and Classification Algorithms, In IEEE International Conference on Robotics and Automation, (ICRA), May 30, 2015, Seattle, USA
- [3] **Inkyu Sa**, Aaron McFadyen, and Peter Corke, Image-based visual servoing for air vehicles, 3rd workshop on Visual Control of Mobile Robots, IEEE International Conference on Intelligent Robots and Systems (IROS), 2014
- [2] **Inkyu Sa**, and Peter Corke, High-speed Monocular Vision for Close-quarters Flying, Workshop on IEEE International Conference on Intelligent Robots and Systems (IROS), 2013.
- [1] **Inkyu Sa**, and Peter Corke, 3D sensing and estimation for indoor quadcopter flight, Workshop on IEEE International Conference on Robotics and Automation (ICRA), 2011

Technical reports

- [4] The trend of domestic Home network service market, Electronics Information Center, Oct.11 2005.
- [3] A prospect of the trend of Domestic and international technique and market of sensor industry, Electronics Information Center, Jun.16 2005.
- [2] An analysis of the trend of Domestic and international technique and market of a small size high accuracy motor control, Electronics Information Center, Jun.10 2004.
- [1] An analysis of the trend of Domestic and international technique and market of intelligent robots, Electronics Information Center, Apr.1 2004.

Projects

- [2017] Disney Research Zurich, Paintcopter, Dense 3D reconstructions of natural environments and painting using an Unmanned Aerial Vehicle (UAV) acting as co-supervisor with Dr. Paul Beardsley.
- [2017] European Space Agency, ARTES 3-4 Satcom Applications programme, Solar3 (Solar cube) Project
Description: Project leader of ETHZ, Solar-powered space-augmented UAS platform for large-scale diagnostics and decision support in precision farming.
- [2017] European Commission, Horizon 2020, Work programme 2014-2015, Research and Innovation actions (ICT 2014), The AeroWorks project.
Description: One of project partners. A power plan inspection with a UAV.
- [2016] European Commission, Horizon 2020, Work programme 2014-2015, Information and Communications Technologies (ICT 2014), The Flourish project. Description: Project coordinator and overseeing entire project. UAV localization and farm site environmental modeling.
- [2015] Horticultural application, Queensland DAF Strategic Investment in Farm Robotics (SIFR), SIFR-MR-CropDet-June-2015, Description: Development of visual recognition of crop (capsicum or sweet pepper).
- [2009] Samsung first Google android phone GT-I7500(GSM850/GSM900/DCS1800/PCS1900) for Bouygues in France.
Description: Development Term: July.2007 ~ July.2009., Research Institute: Samsung Electronics CO
- [2007] CDMA&WCDMA Terminal devices development
Description: Development Term: June, 2006 ~ July, 2007. Samsung Electronics CO

Awards

- [28] Formula Student Germany 2017, **the first prize** in driverless competition, acting as a supervisor in state estimation and sensor fusion.
- [27] Mohamed Bin Zayed International Robotics Challenge (MBZIRC) 2017, **Second place** in Challenge 3 and Grand Challenge, 18 March 2017.
- [26] IROS 2016 Autonomous Drone racing Competition, **Third place**, 13 Oct. 2016
- [25] **Finalist** for ICRA 2016 Best Automation Paper Award, "Sweet Pepper Pose Detection and Grasping for Automated Crop Harvesting"
- [24] One to Watch, Robot Launch 2014, 3DOF Robotics by iStartUp 2014.
- [23] **The best student award** from 2007 Conference on Information and Control System (CICS2007), Oct. 2007
- [22] The **second** prize in the SAMSUNG ELECTRONICS Robot Design contest by Samsung Electronics Co, July.2006
- [21] The **second** prize in Altera NIOS Embedded system design contest by Altera, Nov.2006
- [20] **Third** prize in the software competition of KOREA hosted by IPAK, Dec.2005
- [19] The **first** prize in the intelligent creative robot contest hosted by CHUNGNAM National University, Dec.2005
- [18] The **first** prize in the intelligent robot contest (IRC) hosted by POSTECH, Oct.2005
- [17] The **first** prize in the Korea Intelligent Robot Contest at KyungNam University, May.2005
- [16] Received popularity award, Microsoft Imagine Cup 2005 from Microsoft, Feb.2005
- [15] **Third** prize in Dept. of Information and Communications, GIST contest by GIST, Aug. 2004,
- [14] **Third** prize in Intelligent Electronics competition by KIPE, July.2004
- [13] The **first** prize in the national wireless internet software and contents contest hosted by KIPA(Korea SW industry Promotion Agency) and Juseong University, Jun.2004
- [12] **Third** prize in the 1st KOREA micro-controller competition from Comfile Technology Inc. , April.2004
- [11] The **first** prize in the central part Robot Soccer mirosot league by KRSA (Korea Robot Soccer Association) and KangNam University, Feb.2004
- [10] The **first** prize in 2003 FIRA Robot Soccer World Championship Middle League by FIRA (Federation of International Robot Soccer Association), Oct.2003
- [9] The **first** prize in 2003 FIRA Robot Soccer World Championship Large League by FIRA (Federation of International Robot Soccer Association), Oct.2003
- [8] The **first** prize in 2003 FIRA KOREA CUP Robot Soccer competition by KRSA (Korea Robot Soccer Association), Aus.2003
- [7] The **first** prize in 3rd the central part Robot Soccer mirosot league from KRSA (Korea robot soccer association) and Chung-ang University, July.2003
- [6] **The best student award** from the president of Sung Kyun Kwan University at the graduation, Feb.2003
- [5] **Third** prize in 2002 FIRA Robot Soccer World Championship by FIRA (Federation of International Robot Soccer Association), May.2002
- [4] The **second** prize in 2002 FIRA-POSCO Cup National Robot Soccer competition by KRSA(Korea Robot Soccer Association), Jan.2002
- [3] **The Best paper award** in the 2002 FIRA-POSCO Cup National Robot Soccer Conference by KRSA, Jan.2002
- [2] The **first** prize in Robot Soccer competition for commemoration of national athletic conference hosted by KRSA and Chung-Chung Namdo, Oct.2001
- [1] Manner prize in the first central part Robot Soccer competition hosted by KRSA and Sung Kyun Kwan University, Aus.2001

Language capabilities

- Korean (Native), English (Proficient)

List of referees

Institute	Name	Contact	Position
Queensland University of Technology(QUT)	Peter Corke	peter.corke@qut.edu.au	Professor
The Commonwealth Scientific and Industrial Research Organisation(CSIRO)	Stefan Hrabar	Stefan.Hrabar@csiro.au	Senior Research Scientist
ETH Zurich	Roland Siegwart	rsiegwart@ethz.ch	Professor