

SUNGMOON JOO

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EDUCATION / TRAINING

Sep. 2003 – Mar. 2010	Stanford University • Ph.D. in Aeronautics and Astronautics	Stanford, CA
Aug. 2001 - May 2003	University of California, Berkeley • M.S. in Mechanical Engineering	Berkeley, CA
Mar. 1998 - Jun. 1998	Korea Navy Officer Candidate School • Naval Officer Commissioned	Jinhae, Korea
Mar. 1996 - Feb. 1998	Seoul National University • M.S. in Naval Architecture and Ocean Engineering	Seoul, Korea
Mar. 1992 - Feb. 1996	Seoul National University • B.S. in Naval Architecture and Ocean Engineering	Seoul, Korea

WORK EXPERIENCE

Mar. 2015 - present	Korea Atomic Energy Research Institute (KAERI) • Principal researcher • Senior researcher • Project leader and team member - Space Challenge: Mars exploration system - LiDAR-only semantic SLAM for nuclear application - Object classification & pose estimation using scan data • Project team member - Robotic cutting system for nuclear decommissioning - Robotic system for nuclear emergency response - Small reactor for marine applications - Jordan Research Reactor, Kijang Research Reactor	Daejeon, Korea Sep. 2019 - Present Mar. 2015 - Aug. 2019 Apr. 2023 - Present Apr. 2022 - Dec. 2023 Apr. 2019 - Mar. 2022 Mar. 2017 - Present May. 2022 - Present Mar. 2017 - Dec. 2023 Mar. 2015 - Feb. 2017
Jan. 2013 - Feb. 2015	Georgia Institute of Technology (GIT) • Research scientist II of School of Interactive Computing, College of Computing • Lecturer - CS4649/7649 Robot Intelligence – Planning • Project team member and project facilitator - Object-level communication for robot motion generation - DARPA Robotics Challenge	Atlanta, GA Fall 2014 Oct. 2013 - Feb. 2015 Jan. 2013 - Dec. 2013
Jul. 2009 - Jan. 2013	Samsung Heavy Industries, Co. Ltd. (SHI) • Principal research engineer • Senior research engineer	Daejeon, Korea Mar. 2012 - Jan. 2013 Jul. 2009 - Feb. 2012

	<ul style="list-style-type: none"> • Project leader <ul style="list-style-type: none"> - Distributed embedded robot controller • Project leader and team member <ul style="list-style-type: none"> - Teleoperation robot for offshore platform O&M • Project team member <ul style="list-style-type: none"> - Wire-driven parallel robot mechanism 	<p>Dec. 2011 - Oct. 2012</p> <p>Aug. 2011- Oct. 2012</p> <p>Jul. 2009 - Jul. 2011</p>
Jun. 2007 - Sep. 2007	Carnegie Mellon University at Silicon Valley (CMU@SV) <ul style="list-style-type: none"> • Summer research assistant • Project team member <ul style="list-style-type: none"> - Vision-aided autonomous unmanned aerial vehicle landing 	Moffett Field, CA Jun. 2007 - Sep. 2007
Jul. 1998 - Jun. 2001	Korea Naval Academy <ul style="list-style-type: none"> • Teaching instructor of the Department of Naval Architecture and Mechanical Engineering • Taught undergraduate-level engineering courses. 	Jinhae, Korea

RESEARCH EXPERIENCE

Mar. 2015 – present	KAERI <ul style="list-style-type: none"> • SPACE Challenge: MARS rover and fixed-wing drone <ul style="list-style-type: none"> - Role: Project leader and team member - Technical contribution as a team member: Vision-based drone detection and tracking • LiDAR-only semantic SLAM for nuclear application <ul style="list-style-type: none"> - Role: Project leader and team member - Technical contribution as a team member: LiDAR only SLAM, object classification & pose estimation (planned) • Object classification & pose estimation using scan data <ul style="list-style-type: none"> - Role: Project leader and team member - Technical contribution as a team member: Defined & formulated deep learning problems for object classification, segmentation and pose estimation using partial view scan data. Developed the scanner simulator for synthetic laser scan data generation. Developed the adaptive ICP-based matching algorithm for object pose fine-tuning. • Robotic cutting system for nuclear decommissioning <ul style="list-style-type: none"> - Role: Project team member - Technical contribution as a team member: Developed the deep-learning-based object classification and segmentation system using underwater scan data. Developed the deep-learning-based underwater scan data distortion correction system. Developed the deep-learning-based kinematic calibration system for hydraulic multi-joint serial link robot. • Robotic system for nuclear emergency response <ul style="list-style-type: none"> - Role: Project team member - Technical contribution as a team member: Developed the stairway detection and parameter estimation algorithm, using point cloud. • Small reactor for marine applications <ul style="list-style-type: none"> - Role: Project team member - Technical contribution as a team member: Developed simulators for testing advanced reactor power control logics. Performed controller parameter tuning. • Jordan Research Reactor(JRR), Kijang Research Reactor(KJRR) <ul style="list-style-type: none"> - Role: Project team member - Technical contribution as a team member: Wrote design specifications and documents for JRR/KJRR nuclear measurement systems. Performed factory acceptance tests for JRR nuclear measurement systems. Performed nuclear power calibration tests for JRR. 	<p>Jun. 2023 - Present</p> <p>Apr. 2022 - Present</p> <p>Apr. 2019 - Mar.2022</p> <p>Mar. 2017 - Present</p> <p>Mar. 2017 - Present</p> <p>Apr. 2017 - Dec. 2023</p> <p>Mar. 2017 - Dec. 2021</p>
Jan. 2013 – Feb. 2015	Humanoid Robotics Laboratory, GIT <ul style="list-style-type: none"> • Object-level communication for robot motion generation <ul style="list-style-type: none"> - Role: Project team member 	Oct. 2013 - Feb. 2015

- Technical contribution as a team member: Designed the combinatory categorial grammar and corpus for human-robot interaction in object manipulation scenarios.
- Contribution as a project facilitator: Helped PI to achieve interim milestones and deliver deliverables on time and to proper specification. Participated progress review meetings on behalf of PI.

- DARPA Robotics Challenge Jan. 2013 - Dec. 2013
 - Role: Project team member and project facilitator
 - Technical contribution as a team member: Designed and tested impedance controllers for object manipulation
 - Contribution as a project facilitator: Helped the GIT team working on DRC project to achieve interim milestones and deliver deliverables on time and to proper specification, handling logistics and staffing issues.

- Jul. 2009 - Jan. 2013 Center for Mechatronics, SHI
- Distributed embedded robot controller Dec. 2011 - Oct. 2012
 - Role: Project leader team member
 - Technical contribution as a team member: Designed the combinatory categorial grammar and corpus for human-robot interaction in object manipulation scenarios.

- Sep. 2003 – Jun. 2009 Aerospace Robotics Laboratory, Stanford University
- Research topic: Stochastic nonlinear optimal control approach to navigation and mapping for unmanned vehicles with vision aided inertial navigation system.
 - Contribution: Nonlinear stochastic optimal control, Simultaneous localization and Mapping with on-line filtering approaches.
 - Acquired experience in building unmanned aerial vehicles and rovers.

- Jun. 2007 – Sep. 2007 Carnegie Mellon Innovations Laboratory, CMU@SV
- Research topic: Autonomous landing using vision-aided inertial navigation system.
 - Contribution: Sensor fusion algorithm using extended Kalman Filtering, vision system for object detection using optical flow.
 - Acquired experience in inertial navigation system, GPS, and vision system.

- Aug. 2001 - May 2003 Vehicle Dynamics Laboratory, University of California, Berkeley
- Research topic: Coordination layer design and implementation for automatic highway system.
 - Contribution: Optimal truck merging algorithm using mathematical programming.

- Jan. 2000 - Dec. 2000 Naval Institute for Ocean Research Korea Naval Academy
- Research topic: Motion characteristic analysis and maximum hitting probability of underwater guidance weapons.
 - Contribution: Analysis on equations of motion of underwater guidance weapons.

- Mar. 1996 - Feb. 1998 Ocean Engineering Lab Seoul National University
- Research topic: Dynamic positioning system of floating offshore vessels.
 - Contribution: Design linear optimal controllers for dynamic positioning systems.

PROFESSIONAL ACTIVITIES/SERVICES

Sep. 2022 – Present NVIDIA DLI, Jetson AI Ambassador

2021 - Present Member of Korea Robotics Society

Jul. 2021 - Present	Executive Committee, Robotics and Remote Systems Division, ANS
2017 - Present	Member of American Nuclear Society (ANS)
2017 - Present	Member of Korean Radioactive Waste Society
2015 - Present	Member of Korean Nuclear Society
2015	Workshop co-organizer, International Conference on Robotics and Automation (ICRA) Workshop title: Using the Hubo Platform to Advance Humanoids Research *Main organizer: Dr. Youngmoo Kim, Dr. Dennis Hong, Dr. Stephan Schaal, Dr. Paul Oh
2013 - 2014	Program Committee/Associate Editor, IEEE/RAS Humanoids 2014 Conference
2009 - Present	Member of Institute of Control, Robotics and Systems
2002 - Present	Member of Institute of Electrical and Electronics Engineers (IEEE)