# Daeun Song

**Computer Science and Engineering · Robotics**

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## Research Interests

Robot Path and Motion Planning, Computational Geometry

## Education

### Ewha Womans University, Seoul, Korea

*2017 - Current*

**M.S. and Ph.D combined in Computer Science and Engineering**

- Advisor : Professor Young J. Kim
- Graduate student representative of CSE department in 2020

### Ewha Womans University, Seoul, Korea

*2013 - 2017*

**B.S. in Computer Science and Engineering**

## Experience

### LAAS-CNRS, Toulouse, France

*JUN 2019 - SEP 2019*

**Gepetto Team, Summer Internship [C03]**

- Worked on multi-contact planner for legged robots on uneven terrain, SL1M.
- Implemented a module that generates a set of possible contact surfaces using a guide-path result from hpp-rbprm in Python.

### Ewha Womans University, Seoul, Korea

*JAN 2021 - Current*

**"Large-scale Robotic Drawing System", ITRC [D03], [H11]**

- Developing a large-scale robotic drawing system that draws a pen drawing on a large surface.
- Implementing under ROS using KUKA LBR IIWA 7 R800 as a manipulator and Clearpath Robotics Ridgeback as a mobile platform.
- Leading the team composed of two undergraduate students and myself.

*JAN 2016 - FEB 2017*

**Computer Graphics Lab, Undergraduate Research [J01]**

- Worked on rendering an astronaut model with the physics-based character animation under reduced gravity.
- Developed under Motion Builder and 3dsMax with V-ray.

*MAR 2016 - DEC 2016*

**"SSK, the drawing robot", Graduation Project [W01], [P01], [H04, H05, H06]**

- Developed a robotic application to reproduce the user's input drawing from a tablet PC on an arbitrary surface. Worked on the robot part.
- Implemented under Sunrise Workbench in Java, using KUKA LBR IIWA 7 R800, manipulator.
- Lead the team composed of three undergraduate students.

# Publications

## International Journals

[J02] **Daeun Song**, Pierre Fernbach, Thomas Flayols, Andrea Del Prete, Nicolas Mansard, Steve Tonneau, Young J. Kim, **"Solving Footstep Planning as a Feasibility Problem using L1-norm Minimization"**, IEEE Robotics and Automation Letters (RA-L)*, 6(3), July 2021.

[J01] Yun-Hyeong Kim, Taesoo Kwon, **Daeun Song**, Young J. Kim, **"Full-body Animation of Human Locomotion in Reduced Gravity using Physics-based Control"**, IEEE Computer Graphics and Applications (CG&A)*, (Special issue on Physically Based Animation), 37(6), Nov/Dec 2017.

## International Conference Papers

[C04] Jason Chemin, Pierre Fernbach, **Daeun Song**, Nicolas Mansard, Steve Tonneau, **"Learning to steer a locomotion contact planner"**, IEEE International Conference on Robotics and Automation (ICRA), May 2021.

[C03] Steve Tonneau, **Daeun Song**, Pierre Fernbach, Nicolas Mansard, Michel Taix, Andrea Del Prete, **"SL1M: Sparse L1-norm Minimization for contact planning on uneventerrain"**, IEEE International Conference on Robotics and Automation (ICRA), May 2020.

[C02] **Daeun Song**, Young J. Kim, **"Distortion-free Robotic Surface-drawing using Conformal Mapping"**, IEEE International Conference on Robotics and Automation (ICRA), May 2019. **[H09]**

[C01] **Daeun Song**, Taekhee Lee, Young J. Kim, **"Artistic Pen Drawing on an Arbitrary Surface using an Impedance-controlled Robot"**, IEEE International Conference on Robotics and Automation (ICRA), May 2018. **[H08]**

## Domestic Conference Papers

[D03] Eunjung Lim, Jiyoon Kim, **Daeun Song**, Young J. Kim, "TSP Pen Art using a Mobile Collaborative Robot (extended abstract)", Korea Computer Graphics Society Annual Conference (KCGS), Jul 2021. **[H11]**

[D02] **Daeun Song**, Young J. Kim, "Distortion-free Robotic Surface-drawing using Conformal Mapping (extended abstract of [C02])", Korea Robotics Society Annual Conference (KRoC), Aug 2020.

[D01] **Daeun Song**, Taekhee Lee, Young J. Kim, "Artistic Pen Drawing on an Arbitrary Surface using an Impedance-controlled Robot (extended abstract of [C01])", Korea Robotics Society Annual Conference (KRoC), Jan 2018. **[H07]**

## Workshops and Forum

[W02] **Daeun Song**, Young J. Kim, "Hi-fidelity Robotic Pen Drawing on a Bumpy Surface", IEEE International Conference on Robotics and Automation (ICRA) Robots and Art Forum, May 2018.

[W01] **Daeun Song**, Taekhee Lee, Jungmin Kim, Sungmin Sohn, Young J. Kim, "Artistic Pen Drawing on an Arbitrary Surface using an Impedance-controlled Robot", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Workshop on Artistically Skilled Robots, Oct 2016.

* : SCI (Science Citation Index)-listed journals

# Patents

[P01] Young J. Kim, **Daeun Song**, Jungmin Kim, "Robotic apparatus and method for artistic pen drawing on an arbitrary surface," Korean intellectual Property Office, 1019356400000

## Technical Skills

**Programming Languages**: C/C++, Python, Java, Matlab
**Robotic Programming**: ROS, Sunrise Workbench for KUKA
**Robotic Planner and Simulator**: OMPL, HPP, MoveIt!, Gazebo, CoppeliaSim
**Robotic Hardware**: KUKA iiwa 7 R800, Ridgeback mobile platform, Fetch mobile manipulator, Turtlebot
**Others**: Experienced with OpenGL, OpenCV Gurobi, PCL

## Honors & Awards

[H10] **Best Undergrad Paper Award** | Korea Computer Graphics Society Annual Conference (KCGS 2021)
[H09] **Solvay Korea Scholarship Award** | Outstanding Academic Performance (2019 - 2020)
[H08] **RAS Travel Award** | International Conference on Robotics and Automation (ICRA 2019)
[H07] **RAS Travel Award** | International Conference on Robotics and Automation (ICRA 2018)
[H06] **Best Paper Award** | The 13th Korea Robotics Society Annual Conference (KRoC 2018)
[H05] **Participation Award** | Hanium Expo Contest 2016
[H04] **Special Award** | Capston Awards (Engineering Education Festa 2016)
[H03] **1st Place** | Ewha Engineering Capstone Design Contest 2016
[H02] **1st Place** | Ewha Engineering Student Portfolio Contest 2016
[H01] **2nd Place** | Ewha Power ProgrammER(E-PPER) Contest 2016

## Activities

### Academic

- **Summer School** | Participate, AI & Robotics Summer School 2020 *AUG 2020*
- **Tutorial** | Participate, Reinforcement Learning Tutorial *JAN 2017*
- **Tutorial** | Participate, Arduino & IoT Sensing and Wireless Communication Control Tutorial *JAN 2016*
- **Teaching Assistant** | Computer Programming Class *Spring 2016*
- **Summer School** | Participate, EWHA-EPITA Sumer School, Paris, France *JUL 2015*

### Talks & Demos

- **TALK** | The 5th NZ/KOREA Workshop on HDI4D *NOV 2017*
- **DEMO** | Drawing robot demo, Engineering Education Festa 2016 *NOV 2016*
- **DEMO** | Drawing robot demo, Hanium Expo 2016 *NOV 2016*