Jisung (Ji) Jeong

M.Sc. Mobile Robotics · University of Bonn
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Education

MSc, Mobile Robotics October 2025 – Present
The University of Bonn (Rheinische Friedrich-Wilhelms-Universität Bonn) Bonn, Germany

BASc, Mechatronic Systems Engineering (Honours) September 2020 – August 2025
Simon Fraser University (SFU) Vancouver, Canada

- Designation: Honours Degree with Distinction (GPA: 3.68/4.33)
- Thesis: Photorealistic Multi-Robot Simulation and GPS-Based UGV Localization using Synthetic Aerial Imagery (Supervisor: Dr. Simon Monckton)

Research Experience

Studentische Hilfskraft (Part-time Student Assistantship) December 2025 – Present
Fraunhofer FKIE Wachtberg, Germany (Hybrid)

- Simulating multi-robot systems and developing vision-based algorithms.

Robotics Research Co-op September 2024 – April 2025
Defence Research and Development Canada (DRDC) Suffield, Canada

- Generated over 10,000 synthetic aerial images of a moving pickup truck in NVIDIA Isaac Sim using domain randomization and ROS2 topic control
- Mapped 3D bounding boxes to oriented bounding boxes (OBBs) and trained custom YOLOv11n-OBB models, improving generalization and reducing training time with limited real-world data.
- Processed drone-captured photogrammetry data in Blender and exported it to Isaac Sim as a terrain mesh for synthetic data generation.
- Created a SITL test framework combining ROS2 and PX4 for UAV-UGV teleoperation and wrote a pyMAVLink script to replay flight telemetry with visualization in QGroundControl and RViz2.

Research Assistant Co-op May – December 2022
SFU Fuel Cell Research Lab (FCReL) Vancouver, Canada

- Prepared catalyst layer samples on PTFE membranes and transferred them via decal; supported ink formulation and lab-scale direct film coating.
- Conducted accelerated stress tests (temperature, humidity, cross-pressure) to analyze mechanical durability of fuel cell membranes.
- Observed performance trends in a commercial hydrocarbon-based membrane under varying test conditions.

Publications

Published or Appeared
Mirfarsi SH., Kumar A., **Jeong J.**, Brown E., Adamski M., Jones S., McDermid S., Britton B., and Kjeang E. Mechanical durability of reinforced sulfo-phenylated polyphenylene-based proton exchange membranes: Impacts of ion exchange capacity and reinforcement thickness." Journal of Power Sources, 630, 236137, 2025.

Stoll J., **Jeong J.**, Huynh P., and Kjeang E. Impacts of Catalyst Ink Composition and Wet Film Thickness on Fuel Cell Catalyst Layers Fabricated by Direct Film Coating Method. Journal of The Electrochemical Society, 171(5), 054520, 2024.

Mirfarsi, SH., Kumar, A., **Jeong, J.**, Adamski, M., McDermid, S., Britton, B., and Kjeang, E. High-Temperature Stability of Hydrocarbon-Based Pemion® Proton Exchange Membranes: A Thermo-Mechanical Stability Study. International Journal of Hydrogen Energy, 50, 1507-1522, 2024.

Mirfarsi, SH., Kumar, A., **Jeong, J.**, Adamski, M., McDermid, S., Britton, B., and Kjeang, E. Thermo-Mechanical Stability of Hydrocarbon-Based Pemion® Proton Exchange Membranes. Electrochemical Society Meeting Abstracts 244, 39, 1903-1903, 2023.

Mirfarsi, SH., Kumar, A., **Jeong, J.**, Adamski, M., McDermid, S., Britton, B., and Kjeang, E. High Durability of Pemion® Proton Exchange Membranes in Cross-Pressure Accelerated Mechanical Stress Tests. Electrochemical Society Meeting Abstracts 244, 39, 1920-1920, 2023.

In preparation
Jeong J., Monckton S., Simulated GPS Localization of UGV using Synthetic Aerial Imagery: Technical Manual for Synthetic Data Generation & Rigid-Body Simulation in NVIDIA Isaac Sim. Draft for DRDC Suffield Defense Research Reports

Projects/Competitions

Vision-guided Aerial Manipulation for Pick-and-Place (VAM-P^2) | Top 10 / 120 Teams Worldwide September 2025
REVEL x LycheeAI x NVIDIA Isaac Sim Hackathon Remote

- Developed a ROS2-based suction gripper control algorithm enabling joystick teleoperation.
- Generated ~2,500 synthetic aerial images using scalable Python scripts for indoor and outdoor environments.
- Achieved live teleoperated pick-and-place of a DHL box using YOLOv11n-OBB for detection and ≤ 1 m localization error in a containerized Isaac Sim setup.

ROS 2 Kilted Tutorial Party May 2025
Open Robotics Remote

- Tested core features (rviz, rqt, demo_nodes_py, topic monitor) on Windows for the upcoming "Kilted" release.
- Provided detailed logs and screen-capture videos that helped Open Robotics resolve four issues before the feature-freeze.

ML-Based Prediction of Hydraulic Conductivity March – April 2024
MSE 413: Machine Learning in Mechatronics Surrey, Canada

- Developed supervised machine learning models to predict hydraulic conductivity in BC soil using government soil data.
- Implemented regression algorithms and feature engineering techniques to optimize model performance.
- Employed 10-fold cross-validation and hyperparameter tuning to optimize model performance and ensure robustness.

Automated Live Braille (Winner) February –March 2024
SFU Faculty of Applied Science Speak Out Competition 2024 Vancouver, Canada

- Advocated for accessibility by addressing physical barriers for blind and visually impaired students.
- Prototyped real-time processing software utilizing OpenCV and Machine Learning to convert annotated lecture content into digital Braille.
- Developed a Python program for real-time transmission of predicted characters to Arduino, generating corresponding Braille character outputs instantly.

Robotic Arm for Engine Block Assembly March – April 2024
MSE 429: Advanced Kinematics for Robotic System Vancouver, Canada

- Designed a three-degree-of-freedom robotic arm in SolidWorks and simulated assembly in MATLAB.
- Developed algorithms for robot arm kinematics, dynamics, trajectory and motion planning, and force and torque analysis for valve cap installation.

Design Teams

Power Systems Lead January 2022 – August 2023
Team Phantom – SFU Formula SAE Vancouver, Canada

- Led electrical sub-system integration for a Formula SAE team, coordinating across disciplines to ensure hardware reliability and system safety.
- Designed PCBs in Altium for safety indicators and mentored junior members in circuit design, soldering, and embedded systems fundamentals.

Controls Engineer October 2022 – September 2023
SFU Rocketry Vancouver, Canada

- Configured SPI communication in Embedded C between Arduino DAQ and Raspberry Pi control module to monitor real-time engine pressure.

Extracurricular Activities

Home for Interactive Virtual Environment (HIVE) August – November 2021
Welcome Leader
SFU - Student Engagement and Retention Vancouver, Canada

- Facilitated the integration of new students into the SFU community by fostering connections and promoting a culture of inclusion.

- Led HIVE groups in an online course, creating a supportive and accessible space for students to cultivate friendships.

First Year Representative (Elected) September 2020 – September 2021
Mechatronic Systems Engineering Student Society (MSESS) Vancouver, Canada

- Collaborated with instructors and students to address and resolve academic challenges in first-year mechatronics courses.
- Represented the first-year student body to enhance the overall campus experience by organizing recreational events that addressed student needs and concerns.

Honours & Awards

Triple A Award in Mechatronics | SFU October 2023

- Recognized for good academic standing and leadership skills.

Natural Sciences and Engineering Research Council of Canada March 2022
Undergraduate Student Research Award (USRA) | SFU

- Associated with SFU Fuel Cell Research Lab.
- Awarded for high academic aptitude and research potential.

Dean's Honour Roll | SFU

- Spring 2021; Fall 2021, 2023; Summer 2021, 2023

Certifications

Drone Pilot Certificate - Basic Operations September 2024

- Allows legal and safe operations of drones within Canada.

Certificate of Training: Automation and Digital Technology for Agriculture and Food Processing April 2024

- Covered core mechatronics systems with application to agricultural automation (PLCs, sensors, pneumatics, and system integration).

Siemens Certified Mechatronic Systems Assistant May 2023

- Completed foundational industrial mechatronics certification (mechanical, electrical, PLC, and diagnostic systems).

Certified SOLIDWORKS Associate in Simulation February 2022

- Demonstrates a foundational understanding of engineering simulations and skills in analyzing and simulating mechanical designs.

Certified SOLIDWORKS Associate in Mechanical Design September 2021

- Indicates a foundation in and apprentice knowledge of 3D CAD design and engineering practices and principles.

Skills

Robotics: Isaac Sim, ROS 2 (Humble), MAVLink, PX4-Autopilot, QGroundControl
Programming: Python, MATLAB, C/C++
Software Tools & DevOps: Blender, Linux, Docker, Git/GitHub/GitLab, LaTeX
Languages: Fluent English, Fluent Japanese, Native Korean, German (A1)