

JEONGHWAN ‘JAY’ LEE

+1 (512) 771-4956 | Austin, TX

jeonghwan.lee85@gmail.com | www.linkedin.com/in/jlee52 | <https://jlee52.github.io/>

SUMMARY

Ph.D. in Mechanical Engineering from the University of Texas at Austin, a top-tier U.S. engineering program, with expertise in **human movement biomechanics** and **wearable robotics**. Over 2 years in **robot perception software** development, focusing on computer vision and machine learning processes. Skilled in statistical analysis, human subject research, multi-modal sensor data analysis (IMU, EMG, vision), motion analysis (kinematics and kinetics), and optimization. Proven ability to deliver innovative solutions in dynamic start-up and scale-up environments.

SKILLS

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|----------------------------------|---|
| Programming: | Python, C/C++, C#, MATLAB, Bash/Shell |
| Statistics / ML Platform: | SciPy, R, PyTorch, TensorFlow |
| DevOps / SysAdmin: | Docker, Git, Linux/Unix |
| Robotics Middleware: | Robot Operation System (ROS / ROS2) |
| Simulation Tools: | Simulink, Simscape, OpenSim (Musculoskeletal Simulation), MuJoCo Gazebo |
| Design Tools: | SolidWorks, Eagle |

WORK EXPERIENCE

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| Contoro Robotics | Austin, TX |
| Senior Robotics Engineer – Perception | Sept 2022 – Present |
| <ul style="list-style-type: none">• Led the development of a ROS-integrated, multi-functional robot perception pipeline with object detection, segmentation, 6D pose estimation, optical character recognition, and teleoperation feedback, enhancing reliability and flexibility in real-world use.• Designed and implemented a multi-step hand-eye calibration methodology for a multi-camera setup (eye-in-hand, eye-to-hand, and stereo), achieving localization accuracy within 0.5% of working distance.• Developed a human-in-the-loop segmentation workflow with instance and zero-shot segmentation, achieving 0% operational failures and enhancing model robustness through continuous data annotation.• Established a decentralized machine learning pipeline for customer-specific training, collaboratively enhancing a global model by 10% in performance and scalability.• Led impactful technical demonstrations that played a pivotal role in securing \$4.7 million in Seed funding. | |
| Harmonic Bionics, Inc. | Austin, TX |
| System Validation Engineer Intern | May 2019 – Aug 2019 |
| <ul style="list-style-type: none">• Developed C/C++ EtherCAT library for motion controllers and sensor interfaces.• Built dual-motor haptic demo kits for exhibitions, demonstrating advanced motion control capabilities. | |

RESEARCH EXPERIENCE

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|---|---------------------|
| University of Texas at Austin | Austin, TX |
| Graduate Research Assistant | Aug 2017 – Aug 2022 |
| <ul style="list-style-type: none">• Led three data-driven research initiatives in human movement biomechanics to advance wearable robotics for post-stroke gait rehabilitation, culminating in four first-authored publications.• Supervised two master’s students in research on gait biomechanics related to cognitive decline and exoskeleton design, resulting in two co-authored publications.• Managed the end-to-end research process: study conceptualization, securing funding, data collection/analysis (kinematics, kinetics, and EMG), interpretation, visualization, publication authorship, and presentation.• Collaborated with a multidisciplinary team of neuroscientists, clinicians, and engineers to drive innovative solutions. | |

Korea Institute of Science and Technology (KIST)

Seoul, South Korea

Research Assistant

Mar 2017 – July 2017

- **Devised a non-invasive, patient-specific surgical tool navigation method** for orbital reconstructive surgery, achieving up to 50% improvement in registration and tool tracking accuracy using a 3D-printed phantom model.

Seoul National University

Seoul, South Korea

Graduate Research Assistant

Mar 2016 – Feb 2017

- **Developed a needle steering scheme** using pivoted super-elastic Nitinol for an MR-guided breast needle intervention robot, enhancing insertion angle control with a targeting error of less than 5mm.
- **Designed a vehicle door and driver's seat mockup** with ten adjustable parameters, enabling controlled ingress/egress experiments.

The University of Texas Health Science Center (UTHealth)

Houston, TX

Research Assistant

Sept 2014 – Feb 2016

- **Prototyped and tested hysteresis** of a 7-DOF dual-segmented cable-driven continuum robotic manipulator for single-port surgery using a motorized testbed.
- **Contributed to transitioning a lab innovation into a commercial venture**, supporting initial product development and establishing scalable engineering processes (now Endoquest Robotics).

EDUCATION

Ph.D. in Mechanical Engineering, University of Texas at Austin, TX 2022

M.S. in Mechanical Engineering, Seoul National University, Seoul, South Korea 2017

B.S. in Mechanical Engineering, Hanyang University, Seoul, South Korea 2013

CERTIFICATES

Data Science and Applied Machine Learning May 2021

The University of Texas at Austin, Department of Statistics and Data Sciences

Scalable Machine Learning: Methods and Tools May 2021

The University of Texas at Austin, Department of Statistics and Data Sciences

SELECTED PEER REVIEWED ARTICLES (3 OUT OF 12) – [GOOGLE SCHOLAR](#)

*Selected works center on data-driven human movement biomechanics, gait rehabilitation, and wearable exoskeleton design, which are integral to developing personalized, effective solutions for post-stroke rehabilitation and assistive robotics.

1. **Lee, J.**, Seamon, A. Bryant., Lee, K. Robert., Kautz, A. Steven., Neptune, R. Richard., & Sulzer, J. (2024), Post-Stroke Stiff-Knee Gait: Are there different types or different severity levels?, Journal of NeuroEngineering and Rehabilitation (in review).
2. **Lee, J.**, Akbas, T., & Sulzer, J. (2023). Hip and knee joint kinematics predict quadriceps hyperreflexia in people with post-stroke Stiff-Knee gait. Annals of Biomedical Engineering, 51(9), 1965-1974.
3. **Lee, J.**, Li, L., Shin, S. Y., Deshpande, A. D., & Sulzer, J. (2021). Kinematic comparison of single degree-of-freedom robotic gait trainers. Mechanism and Machine Theory, 159, 104258.

PATENTS

1. Kim, Y., **Lee, J.**, Park, S., Park, S.M., Cho, H., Kim, L., Noh, G., Lee, J.W., Lee, B.H., (2020). Automatic bending apparatus of plate for surgery, Republic of Korea (KR) Patent, No. 1021566940000.