

Jung Hyun Bae

Institute for Robotics and Intelligent Machines
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EDUCATION

- Aug. 2024 – **Georgia Institute of Technology, Atlanta, Georgia**
Doctor of Philosophy in Robotics
- Aug. 2022 – Aug. 2024 **University of Texas at Austin, Austin, Texas**
Master of Science in Mechanical Engineering (Dynamic Systems and Controls Track)
- Mar. 2015 – Feb. 2022 **Chung-Ang University, Seoul, South Korea**
Two years of military service
Bachelor of Science in Mechanical Engineering

RESEARCH EXPERIENCE

- Aug. 2023 – Dec. 2023 Rehabilitation and Neuromuscular Robotics Lab, University of Texas at Austin
- **Research Project: ACT-Hand Design and Optimization of Nonlinear Control Algorithm**
 - Designing Anatomically Correct Testbed (ACT) simulating the musculoskeletal structure of the fingers of the human hand
 - Developing sensor system and control algorithm for nonlinear control
- Sep. 2022 – Present Human Centered Robotics Lab, University of Texas at Austin
- **Research Project: PLATO; Robot hand manipulation and teleoperation**
[Research Support: Sony Corporation]
 - Planning and simulating motion tasks using MoveIt and the Gazebo environment for the robot hand manipulation.
- Sep. 2022 – Apr. 2023
- **Research Project: Design, Fabrication and Modelling of Two Bio-inspired Rigid-soft Coupling Wearable Pneumatic Robots**
 - Designed and fabricated a two-degree-of-freedom soft robot system, including a silicone pneumatic actuator
- Jan. 2023 – Jul. 2023 Precision Mechatronics and Control Lab, University of Texas at Austin
- **Research Project: “A Novel Soft Electromagnetic Actuator with Lorentz-type Design and Ferrofluidic Bearings for High Strength, Efficiency, and Transparency”**
[Research Support: Meta Platforms, Inc.]
 - Developed a novel soft electromagnetic actuator for wearable haptic devices, tailored to maximize ferrofluid functionality, thereby improving performance.
- Sep. 2020 – Jun. 2021 Assistive and Rehabilitation Robotics Lab, Chung-Ang University, Seoul, Korea
- **Research Project: “FLEX: Development of Smart Wearable Suit Combined with Deep Learning for Muscle Power Assistance, Injury Prevention, and Work Efficiency Enhancement for Forest Workers”**
[Research Support: Korea Forest Service]
 - *Research Assistant, Mechanical Design team (Actuator Structure Design)*
 - Designed an actuator used on soft exosuit for reducing the metabolic cost
 - Enhanced the performance of the actuator by introducing a two-way operable dual pulley mechanism using the moving gear capable of automatic dislocation
 - Optimized the heat treatment of related parts including torsional spring based on quenching-tempering process
 - *Research Assistant, Electronics team (Motor Control)*
 - Designed electronic system mounted on the exosuit

RESEARCH SKILLS & CERTIFICATES

Design Software Solidworks, Autodesk Inventor
System Control Python, C++, MATLAB, LabVIEW
Analysis Software Ansys, Minitab, Abaqus
Simulation/Visualization Gazebo, Visual3D(Biomechanical Analysis of Visual 3D), Blender, Premiere Pro, Photoshop

Certificates MENSA Korea membership
 BAV(Biomechanical Analysis of Visual 3D) Level II
 Adult and Pediatric First Aid/CPR/AED, American Red Cross
 Fire Safety Management Level 2, Korea Fire Safety Institute

PUBLICATION

Haiyun Zhang, Gabrielle Naquila, Jung Hyun Bae, Zonghuan Wu, Ashwin Hingwe and, Ashish Deshpande. (2024). Novel bio-inspired soft actuators for upper-limb exoskeletons: design, fabrication and feasibility study. *Frontiers in Robotics and AI*.

Jung Hyun Bae. (2024). Development of the ACT Hand with a Broad and Precisely Adjustable Stiffness Spectrum via Series Elastic Actuators. Graduate Thesis Paper for M.S. degree, University of Texas at Austin(UTA).

Jung Hyun Bae. (2021). Designing Wire-driven Running Reinforcement Shoes. Graduate Thesis Paper for B.S. degree, Chung-Ang University (CAU).

Jung Hyun Bae, Myunghwan Song. (2021). Design of LED Rubber Cone for Triboelectrification-Based Power Generation. Graduate Thesis Paper for B.S. degree, Chung-Ang University (CAU).

WORK EXPERIENCE

- Aug. 2023 – Present **The University of Texas at Austin**
Teaching Assistant (Dynamic System & Controls Lab)
- Directed experiments on mechanical vibration systems using Arduino and Python, complementing theoretical instruction with data measurement and analysis
- Sep. 2017 – Aug. 2019 **VHS(Veterans Health Service) Medical Center, Seoul, Korea**
Facility Equipment Manager
- Repair and calibration of medical equipment, such as Non-Invasive Blood Pressure devices
- May. 2017 – Jun. 2017 **KWANGGEON T&C, Chungcheongbuk-do, Korea**
- Constructed and supplied materials for building interior of SK Hynix Semiconductor Industrial Complex

ACADEMIC EXPERIENCE

- Mar.2021 - Jun. 2021 Capston Design Project, Mechanical Engineering, Chung-Ang University
- **Project Title: Wire-driven Running Reinforcement Shoes**
 - Designed wearable running reinforcement device by using Solidworks, Ansys
 - Utilized planetary gear system and wire-driven mechanism to deliver the energy from running motion's arm movement to soles to strengthen the running propulsion
 - Worked on a graduation thesis (Completed advisor review)
- Jan. 2021 – Jan. 2021 **Certified BAV(Biomechanical Analyst of Visual 3D) Level II, Vector Biomechanics**
- Completed 18-hour course on biomechanics software Visual 3D
 - Utilized Visual 3D for advanced biomechanical analysis, including Full-Body Modeling and EMG Data Processing of walking motions
- Jul. 2020 – Aug. 2020 **Mechanical Engineering Short Term Research Program, Chung-Ang University**
- Introduced a belt mechanism on the high-power actuator for wearable robot to develop a power transmission system with lighter weight and smaller size

- Oct. 2018 – Oct. 2018 **“Samsung Medical Center” & “Digital Healthcare Partners(DHP)” & “Samsung Advanced Institute for Health Sciences & Technology (SAIHST)” & “Seoul Center for Creative Economy & Innovation”, Seoul, Korea**
- Used JavaScript to make “Healthcare Service Program” that uses AI voice recognition system to provide health information to patients at hospital

AWARDS, SCHOLARSHIPS AND HONORS

15. Oct. 2020 **2020 Summer Internship**(Mechanical Engineering Short Term Research Program; MESTER) Excellence Award, Mechanical Engineering Department, Chung-Ang University
- Fall Semester. 2019 **Scholarship** (Academic Excellence), Chung-Ang University, Seoul, South Korea
05. Dec. 2018 **Award for Excellent Volunteer Service**, (100 hour), Yangcheon-gu Volunteer Center
01. Sep. 2017 **Citation Award**, Veterans Health Service Medical Center
- Fall Semester. 2016 **Scholarship for Volunteer Work**, Mechanical Engineering Department, Chung-Ang University

VOLUNTARY/ EXTRACURRICULAR ACTIVITIES

- Aug. 2021 (24 Hours) **C-Design Thinking Academy, Central Library, Chung-Ang University, Seoul, South Korea**
- Worked on the design thinking process for finding and coming up with creative problem-solving methods in multidisciplinary aspects
- Feb. 2021 – Apr. 2021 **PTStar; Speech and Presentation Club, Seoul, South Korea**
- Training on presentation planning, team presentation, and one-minute speech
- Aug. 2020 – Nov. 2020 **Korea Student Alpine Federation, Seoul, South Korea**
- Feb. 2020 – May. 2020 (12 Hours) **‘SNS(Saturday & Sunday Neighborhood Service)’ Voluntary Club, Seoul, South Korea**
23. Mar. 2019 **“Mugunghwa Run: Like A Flower”**
Participated in the marathon held for 100th anniversary of May 1st Movement, finished marathon, and donated for victims of sexual slavery by Japanese Army
- Feb. 2019 – Apr. 2019 **DEMA Studio, Seoul, South Korea**
- Engaged in biweekly discussions on “Design Thinking” and activity applied the principles to address real-world challenges, fostering the development of creative and innovative thinking skills
- Mar. 2015 – Jan. 2019 (87 Hours) **Child Care and Education Volunteer Club, Chung-Ang University, Seoul, South Korea**
- Guidance and instruction in academic learning for foster children
- Mar. 2018 - Dec. 2018 (92 Hours) **KT&G Cooperative Volunteer Work Club of Yangcheon-gu Volunteer Center, Seoul, Korea**
Student President
- Jul. 2015 – Nov. 2017 **Cultural Exchange Club, Seoul & Gyeonggi-do & Incheon, South Korea**
20. Feb. 2017 (5 Hours) **Beautiful Store Dongsung-dong Bookstore, Jongno-gu Volunteer Center, Seoul, South Korea**