Jung Hyun Bae

Walker Department of Mechanical Engineering
The University of Texas at Austin, Cockrell School of Engineering, Austin, TX 78712-1591
Cell: +1 (737) 932 3527 | Email: jhbae131@utexas.edu | Website: junghyunbae.com

EDUCATION

Aug. 2022 – Aug. 2024 (Expected)	**University of Texas at Austin, Austin, Texas** Master of Science in Mechanical Engineering (Dynamic Systems and Controls Track)
Mar. 2015 – Feb. 2022 Two years of military service	**Chung-Ang University, Seoul, South Korea** Bachelor of Science in Mechanical Engineering (GPA: 3.85/4.5)

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
	Adult and Pediatric First Aid/CPR/AED, American Red Cross
	Fire Safety Management Level 2, Korea Fire Safety Institute
	Driver's License C Class, Texas

PUBLICATION

Haiyun Zhang, Gabrielle Naquila, Jung Hyun Bae, Zonghuan Wu, Ashwin Hingwe and, Ashish DeshpandeA 2-DOF Bio-inspired Pneumatic Driven Upper-limb Soft Exoskeleton for Rehabilitation Training: Design, Fabrication, Modeling and Control. IEEE Transactions on Medical Robotics and Bionics (In progress)

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 Libary, 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**