

Hochul Hwang

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[Google Scholar](#)

[hchlhwang.github.io](https://github.com/hchlhwang)

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EDUCATION

University of Massachusetts Amherst Sep.2021 - Present
M.S./Ph.D. in Computer Science (Advisor: Prof. Donghyun Kim)
Research area: Robotics, Human-Robot Interaction, Computer Vision

Hanyang University ERICA Mar.2013 - Jun.2019
B.S. in Robot Engineering, GPA: 3.91 / 4.5 (**Cum Laude**)

The University of Texas at Austin Aug.2017 - May.2018
Exchange Program, Electrical and Computer Engineering (Advisor: Prof. Luis Sentis)

PUBLICATIONS

[Is it safe to cross? Interpretable Risk Assessment with GPT-4V for Safety-Aware Street Crossing](#)
[H. Hwang](#), S. Kwon, Y. Kim, and D. Kim
International Conference on Ubiquitous Robots [Submitted]

[Towards Robotic Companions: Understanding Handler-Guide Dog Interactions for Informed Guide Dog Robot Design](#)
[H. Hwang](#), H. T. Jung, N. A. Giudice, J. Biswas, S. I. Lee*, and D. Kim*
ACM Conference on Human Factors in Computing Systems [**CHI'24**]

[System Configuration and Navigation of a Guide Dog Robot: Toward Animal Guide Dog-Level Guiding Work](#)
[H. Hwang](#)[†], T. Xia[†], I. Keita, K. Suzuki, J. Biswas, S. I. Lee*, and D. Kim*
IEEE International Conference on Robotics and Automation [**ICRA'23**]

[Dynamic Object Avoidance using Event-Data for a Quadruped Robot](#)
S. Zhu, N. Perera, S. Yu, [H. Hwang](#), and D. Kim
IEEE/RSJ International Conference on Intelligent Robots and Systems IPPC Workshop [**IROS Workshop'23**]

[Highly Sensitive Capacitive Pressure Sensors over a Wide Pressure Range Enabled by the Hybrid Responses of a Highly Porous Nanocomposite](#)
K. H. Ha, W. Zhang, H. Jang, S. Kang, L. Wang, P. Tan, [H. Hwang](#), and N. Lu
Advanced Materials'21

[ElderSim: A Synthetic Data Generation Platform for Human Action Recognition in Eldercare Applications](#)
[H. Hwang](#), C. Jang, G. Park, J. Cho, and I.J. Kim
IEEE Access'21

[Control Scheme and Uncertainty Considerations for Dynamic Balancing of Passive-Ankled Biped and Full Humanoids](#)
D. Kim, S. J. Jorgensen, [H. Hwang](#), and L. Sentis
IEEE-RAS International Conference on Humanoid Robots [**Humanoids'18**]

[Computationally-Robust and Efficient Prioritized Whole-Body Controller with Contact Constraints](#)
D. Kim, J. Lee, O. Campbell, [H. Hwang](#), and L. Sentis
IEEE/RSJ International Conference on Intelligent Robots and Systems [**IROS'18**]

PATENTS

[Human behavior recognition system and method using hierarchical class learning considering safety](#)
J. Cho, I. J. Kim, and [H. Hwang](#) U.S. Patent Application (17/565,453), 2022

RESEARCH EXPERIENCE

Intelligent perception and navigation based guide dog robot development for blind people ([video](#), [w/ audio](#), [news](#))

Graduate Research Assistant, Dynamic and Autonomous Robotic Systems Lab @ UMass Amherst May.2021 - Present

- Led **qualitative research** on interviewing 28 human subjects to inform guide robot design [CHI'24]
- Implemented **semantic-aware local path planning** in **legged system**, reflecting human-dog interaction [ICRA'23]
- Generated [synthetic data](#) (NVIDIA NDDS in Unreal Engine 4) and finetuned models for tactile paving detection
- Evaluated **object detection** and **segmentation** algorithms on **AGX Orin** for safe navigation in [sidewalk environment](#)
- Integrating **language and multimodal foundation models** (LLaMA, LLaVA, and CLIP) for safe decision making when crossing streets and implementing navigation algorithms utilizing foundation models (e.g., LM-Nav and ViNT)

Evaluation of human action recognition models and synthetic data for eldercare robot's perception [Access'21]

Research Intern, Center for AI @ Korea Institute of Science and Technology Sep.2019 - Dec.2020

- Finetuned RGB/skeleton-based human action recognition algorithms on **our synthetic data** and enhanced accuracy
- Developed a **real-time human action recognition system** with accuracy of 75% (90% in trimmed videos)

Testing and optimizing the 6 DOF passive-ankled biped robot, Mercury [IROS'18, Humanoids'18]

Undergraduate researcher, Human Centered Robotics Lab @ UT Austin Sep.2017 - Aug.2018

- Setup experiment protocol and supported dynamic **biped balancing** test
- Wrote python code for plotting **sensor** (joint encoder, IMU, motion capture, and contact) and **state estimation** data
- Designed mechanical components using CAD, 3D printing, and laser cutting

Evaluation of flexible resistive force sensors for lower-limb prosthetic stress distribution [Advanced Materials'21]

Undergraduate researcher, Lu Research Group @ UT Austin Apr.2018 - Jun.2018

- Manufactured and optimized resistive force sensor (Silhouette Studio) by analyzing resistance/stress using LabVIEW

HONORS AND AWARDS

CYBATHLON Challenges 2023 2nd place Mar.2023

University of Massachusetts Amherst CICS Jumpstart Fellowship Sep.2021 - May.2022

STEAM CUP Creative Technology and Excellence Award Jun.2017 - Aug.2017

{Hanyang University, Haksan Foundation} Academic Achievement Scholarship Fall 2016, Spring 2017

SKILLS

Programming & software: Python, C++, MATLAB;

Software: PyTorch, TensorFlow, CUDA, ROS, Unreal Engine, Unity, Docker, Git

Mechatronics: SOLIDWORKS (Certified SolidWorks Associate), CATIA, Onshape

TEACHING AND SERVICE

Teaching Assistant University of Massachusetts Amherst

- Robotics: [mobile robot platform test and setup](#) Spring 2023
- Introduction to Robotics - Mechanics, Dynamics, and Control: [interactive quiz website](#) Fall 2022

Student Mentor University of Massachusetts Amherst

- [Krisha Adhikari](#) (honors thesis: synthetic data), [Matthew Hersey](#) (honors thesis: deep learning), [Tim Xia](#) (research: path planning), [Ken Suzuki](#) (research: CAD), [Millan Taranto](#) (independent study: CAD)

UMass Korean Graduate Student Association (KGSA) President May.2022- Jun.2023

Reviewer: RA-L'24, CHI'24, IROS'23, ICRA'22