

HUBERT KIM

Robotics Engineer

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Home: Bay Area, CA
(willing to relocate)

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SKILLS

Rapid prototyping wearables

Sizing actuators

Real-time debugging

Digital signal processing

Graphical user interface

Human subject testing

Biopotential data processing

Psychophysics experiment

Feature extraction

EDUCATION

PhD,
Mechanical Engineering
Virginia Tech, Blacksburg, VA
Sept 2021

Dissertation: Joint Torque
Feedback for Motion Training
with an Elbow Exoskeleton

BS, cum laude,
Mechanical Engineering
NYU Tandon, Brooklyn, NY
May 2015

SUMMARY

A robotics engineer with specialties in signal processing and prototyping wearables. Seeks to join engineering team with project-driven environment to improve human and robot perception. Competent in:

- **Developing concepts into prototypes** with manufacturing and programming skills resulting in open-sourced publication
- **Solving problems in frequency-domain** with signal processing skill, contributing to one peer-reviewed journal and four coauthored papers
- **Designing and executing quantitative research** with statistical tools resulting in two journal articles

AREAS OF EXPERTISE

Mechatronic Product Development

Gained as a PhD Researcher | *Assistive Robotics Laboratory at Virginia Tech*

- Led Arm Haptic Feedback Team with rapid prototyping and embedded programming as evidenced by open-source paper, HardwareX
- Interviewed and cooperated with programming role MS student resulting in development of direct-drive wearable robot
- Collaborated with motor expert to solve Initial Pose Detection problem of Brushless DC motor as exhibited in HardwareX
- Mentored two MS students in mechatronics topics and advised two senior design teams, including team that participated in 2019 Cornell Cup Robotics

Modeling and Simulation of Physical Human—robot Interaction

Gained as PhD Researcher | *Assistive Robotics Laboratory at Virginia Tech*

- Operated project assessing physical Human—Robot Interaction through frequency-domain analysis ending with a poster presentation at 2016 IROS conference
- Carried out system identification of wearables as an impedance model as demonstrated in the poster

Human-centered Research

Gained as PhD Researcher | *Assistive Robotics Laboratory at Virginia Tech*

- Managed quantitative human subject studies to discover human perceptual threshold when wearing exoskeleton, as described in paper in *Scientific Reports*
- Oversaw design iterations of adaptive User Interface to measure kinesthetic perception resulting in 2020 ICRA conference presentation
- Collaborated with a statistical expert in analyzing user data through signal processing (i.e., PCA analysis), resulting in discovering active human joint stiffness, as evidenced by a journal paper in *IEEE Access*

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TECHNICAL SKILLS

Embedded Programming (C/C++ via CCStudio):

- UART/I2C/CAN
- Vector Control
- Oscilloscopes/logic analyzers

Data Acquisition and Simulation:

- MATLAB
- LabVIEW

3D CAD:

- NX/SolidWorks

Statistics:

- JMP
- SPSS

Data Processing with NN:

- Python
- Tensorflow (Jupyter)

Physiological Sensors:

- EMG/IMU

HONORS

Doctoral Scholarship

ICTAS, Virginia Tech

March 2016–July 2020

Best Mechanical Engineering Experience Award for Undergraduate

NYU Tandon

May 2015

OTHER ACTIVITIES

- Basketball
- Weightlifting
- Reading Science Fiction
- NCEES: FE, NY, 2015

AREAS OF EXPERTISE *continued*

Signal Processing and Analysis

Gained as Undergraduate Researcher | *Dynamic System Laboratory at NYU*

- Conducted transfer function identification of smart material that led to validating physics-based model in energy harvesting field
- Performed impedance analysis on the smart materials to characterize the material's electro/mechanical properties using potentiostat ending with a journal from J. of Intell Mater Syst Struct
- Configured custom and off-shelf data acquisition systems leading to several journal publications (one first author, four authorships) and resulting in ICTAS funding (four-plus-year scholarship) for doctoral study

SELECTED PUBLICATIONS

The Effects of Torque Magnitude and Stiffness in Arm Guidance through Joint Torque Feedback

Kim, H., Asbeck, A. [In press]

- 2022
- [IEEE Access](#)

Just Noticeable Differences for Elbow Joint Torque Feedback

Kim, H., Asbeck, A.

- 2021
- [Scientific Report](#)

An Elbow Exoskeleton for Haptic Feedback Made with a Direct Drive Hobby Motor

Kim, H., Asbeck, A.

- 2020
- [HardwareX](#)

Just Noticeable Differences for Joint Torque Feedback During Static Poses

Kim, H., Guo, H., Asbeck, A.

- 2020
- [ICRA](#)

Voltage Attenuation along the Electrodes of Ionic Polymer Metal Composites

Kim, H., Cha, Y., Porfiri, M.

- 2016
- [Journal of Intell Mater Syst Struct](#)

SCHOLARLY REVIEWS

Machine Learning Model Comparisons of User Independent & Dependent Intent Recognition Systems for Powered Prostheses

- 2020
- [IEEE Robotics and Automation](#)

Probabilistic Model-based Learning Control for Task-oriented Intention-driven Training with Soft Rehabilitation Robots

- 2020
- [Transactions on Mechatronics](#)