

HUBERT KIM

Robotics Engineer

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Home: Bay Area, CA
(willing to relocate)

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SKILLS

Firmware Developing

Digital Signal Processing

User Interface Design

Human Subject Testing

Adaptive Control and Machine Learning

Numerical Simulation and Path Planning

EDUCATION

Ph.D.,
In Mechanical Engineering
Virginia Tech, Blacksburg, VA
Sept 2021

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

B.S., cum laude,
In Mechanical Engineering
NYU Tandon, Brooklyn, NY
May 2015

SUMMARY

A robotics engineer with specialties in low-level programming and control theory. Seeks to join an engineering team with a project-driven environment to improve human and robot perception. Competent in:

- **Developing concepts into prototypes** with manufacturing and programming skills resulting in an open-sourced publication.
- **Solving problems in frequency-domain** with modeling and simulation skills contributing 1 peer-reviewed journal and 4 co-authored papers.
- **Designing and executing quantitative research** with analytical tools resulting in 2 journal articles.

AREAS OF EXPERTISE

Mechatronic Product Development

Gained as a Ph.D. Researcher | *Assistive Robotics Laboratory at Virginia Tech*

- Led Arm Haptic Feedback Team with rapid prototyping and embedded programming as evidenced by an open-source paper, HardwareX.
- Interviewed and cooperated with a programming role M.S. student ended up developing a direct-drive, light-weight wearable robot.
- Collaborated with a Motor Expert to solve the Initial Pose Detection problem of a Brushless DC motor as exhibited in the HardwareX.
- Mentored two professionals in mechatronics topics and advised 2 Senior Design teams, including a team that participated in the 2019 Cornell Cup Robotics.

Modeling and Simulation of Physical Human-robot Interaction

Gained as a Ph.D. Researcher | *Assistive Robotics Laboratory at Virginia Tech*

- Operated a project of assessing physical Human-Robot Interaction via control design technique ending up poster presentation at 2016 IROS conference.
- Carried out system identification of wearables as demonstrated by the development of the impedance controller in the poster.

Human-centered Research

Gained as a Ph.D. Researcher | *Assistive Robotics Laboratory at Virginia Tech*

- Managed quantitative human subject studies leading to discover human perceptual threshold when wearing an exoskeleton.
- Oversaw design iterations of the adaptive User Interface to measure kinesthetic perception resulting in the 2020 ICRA conference presentation.
- Collaborated with a statistical expert to deal with statistical model selection, outlier handlings resulting in two journal papers, including a paper in Scientific Reports.
- Analyzed the user data resulting in the discovery of active human joint stiffness in the haptic field.

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TECHNICAL SKILLS

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

- UART/ I2C/ CAN
- Vector Control of Brushless DC
- Debugging w. Oscilloscopes/ logic analyzers

Data Acquisition and Simulation:

- MATLAB
- LabVIEW

3D CAD:

- NX/SolidWorks

Statistics:

- JMP
- SPSS

Data Processing with NN:

- Python
- Tensorflow (Jupyter)

HONORS

Doctoral Scholarship

ICTAS, Virginia Tech

Mar 2016 – July 2020

Best Mechanical Engineering

Experience Award for Undergrad

NYU Tandon

May 2015

OTHER ACTIVITIES

- Basketball
- Weightlifting
- Sci-Fi Novel
- NCEES: FE, NY, 2015

AREAS OF EXPERTISE *continued*

Signal Processing and Analysis

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

- Conducted the transfer function identification of the smart material that led to validating the physics-based model in the energy harvesting field.
- Configured custom and off-the-shelf data acquisition systems leading to several journal publications (1 first author, 4 authorships) and resulting in ICTAS funding (4-year scholarship) for the doctoral study.

SELECTED PUBLICATIONS

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

Kim, H., Asbeck, A. [Submitted]

- 2021
- [IEEE Access](#)

Just Noticeable Differences for Elbow Joint Torque Feedback

Kim, H., Asbeck, A. [Under review]

- 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
- [J. 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](#)