

HUBERT KIM

Research Scientist

E-mail: jk.hubert.kim@gmail.com

Mobile: 917.834.0377

Home: Bay Area, CA
(willing to relocate)

Web: hubertkim.com

LinkedIn: [~/hubertkim](https://www.linkedin.com/in/~hubertkim)

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 haptic researcher with specialties in embedded programming and control theory. Seeks to join an engineering team with a project-driven environment to improve the human and robot perception. Competent in:

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

AREAS OF EXPERTISE

Mechatronic Product Development

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

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

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 2020 ICRA conference presentation.
- Collaborated with a statistical expert to deal with statistical model selection, outlier handlings resulting in two journal papers including a publication in Scientific Report.
- Analyzed the user data resulting in discovery of active human joint stiffness in the haptic field.

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 on 2016 IROS conference.
- Carried out system identification of wearables as demonstrated by the development of the impedance controller in the poster.

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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

HONORS

Doctoral Scholarship
ICTAS, Virginia Tech
Mar 2016 – July 2020

**Best Mechanical Engineering
Experience Award for Undergrad**
NYU Tandon
May 2015

INTERESTS

Basketball

Weightlifting

Reading Sci-Fi Novel

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 the several journal publications (1 first author, 4 second author) 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](#)