HUBERT KIM

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EDUCATION

Virginia Polytechnic Institute and State University, Blacksburg VA *May 2015 - Present*
Candidate for Ph.D. program in Mechanical Engineering
New York University Polytechnic School of Engineering, Bklyn NY *Sept 2012 - May 2015*
Bachelor of Science, Mechanical Engineering (Minor: Mathematics) *cum laude*

RESEARCH INTERESTS

Physical Human-Robot Interaction; **Haptic**; **Exoskeleton**

PROJECTS

Joint Torque Feedback for Elbow Motion Correction - Assistive Robotics Laboratory -
Research Assistant, Advisor: Dr. Alan T. Asbeck *May 2015 - Present*

· Develop a paradigm of kinesthetic cue as a means of information transfer in arm motion training:
The project is broken down into 1) **learning psychophysical requirements** for the torque output; 2) explore the **torque stiffness leading to the highest bandwidth** of the trainee's arm. The mechanical platform of the exoskeleton is realized through multiple iterations of fast-prototyping, while the user interface is settled by accommodating empirical data from pilot human subject testings.

Cornell Cup Robotics: Active Arm Exoskeleton Team
Team Advisor *Feb 2019 - May 2019*

· Technical advising a senior design team in programming for the competition:
A five degree-of-freedom exoskeleton for industry workers, providing gravity-compensation and pre-programmed repeated motion assisting. The product was presented at NASA Kennedy Space Center Visitor Center.

Light-weight Exoskeleton for Haptic Feedback
Poster presenter *Oct 2016*

· Concept validation of a concurrent arm motion augmentation using Joint Torque Feedback:
An arm exoskeleton fabricated with a cable-driven actuator with a semi-rigid sleeve. The work was presented at IEEE/RSJ International Conference on Intelligent Robots and Systems 2016.

Energy Harvesting with Smart Materials - Dynamic System Laboratory -
Undergraduate researcher, Advisor: Dr. Maurizio Porfiri *Mar 2013 - May 2015*

· Explore signal processing applications for Piezoelectric and Ionic Polymer Metallic Composite (IPMC):
Modeling of the transfer functions followed by experimental validations on various conditions: 1) Piezoelectric, underwater frequency analysis; 2) IPMC, underwater translational buckling motion with changing water temperatures; 3) Piezoelectric, excited with the oscillatory motion of the biomimetic shark tail.

Capstone project: Asteroid Capture, Retrieval, Utilization and Mitigation Project
Advisors: Dr. Joseph Borowiec and Dr. Charles Camarda *Aug 2014 - May 2015*

· Simulate an end-effector that captures a mock asteroid in space:
Built a tendon-actuated manipulator to detect and grab the spinning object using Arduino, flex sensors, and servo motors. The demonstration and final result was presented at ICED/AerosPACE Epic Challenge Student Exposition, NASA Langley Research Center.

TECHNICAL STRENGTHS

Embedded systems programming	Code Composer Studio, C/C++
Visual programming	JavaScript port for Processing
Data analysis & Numerical simulation	MATLAB, LabVIEW
3D CAD	NX, Solidworks

LANGUAGES

Native in English and Korean (dual citizenship)

TEACHING EXPERIENCE

- Teaching assistant for ME4015, Engineering Design and Project. *Aug 2015 - Dec 2015*
- Tutored in Federal TRIO Center, subjects: Statics, Calculus *Aug 2013 - Dec 2013*

HONORS

- Selected for ICTAS Doctoral Scholars program at Virginia Tech
- Selected for New Horizon Graduate Scholars program at Virginia Tech
- Awarded for Best Mechanical Engineering Experience for Undergraduate by NYU
- Awarded for Founders Day Award by NYU

PUBLICATIONS

- Kim, H., Guo, H., Asbeck, A., 2019; "Just Noticeable Differences for Joint Torque Feedback During Static Poses", IEEE International Conference on Robotics and Automation, in press
- Kim, H., Cha, Y., Porfiri, M., 2016; "Voltage attenuation along the electrodes of ionic polymer metal composites", Journal of Intelligent Material Systems and Structures, 27(17), 2426-2430.
- Cha, Y.; Chae, W.; Kim, H., 2015; Walcott, H.; Peterson, S.; "Energy harvesting from a piezoelectric biomimetic fish tail", Renewable Energy 86, 449458
- Cha, Y., Kim, H., Porfiri, M., 2014: "Matching the impedance of ionic polymer metal composites for energy harvesting", Smart Materials and Structures 23(12), 127002
- Cha, Y., Kim, H., Porfiri, M., 2014: "Influence of temperature on the impedance of ionic polymer metal composites", Materials Letters 133, 179-182
- Cha, Y., Kim, H., Porfiri, M., 2013: "Energy harvesting from underwater base excitation of a piezoelectric composite beam", Smart Materials and Structures 22(11), 115026

OTHER ACTIVITIES

- Passed NCEES:FE exam, NY, 2015
- Member of the NY Rho Chapter of Tau Beta Pi & Pi Tau Sigma
- Inno/Vention competition with prototyping Fund in Spring 2014 from NYU Entrepreneurs Lab
- Served Air Force in Republic of Korea : *Feb 2010 - Mar 2012*
military translator for Ammunition Stockpile Reliability Program from Raytheon.