

Seongsik PARK

PERSONAL DATA

Postdoctoral Researcher
Mechanical Engineering Department
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RESEARCH INTERESTS

To recognize human motion using motion sensor and sEMG

- unveiling explosive and/or sensitive motor skills using sensors and algorithms
- recognition of sEMG pattern and discrete motion w/ or w/o prerequisite training
- hierarchical motion segmentation of continuous movement using sEMG
- application for human-robot interaction e.g., manipulator and prosthesis

To teach and deliver human motor skill to robot

- representing and demonstrating motor skills by robot
- impedance robot programming by demonstration using sEMG
- human motion analysis by iterative optimal control

EDUCATION

AUG 2019 Ph.D. in MECHANICAL ENGINEERING
MAR 2011 **Pohang University of Science and Technology (POSTECH)**, Pohang, Korea
Thesis: Dynamic Motion Recognition and Robot Control using sEMG
Advisor: Prof. Wan Kyun CHUNG
GPA: 3.77/4.30

AUG 2010 B.S. in MECHANICAL AND AEROSPACE ENGINEERING
MAR 2007 **Seoul National University (SNU)**, Seoul, Korea
GPA: 3.43/4.30 standing 67/179.

RESEARCH EXPERIENCE

Current Postdoctoral Researcher in [MARCH Lab.](#) | Prof. Keehoon KIM
MAR 2020 **Pohang University of Science and Technology (POSTECH)**, Pohang, Korea

FEB 2020 Postdoctoral Researcher in [Robogram Lab.](#) | Dr. Yong Seok IHN
SEP 2019 **Korea Institute of Science and Technology (KIST)**, Seoul, Korea

AUG 2019 Research Student in [MARCH Lab.](#) | Dr. Keehoon KIM
APR 2016 **Korea Institute of Science and Technology (KIST)**, Seoul, Korea

AUG 2019 Research Assistant in [Robotics Lab.](#) | Prof. Wan Kyun CHUNG
MAR 2011 **Pohang University of Science and Technology (POSTECH)**, Pohang, Korea

AWARDS AND HONORS

- DEC 2019 **Best Student Paper Award** in *Mechanical Engineering Department, POSTECH*
DEC 2018 **Best Paper Award** in *Robotics and Media Institute, KIST*
JAN 2018 **Best Paper Award** in *2018 13th Korea Robotics Society Annual Conference*
MAY 2013 **Best Paper Award** in *2013 8th Korea Robotics Society Annual Conference*
2007-2010 **National Science and Technology Scholarship** of *Korea Student Aid Foundation*

PUBLICATIONS

Journal Articles

3. **Seongsik Park**, Wan Kyun Chung, and Keehoon Kim, "Training-Free Bayesian Self-Adaptive Classification for sEMG Pattern Recognition Including Motion Transition," *IEEE Transactions on Biomedical Engineering* (early access).
2. **Seongsik Park**, Donghyeon Lee, Wan Kyun Chung, and Keehoon Kim, "Hierarchical Motion Segmentation through sEMG for Continuous Lower Limb Motions," *IEEE Robotics and Automation Letters*, vol. 4, no. 4, pp. 4402-4409, 2019.
1. **Seongsik Park**, Woongyong Lee, Wan Kyun Chung, and Keehoon Kim, "Programming by Demonstration Using the Teleimpedance Control Scheme: Verification by an sEMG-Controlled Ball-Trapping Robot," *IEEE Transactions on Industrial Informatics*, vol. 15, no. 2, pp. 998-1006, 2019.

Refereed Conference Papers

9. **Seongsik Park**, and Wan Kyun Chung, "Localizing a needle tip using 2D microscope images and detecting vertical approach of a needle based on focus measures for intracellular microneedle insertion," in *Intelligent Robots and Systems (IROS), 2016 IEEE/RSJ International Conference on*, 2016, pp. 2567-2571.
8. **Seongsik Park**, and Wan Kyun Chung, "Tele-impedance control of virtual system with visual feedback to verify adaptation of unstable dynamics during reach-to-point tasks," in *Biomedical Robotics and Biomechanics (BioRob), 2016 6th IEEE RAS/EMBS International Conference on*, 2016, pp. 1283-1289.
7. **Seongsik Park**, Il Hong Suh, and Wan Kyun Chung, "Dynamic motion phase segmentation using sEMG during countermovement jump based on hidden semi-Markov model," in *Robotics and Automation (ICRA), 2015 IEEE International Conference on*, 2015, pp. 1461-1467.
6. **Seongsik Park**, and Wan Kyun Chung, "Dynamic motion phase segmentation using electromyogram," in *Ubiquitous Robots and Ambient Intelligence (URAI), 2015 12th International Conference on*, 2015, pp. 202-203.
5. **Seongsik Park**, and Wan Kyun Chung, "Decoding surface electromyogram into dynamic state to extract dynamic motor control strategy of human," in *Intelligent Robots and Systems (IROS), 2014 IEEE/RSJ International Conference on*, 2014, pp. 1427-1433.
4. **Seongsik Park**, and Wan Kyun Chung, "Autonomous segmentation of motion primitive including muscular activation using variational Bayesian mixture of Gaussian," in *Ubiquitous Robots and Ambient Intelligence (URAI), 2013 10th International Conference on*, 2013, pp. 5-9.
3. Minjae Kim, **Seongsik Park**, and Wan Kyun Chung, "Flexible polymer-based micro needle array sEMG sensor," in *Ubiquitous Robots and Ambient Intelligence (URAI), 2013 10th International Conference on*, 2013, pp. 1-4.

2. Min Jun Kim, **Seongsik Park**, and Wan Kyun Chung, “Nonlinear robust internal loop compensator for robust control of robotic manipulators,” in *Intelligent Robots and Systems (IROS), 2012 IEEE/RSJ International Conference on*, 2012, pp. 2742-2748.
1. **Seongsik Park**, and Wan Kyun Chung, “Combined method of weighted least norm and gradient projection for avoiding joint limit,” in *Ubiquitous Robots and Ambient Intelligence (URAI), 2011 8th International Conference on*, 2011, pp. 798-799.

Selected Domestic Journal and Conference

3. **Seongsik Park**, Hyun-Joo Lee, Wan Kyun Chung, and Keehoon Kim, “Training-Free sEMG Pattern Recognition Algorithm: A Case Study of A Patient with Partial-Hand Amputation,” *Journal of Korea Robotics Society*, vol. 14, no. 3, pp. 211-220.
2. **Seongsik Park**, Woongyong Lee, Wan Kyun Chung, and Keehoon Kim, “Ball trapping: impedance programming by demonstration using sEMG,” in *2018 13th Korea Robotics Society Annual Conference*.
1. **Seongsik Park**, and Wan Kyun Chung, “Simulation study of planar 2-DOF arm model for velocity-dependent stiffness modulation using iLQR algorithm,” in *2013 8th Korea Robotics Society Annual Conference*.

LANGUAGES, SKILLS AND ABILITIES

Languages	Korean (mothertongue) English (intermediate)
Computer Skills	MATLAB, C/C++, \LaTeX , Python Visual Studio, OpenSim, Real-time OS (RTX, Xenomai) SolidWorks, Adobe Illustrator & Premiere
Hardware & Equipment	Manipulators (Schunk 7-DOF LWA3, Neuromeka Indy RP) Robot hand (Allegro hand) sEMG sensors (Delsys, Noraxon, Thalmic MYO) Motion capture (MotionAnalysis) DAQ devices (National Instruments)

INTERESTS AND ACTIVITIES

Badminton, Swimming, Photograph, Pungmul (Korean traditional music), Bicycle