

# Seongsik PARK

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Artificial Intelligence Department  
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## RESEARCH INTERESTS

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- **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

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AUG 2019 Ph.D. in MECHANICAL ENGINEERING  
MAR 2011 **Pohang University of Science and Technology (POSTECH)**, Pohang, Korea  
*Dissertation: Dynamic Motion Recognition and Robot Control using sEMG*  
Advisor: Prof. Wan Kyun CHUNG  
AUG 2010 B.S. in MECHANICAL AND AEROSPACE ENGINEERING  
MAR 2007 **Seoul National University (SNU)**, Seoul, Korea

## RESEARCH EXPERIENCE

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*Current* Assistant Professor in [Artificial Intelligence Department](#)  
SEP 2020 **Dongguk University**, Seoul, Korea  
AUG 2020 Postdoctoral Researcher in Mechanical Engineering Department  
MAR 2020 **Pohang University of Science and Technology (POSTECH)**, Pohang, Korea  
FEB 2020 Postdoctoral Researcher in Center for Intelligent & Interactive Robotics  
SEP 2019 **Korea Institute of Science and Technology (KIST)**, Seoul, Korea  
AUG 2019 Research Student in Center for Intelligent & Interactive Robotics  
APR 2016 **Korea Institute of Science and Technology (KIST)**, Seoul, Korea  
AUG 2019 Research Assistant in Mechanical Engineering Department  
MAR 2011 **Pohang University of Science and Technology (POSTECH)**, Pohang, Korea

## AWARDS AND HONORS

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- 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

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### 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*, vol. 67, no. 7, pp. 1775-1786, 2019.
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, 2018.

### 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, 2019.
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*.

## LECTURES

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SPRING 2021	[AIX7026] Advanced Machine Learning [SCS4049] Machine Learning and Data Science [DSC4007] Data Science Capstone Design [DES4024] Enterprise and Society Tailored Capstone Design Project
FALL 2020	[AIX7021] Computer Vision [SCS4049] Machine Learning and Data Science [SCS4031] Convergence Capstone Design

## INVITED TALKS

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Nov 2020	Dynamic Motion Recognition and Robot Control using sEMG New Faculty Workshop, Changwon National University
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## PROFESSIONAL SERVICE

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Served/ing as a reviewer for international journals, including:

- IEEE Transactions on Robotics (T-RO)
- IEEE Transactions on Haptics
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Journal of Biomedical and Health Informatics
- Intelligent Service Robotics

Served/ing as a reviewer for international conference, including:

- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- AAAI Conference on Artificial Intelligence (AAAI)

## LANGUAGES, SKILLS AND ABILITIES

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Languages	Korean (mothertongue) English (intermediate)
Computer Skills	MATLAB, C/C++, $\LaTeX$ , Python Visual Studio, OpenSim, Real-time OS (RTX, Xenomai) SolidWorks, Adobe Illustrator & Premiere Amazon AWS EC2 & Lightsail, Microsoft Azure, Linux APM Server
Hardware & Equipment	Manipulators (Schunk 7-DOF LWA3, Neuromeka Indy RP) Robot hand (Allegro hand) sEMG sensors (Delsys, Noraxon, Thalmic MYO) Motion capture (MotionAnalysis)

## REFERENCES

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- Prof. Wan Kyun CHUNG Mechanical Engineering Department, POSTECH, Korea  
[wkchung@postech.ac.kr](mailto:wkchung@postech.ac.kr)
- Prof. Keehoon KIM Mechanical Engineering Department, POSTECH, Korea  
(former) Senior Research Scientist, KIST, Korea  
[khk@postech.ac.kr](mailto:khk@postech.ac.kr)