SOL LIM

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EDUCATION

Ph.D., Industrial and Operations Engineering 4/2019 (Expected)
University of Michigan, Ann Arbor, Michigan

Graduate Certificate in Data Science, Michigan Institute for Data Science 4/2018
University of Michigan, Ann Arbor, Michigan

M.S., Biomedical Engineering 4/2015
University of Michigan, Ann Arbor, Michigan

M.S., Industrial Engineering 2/2011
Seoul National University, South Korea

B.S., Clothing and Textiles, College of Human Ecology 2/2009
Yonsei University, South Korea

RESEARCH INTERESTS

Human factors, occupational ergonomics, biomechanics, wearable technology, predictive modeling, machine-learning, healthcare ergonomics

GRANTS, HONORS AND AWARDS

- 1st Place (Inaugural Outstanding Team Grant Proposal) at the NIOSH Funded Research Capacity Building Workshop, University of Cincinnati 2018
- UM Education and Research Center (ERC) Travel Grant Award to attend the NIOSH Funded Research Capacity Building Workshop, University of Cincinnati 2018
- 1st Place (poster) at the Industrial, Operations, and Financial Engineering session, UM Engineering Graduate Symposium 2017
- HFES Student Author Presentation Support Award (SAPSA) 2017
- COHSE Directors' Award (poster), Regional Research Symposium, Education and Research Center (ERC) 2017
- UM Rackham Graduate School Travel Grant Award 2015, 2016, 2017, 2018
- People's Choice Award (poster), Regional Research Symposium, Education and Research Center (ERC) 2016
- Pilot Project Research Training Program (PPRT) award from NIOSH 2015-2016
- Industrial and Operations Engineering Departmental Fellowship, University of Michigan. Fellowship includes monthly stipend, tuition, and required fees. ($66,671) 2015
- Jungsong Foundation Scholarship. Scholarship supports a two-year of master's program. ($110,000) 2013-2014
- University designated scholarship, Yonsei University 2004-2007
- Awarded the Highest Honors, Yonsei University 2005
- Awarded Honors, Yonsei University 2008

RESEARCH EXPERIENCE

Graduate Student Researcher 10/2014 - present
Inclusive Mobility Laboratory
University of Michigan, Department of Industrial and Operations Engineering

- Faculty Advisor: Clive D'Souza, Ph.D.
- Dissertation title: "Combining Inertial Sensing and Predictive Modeling for Biomechanical Exposure Assessment in Non-Repetitive Work" (Funding: Pilot project research training program award from NIOSH)
- Project: "Novel methods to track changes in health and function, before and after adult bariatric surgery" (Funding: MCubed program from University of Michigan)
- Project: "Field-based usability evaluation of public transit vehicles" (Funding: National Institute on Disability, Independent Living, and Rehabilitation Research)

Independent Research Project 1/2013 - 5/2013
Direct Brain Interface Laboratory
University of Michigan, Department of Industrial and Operations Engineering

- Faculty Advisor: Jane Huggins, Ph.D.
- Project: "P300 latency variation in Amyotrophic Lateral Sclerosis (ALS) patients"

Research Assistant 8/2011 - 6/2012
Brain-Computer Interface Laboratory
North Carolina State University, Department of Industrial and Systems Engineering

- Faculty Advisor: Chang Nam, Ph.D.
- Project: "The effects of individual's mood state and personality trait on the cognitive processing of emotional stimuli"

Research Assistant 12/2008 - 2/2011
Human Factors Laboratory
Seoul National University, Department of Industrial Engineering

- Faculty Advisor: Myun Lee, Ph.D.
- Project: "Assessment of emotional state by combinatorial analysis of neurophysiological signals"

Research Assistant 5/2007 - 10/2007
Clothing Sensibility Development Research Laboratory
Yonsei University, College of Human Ecology

- Faculty Advisor: Gilsoo Cho, Ph.D.
- Project: "Development of sound and temperature responsive clothings"

PROFESSIONAL AFFILIATION

Human Factors and Ergonomics Society (HFES) 2012 - present
Occupational Ergonomics Technical Group
Healthcare Technical Group

Institute of Industrial and Systems Engineers (IISE) 2018 - present

International Society of Biomechanics (ISB) 2018 - present

PUBLICATIONS AND PRESENTATIONS

Journal Publications

[J.4] **Lim, S.**, Luo, Y.*, & D'Souza, C. (in preparation). Task Performance and Stepping Adaptation during Obstacle Clearance Task in Individuals with High Body Mass Index.

[J.3] **Lim, S.**, & D'Souza, C. (in preparation). A Systematic Review of Inertial Sensing-Based Ergonomic Exposure Assessment.

[J.2] **Lim, S.**, & D'Souza, C. (under review). Statistical Prediction of Load Carriage Mode and Magnitude from Inertial Sensor Derived Gait Kinematics.

[J.1] **Lim, S.**, & D'Souza, C. (under review). Measuring Effects of Two-handed Side and Anterior Load Carriage on Gait Kinematics using Wearable Inertial Sensors.

Peer-Reviewed Conference Proceedings

[C.10] **Lim, S.**, & D'Souza, C. (accepted). Inertial Sensor-based Measurement of Thoracic-Pelvic Coordination Measures Predicts Hand-Load Levels in Two-handed Anterior Carry. Proceedings of the 62nd Annual Meeting of the Human Factors and Ergonomics Society (HFES), Philadelphia, PA, October 2018.

[C.9] **Lim, S.**, Luo, Y.*, Ebert, S., Johns, M., Varban, O., & D'Souza, C. (accepted). Preliminary Study of Obstacle Clearance and Compensatory Movements in Individuals with High Body Mass Index. Proceedings of the 62nd Annual Meeting of the Human Factors and Ergonomics Society (HFES), Philadelphia, PA, October 2018.

[C.8] **Lim, S.**, & D'Souza, C. (2017). Statistical Prediction of Hand Force Exertion Levels in a Simulated Push Task using Posture Kinematics. Proceedings of the 61st Annual Meeting of the Human Factors and Ergonomics Society (HFES), Austin, TX, October 2017. DOI: 10.1177/1541931213601741

[C.7] **Lim, S.**, Case, A.*, & D'Souza, C. (2016). Comparative Analysis of Inertial and Optical Motion Capture Derived Kinematics during Isometric Push-Pull Exertions. Proceedings of the 60th Annual Meeting of the Human Factors and Ergonomics Society (HFES), Washington, DC, September 2016, pg: 970 - 974. DOI: 10.1177/1541931213601224

[C.6] **Lim, S.**, Case, A.*, & D'Souza, C. (2016). Comparing Postural Responses to Push and Pull Task Demands using Optical Motion vs. Inertial Measurement. Proceedings of the 9th International Scientific Conference on the Prevention of Work-Related Musculoskeletal Disorders (PREMUS), Toronto, Canada, June 2016.

[C.5] **Lim, S.**, Woo. J., Bahn, S., & Nam, C. (2012). The Effects of Individuals Mood State and Personality Trait on the Cognitive Processing of Emotional Stimuli. Proceedings of the 56th Annual Meeting of the Human Factors and Ergonomics Society (HFES), Santa Monica, September 2012. DOI:10.1177/1071181312561231

[C.4] **Lim, S.**, Bahn, S., Woo, J., & Nam, C. (2012). Hemispheric Asymmetries in the Perception of Emotion. Proceedings of the International Conference on Applied Human Factors and Ergonomics (AHFE), San Francisco, July 2012.

[C.3] **Lim, S.**, & Lee, M. (2010). Towards a Systematic Approach to Assess Emotional State by Combinatorial Analysis of Neurophysiological Signals. Proceedings of 2010 Fall Symposium of Korea Institute of Industrial Engineers (KIIE), Seoul, Korea.

[C.2] **Lim, S.**, & Lee, M. (2010). Towards a Quantitative Measure of Facial Expression. Proceedings of 2010 Spring Symposium of Korea Institute of Industrial Engineers (KIIE), Jeju, Korea.

[**C.1**] Kim, Y., Park, J., Rhiu, I., Kim, W., **Lim, S.**, You, K., & Lee, W. (2009). Facial EMG, Skin Conductance, Heart Beat and Respiration Changes to Short Downhill Cart Riding. Proceedings of 2009 Fall Conference of Ergonomics Society of Korea (ESK), Daegu, Korea.

Poster Presentations

[**P.12**] **Lim, S.**, & D'Souza, C. (2018). Predicting Hand-load Carrying Strategy and Load Level from Gait Kinematics Obtained from Wearable Inertial Sensor. Poster presented at the Michigan Institute for Computational Discovery and Engineering (MICDE) 2018 Annual Symposium, Ann Arbor, MI, March 2018.

[**P.11**] Luo, Y.*, **Lim, S.**, Futerman, S.*, Grider, J.*, Ebert, S., Jones., M., Varban, O., & D'Souza, C. (2018). Dynamic Balance and Measures of Obstacle Clearance Performance in Individuals with High Body Mass Index. Poster presented at the Education and Research Center (ERC) Regional Research Symposium, University of Illinois at Chicago, Illinois, March 2018.

[**P.10**] **Lim, S.**, & D'Souza, C. (2017). Statistical Prediction of Hand-load Carrying Strategy and Load Level from Wearable Inertial Sensor Data. Poster presented at the 2017 Engineering Graduate Symposium, Ann Arbor, MI, November 2017. **- Won "1st Place at the Industrial, Operations, and Financial Engineering session"**

[**P.9**] **Lim, S.**, & D'Souza, C. (2017). Statistical Prediction of Hand-load Carrying Strategy and Load Level from Wearable Inertial Sensor Data. Poster presented at the 60th IOE Anniversary Poster Reception, Ann Arbor, MI, November 2017.

[**P.8**] **Lim, S.**, Ebert, S., Malik, L., Luo, Y.*, Futerman, S.*, Lin, S.*, D'Souza, C., Jones, M., & Varban, O. (2017). Novel Methods to Track Changes in Health and Function of Individuals with High Body Mass Index (BMI). Poster presented at the MCubed Symposium 2017, Ann Arbor, MI, November 2017.

[**P.7**] **Lim, S.**, Bixler, K.*, Chiang, J.*, & D'Souza, C. (2017). Preliminary Investigation of External Load Prediction in Manual Material Handling. Poster presented at the Education and Research Center (ERC) Regional Research Symposium, Ann Arbor, Michigan, March 2017. **- Won "Center for Occupational Health & Safety Engineering (COHSE) Director's Award"**

[**P.6**] **Lim, S.**, Bixler, K.*, Chiang, J.*, & D'Souza, C. (2016). Preliminary Investigation of External Load Prediction in Simulated Manual Tasks. Poster presented at the Center for Ergonomics open house, Ann Arbor, Michigan, December 2016.

[**P.5**] **Lim, S.**, Case, A.*, & D'Souza, C. (2016). Development of Classification Algorithm for Estimating Physical Task Demands Using Inertial Sensors. Poster presented at the Education and Research Center (ERC) Regional Research Symposium, Ann Arbor, Michigan, March 2016.

[**P.4**] Case, A.*, **Lim, S.**, & D'Souza, C. (2016). Accuracy and Precision of Inertial Sensors in Ergonomics Evaluations of Static vs. Dynamic Work Posture. Poster presented at the Education and Research Center (ERC) Regional Research Symposium, Ann Arbor, Michigan, March 2016. **- Won "People's Choice Award"**

[**P.3**] **Lim, S.**, Case. A.*, Chung, C.*, Keci, A.*, & D'Souza, C. (2015). Methodology for Validating Inertial Sensors in Ergonomics Posture Assessment. Poster presented at the Center for Ergonomics open house, Ann Arbor, Michigan, December 2015.

[**P.2**] Keci, A.*, **Lim, S.**, & D'Souza, C. (2015). Validating Inertial Sensors for Ergonomics Posture Assessment. Poster presented at the 2015 UROP Summer Symposium, August 2015.

[**P.1**] Chimbala, N.*, **Lim, S.**, Diaz, G., & D'Souza, C. (2015). Preliminary Validation of IMUs for Ergonomics Posture Assessment. Poster presented at the 2015 UROP Winter Symposium, April

2015.

* Students supervised

Technical Reports

[**T.1**] **Lim, S.** & D'Souza, C. (2016). Inertial Sensor-based Postural Demand Profiles for Cumulative Physical Workload Estimation: Final Project Report. Center for Ergonomics, University of Michigan, Ann Arbor, MI, July 2016.

Invited Lectures

[**L.3**] **Lim, S.** (2012). Hemispheric asymmetries in the perception of emotions. Invited lecture at the Human Factors Brownbag series. North Carolina State University, NC. March.

[**L.2**] **Lim, S.** (2012). The Effects of Individuals Mood State and Personality Trait on the Cognitive Processing of Emotional Stimuli. Invited lecture in IE: Ergonomics. Hongik University, Seoul, Korea. June.

[**L.1**] **Lim, S.** (2012). The Effects of Individuals Mood State and Personality Trait on the Cognitive Processing of Emotional Stimuli. Invited lecture in HFE 304: High Touch Design. Ulsan Institute of Science and Technology (UNIST), Seoul, Korea. June.

Invited Events

[**E.1**] Haney, J. and **Lim, S.** (2017). Ergonomic Guidelines for Proper Seated Posture. Poster presented at FDA and PTO 3rd Annual Wellness Fair. Detroit, Michigan. July.

TEACHING AND MENTORING EXPERIENCE

Module Instructor

University of Michigan, Ann Arbor, Dept. of Industrial and Operations Engineering

IOE 591: Ergonomics Research Methods Laboratory - Developed a lab module for 'Physiology and Wearable Devices' and led two lab sessions — Winter, 2018

Graduate Student Instructor

Seoul National University, Dept. of Industrial Engineering

Leadership and Management — Spring, 2009/2010
Organization Theory — Fall, 2009/2010

Preparing Future Faculty Seminar

Rackham School of Graduate Studies and the Center for Research on Learning and Teaching
University of Michigan, Ann Arbor

Selected to attend a 5-week seminar to advance teaching in higher education and academic professionalism. Learned and practiced topics in inclusive teaching, active learning techniques, course design, and assessment tools in higher education. — Summer, 2018

IOE Ph.D. Mentor Program

University of Michigan, Dept. of Industrial and Operations Engineering

Geunyeong Byeon, IOE, Ph.D. candidate — 2016 - 2017
Chenlan Wang, IOE, Ph.D. student — 2017 - 2018

Research Supervisor
Inclusive Mobility Laboratory
University of Michigan, Department of Industrial and Operations Engineering

Claire Stemper, IOE, UG Research Assistant (5/2018 - current)	
Hannah Brown, IOE, UG Research Assistant (4/2018 - current)	
Jordan Keeley, IOE, UG Research Assistant (2/2018 - current)	
Yue Luo, BME, Graduate Research Assistant (9/2017 - current)	[J.4],[C.9],[P.8],[P.11]
Sidnie Futerman, IOE, UG Research Assistant (9/2017 - 4/2018)	[P.8]
Joelle Grider, IOE, UG Research Assistant (9/2017 - 4/2018)	[P.11]
Ayano Nakamura, IOE, UG Research Assistant (9/2017 - 1/2018)	
Zhining Zhou, IOE, UG Research Assistant (9/2017 - 12/2017)	
Sabrina Lin, IOE, UG Research Assistant (9/2017 - 12/2017)	[P.8]
Allison Winnik, IOE, SURE program (5/2017 - 7/2017)	
Kellen Bixler, CS, UG Research Assistant (5/2016 - 6/2017)	[P.6],[P.7]
Mary Owczarczak, IOE, UG Research Assistant (1/2017 - 5/2017)	
Joanna Chiang, Kinesiology, Graduate Research Assistant (9/2016 - 12/2016)	[P.6],[P.7]
Maggie Hafers, IOE, SURE program (5/2016 - 8/2016)	
Andrea Case, IOE, SURE program (5/2015 - 4/2016)	[C.6],[C.7],[P.3],[P.4],[P.5]
Angjela Keci, IOE, UROP program (5/2015 - 4/2016)	[P.2],[P.3]
Chanmee Chung, IOE, UG Research Assistant (4/2015 - 10/2015)	[P.3]
Naboth Chimbala, ME, UROP program (1/2015 - 4/2015)	[P.1]

PROFESSIONAL AND LEADERSHIP DEVELOPMENT

University-Related Service

UM Chapter of the Human Factors and Ergonomics Society (HFES)

Acting President	2017
Vice-President	2016 - 2017
Treasurer	2015 - 2016

Professional Service

Reviewer, Human Factors and Ergonomics Society (HFES) Annual Meeting	2017 - present
Reviewer, International Journal of Industrial Ergonomics	2018 - present

Grant Proposal Writing

Attended two full-day 14th Annual Research Capacity Building Workshop 3/2018
sponsored by Pilot Research Project Training Program of the NIOSH Funded Education and Research Center, University of Cincinnati, College of Medicine

Community Service

Led workshop "ErgOlympics: Human Factors & Ergonomics" with local elementary students 2017
Discover Engineering, University of Michigan, Ann Arbor

Other Activities

Student volunteer, Human Factors and Ergonomics Annual Meeting	2016
Student volunteer, AutomotiveUI Conference	2016
Student volunteer, Applied Human Factors and Ergonomics International Conference	2012

Updated August, 2018