

# SeongHyeon MOON

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## RESEARCH INTERESTS

- Keywords:** *Crowd Analysis, Object Segmentation, Object Tracking, Computer Vision, Deep Learning*
- Detect groups or objects and predict future movement and density, and track them.
  - 3D-point clouds, 2D-image and video based computer vision challenges

## EDUCATION

MAY 2024	<b><i>Doctor of Philosophy - Computer Science</i></b>	New Brunswick, NJ, USA
SEP 2018	Rutgers, The State University of New Jersey <b>Adviser:</b> <a href="#">Mubbasir Kapadia</a> Dissertation: Maximize Utilization of Support-Set for Few-shot Segmentation	
FEB 2017	<b><i>Master of Science - Mechanical Engineering</i></b>	Gwangju, KOR
MAR 2015	Gwangju Institute of Science and Technology (GIST) <b>Adviser:</b> <a href="#">Kwanghee Ko</a> Thesis: Parameterization of Unorganized Cylindrical 3D-Point Clouds for Surface Fitting	
FEB 2015	<b><i>Bachelor of Science - Industrial and Information System Engineering</i></b>	Seoul, KOR
MAR 2009	Seoul National Univerisity of Science and Technology Graduated with the highest honor ( <b>Rank 1/45</b> )	

## WORK EXPERIENCE

PRESENT	<b><i>Brookhaven National Laboratory (BNL)</i></b>	Upton, NY, USA
JUL 2024	<b>Research Associate, Computer Vision</b> at Computational Science Initiative <ul style="list-style-type: none"><li>• Topic: TBA</li></ul>	
AUG 2023	<b><i>Roblox</i></b>	San Mateo, CA, USA
MAY 2023	<b>Research Intern</b> at Roblox AI. <b>Mentor:</b> <a href="#">Mubbasir Kapadia</a> <ul style="list-style-type: none"><li>• Topic: Real-time Body Movement Tracking</li></ul>	
AUG 2022	<b><i>NEC Laboratories America</i></b>	Princeton, NJ, USA
MAY 2022	<b>Research Intern</b> at Machine Learning Dept. <b>Mentor:</b> <a href="#">Alexandru Niculescu-Mizil</a> , <a href="#">Iain Melvin</a> <ul style="list-style-type: none"><li>• Topic: Multi-camera Multi-object Tracking</li><li>• Devised a new association method combining visual features with location information</li></ul>	
AUG 2020	<b><i>DeepMotion</i></b>	San Mateo, CA, USA
JUN 2020	<b>Research Intern</b> in Research Group. <b>Mentor:</b> <a href="#">Kevin He</a> <ul style="list-style-type: none"><li>• Topic: Controlling a humanoid model using reinforcement learning</li><li>• Hierarchical reinforcement learning was utilized and trained a high-level policy to control a complex human agent to move a specific location</li></ul>	
AUG 2019	<b><i>AutoDesk</i></b>	Toronto, ON, CAN
JUN 2019	<b>Software Engineer Intern</b> in Autodesk Research. <b>Mentor:</b> <a href="#">Rhys Goldstein</a> <ul style="list-style-type: none"><li>• Topic: Human behavior simulation in a building</li><li>• Combined the two frameworks (SyDEVs and SteerSuite) and made an open-source C++ framework(SyDEVs-Building) generating human behaviors in an office building</li></ul>	
MAY 2018	<b><i>Gwangju Institute of Science and Technology</i></b>	Gwangju, KOR
JAN 2018	<b>Research Assistant</b> in Modeling and Simulation Lab. <b>Adviser:</b> <a href="#">Kwanghee Ko</a> <ul style="list-style-type: none"><li>• Topic: Human tracking using a smartphone IMU sensor</li></ul>	

## HONORS & AWARDS

- [Andrew Kim](#) Memorial Foundation Fellowship, Northeast Regional Conference (NRC), 2024
- Korean Government Scholarship (Tuition and Stipend), Gwangju Institute of Science and Technology, 2015, 2016
- Graduated with the highest honor in the department of IISE, Seoul National Univerisity of Science and Technology, 2015
- High G.P.A., Seoul National Univerisity of Science and Technology, 2010

## SKILLS

Python, C++, C, Java, Pytorch, OpenCV, OpenGL, Unity, Ubuntu, Solidity, MATLAB, etc.

## SELECTED PUBLICATIONS

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### JOURNAL ARTICLES \*Equal contribution

- [3] ***JOIN: an integrated platform for joint simulation of occupant-building interactions***  
Architectural Science Review, 2019  
\*Seonghyeon Moon, \*Davide Schaumann, Muhammad Usman, Rhys Goldstein, Simon Breslav, Azam Khan, Petros Faloutsos, and Mubbasir Kapadia
- [2] ***Dynamic Correction of Image Distortions for a Kinect-Projector System***  
Journal of WSCG, 2018  
Jihoon Park, Seonghyeon Moon, and Kwanghee Ko
- [1] ***A point projection approach for improving the accuracy of the multilevel B-spline approximation***  
Journal of Computational Design and Engineering, 2018  
Seonghyeon Moon and Kwanghee Ko

### CONFERENCE PAPERS \*Equal contribution (Top conferences are highlighted in red)

- [10] ***Learning from Synthetic Human Group Activities***  
Conference on Computer Vision and Pattern Recognition (CVPR 2024) - 24% Acceptance rate  
Che-Jui Chang, Danrui Li, Deep Patel, Parth Goel, Honglu Zhou, Seonghyeon Moon, Samuel S. Sohn, Sejong Yoon, Vladimir Pavlovic, Mubbasir Kapadia
- [9] ***MSI: Maximize Support-Set Information for Few-Shot Segmentation***  
The 19th International Conference on Computer Vision (ICCV 2023) - 26% Acceptance rate  
Seonghyeon Moon, Samuel S Sohn, Honglu Zhou, Sejong Yoon, Vladimir Pavlovic, Muhammad Haris Khan, Mubbasir Kapadia
- [8] ***HM: Hybrid Masking for Few-Shot Segmentation***  
The 17th European Conference on Computer Vision (ECCV 2022) - 28% Acceptance rate  
Seonghyeon Moon, Samuel S Sohn, Honglu Zhou, Sejong Yoon, Vladimir Pavlovic, Muhammad Haris Khan, Mubbasir Kapadia
- [7] ***Harnessing Fourier Isovists and Geodesic Interaction for Long-Term Crowd Flow Prediction***  
The 31st International Joint Conference on Artificial Intelligence (IJCAI 2022) - 15% Acceptance rate  
Samuel S Sohn, Seonghyeon Moon, Honglu Zhou, Mihee Lee, Sejong Yoon, Vladimir Pavlovic, Mubbasir Kapadia
- [6] ***MUSE-VAE: Multi-Scale VAE for Environment-Aware Long Term Trajectory Prediction***  
Conference on Computer Vision and Pattern Recognition (CVPR 2022) - 25% Acceptance rate  
Mihee Lee, Samuel S Sohn, Seonghyeon Moon, Sejong Yoon, Mubbasir Kapadia, Vladimir Pavlovic
- [5] ***A2X: An Agent and Environment Interaction Benchmark for Multimodal Human Trajectory Prediction***  
Motion, Interaction and Games (MIG 2021)  
Samuel S Sohn, Mihee Lee, Seonghyeon Moon, Gang Qiao, Usman Muhammad, Sejong Yoon, Mubbasir Kapadia
- [4] ***Deep Integration of Physical Humanoid Control and Crowd Navigation***  
Motion, Interaction and Games (MIG 2020)  
Brandon Haworth, Glen Berseth, Seonghyeon Moon, Petros Faloutsos, Mubbasir Kapadia
- [3] ***Laying the Foundations of Deep Long-Term Crowd Flow Prediction***  
The 16th European Conference on Computer Vision (ECCV 2020) - 27% Acceptance rate  
Samuel S Sohn, Honglu Zhou, Seonghyeon Moon, Sejong Yoon, Vladimir Pavlovic, Mubbasir Kapadia
- [2] ***Toward a Multi-Level and Multi-Paradigm Platform for Building Occupant Simulation***  
Symposium on Simulation for Architecture and Urban Design (SimAUD 2019)  
\*Seonghyeon Moon, \*Davide Schaumann, Muhammad Usman, Rhys Goldstein, Simon Breslav, Azam Khan, Petros Faloutsos, Mubbasir Kapadia
- [1] ***Parameterization of unorganized cylindrical point clouds for least squares B-spline surface fitting***  
25th Conference in Central Europe on Computer Graphics, Visualization and Computer Vision (WSCG2017)  
Seonghyeon Moon, Jin-Eon Park and Kwanghee Ko