# Soyong Shin

**CURRICULUM VITAE**


CONTACT INFORMATION

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## EDUCATION

**Carnegie Mellon University** - PRESENT
Ph.D. in Mechanical Engineering (Advisor: Prof. Eni Halilaj)
* Presidential Fellowship in the College of Engineering

**Carnegie Mellon University** - MAY. 2021
M.S. in Mechanical Engineering (Advisor: Prof. Eni Halilaj)
* ATK-Nick G. Vlahakis Fellowship

**Seoul National University** - FEB. 2019
B.S. in Mechanical Engineering
* The National Scholarship for Science and Engineering

## WORK AND RESEARCH EXPERIENCE

**Research Scientist Intern** MAY. 2024 - AUG. 2024
*Meta Reality Lab Research, Pittsburgh, PA*
- Incoming research scientist intern at Meta

**Research Assistant** AUG. 2019 - PRESENT
*Musculoskeletal Biomechanics Laboratory, Carnegie Mellon University, Pittsburgh, PA*
- Working under the supervision of Professor Eni Halilaj

**Visiting Scholar** MAY. 2023 - AUG. 2023
*Perceiving System, Max Planck for Institute Intelligence System, Tübingen, Germany*
- Worked with PS Director, Michael J. Black.

**Research Engineer** APR. 2019 - JUL. 2019
*Lomin-AI, Seoul, Korea*
- Awarded Minister Prize (Korean Ministry of Science and ICT) from *2019 Korean AI Grand Challenge*

**Undergraduate Research Assistant** SEP. 2017 - DEC. 2018
*Seoul National University Towing Tank Laboratory, Seoul National University, Seoul, Korea*
- Worked under the supervision of professor Shin Hyung Rhee

## PUBLICATIONS

### Full-length Articles

**S. Shin**, J. Kim, E. Halilaj, M. J. Black. "WHAM: Reconstructing World-grounded Humans with Accurate 3D Motion," *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024

M. Keller, K. Werling, **S. Shin**, S. Delp, S. Pujades, K. Liu, M. Black. "From Skin to Skeleton: Towards Biomechanically Accurate 3D Digital Humans," *ACM Transactions on Graphics (Proc. SIGGRAPH ASIA – **Honorable Mention**)*, 2023

**S. Shin**, Z. Li, E. Halilaj. "Fast 3-D Motion Tracking with Noisy Video and IMU Data," *IEEE Trans. Biomedical Engineering*, vol. 70(11), 3082-3092, 2023

O. Pearl, **S. Shin**, A. Godura, S. Bergbreiter, E. Halilaj. "Fusion of Video and Inertial Sensing Data via Dynamic Optimization of a Biomechanical Model," *Journal of Biomechanics*, Vol 155, 111617, 2023

E. Halilaj, **S. Shin**, E. Rapp, D. Xiang. "American Society of Biomechanics Early Career Achievement Award 2020: Toward Portable and Modular Biomechanics Labs: How Video and IMU Fusion Will Change Gait Analysis," *Journal of Biomechanics*, Vol 129, 110650, 2021

**S. Shin** , E. Halilaj. "Multi-view Human Pose and Shape Estimation Using Learnable Volumetric Aggregation," *arXiv*, 2021

E. Rapp*, **S. Shin***, W. Thomsen, R. Ferber, E. Halilaj. "Estimation of Kinematics from Inertial Measurement

Units Using a Combined Deep Learning and Optimization Framework," *Journal of Biomechanics*, Vol. 116, 110229, 2021 (* equal contribution)

H. Yeo, W. Seok, **S. Shin**, Y.C. Huh, B.C. Jung, C-S. Myeong, S.H. Rhee. "Computational Analysis of the Performance of a Vertical Axis Turbine in a Water Pipe," *Energies*, Vol. 12, 3998, 2019

**Peer-reviewed Abstracts**

**S. Shin**, Z. Li, E. Halilaj. "3D Human Motion Tracking Using a Single Camera," *American Society of Biomechanics (ASB)*, 2023 (Poster)

**S. Shin**, J. Hodgins, E. Halilaj. "Physical Therapy Assessment with Uncalibrated Cameras and Inertial Sensors," *American Society of Biomechanics (ASB)*, 2023 (Poster)

**S. Shin**, E. Halilaj. "Fast 3-D Motion Tracking With Noisy Video and IMU Data," *North American Congress on Biomechanics (NACOB)*, 2022 (Oral)

E. Halilaj, **S. Shin**, O. Pearl, N. Rohkmanova. "Rehabilitation Monitoring with Wearables: from Physical Therapy to Natural Ambulation," *Quadrennial World Congress of Biomechanics*, 2022

**S. Shin**, E. Halilaj. "Learning-based 3D Human Body Reconstruction From Multi-view Cameras," *American Society of Biomechanics (ASB)*, 2021 (Poster)

**S. Shin** , E. Rapp, R. Ferber, E. Halilaj. "Combined Deep Learning and Top-down Optimization for Estimation of Kinematics from IMUs," *American Society of Biomechanics (ASB)*, 2020 (Poster)

E. Halilaj, **S. Shin** , E. Rapp, D. Xiang, Y. Raaj. "A Multimodal Dataset for Modeling Human Pose Priors," *American Society of Biomechanics (ASB)*, 2020

**S. Shin**, H. Yeo, S.H. Rhee. "Performance Evaluation of a Vertical Axis Turbine Installed in a Water Pipe by CFD," International Conference of Energy and Sustainability, 2018 (Poster)

**S. Shin**, W-C. Seok, S.H. Rhee. "Tip Clearance Effect on Performance of Vertical Axis Turbine in a Water Pipe," Korean Society of Computational Fluids Engineering, 2018 (Oral)

## HONORS AND AWARDS

**Presidential Fellowship in the College of Engineering** — JAN. 2024
Selected as 1 of N PhD students at Carnegie Mellon University College of Engineering

**Apple Scholars in AI/ML Nomination** — SEP. 2022
Nominated as 1 of 3 PhD students at Carnegie Mellon University for Apple Scholars in AI/ML.

**CMLH Fellowship** — JUNE. 2022
Full academic expenditure for only few CMU Ph.D students studying *ML in Digital Health*

**ATK-Nick G. Vlahakis Fellowship** — JAN. 2021
10,000 USD for only 2 CMU College of Engineering Master's students

**The Korean Government Scholarship Program for Study Overseas** — AUG. 2020
80,000 USD for 5 Korean students studying abroad in the field of AI/ML

**Three Minutes Thesis Competition** — AUG. 2020
Selected as a student competition candidate in 2020 Annual Meeting of American Society of Biomechanics

**Minister prize,** Korean Ministry of Science and ICT — JUL. 2019
1st prize among 34 teams at 2019 Korean AI Grand Challenge

**Best Presenting Paper Award,** Korean Society of Computational Fluids Engineering — OCT. 2018
1 of 5 selected at 2018 Annual Meeting of Korean Society of Computational Fluids Engineering

**Excellence Award,** Dean of Engineering College, Seoul National University — DEC. 2017
3rd prize in X-Corps Competition

**Special Award,** Korean Society of Computational Fluids Engineering — NOV. 2017
3rd prize at EDISON competition

**Academic Excellent Scholarship** , Seoul National University — JUL. 2017

**The National Scholarship for Science and Engineering** , Korean Student Aid Foundation JUL. 2016

## PATENTS AND COPYRIGHTS

W. Seok, **S. Shin**, H. Yeo, S. H. Rhee. "SNUFOAM-Computational Analysis Solver for Vertical Axis Turbine," Korean Copyright Commision, April 2019, Korean Copyright

S. H. Ahn, **S. Shin**, Y. Park, J. Y. Song, M. Choi. "Controllable Pitch Propeller Using Shape Memory Alloy," Korean Intellectual Property Office, December 2017, Korean Patent

## SEMINARS AND TALKS

WHAM: World-grounded Humans with Accurate 3D Motion, **Shirley Ryan Ability Lab** FEB. 2024

Fast 3-D Human Motion Tracking with Noisy Videos and IMUs, **Meta Reality Lab** JAN. 2023

Machine learning in Digital Health, **Yonsei University** JUNE. 2022

AI in Biomechanics, **Konkuk University** MAY. 2021

## GRADUATE COURSEWORKS

| | | |
|---|---|---|
| 16-745 | Optimal Control and Reinforcement Learning | SPRING 2023 |
| 16-889 | Learning for 3D Vision | SPRING 2022 |
| 11-777 | Multimodal Machine Learning | SPRING 2022 |
| 24-771 | Linear System | FALL 2021 |
| 16-726 | Learning-based Image Synthesis | SPRING 2021 |
| 16-811 | Mathematical Fundamentals for Robotics | FALL 2020 |
| 24-663 | Biomechanics of Human Movement | SPRING 2020 |
| 24-785 | Engineering Optimization | SPRING 2020 |
| 24-787 | Machine Learning and Artificial Intelligence for Engineers | FALL 2019 |
| 24-780 | Engineering Computation | FALL 2019 |

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